# **REAL TIME DANGER ZONE ALERT SYSTEM**

A project submitted to

### ST. MARY'S COLLEGE (Autonomous), THOOTHUKUDI

Affiliated to

### MANONMANIAM SUNDARANAR UNIVERSITY,

### TIRUNELVELI

In partial fulfillment of the award of the degree of

### MASTER OF SCIENCE IN COMPUTER SCIENCE

Submitted by

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# Reg.No:19SPCS01

Under the Supervision and Guidance of

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# PG DEPARTMENT OF COMPUTER SCIENCE (SSC)

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APRIL - 2021

#### CERTIFICATE

Thus is to certify that this project work entitled "REAL TIME DANGER ZONE ALERT SYSTEM" is submitted to St. Mary = College (Autonomous). Thoothukudi affiliated to Manonmaniam Sundaranar University, Tirunelveli, in partial fulfidiment for the award of the degree of Master of Science in Computer Science for the work done during the year 2020-2021 by ISHARIN.K (Reg.No: 19SPC 801)

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1. Finite

Signature of the Examiner

# DECLARATION

I do here by declare that, the project entitledas "REAL TIME DANGER ZONE ALERT SYSTEM" submitted for the degree of Master of Science in Computer Science is my original work carried out under the guidance of Dr. A. Vithya Vijayalakshmi, MCA., M.Phil., Ph.D., Assistant Professor, PG Department of Computer Science (SSC), St. Mary's College(Autonomous), Thoothukudi.

Station: Thoothukudi

Signature of the student

Date:

# ACKNOWLEDGEMENT

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Isharin.K

### ABSTRACT

The danger zone monitoring method involves capturing danger zone pictures of a danger zone. The danger zone pictures are conveyed to a rail vehicle that is located in a predetermined distance from the danger zone. The pictures of the danger zone are shown in a cab of the rail vehicle. A position of the rail vehicle is determined. A radio signal is sent for coding the rail vehicle position when required. Independent claims are included for the following: a rail vehicle with a radio communication device; and a railroad overpass monitoring device. The invention relates to a method for monitoring a danger area a railway system, in particular one between two road sections lying danger zone of a railway crossing. According to one second aspect, the invention relates to a rail vehicle with a Radio communication device, an image display device and an electrical control. According to one In another aspect, the invention relates to a level crossing monitoring system with a camera arranged to capture danger area images a railroad crossing, and a radio communication device. The Invention solves the problem by a method of monitoring a danger zone of a railway system, in particular one between two Road sections lying danger zone of a railroad crossing, with the steps of (a) detecting hazard area images of the danger area and (b) transmitting the hazard area images to at least a rail vehicle that is at a predetermined distance from located at the railroad crossing.

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## INTRODUCTION

According to one second aspect, the invention solves the problem by generic rail vehicle in which the electrical control is set up to perform a method according to the invention. The invention solves the problem also by a generic Level crossing monitoring system at which the radio communication device is set up to carry out an inventive Process. The invention is not limited to danger areas of level crossings. So it is possible in principle, even at other locations where there is an increased likelihood that obstacles are on the rails to pick up hazard area images and transmit them to the rail vehicle. In principle, it is even possible to record dangerous area images from a complete railway installation, for example a track section, and to transmit them to the at least one rail vehicle. In particular, it is possible It is necessary to transmit precisely the danger zone images to the rail vehicle, which lie essentially within a braking distance of the rail vehicle. The braking distance is the distance within which the rail vehicle can come to a halt during emergency braking. In this way, the train driver of the rail vehicle can always brake in time if he detects an obstacle on the track. in the Within the scope of the present description, hazard area images are used understood in particular with a camera recorded digitized images. These may be color images or black and white images act. It is also possible, for example infrared images or synthetically generated from infrared images and other images Take pictures or transmit to the rail vehicle.

The danger area images are preferably continuous and in taken a sufficiently high succession of frames, so that the platoon leader The rail vehicle always has a comprehensive picture of the situation in the danger zone. To do this the danger area images of the danger area are shown, the rail vehicle will pass next. The invention is not limited to danger areas of level crossings. So it is possible in principle, even at other locations where there is an increased likelihood that obstacles are on the rails to pick up hazard area images and transmit them to the rail vehicle. In principle, it is even possible to record dangerous area images from a complete railway installation, for example a track section, and to transmit them to the at least one rail vehicle. In particular, it is possible It is necessary to transmit precisely the danger zone images to the rail vehicle, which lie essentially within a braking distance of the rail vehicle. The braking distance is the distance within which the rail vehicle can come to a halt during emergency braking. In this way, the train driver of the rail vehicle can always brake in time if he detects an obstacle on the track. In the Within the scope of the present description, hazard area images are used understood in particular with a camera recorded digitized images. These may be color images or black and white images act. It is also possible, for example infrared images or synthetically generated from infrared images and other images Take pictures or transmit to the rail vehicle. The danger area images are preferably continuous and in taken a sufficiently high succession of frames, so that the platoon leader The rail vehicle always has a comprehensive picture of the situation in the danger zone. For example, the frame rate is at over an image per second.

To avoid abuse the danger area images are advantageously encrypted and / or compressed.Prefers become the danger area pictures in a cab of the rail vehicle. This can be done for example on one Screen or by projection onto an inside of a windshield respectively. The presentation is preferably automated. To do this the danger area images of the danger area are shown, the rail vehicle will pass next. One Method according to the invention preferably comprises the steps of determining a rail vehicle position of Rail vehicle, optionally transmitting a radio signal, which encodes the rail vehicle position and a transmission the danger area images only to those rail vehicles, the are at the predetermined distance from the railroad crossing. For example, it can be provided that the hazard area images are provided with an identifier indicating the geographical position indicate the danger area. In the rail vehicle are all incoming Radio signals encoding hazard area images are then examined, whether the rail vehicle the danger area within a given Time will happen. This is done in an electrical control stored route of the rail vehicle by means of a digital Map aligned with the location of that danger area, from which the danger area images originate. Hazard area pictures of such danger areas, which are not within the specified Time to be passed by the rail vehicle are not shown.

# SYSTEM SPECIFICATION

# HARDWARE REQUIREMENT:

- Processor Pentium –IV
- Speed 1.1 GHz
- ✤ RAM 512 MB (min)
- ✤ Hard Disk 40 GB
- Floppy Drive 1.44 MB
- Key Board Standard Windows Keyboard
- ✤ Mouse Two or Three Button Mouse
- Monitor SVGA
- Camera Web Camera

### SOFTWARE REQUIREMENTS:

- ✤ Operating System : Windows XP or Win10
- ✤ Document : MS-Office 2007

#### SOFTWARE DESCRIPTION

#### MATLAB

MATLAB stands for matrix laboratory. MATLAB was originally written to provide easy access to matrix software. It is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation.MATLAB is an interactive system whose basic data element is an array that does not require dimensioning. The MATLAB system consists of five main parts,

#### The MATLAB language

This is a high-level matrix/array language with control flow statements, functions, data structures, input/output, and object-oriented programming features. It allows both "programming in the small" to rapidly create quick and dirty throw-away programs, and "programming in the large" to create complete large and complex application programs.

#### The MATLAB working environment

This is the set of tools and facilities that you work with as the MATLAB user or programmer. It includes facilities for managing the variables in your workspace and importing and exporting data. It also includes tools for developing, managing, debugging, and profiling M-files, MATLAB's applications.

#### **Handle Graphics**

This is the MATLAB graphics system. It includes high-level commands for twodimensional and three-dimensional data visualization, image processing, animation, and presentation graphics. It also includes low-level commands that allow you to fully customize the appearance of graphics as well as to build complete Graphical User Interfaces on your MATLAB applications.

#### The MATLAB mathematical function library

This is a vast collection of computational algorithms ranging from elementary functions like sum, sine, cosine, and complex arithmetic, to more sophisticated functions like matrix inverse, matrix eigenvalues, Bessel functions, and fast Fourier transforms.

#### The MATLAB Application Program Interface (API)

This is a library that allows you to write C and FORTRAN programs that interact with MATLAB. It include facilities for calling routines from MATLAB (dynamic linking), calling MATLAB as a computational engine, and for reading and writing MAT-files.

#### **Typical Uses of MATLAB**

- Algorithm development
- Modeling, simulation, and prototyping
- Data analysis, exploration, and visualization.
- Math and computation
- Scientific and engineering graphics
- Application development, including graphical user interface building
- Matrix computations
- Graphics

### **MATLAB for Image Processing**

Image processing is a method to perform some operations on an image, in order to get an enhanced image or to extract some useful information from it. It is a type of signal processing in which input is an image and output may be image or characteristics/features associated with that image.MATLAB stores most images as two Dimensional arrays i.e., matrices in which each element of the matrix corresponds to a single pixel in the displayed image.Some image arrays have more dimensions to represent colour information or an image sequence. Image Processing Toolbox in MATLAB provides us a comprehensive set of reference-standard algorithms and workflow apps for image processing, analysing, visualization, and algorithm development. We can also perform image segmentation, image enhancement, noise reduction, geometric transformations, image registration, and 3D image processing.

# **Advantages of MATLAB**

- Ease of use
- Platform independence
- Predefined functions

# **PROJECT DESCRIPTION**

This work relates to a method for monitoring a danger area a railway system, in particular one between two road sections lying danger zone of a railway crossing. According to one second aspect, the invention relates to a rail vehicle with a Radio communication device, an image display device and an electrical control. According to one in another aspect, the invention relates to a level crossing monitoring system with a camera arranged to capture danger area images a railroad crossing, and a radio communication device.

The Invention solves the problem by a method of monitoring a danger zone of a railway system, in particular one between two Road sections lying danger zone of a railroad crossing, with the steps of (a) detecting hazard area images of the danger area and (b) transmitting the hazard area images to at least a rail vehicle that is at a predetermined distance from located at the railroad crossing. The braking distance is the distance within which the rail vehicle can come to a halt during emergency braking. In this way, the train driver of the rail vehicle can always brake in time if he detects an obstacle on the track. in the Within the scope of the present description, hazard area images are used understood in particular with a camera recorded digitized images. These may be colour images or black and white images act. The rail vehicle always has a comprehensive picture of the situation in the danger zone.

In principle, it is even possible to record dangerous area images from a complete railway installation, for example a track section, and to transmit them to the at least one rail vehicle. In particular, it is possible It is necessary to transmit precisely the danger zone images to the rail vehicle, which lie essentially within a braking distance of the rail vehicle. The braking distance is the distance within which the rail vehicle can come to a halt during emergency braking. In this way, the train driver of the rail vehicle can always brake in time if he detects an obstacle on the track. In the Within the scope of the present description, hazard area images are used understood in particular with a camera recorded digitized images.

# **MODULE DESCRIPTION**

#### **METHODOLOGY**

#### Modules

- > Estimate optical flow
- Segment Moving Object
- ➢ Kalman Filter
- > Danger Zone Alert

### **Estimation Optical flow**

Optical flow is the motion of objects between consecutive frames of sequence, caused by the relative movement between the object and camera. he problem of optical flow may be expressed as:

I(x, y, t)I(x + dx, y + dy, t + dt)
$$(x, y)$$
 $(x + dx, y + dy)$  $\bigcirc$  $\bigcirc$ displacement = (dx, dy) $\bigcirc$ time = ttime = t + dt

, we can express the image intensity (I)(I) as a function of space (x,y)(x,y) and time (t)(t). In other words, if we take the first image I(x,y,t)I(x,y,t) and move its pixels by (dx,dy)(dx,dy) over tt time, we obtain the new image I(x+dx,y+dy,t+dt)I(x+dx,y+dy,t+dt).

First, we assume that pixel intensities of an object are constant between consecutive frames.

$$I(x,y,t) = I(x+\delta x,y+\delta y,t+\delta t)$$

Constant intensity assumption for optical flow

Second, we take the Taylor Series Approximation of the RHS and remove common terms.

$$I(x + \delta x, y + \delta y, t + \delta t) = I(x, y, t) + \frac{\partial I}{\partial x}\delta x + \frac{\partial I}{\partial y}\delta y + \frac{\partial I}{\partial t}\delta t + \dots$$
$$\Rightarrow \frac{\partial I}{\partial x}\delta x + \frac{\partial I}{\partial y}\delta y + \frac{\partial I}{\partial t}\delta t = 0$$

Taylor Series Approximation of pixel intensity

Third, we divide by dtdt to derive the optical flow equation:

$$\frac{\partial I}{\partial x}u + \frac{\partial I}{\partial y}v + \frac{\partial I}{\partial t} = 0$$

Optical flow equation

where u=dx/dtu=dx/dt and v=dy/dtv=dy/dt.

dI/dx,dI/dydI/dx,dI/dy, and dI/dtdI/dt are the image gradients along the horizontal axis, the vertical axis, and time. Hence, we conclude with the problem of optical flow, that is, solving u(dx/dt)u(dx/dt) and v(dy/dt)v(dy/dt) to determine movement over time. You may notice that we cannot directly solve the optical flow equation for uu and vv since there is only one equation for two unknown variables. We will implement some methods such as the Lucas-Kanade method to address this issue.

#### **Segment Moving Object**

The segmentation of moving objects in image sequence can be formulated as a background subtraction problem—the separation of objects from the background in each image frame. The background scene is learned and modeled. A pixelwise process is employed to classify each pixel as an object or background based on its similarity with the background model. The segmentation is challenging due to the occurrence of dynamic elements such as illumination change and background motions. We propose a framework for object segmentation with a novel feature for background representation and new mechanisms for updating the background model. A ternary pattern is employed to characterize the local texture. The pattern and photometric features are used for background modeling. The

classification of pixel is performed based on the perceptual similarity between the current pixel and the background model. The segmented object is refined by taking into account the spatial consistency of the image feature. For the background model update, we propose two mechanisms that are able to adapt to abrupt background change and also merge new background elements into the model. We compare our framework with various background subtraction algorithms on video datasets.

#### Kalman Filter

Kalman Filter works on prediction-correction model used for linear and time-variant or timeinvariant systems. Prediction model involves the actual system and the process noise. The update model involves updating the predicated or the estimated value with the observation noise. Kalman gain is calculated based on RLS algorithm in order to reach the optimal value within less amount of time.

#### **Danger Zone Alert**

Monitoring a danger zone of a railway system, in particular one between two Road sections lying danger zone of a railroad crossing, with the steps of (a) detecting hazard area images of the danger area and (b) transmitting the hazard area images to at least a rail vehicle that is at a predetermined distance from located at the railroad crossing.

### SYSTEM STUDY

#### **EXISTING SYSTEM**

Rear End Collision and Accident Alert System Using Video Processing -Joseph, A. B. (2018)

The population of the world is increasing and with this the number of vehicles on road is also increasing exponentially. Every household has at least 2 or 3 vehicles. This automatically leads to the rise the number of on-road accidents, in spite of government laws being enforced for the safety of the riders. This is because traffic rules are not being followed properly and many a times accidents occur with no fault of one of the driver. This is due to the fact that most accidents tend to happen when there is collision at the rear end. Hence there is a need of technology in vehicles which detects probable accidents by taking into account various factors around the vehicle and sending appropriate alerts. Keeping all this in mind, this paper proposes a system that uses image processing to detect the vehicles approaching from the rear end and alert the driver accordingly. Image processing is the analysis and manipulation of a digitized image, especially in order to improve its quality. We propose an algorithm which can detect vehicles from images with varying levels of brightness. If implemented in ITS (Intelligent transport system), this algorithm can revolutionize accident alert and detection systems and make them more effective.

### **PROPOSED SYSTEM**

This work relates to a method for monitoring a danger area a railway system,

The Invention solves the problem by a method of monitoring a danger zone of a railway

system, in particular one between two Road sections lying danger zone of a railroad

crossing, with the steps of

(a) detecting hazard area images of the danger area and

(b) transmitting the hazard area images to at least a rail vehicle that is at a predetermined distance from located at the railroad crossing.

The braking distance is the distance within which the rail vehicle can come to a halt during emergency braking.

# SYSTEM ANALYSIS

#### **FEASIBILITY STUDY:**

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ECONOMICAL FEASIBILITY
- ♦ TECHNICAL FEASIBILITY
- SOCIAL FEASIBILITY

#### **ECONOMICAL FEASIBILITY:**

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

#### **TECHNICAL FEASIBILITY:**

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

#### SOCIAL FEASIBILITY:

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

### SYSTEM TESTING

Testing is a process of checking whether the developed system is working according to the original objectives and requirements. It is a set of activities that can be planned in advance and conducted systematically. Testing is vital to the success of the system. System testing makes a logical assumption that if all the parts of the system are correct, the global will be successfully achieved. In adequate testing if not testing leads to errors that may not appear even many months. This creates two problems, the time lag between the cause and the appearance of the problem and the effect of the system errors on the files and records within the system. A small system error can conceivably explode into a much larger Problem. Effective testing early in the purpose translates directly into long term cost savings from a reduced number of errors. Another reason for system testing is its utility, as a user-oriented vehicle before implementation. The best programs are worthless if it produces the correct outputs.

#### **UNIT TESTING:**

A program represents the logical elements of a system. For a program to run satisfactorily, it must compile and test data correctly and tie in properly with other programs. Achieving an error free program is the responsibility of the programmer. Program testing checks for two types of errors: syntax and logical. Syntax error is a program statement that violates one or more rules of the language in which it is written. An improperly defined field dimension or omitted keywords are common syntax errors. These errors are shown through error message generated by the computer. For Logic errors the programmer must examine the output carefully.

### **UNIT TESTING:**

Description	Expected result	
Test for application	All the properties of the windows are to be properly aligned and	
window properties.	displayed.	
Test for mouse	All the mouse operations like click, drag, etc. must perform the	
operations.	necessary operations without any exceptions.	

### **FUNCTIONAL TESTING:**

Functional testing of an application is used to prove the application delivers correct results, using enough inputs to give an adequate level of confidence that will work correctly for all sets of inputs. The functional testing will need to prove that the application works for each client type and that personalization function work correctly. When a program is tested, the actual output is compared with the expected output. When there is a discrepancy the sequence of instructions must be traced to determine the problem. The process is facilitated by breaking the program into self-contained portions, each of which can be checked at certain key points. The idea is to compare program values against desk-calculated values to isolate the problems.

Description	Expected result
Test for all modules.	All peers should communicate in the group.
Test for various peer in a distributed network framework as it display all users available in the group.	The result after execution should give the accurate result.

#### **NON-FUNCTIONAL TESTING:**

The Non Functional software testing encompasses a rich spectrum of testing strategies, describing the expected results for every test case. It uses symbolic analysis techniques. This testing used to check that an application will work in the operational environment. Non-functional testing includes:

- Load testing
- Performance testing
- Reliability testing
- Security testing

### LOAD TESTING:

An important tool for implementing system tests is a Load generator. A Load generator is essential for testing quality requirements such as performance and stress. A load can be a real load, that is, the system can be put under test to real usage by having actual telephone users connected to it. They will generate test input data for system test.

Description	Expected result
It is necessary to ascertain that the	
application behaves correctly under	Should designate another active node as a Server.
loads when 'Server busy' response is	
received.	

### **PERFORMANCE TESTING:**

Performance tests are utilized in order to determine the widely defined performance of the software system such as execution time associated with various parts of the code, response time and device utilization. The intent of this testing is to identify weak points of the software system and quantify its shortcomings.

Description	Expected result
This is required to assure that an application perforce adequately, having the capability to handle many peers, delivering its results in expected time and using an acceptable level of resource and it is an aspect of operational management.	Should handle large input values, and produce accurate result in a expected time.

#### **RELIABILITY TESTING:**

The software reliability is the ability of a system or component to perform its required functions under stated conditions for a specified period of time. Reliability can be expressed as the ability of the software to reveal defects under testing conditions, according to the specified requirements. It the portability that a software system will operate without failure under given conditions for a given time interval and it focuses on the behaviour of the software element. It forms a part of the software quality control team.

Description	Expected result
This is to check that the server is rugged and reliable and can handle the failure of any of the components involved in provide the application.	In case of failure of the server an alternate server should take over the job.

### **SECURITY TESTING:**

Security testing evaluates system characteristics that relate to the availability, integrity and confidentiality of the system data and services. Users/Clients should be encouraged to make sure their security needs are very clearly known at requirements time, so that the security issues can be addressed by the designers and testers.

Description	Expected result
Checking that the user identification is	In case failure it should not be connected in the
authenticated.	framework.
Check whether group keys in a tree are	The peers should know group key in the same
shared by all peers.	group.

# SYSTEM DESIGN

# ARCHITECHTURE



### CODING

```
clc;
clear all;
close all;
warning off;
% Object for reading video file.
%convertvideo('vv.avi');
filename = 'video11.avi';
hVidReader = vision.VideoFileReader(filename, 'ImageColorSpace', 'RGB',...
'VideoOutputDataType', 'single');
% 'Method', 'Lucas-Kanade',
hOpticalFlow = vision.OpticalFlow('Method', 'Lucas-Kanade', 'OutputValue',
'Horizontal and vertical components in complex
form', 'DiscardIllConditionedEstimates', false,...
'ReferenceFrameDelay', 3);
hMean1 = vision.Mean;
hMean2 = vision.Mean('RunningMean', true);
hMedianFilt = vision.MedianFilter;
hclose = vision.MorphologicalClose('Neighborhood', strel('line',5,45));
hblob = vision.BlobAnalysis(...
'CentroidOutputPort', false, 'AreaOutputPort', true, ...
'BoundingBoxOutputPort', true, 'OutputDataType', 'double', ...
'MinimumBlobArea', 250, 'MaximumBlobArea', 3600, 'MaximumCount', 80);
herode = vision.MorphologicalErode('Neighborhood', strel('square',2));
shapeInserter = vision.ShapeInserter;
hshapeins1 = vision.ShapeInserter('BorderColor', 'Custom', ...
'CustomBorderColor', [0 1 0]);
hshapeins2 = vision.ShapeInserter( 'Shape', 'Lines', ...
'BorderColor', 'Custom', ...
'CustomBorderColor', [255 255 0]);
htextins = vision.TextInserter('Text', '%4d', 'Location', [1 1], ...
'Color', [1 1 1], 'FontSize', 12);
sz = get(0, 'ScreenSize');
pos = [20 sz(4) - 300 300 300];
hVideo1 = vision.VideoPlayer('Name','Original Video','Position',pos);
pos(1) = pos(1) + 300; % move the next viewer to the right
hVideo2 = vision.VideoPlayer('Name', 'Motion Vector', 'Position', pos);
pos(1) = pos(1) + 300;
hVideo3 = vision.VideoPlayer('Name', 'Thresholded Video', 'Position', pos);
pos(1) = pos(1) + 300;
hVideo4 = vision.VideoPlayer('Name', 'kalman filter
tracking', 'Position', pos);
poss = [20 sz(4) - 700 300 300];
poss(1) = poss(1) + 300;
hVideo5 = vision.VideoPlayer('Name', 'Danger Zone', 'Position', poss);
poss(1) = poss(1) + 300;
hVideo6 = vision.VideoPlayer('Name', 'Harris Point', 'Position', poss);
% Initialize variables used in plotting motion vectors.
lineRow = 22;
firstTime = true;
motionVecGain = 20;
borderOffset = 5;
decimFactorRow = 5;
```

```
decimFactorCol = 5;
while ~isDone(hVidReader) % Stop when end of file is reached
frame = step(hVidReader); % Read input video frame
grayFrame = rgb2gray(frame);
ofVectors = step(hOpticalFlow, grayFrame); % Estimate optical flow
y1 = ofVectors .* conj(ofVectors);
vel th = 0.5 * step(hMean2, step(hMean1, y1));
segmentedObjects = step(hMedianFilt, y1 >= vel_th);
segmentedObjects = step(hclose, step(herode, segmentedObjects));
points = detectHarrisFeatures(segmentedObjects);
2
        result2 = step(frame, points);
2
        step(hVideo6, result2);
% Estimate the area and bounding box of the blobs.
[area, bbox] = step(hblob, segmentedObjects);
Idx = bbox(:,1) > lineRow;
ratio = zeros(length(Idx), 1);
ratio(Idx) = single(area(Idx,1))./single(bbox(Idx,3).*bbox(Idx,4));
ratiob = ratio > 0.1;
count = int32(sum(ratiob));
bbox(~ratiob, :) = int32(-1);
centroid=area;
% Draw bounding boxes around the tracked objects.
[s,s1]=size(bbox);
kalman = [];
for idx = 1: length(bbox)
location = bbox(idx);
if isempty(kalman)
if ~isempty(location)
stateModel = [1 1; 0 1];
measurementModel = [1 0];
kalman = vision.KalmanFilter(stateModel, measurementModel, ...
'ProcessNoise', 1e-4, 'MeasurementNoise', 4);
end
else
trackedLocation = predict(kalman);
if ~isempty(location)
d = distance(kalman, location);
trackedLocation = correct(kalman, location);
end
end
end
y2=trackedLocation;
y2 = step(hshapeins1, frame, bbox);
for i=1:s
centroid = uint16(centroid); % Convert the centroids into Integer for
further steps
centX = centroid(i);
y2(22:23,:,:) = 1;
y2(1:15,1:30,:) = 0;
[n,m]=size(frame);
% danger=centX/10;
line=[620 470 15 10];
bx=bbox(i,:);
```

```
d1=bx(:,1,:,:);
d2=bx(:,2,:,:);
dis=sqrt(double((620-d1).^2+(470-d2).^2));
              dis=d-450;
dis
if dis>800
danger=0;
else
danger=100-((dis/800) *100);
8
              elseif dis>0&&dis<9
00
                  danger=dis+90;
00
              elseif dis<50
8
                  danger=dis+30;
end
%danger=d*80;
J = step(shapeInserter, frame, line);
result = step(htextins, y2, count);
              danger
8
00
result1=insertObjectAnnotation(J, 'rectangle', bbox(i,:), danger);
2
              step(hVideo5, result1);
if danger>75
w= tts('Attention please',[],-4,44100); % you are in dangerous position in
a track, pleasemove away soon from the track', [], -4, 44100);
sound(w,54100);
end
end
% Generate coordinates for plotting motion vectors.
if firstTime
[R C] = size(ofVectors);
                                    % Height and width in pixels
RV = borderOffset:decimFactorRow:(R-borderOffset);
CV = borderOffset:decimFactorCol:(C-borderOffset);
[Y X] = meshgrid(CV,RV);
firstTime = false;
end
% Calculate and draw the motion vectors.
tmp = ofVectors(RV,CV) .* motionVecGain;
lines = [Y(:), X(:), Y(:) + real(tmp(:)), X(:) + imag(tmp(:))];
motionVectors = step(hshapeins2, frame, lines);
% Display the results
step(hVideo1, frame);
                                  % Original video
                               % Video with motion vectors
step(hVideo2, motionVectors);
step(hVideo3, segmentedObjects); % Thresholded video
                                 % Video with bounding boxes
step(hVideo4, result);
8
      step(hVideo6, points);
end
release(hVidReader);
```

```
% delete(filename);
```

# **SCREENSHOTS**

# RESULT



Original input video



Threshold Video



Kalman Filter Tracking



**Motion Vector** 

# CONCLUSION

In the level crossing security unit 30. In addition, an image data evaluation algorithm runs, which then passes through the antenna 36 sends a warning signal if an obstacle in the danger zone 18 is detected. The image evaluation algorithm may be arranged to provide a probability p with which an obstacle exists in the danger area. If this probability exceeds a predetermined threshold value p threshold, then it can be provided that the level crossing security unit 30 emits an automatic brake signal that encodes its position and the request for braking. All rail vehicles which pass the railroad crossing within a given time 14 would then automatically and without action by the respective platoon drivers would be slowed down. At the same time the rail vehicle sends 38 stable its position over radio signals. Only if the level crossing security unit 30 of all of them at a predetermined distance rail vehicles receives their position data and all rail vehicles exceed a minimum distance, it opens the half barriers 22, Alternatively or additionally, all rail vehicles also transmit their speed and the level crossing security unit 30 is designed to already open the half-barriers, if no rail vehicle on the basis of a permissible maximum speed from the last received position within the predetermined time threshold will happen.

# FUTURE ENHANCEMENT

#### App for notification of Alarms

An App is being developed which shall give notification as well as scope for monitoring.

For example, a maintainer receives a notification then there are following possibilities:

- He may be away from the station, or
- He might not have proper tools or material at the time of failure message, or
- He may be on leave, or
- Any other reason for not able to attend the failure

In that case, the message can be transferred to the other persons. Following are the features of notification app:

- (i) Notification of selected alarms to selected personnel.
   Generation of reports which brings out system deficiencies in failure rectification

   to improve the process of failure rectification.
  - Delay in notification

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### SMART HOSPITAL MANAGEMENT SYSTEM

A project submitted to ST. MARY'S COLLEGE (Autonomous), Thoothukudi.

# Affiliated to MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

# in partial fulfillment of the award of the degree of **MASTER OF SCIENCE IN COMPUTER SCIENCE**

Submitted by Jenitta. J Regno: 19SPCS02

Under the Supervision and Guidance of Ms. C. NayanthraMascarenhas M.Sc., M.Phil., SET.,



PG DEPARTMENT OF COMPUTER SCIENCE (SSC) St. Mary's College (Autonomous), Thoothukudi– 628001 April - 2021
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	System" is submitted to St. Marc's College 1	Autonomous), Thoothukudi affiliated to
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	by Jenitta, J (Regno: 198PC802).	
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### DECLARATION

I do hereby declare that the project entitled "Smart Hospital Management System" Submitted for the degree of Master of Science in Computer Science in my original work carriedout under the guidance of Ms. C. Nayanthra Mascarenhas M.Sc., M.Phil., SET.,Assistant Professor and SSC CoordinatorPG Department of Computer Science (SSC), St. Mary's College (Autonomous), Thoothukudi.

Station: Thoothukudi Date:

Signature of the Student

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I thank my family members especially my parents for their encouragement and support both morally and financially which helped me to finish the project successfully.

#### ABSTRACT

The purpose of the project entitled as "SMART HOSPITAL MANAGEMENT SYSTEM" is to computerize the Front Office Management of Hospital to develop software which is user friendly simple, fast, and cost – effective. It deals with the collection of patient's information, diagnosis details, etc. Traditionally, it was done manually. The main function of the system is register and store patient details and doctor details and retrieve these details as and when required, and also to manipulate these details meaningfully System input contains patient details, diagnosis details, while system output is to get these details on to the screen. The Hospital Management System can be entered using a username and password. It is accessible either by an administrator or receptionist. Only they can add data into the database. The data can be retrieved easily. The data are well protected for personal use and makes the data processing very fast. Hospital Management system includes registration of patients, storing their details into the system, and also computerized billing in the pharmacy. Our software has the facility to give a unique id for every patient and stores the details of every patient and the staff automatically. It includes a search facility to know the current status of each room. User can search availability of a doctor and the details of a patient using the id.

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## **INTRODUCTION**

Smart Hospital Management Systemrefers to the use of computer software and hardware technology, network communication technology and other modern means, the flow of people in the hospital and its various departments, Comprehensive management of logistics and financial resources, collecting, storing, processing, extracting, transmitting, summarizing and processing all kinds of data generated in various stages of medical activities to generate various information, thus providing comprehensive and automated management for the overall operation of the hospital. Information systems may be for various hospital utility services. These may be connected with medical billing systems for payment of hospital medical bills. Hospital Management System. The main goal of the medical Hospital Management Systemis to support the hospital's administrative management and transaction processing business, reduce the labour intensity of transaction personnel, assist hospital management, and improve the hospital management system, medical Hospital Management Systemand hospital management activities directly related information system. The hospital his system is aimed at assisting decision-making with the aim of improving the efficiency and level of hospital management and medical work.

## SYSTEM SPECIFICATION

In the system specification, the latest hardware and software specifications must be proposed to enable faster retrieval of the information. The System Specifications involves two concepts. They are as follows

- Hardware Requirements
- Software Requirements

The detailed Hardware and Software Specifications are given below

# HARDWARE SPECIFICATIONS

- Processor : AMD PRO A4-3350B APU with Radeon R4 Graphics 200GHz
- RAM : 4GB
- Hardware: 500MB (Minimum)

# SOFTWARE SPECIFICATIONS

- Operating System: Windows 7
- Front End: Html, Css, java script
- Server Side Script: Php
- Back End: MySQL

### **PROJECT DESCRIPTION**

The purpose of the project entitled as "SMART HOSPITAL MANAGEMENT SYSTEM" is to computerize the Front Office Management of Hospital to develop software which is user friendly simple, fast, and cost – effective. It deals with the collection of patient's information, diagnosis details, etc. Traditionally, it was done manually. The main function of the system is register and store patient details and doctor details and retrieve these details as and when required, and also to manipulate these details meaningfully System input contains patient details, diagnosis details, while system output is to get these details on to the screen. The Hospital Management System can be entered using a username and password. It is accessible either by an administrator or receptionist. Only they can add data into the database. The data can be retrieved easily. The data are well protected for personal use and makes the data processing Hospital Management System provides the benefits of streamlined operations, very fast. enhanced administration & control, superior patient care, strict cost control and improved profitability. It is powerful, flexible, and easy to use and is designed and developed to deliver real conceivable benefits to hospitals. More importantly it is backed by reliable and dependable support.

# **MODULE DESCRIPTION**

# **ADMIN MODULE**

## DASHBOARD

Dashboard provides a navigational overview of the Smart Hospital Management System.

## FRONT OFFICE

For all OPD appointment and reception/front office related activities. It has five tabs.

- Add Appointment
- Visitor Book
- Phone Call Log
- Postal
- Complain
- Add Appointment

Appointment feature is for making Doctor Appointment. Receptionist or any permitted user can enter doctor appointment details here, also here can be Approved/Cancelled through online appointment.

• Visitor Book

Visitor book is for managing visitor's records coming in hospital.

• Phone Call Log

Phone Call Log is for managing incoming or outgoing call details.

• Postal:

**Receive** – Postal Receive is for managing postal inward documents.

**Dispatch** – Postal Dispatch is for managing postal outward documents.

• Complain

Complain is for managing any complain raise by any person.

## **OUT PATIENT**

OPD (Out Patient Department) module is for managing out patient who just come for doctor for their issue/disease checkup.

It has three tabs.

- Visits Visits tab has all details of patient visit.
- **Diagnosis** Here you can see patient all diagnosis details.
- **Timeline** Here you can see patient timeline or you can enter any note in timeline.

# **IN PATIENT**

IPD (In Patient Department) module is for managing those patient who admit in hospital for their issues/disease treatment.

It has eight tabs.

- **Consultant Register** Consultant Register tab has all details about instructions given by doctors day to day for this patient's treatment.
- Diagnosis Here you can see patient all diagnosis details.
- **Timeline** Here you can see patient timeline or you can enter any note in timeline.
- **Prescription** Here doctor can prescribe medicine to the patient.
- Charges Here you can see all applied charges for patient day to day treatment.
- **Payment** Here you can see all payments done by patient.
- **Bill** Here you can see patient IPD Bill breakdown in Applied Charges, Payment done and Bill Summary with Total Charges, Total Payment Balance here if you want you can apply Discount, Other Charges and Tax while generating final bill.
- Discharged Patient Here you can see all details of IPD Discharge patient.

# PHARMACY

Pharmacy module is for managing medicines stock, selling and generating medicine bill.

• Generate Bill

Here admin can generate bill to the patient.

### • Medicines

Managing medicines click on Medicines button. You can see all medicine list with their name and available stock here.

# **BLOOD BANK**

For managing blood group available, blood stock, donor details and blood issue details.

## FINANCE

It has two tabs..

• Income

Here admin can maintain income details.

• Expenses

Here admin can maintain expense details.

## AMBULANCE

For managing ambulance vehicles and ambulance call details.

## **BIRTH AND DEATH RECORD**

For managing all details of newly born baby's birth and patients death in the hospital

### **HUMAN RESOURCE**

In Human Resource we will manage all activities of hospital staff.

• Staff Directory

Here you can search all active staff members. You can filter staff members by Role or search by any keyword. You can also see staff directory in two views Card View or List View.

• Staff Attendance

Here you can record staff attendance.

• Pay Roll

Here we will generate monthly salary of staff members.

• Leaves

Here you can apply for leave request or if you have permissions then you can approve other leave request.

## MESSAGING

It works like a notice board basically a messaging system for communication to patient and staff.

## **DOWNLOAD CENTER**

Download Center is for managing different documents which should be available for download to other staff members.

## **INVENTORY**

Inventory module is for managing different assets or items present in hospital. First we will add items then add item stocks then we will manage issue and return of items to different staff members.

### FRONT CMS :

Manage front website of Smart Hospital here by creating pages, menus, events, gallery.

# REPORTS

All the reports related to different modules can be found here.

- Transaction Report
- Appointment Report
- OPD Report
- IPD Report
- Discharged Patient
- Pharmacy Bill Report
- Blood Issue Report
- Blood Donor Report
- Income Report
- Income Group Report
- Expense Report
- Expense Group Report
- Ambulance Report
- Birth Report
- Death Report
- Payroll Month Report
- Payroll Report
- Staff Attendance Report
- User Log
- Patient Login Credential
- Email / SMS Log
- Inventory Stock Report
- Inventory Item Report
- Inventory Issue Report

#### SETUP

Setup module is for configuration settings and master entry forms for other modules to run whole Smart Hospital system properly.

## **USER MODULE**

It has six modules.

## • My Appointments

In my appointments, user can see and book their appointments.

## • Out Patient

Patient can see their OPD details like OPD Visits, Diagnosis, and Timeline.

## • In Patient

Patient can see their IPD details like Consultant Register, Diagnosis, Timeline, Charges, Payment, and Bill.

## • Pharmacy

Here patient can see purchased medicines details.

## • Ambulance

Here patient can see their booked ambulance details.

### Blood Bank

Here patient can see issue blood from blood bank details.

### • Notification

Here patient can see notification messages for different events.

### • Calendar

Here patient can see their public events created on hospital by other staff users.

### SYSTEM STUDY

## **Existing System**

The current manual system has a lot of paper work. To maintain the records of sale and service manually, is a Time-consuming task. With the increase in database, it will become a massive task to maintain the database. Requires large quantities of file cabinets, which are huge and require quite a bit of space in the office, which can be used for storing records of previous details. The retrieval of records of previously registered patients will be a tedious task. Lack of security for the records, anyone disarrange the records of your system. If someone want to check the details of the available doctors the previous system does not provide any necessary detail of this type.

Hospitals currently use a manual system for the management and maintenance of critical information. The current system requires numerous paper forms, with data stores spread throughout the hospital management infrastructure. Often information is incomplete or does not follow management standards. Forms are often lost in transit between departments requiring a comprehensive auditing process to ensure that no vital information is lost. Multiple copies of the same information exist in the hospital and may lead to inconsistencies in data in various data stores.

# Proposed System Appointment Management

For hospitals having their own site, appointment widgets will be integrated onto the site. Patients visiting the hospital's website can book online appointments with ease.

#### **Billing Management**

Integrated Billing with treatments, Lab and Radiology. Alerts will be sent on Discount Authorisation. Automatic due capture, Option to bill before and after consultation.

#### **Prescription Management**

Manage commonly and recently used medicines. Option to show medicines available in the pharmacy.SMS prescriptions to Patients.

### **Discharge Summary**

Template based Discharge Summary. ICD10 integration.Option to prevent discharge summary till IP bill is closed.

## **Pharmacy Management**

Comprehensive Pharmacy Management handles stock, Prescription Integration, Ward Request, Stock Management, Stock Moment and intelligent reports.

## **Master Information Systems**

Let's you access entire MIS data from your palm.

## Manage Multiple Locations

Any number of branches can be added and managed using a single account.

## **Benefits of Hospital Management System:**

We have so far clarified on the importance of HMS, it is your responsibility to pick out the right kind of HMS for your needs and purposes. Here we give more information on the benefits of various HMS and the impact it creates on hospital systems.

### Easy Patient data retrieval:

HMS makes it possible to access all the data related to a patient via a system by the means of a few simple clicks. Information like patient history, current illness, doctors involved, tests reports taken, billing information and many more can be made visible to the user. These data will help to connect the dots about the patient, like specific diagnosis, related treatment, and medication.

## The Electronic Medical Record (EMR) or Electronic Health Record (EHR):

This electronic-based medical record system can be viewed as a patient's health chart. It retrieves information based on the patient's name or medical record number or the physician's record number.

#### **Increased Data security**:

The patient data can be kept a hundred percent safe by using HMS in your hospital. It can be made accessible by only a limited amount of authorized personnel. With HMS, all the data is stored on a server or cloud and kept safe by just securing the login information safe.

#### **Improve Visibility and Transparency:**

Hospital Management System (HMS) improves the visibility and transparency in the complete management process and in all records.

#### **Streamline Accurate Reporting:**

It helps in streamlining the accurate reporting with the help of updated and accurate records.

#### **Improved Quality Control:**

Hospital Management System improves the quality control on the products and services of the hospital.

#### **Improved Management Visibility:**

It also improves the management visibility of hospital, all information, and data regarding the patient, doctor and medicine could be seen by any department easily.

#### **Ease to Access System Facilities:**

Hospital Management System makes it easy to get access to the management system facilities for the authorized users and keep it safe from unauthorized users.

#### **Cost Effective:**

HMS not only saves time in the hospital but also is cost-effective in decreasing the number of people working on the system of manual entry of data and paperwork. The implementation of His will decrease the human intervention into the system thereby avoiding human-caused errors.

#### SYSTEM ANALYSIS

This system overcomes the customer churn by using predictive analysis. Initially, with more data and lesser understanding of the system, the model was not so effective. This system overcome the challenges faced in the sales management system and meets the needs of Organizations that are not satisfied by existing applications in the field of Invoice management. System analysis shows the various sectors from which the organization generates revenue. While developing the model for predictive analytics, an optimum number of features had to be selected. The decision tree had to balance bias as a by-product of a very complex model with variance in results, by managing its depth. Analytics being performed on data also provide the organization with meaningful information about their products and knowledge on customer behavior. The products are be industry specific thus catering to the needs of the buyer.

#### FEASIBILITY STUDY:

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ✓ ECONOMICAL FEASIBILITY
- ✓ TECHNICAL FEASIBILITY
- ✓ SOCIAL FEASIBILITY

#### **ECONOMICAL FEASIBILITY:**

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

#### **TECHNICAL FEASIBILITY:**

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

#### SOCIAL FEASIBILITY:

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

# SYSTEM DESIGN

# **DATA FLOW DIAGRAM**

Data flow diagram is the graphical representation of a data movement processes and files used in support for an information system. Data flow is the movement of the origin to a specific destination.





#### SYSTEM TESTING

Testing is a process of checking whether the developed system is working according to the original objectives and requirements. It is a set of activities that can be planned in advance and conducted systematically. Testing is vital to the success of the system. System testing makes a logical assumption that if all the parts of the system are correct, the global will be successfully achieved. In adequate testing if not testing leads to errors that may not appear even many months. This creates two problems,the time lag between the cause and the appearance of the problem and the effect of the system errors on the files and records within the system. A small system error can conceivably explode into a much larger Problem. Effective testing early in the purpose translates directly into long term cost savings from a reduced number of errors. Another reason for system testing is its utility, as a user-oriented vehicle before implementation. The best programs are worthless if it produces the correct outputs.

#### **UNIT TESTING:**

A program represents the logical elements of a system. For a program to run satisfactorily, it must compile and test data correctly and tie in properly with other programs. Achieving an error free program is the responsibility of the programmer. Program testing checks for two types of errors: syntax and logical. Syntax error is a program statement that violates one or more rules of the language in which it is written. An improperly defined field dimension or omitted keywords are common syntax errors. These errors are shown through error message generated by the computer. For Logic errors the programmer must examine the output carefully.

#### **FUNCTIONAL TESTING:**

Functional testing of an application is used to prove the application delivers correct results, using enough inputs to give an adequate level of confidence that will work correctly for all sets of inputs. The functional testing will need to prove that the application works for each client type and that personalization function work correctly. When a program is tested, the actual output is compared with the expected output. When there is a discrepancy the sequence of instructions must be traced to determine the problem. The process is facilitated by breaking the program into self-contained portions, each of which can be checked at certain key points. The idea is to compare program values against desk-calculated values to isolate the problems.

#### **NON-FUNCTIONAL TESTING:**

The Non Functional software testing encompasses a rich spectrum of testing strategies, describing the expected results for every test case. It uses symbolic analysis techniques. This testing used to check that an application will work in the operational environment. Non-functional testing includes:

- ✓ Load testing
- ✓ Performance testing
- ✓ Usability testing
- ✓ Reliability testing
- ✓ Security testing

#### LOAD TESTING:

An important tool for implementing system tests is a Load generator. A Load generator is essential for testing quality requirements such as performance and stress. A load can be a real load, that is, the system can be put under test to real usage by having actual telephone users connected to it. They will generate test input data for system test.

#### **PERFORMANCE TESTING:**

Performance tests are utilized in order to determine the widely defined performance of the software system such as execution time associated with various parts of the code, response time and device utilization. The intent of this testing is to identify weak points of the software system and quantify its shortcomings.

#### **RELIABILITY TESTING:**

The software reliability is the ability of a system or component to perform its required functions under stated conditions for a specified period of time and it is being ensured in this testing. Reliability can be expressed as the ability of the software to reveal defects under testing conditions, according to the specified requirements. It the portability that a software system will operate without failure under given conditions for a given time interval and it focuses on the behaviour of the software element. It forms a part of the software quality control team.

#### **SECURITY TESTING:**

Security testing evaluates system characteristics that relate to the availability, integrity and confidentiality of the system data and services. Users/Clients should be encouraged to make sure their security needs are very clearly known at requirements time, so that the security issues can be addressed by the designers and testers.

#### WHITE BOX TESTING:

White box testing, sometimes called glass-box testing is a test case design method that uses the control structure of the procedural design to derive test cases. Using white box testing method, the software engineer can derive test cases. The White box testing focuses on the inner structure of the software structure to be tested.

#### **BLACK BOX TESTING:**

Black box testing, also called behavioural testing, focuses on the functional requirements of the software. That is, black testing enables the software engineer to derive sets of input conditions that will fully exercise all functional requirements for a program. Black box testing is not alternative to white box techniques. Rather it is a complementary approach that is likely to uncover a different class of errors than white box methods. Black box testing attempts to find errors which focuses on inputs, outputs, and principle function of a software module. The starting point of the black box testing is either a specification or code. The contents of the box are hidden and the stimulated software should produce the desired results.

# **TABLE DESIGNN**

# ADMIN

FIELD NAME	DATATYPE
Username	Char (30)
Password	Char (30)

# **USER TABLE**

FIELD NAME	DATATYPE
Username	Char (30)
Password	Char (30)

# **PATIENT TABLE**

FIELD NAME	DATATYPE
Card_no	Char (30)
Name	Char (30)
Gender	Char (30)
Age	Numeric
Address	Char(30)
Phone	Numeric
Guardian_name	Char (30)
Department	Char(30)
Docdtor_name	Char (30)

# DOCTOR

FIELD NAME	DATATYPE
Dr_code	Char (30)
Dr_name	Char (30)
Gender	Char (30)
Dob	Date
Address	Char (30)
Date_of_join	Date

# **BED DETAILS**

FIELD NAME	DATATYPE			
Bed_no	Char (30)			
Status	Char (30)			
19				

FIELD NAME	DATATYPE
Card_no	Char (30)
Patient_name	Char (30)
Gender	Char (30)
Age	Numeric
Address	Char(30)
Phone	Numeric
Guardian_name	Char (30)
Date	Date
Docdtor_name	Char(30)
Department	Char (30)

# IPD

FIELD NAME	DATATYPE
Card_no	Char (30)
Patient_name	Char (30)
Gender	Char (30)
Age	Numeric
Address	Char(30)
Phone	Numeric
Guardian_name	Char (30)
Date	Date
Docdtor_name	Char(30)
Department	Char (30)

## CODING

# **GENERATE BILL**

<?php \$currency\_symbol = \$this->customlib->getSchoolCurrencyFormat(); ?> <style type="text/css"> /\*REQUIRED\*/ .carousel-row { margin-bottom: 10px; } .slide-row { padding: 0; background-color: #ffffff; min-height: 150px; border: 1px solid #e7e7e7; overflow: hidden; height: auto; position: relative; } .slide-carousel { width: 20%; float: left; display: inline-block; } .slide-carousel .carousel-indicators { margin-bottom: 0; bottom: 0; background: rgba(0, 0, 0, .5); } .slide-carousel .carousel-indicators li { border-radius: 0; width: 20px; height: 6px; } .slide-carousel .carousel-indicators .active { margin: 1px; } .slide-content { position: absolute;

```
top: 0;
left: 20%;
display: block;
float: left;
width: 80%;
max-height: 76%;
padding: 1.5% 2% 2% 2%;
overflow-y: auto;
  }
  .slide-content h4 {
margin-bottom: 3px;
margin-top: 0;
  }
  .slide-footer {
position: absolute;
bottom: 0;
left: 20%;
width: 78%;
height: 20%;
margin: 1%;
  }
  /* Scrollbars */
  .slide-content::-webkit-scrollbar {
width: 5px;
  }
  .slide-content::-webkit-scrollbar-thumb:vertical {
margin: 5px;
background-color: #999;
     -webkit-border-radius: 5px;
  }
  .slide-content::-webkit-scrollbar-button:start:decrement,
  .slide-content::-webkit-scrollbar-button:end:increment {
height: 5px;
display: block;
  }
  .printablea4{width: 100%;}
  /*.printablea4 p{margin-bottom: 0;}*/
  .printablea4>tbody>tr>th,
```

```
.printablea4>tbody>tr>td{padding:5px 0; line-height: 1.42857143;vertical-align: top; font-
size: 12px;}
</style>
<div class="content-wrapper" style="min-height: 946px;">
<!-- Main content -->
<section class="content">
<div class="row">
<div class="col-md-12">
<div class="box box-primary">
<div class="box-header with-border">
<h3 class="box-title"><?php echo $this->lang->line('pharmacy') . " " . $this->lang->line('bill') . "
". $this->lang->line('report'); ?></h3>
</div>
<form role="form" action="<?php echo site_url('admin/pharmacy/billreport') ?>" method="post"
class="">
<div class="box-body row">
<?php echo $this->customlib->getCSRF(); ?>
<div class="col-sm-6 col-md-4" >
<div class="form-group">
<label><?php echo $this->lang->line('search') . " " . $this->lang->line('type'); ?></label>
<select class="form-control" name="search_type" onchange="showdate(this.value)">
<option value=""><?php echo $this->lang->line('all') ?></option>
<?phpforeach ($searchlist as $key => $search) {
                           ?>
<option value="<?php echo $key ?>" <?php</pre>
if ((isset($search_type)) && ($search_type == $key)) {
echo "selected";
                           }
                           ?>><?php echo $search ?></option>
<?php } ?>
</select>
<span class="text-danger"><?php echo form_error('search_type'); ?></span>
</div>
</div>
```

```
<div class="col-sm-6 col-md-4" id="fromdate" style="display: none">
<div class="form-group">
<label><?php echo $this->lang->line('date from'); ?></label><small class="req"> *</small>
<input id="date_from" name="date_from" placeholder="" type="text" class="form-control date"
value="<?php echo set_value('date_from', date($this->customlib->getSchoolDateFormat())); ?>"
/>
<span class="text-danger"><?php echo form error('date from'); ?></span>
</div>
</div>
<div class="col-sm-6 col-md-4" id="todate" style="display: none">
<div class="form-group">
<label><?php echo $this->lang->line('date to'); ?></label><small class="req"> *</small>
<input id="date_to" name="date_to" placeholder="" type="text" class="form-control date"
value="<?php echo set_value('date_to', date($this->customlib->getSchoolDateFormat())); ?>"
1>
<span class="text-danger"><?php echo form error('date to'); ?></span>
</div>
</div>
<div class="form-group">
<div class="col-sm-12">
<button type="submit" name="search" value="search_filter" class="btnbtn-primary btn-sm
checkbox-toggle pull-right"><i class="fafa-search"></i><?php echo $this->lang->line('search');
?></button>
</div>
</div>
</form>
<div class="box border0 clear">
<div class="box-header ptbnull"></div>
<div class="box-body table-responsive">
<div class="download_label"><?php echo $this->lang->line('pharmacy') . " " . $this->lang-
>line('bill') . " " . $this->lang->line('report'); ?></div>
<thead>
```

```
<?php echo $this->lang->line('bill') . " " . $this->lang->line('no') . " "; ?>
```

```
<?php echo $this->lang->line('date') . " "; ?>
<?php echo $this->lang->line('customer') . " " . $this->lang->line('name'); ?>
<?php echo $this->lang->line('customer') . " " . $this->lang->line('type'); ?>
<?php echo $this->lang->line('doctor') . " " . $this->lang->line('name'); ?>
<?php echo $this->lang->line('total') . ' (' . $currency_symbol . ')'; ?>
</thead>
<?php
if (empty($resultlist)) {
                     ?>
<?php
                   } else {
                     \text{scount} = 1;
                     \text{total} = 0;
foreach ($resultlist as $bill) {
if (!empty($bill['net_amount'])) {
                         $total += $bill['net_amount'];
                       }
                       ?>
<?php echo $bill['bill no']; ?>
<?php
                           date($this->customlib->getSchoolDateFormat(true,
                echo
                                                                              true),
strtotime($bill['date'])) ?>
<?php echo $bill['customer_name']; ?>
<?php echo $bill['customer_type']; ?>
<?php echo $bill['doctor_name']; ?>
<?php echo $bill['net_amount']; ?>
<?php
                       $count++;
                     }
                     ?>
```

25

```
<?php echo $this->lang->line('total') . ":
                      ". $currency_symbol. $total; ?>
<?php } ?>
</div>
</div>
</div>
</div>
</div>
</div>
</section>
</div>
<script type="text/javascript">
  $(document).ready(function (e) {
showdate('<?php echo $search_type; ?>');
  });
functionshowdate(value) {
if (value == 'period') {
      $('#fromdate').show();
      $('#todate').show();
    } else {
      $('#fromdate').hide();
      $('#todate').hide();
    }
  }
```

```
</script>
```

# **SCREEN SHOTS**

# **ADMIN LOGIN**

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		Password		
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## DASHBOARD



# FRONT OFFICE

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G Ensure (	ayz	APPN05	13-03-2021 09:24 AM	7890543217 7687666802	Female	belsi moni		Approx		
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# **OUT PATIENT**

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A Front Office	OPD Patient	8						+ Add Patient
Vr. OPO - Out Patient	Search							9883+D
📠 IPD - In Patient	Name -	Patient Id -	Guardian Name -	Gender -	Phone	Consultant -	Last Visit	Total Visit
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🚆 Birth & Death Record 🔇								
🚓 Human Resource								
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🛓 Download Center								
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🗱 Setup								
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# **IN PATIENT**

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🚆 Birth & Death Record 🕔					
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# PHARMACY

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i IPD - In Patient	Bill No -	Date -		Patient Name -	Doctor Name -		Total (Ril) -	,	kotion
<ul> <li>Blood Bank</li> </ul>	1 Records 1 to 1 of 1	10-03-2021 06:13 AM		xyz	bels moni		50.00	10	е 197
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# **BLOOD BANK**

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L Download Center				
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# FINANCE INCOME

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<ul> <li>Pharmacy</li> </ul>	Jenitta .	12	04-02-2021	gfoffhyt	vidhya	500.00
<ul> <li>► Expenses</li> <li>➡ Antbulance</li> <li>➡ Birth &amp; Death Recource</li> <li>➡ Human Resource</li> <li>➡ Human Resource</li> <li>➡ Download Center</li> <li>➡ Download Center</li> <li>➡ Inventory</li> <li>➡ Pront CMS</li> <li>➡ Reports</li> <li></li> <li>♦ Setup</li> <li></li> </ul>						
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# FINANCE EXPENCE

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## **BIRTH RECORD**

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	atient	Child Name -	Gender -	No -	Birth Date -	Mother Name -	Father Name -	Report
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lite Inventory #PL Front CMS L2: Reports € of Senup € 	earth Record ~ cond ecounce Mg 8 Center							
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## **DEATH RECORD**

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V OPD - Out Patient	Search						****
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Blood Bank	Records 7 to 1 of 1						1.001
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# HUMAN RESOURCE

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## **NOTICE BOARD**

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# **DOWNLOAD CENTER**

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## INVENTORY

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A Front Office	Item Stock List						+ Add to	en Sock Elsav ten Elten
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IPD - In Patient	Name -	Category -	Supplier	Store ~	Quantity -	Purchase Price -	Date -	Action
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Blood Bank	Glucose	Liquid medicine	XYZ	XYZ	10	SD	10-03-2021	/ 0
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# FRONT CMS

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A Front Office	Page List		Add Page + EMed	is Manager EMerus Ellanmers
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🛋 IPD - In Patient	Title -	URL -	Page Type	Action
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A Ricord Bank	Complain	http://127.0.0.1/smert/page/complain	(Standard)	1
DICCO David	404 page	http://127.0.0.1/amart/page/404-page	(Standard)	/
G Finance	Contact us	http://127.0.0.1/amart/page/contact-us	Standard	/
Ambulance	our-appointment	http://127.0.0.1/aniert/page/our-appointment	Bardard	/ 0
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## REPORTS

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nbulance	Name -	Reference -	Head -	Date -	Amount (
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	(1001) mmm	OPDN2	OPD	11-09-2021	50.0
man Resource	mmm (3001)	OPDN2	CPD	11-09-2021	200
prigess	xyz (1002)	IPDN3	IPD	11-09-2021	100
	kyz (1002)	IPDN3	D41	11-03-2021	100.0
whichd Center	fghd (1003)	IPDN2	IPD	12-03-2021	500.1
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porta ~	RYZ.	1	Ambulance	10-09-2021	200 0
anisaction Report	jenitta	12	Expenses	10-09-2021	-500.0
spointment Report	manju (12)	1	Payroll	10-03-2021	-45450.0
PD Report					Total : Rs-447
0 Report	Respire 1 to 12 of 12				

# SETUP

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### CONCLUSION

Since we are entering details of the patients electronically in the" Smart Hospital Management System", data will be secured. Using this application we can retrieve patient's history with a single click. Thus processing information will be faster. It guarantees accurate maintenance of Patient details. It easily reduces the book keeping task and thus reduces the human effort and increases accuracy speed.

## **FUTURE ENHANCEMENT**

Though we ought to have a successfully project, it could be still be improved further, according to the needs of the user.

• "Smart Hospital Management System" website will add more additional features

like online consultation with doctors through video calls.

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# ANDROID APPLICATION FOR OBJECT DETECTION AND IDENTIFICATION USING ARTIFICIAL INTELLIGENCE

A project submitted to

### ST.MARY'S COLLEGE (AUTONOMOUS),

### THOOTHUKUDI.

Affiliated to

### MANONMANIAM SUNDARANAR UNIVERSITY,

### TIRUNELVELI.

In partial fulfillment of the award of the degree of

### MASTER OF SCIENCE IN COMPUTER SCIENCE

Submitted by

Kruthika.M

### Reg.No: 19SPCS03

Under the Supervision and Guidance of

Dr.A.Vithya Vijayalakshmi MCA., M.Phil., Ph.D.,



## PG DEPARTMENT OF COMPUTER SCIENCE(SSC)

St.Mary's College (Autonomous), Thoothukudi-628001.

April-2021

## CERTIFICATE

This is to certify that this project work entitled as "ANDROID APPLICATION FOR OBJECT DETECTION AND IDENTIFICATION USING ARTIFICIAL INTELLIGENCE" is submitted to St. Mary's College (Autonomous). Theothekudi affiliated to Manonmaniam Sundaranar University, Tirunelveli, in partial fulfillment for the award of the degree of Master of Science in Computer Science for the work done during the year 2020-2021 by KRUTHIKA.M (Reg.No:19SPCS03).

Army Kyles Signature of the Guide

LOPE Signature of the Director Self Supporting Courses St. Mary's College (Autonomous) Thoothukudi - 628 001.

icia Rose Signature of Principal Principal St. Mary's Collage (Autonomous) Thoothukudi - 828 001.

J. Leville

Signature of the Examiner

## DECLARATION

I do hereby declare that the project entitled as "ANDROID APPLICATION FOR **OBJECT DETECTION** AND **IDENTIFICATION** USING ARTIFICIAL INTELLIGENCE" Submitted for the degree of Master of Science in Computer Science in my original work carried out under the guidance of Dr.A.Vithya Vijayalakshmi MCA., M.Phil., Department Ph.D., Assistant Professor,PG of Computer Science(SSC), St. Mary's College(Autonomous), Thoothukudi.

Station: Thoothukudi.

Signature of the Student

Date:

#### ACKNOWLEDGEMENT

I express my first and foremost thanks to God Almighty for his gracious help and shower of blessings for having rendered us the strength and support to finish our project successfully.

My sincere thanks to Dr. Sr. A. S. J. Lucia Rose M.Sc., PGDCA., M.Phil.,Ph.D., Principal, Sr. Flora Mary, Secretary, Sr. F. Mary Joyce Baby, Director of SSC, St. Mary's College (Autonomous), Thoothukudi, for giving permission to work on this project.

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I thank my family members especially my parents for their encouragement and support both morally and financially which helped me to finish the project successfully.

### ABSTRACT

Object detection is a computer vision technique that allows us to identify and locate objects in an image or video. Object detection allows us to classify the types of things found within the image. Object detection is used to count objects in a scene and determine and track their precise locations.

Object recognition is to describe a collection of related computer vision tasks that involve activities like identifying objects in digital photographs. Image classification involves activities such as predicting the class of one object in an image. Object localization refers to identifying the location of one or more objects in an image and drawing an abounding box around their extent. Object detection does work of combines these two tasks and localizes and classifies one or more objects in an image.

Object detection models can be made small and fast enough to run directly on mobile devices, opening up a range of possibilities, including applications for real-time video surveillance, crowd counting, anomaly detection, and more.

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## **INTRODUCTION**

A few years ago, the creation of the software and hardware image processing systems was mainly limited to the development of the user interface, which most of the programmers of each firm were engaged in. The situation has been significantly changed with the advent of the Windows operating system when the majority of the developers switched to solving the problems of image processing itself. However, this has not yet led to the cardinal progress in solving typical tasks of recognizing faces, car numbers, road signs, analyzing remote and medical images, etc. Each of these "eternal" problems is solved by trial and error by the efforts of numerous groups of the engineers and scientists. As modern technical solutions are turn out to be excessively expensive, the task of automating the creation of the software tools for solving intellectual problems is formulated and intensively solved abroad. In the field of image processing, the required tool kit should be supporting the analysis and recognition of images of previously unknown content and ensure the effective development of applications by ordinary programmers. Just as the Windows toolkit supports the creation of interfaces for solving various applied problems. Object recognition is to describe a collection of related computer vision tasks that involve activities like identifying objects in digital photographs. Image classification involves activities such as predicting the class of one object in an image. Object localization is refers to identifying the location of one or more objects in an image and drawing an abounding box around their extent. Object detection does the work of combines these two tasks and localizes and classifies one or more objects in an image. When a user or practitioner refers to the term "object recognition", they often mean "object detection". It may be challenging for beginners to distinguish between different related computer vision tasks

# SYSTEM SPECIFICATION

## HARDWARE REQUIREMENTS

- ➢ Hardware − 500MB(minimum)
- ➢ Processor Intel(R) Core™ i3-1005G1 CPU @ 1.20GHz 1.19GHz
- Ram 160GB(minimum)
- ➤ Key Board Standard Windows Keyboard

## SOFTWARE REQUIREMENTS

- Operating System Windows 10
- Tools Java JDK5 or latest version, Java Runtime Environment (JRE) 6, Android SDK, Android Studio, Android Development Tool kit (ADT kit)
- Document MS-Office

#### **PROJECT DESCRIPTION**

The aim of object detection is to detect all instances of objects from a known class, such as people, cars or faces in an image. Generally, only a small number of instances of the object are present in the image, but there is a very large number of possible locations and scales at which they can occur and that need to somehow be explored. Each detection of the image is reported with some form of pose information. This is as simple as the location of the object, a location and scale, or the extent of the object defined in terms of a bounding box. In some other situations, the pose information is more detailed and contains the parameters of a linear or nonlinear transformation. For example for face detection in a face detector may compute the locations of the eyes, nose and mouth, in addition to the bounding box of the face. The pose can also be defined by a three-dimensional transformation specifying the location of the object relative to the camera. Object detection systems always construct a model for an object class from a set of training examples.

### **Tensorflow:**

Tensorflow is an open-source software library for dataflow and differentiable programming across a range of tasks. It is an symbolic math library, and is also used for machine learning application such as neural networks, etc.. It is used for both research and production by Google. Tensorflow is developed by the Google Brain team for internal Google use. It is released under the Apache License 2.0

#### **TensorFlow Lite:**

Tensorflow lite is a set of tools to help developers run TensorFlow models on mobile, embedded, and IoT devices. It enables on-device machine learning inference with low latency and a small binary size.

# **MODULE DESCRIPTION**

#### **Image Classification:**

This is done by Predict the type or class of an object in an image. Input: An image which consists of a single object, such as a photograph. Output: A class label (e.g. one or more integers that are mapped to class labels).

### **Object Localization:**

This is done through, Locate the presence of objects in an image and indicate their location with a bounding box.

**Input:** An image which consists of one or more objects, such as a photograph. **Output:** One or more bounding boxes (e.g. defined by a point, width, and height).

### **Object Detection:**

This is done through, Locate the presence of objects with a bounding box and types or classes of the located objects in an image.

Input: An image which consists of one or more objects, such as a photograph.

**Output:** One or more bounding boxes (e.g. defined by a point, width, and height), and a class label for each bounding box.

### **Object recognition:**

Object recognition refers to a collection of related tasks for identifying objects in digital photographs.

Region-based Convolutional Neural Networks, or R-CNNs, is a family of techniques for addressing object localization and recognition tasks, designed for model performance.

You Only Look Once, or YOLO is known as the second family of techniques for object recognition designed for speed and real-time use.

## SYSTEM STUDY

#### **EXISTING SYSTEM**

In the existing system, we don't have any mobile applications for object detection and identification.

### **PROPOSED SYSTEM**

In the proposed system, we are developing an android application for object detection and identification.

Background subtraction technique has been used that is simple and fast. This technique is applicable where there is no movement of camera. For robotic application or automated vehicle assistance system, due to the movement of camera, backgrounds are continuously changing leading to implementation of some different segmentation techniques like single Gaussian mixture or multiple Gaussian mixture models.

Object Identification and Visual Tracking has been done through the use of ordinary camera. The concept is extendable in applications like Intelligent Robots, Automatic Guided Vehicles, Enhancement of Security Systems to detect the behaviour along with detection of weapons, identify the suspicious movements of enemies on boarders with the help of night vision cameras and many such applications.Proposed system is portable.

We use the selective search for extract just 2000 regions from the image and it is called as region proposals.

#### Selective search:

1. Generate the initial sub-segmentation, we generate many candidate regions

2. Use the greedy algorithm to recursively combine similar regions into larger ones

3. Use generated regions to produce the final candidate region proposals

### SYSTEM ANALYSIS

#### **FEASIBILITY STUDY:**

Feasibility study is an important outcome of preliminary investigation, which is determination of whether the request is feasible or not. During our preliminary investigation at college (Department of Science) we examine that the entire affaire concerned with the "Request" is to develop a new project. After getting information we check that the information is economical, technical and operationally feasible or not. The proposed system is reviewed considering three feasibility studies, which are as follows,

- ➢ Economical Feasibility.
- ➤ Technical Feasibility.

#### **ECONOMICAL FEASIBILITY :**

The hardware/software setup required is that the proposed system can be easily run on any dual core smartphone and as the software used to build system is JAVA in windows98/2000/XP/7 or we can build this in Linux/GNU also. So it does not cost high.

#### **TECHNICAL FEASIBILITY :**

Though, there is no equipment in existing system, essential to implementation new computerized system but are not away from college access. The hardware required is (i.e. P.C.) and software JAVA & Android Studio(Operating System) are available at many developers point.

## SYSTEM DESIGN

#### **UML DIAGRAM:**

A UML diagram is a diagram based on the UML (**Unified Modeling Language**) with the purpose of visually representing a system along with its main **actors**, roles, actions, **artifacts** or classes, in order to better understand, alter, maintain, or document information about the system.

#### **USE CASE DIAGRAM:**





## **SEQUENCE DIAGRAM:**



## SYSTEM TESTING

#### **Unit Testing:**

Unit Tests include sets of one or more programs which are designed to verify an atomic unit of source code, such as a method or a class. Android platform comes pre-integrated Junit 3.0 framework. It's open source framework for automating Unit Testing. Android Testing Framework is powerful tool for developer to write the effective unit test program. These tests relate to UI components of your target application. UI tests ensure that your application return the correct UI output in response to sequence of user actions on device.



Common user UI actions on application

The common way to performance UI tests on device is Android <u>Instrumentation</u>. But this has performance issues. One of the best tools to conduct UI testing on Android is <u>Robotium</u>.

#### **Integration Testing:**

In <u>Integration Testing</u>, all unit tested modules, are combined and verified. In Android, integration tests often involve checking integration withAndroid components such as Service testing, Activity testing, Content Provider testing, etc



Types of integration test on Android

There's many testing frameworks are used to conduct integration test for Android such as Troyd, Robolectric, Robotium.

Operational tests

•Operational are also called Functional Tests or Acceptation Tests. They are high level tests designed to check the completeness and correctness of application.

•In Android, <u>FitNesse</u> is open-source framework that makes it easy to conduct operational tests for target application.

#### **System Testing:**

In <u>System Testing</u> the system is tested as a whole and the interaction between the components, software and hardware is checked.

In Android, System Testing normally includes

- •GUI tests
- •Usability tests
- •Performance tests
- •Stress tests

We can use tools like <u>Traceview</u> to conduct performance test on Android .This tool can help you debug your application and profile its performance.

#### Automated ANDROID TESTING:

As android is fragmented, testing on multitude of devices is necessary. But this will also cost you money. Automated Android Testing can help reduce costs Benefits of automated android testing

- •Reduce time for executing test cases
- •Increase productivity of your development process
- •Early bug detection, save cost on software maintenance
- •Quickly found and fix the bugs on implementation
- •Ensure the quality of software

We will study the following 2 frameworks

- •Android Testing framework
- •Robolectric Testing framework

### Android testing framework:

One of the standard testing frameworks for Android application is Android testing framework. It is a powerful and easy-to-use testing framework that is well integrated with the Android SDK tools.



Android testing framework Architecture

1.Application package is your target application which needs to be tested 2.InstrumentationTestRunner is the <u>Test Case</u> runner that executes test case on target application. It includes: 2a) Test tools: A SDK tools for building test. They are integrated in Eclipse IDE or run as command line.

2b) MonkeyRunner: A tool that provides APIs for writing program which control an Android device or emulator outside of Android code.

3.Test package are organized into test projects. This package follows naming convention. If the application under test has a package name of "**com.mydomain.myapp**" than Test package should be "**com.mydomain.myapp.test**".Test package includes 2 objects as below:

- 3a) Test case classes: include test methods to executed on target application.
- 3b) Mock objects : includes mock data that will be used as sample input for test cases.

### **Android UI Testing:**

This is an user-centric testing of the application. In this test phase, items such as visibility of text in various screens of the app, interactive messages, alignment of data, the look and feel of the app for different screens, size of fields etc are tested under this.

### **Interface Testing:**

This testing is done after all the modules of the app are completely developed, tested individually and all the bugs are fixed verified.

Interface testing includes tests like a complete end to end testing of the app, interaction with other apps like Maps, social apps etc, usage of Microphone to enter text, usage of Camera to scan a barcode or to take a picture etc.

### CODING

#### DetectorActivity.java

package org.tensorflow.lite.examples.detection;

import android.graphics.Bitmap; import android.graphics.Bitmap.Config; import android.graphics.Canvas; import android.graphics.Color; import android.graphics.Matrix; import android.graphics.Paint; import android.graphics.Paint.Style; import android.graphics.RectF; import android.graphics.Typeface; import android.media.ImageReader.OnImageAvailableListener; import android.os.SystemClock; import android.util.Size; import android.util.TypedValue; import android.widget.Toast; import java.io.IOException; import java.util.ArrayList; import java.util.List; import org.tensorflow.lite.examples.detection.customview.OverlayView; import org.tensorflow.lite.examples.detection.customview.OverlayView.DrawCallback; import org.tensorflow.lite.examples.detection.env.BorderedText; import org.tensorflow.lite.examples.detection.env.ImageUtils;

import org.tensorflow.lite.examples.detection.env.Logger; import org.tensorflow.lite.examples.detection.tflite.Detector; import org.tensorflow.lite.examples.detection.tflite.TFLiteObjectDetectionAPIModel; import org.tensorflow.lite.examples.detection.tracking.MultiBoxTracker;

/\*\*

\* An activity that uses a TensorFlowMultiBoxDetector and ObjectTracker to detect and then track

\* objects.

\*/

public class DetectorActivity extends CameraActivity implements OnImageAvailableListener {
 private static final Logger LOGGER = new Logger();

// Configuration values for the prepackaged SSD model. private static final int *TF\_OD\_API\_INPUT\_SIZE* = 300; private static final boolean *TF\_OD\_API\_IS\_QUANTIZED* = true; private static final String *TF\_OD\_API\_MODEL\_FILE* = "detect.tflite"; private static final String *TF\_OD\_API\_LABELS\_FILE* = "labelmap.txt"; private static final DetectorMode *MODE* = DetectorMode.*TF\_OD\_API*; // Minimum detection confidence to track a detection. private static final float *MINIMUM\_CONFIDENCE\_TF\_OD\_API* = 0.5f; private static final boolean *MAINTAIN\_ASPECT* = false; private static final Size *DESIRED\_PREVIEW\_SIZE* = new Size(640, 480); private static final float *TEXT\_SIZE\_DIP* = 10; OverlayView trackingOverlay; private Integer sensorOrientation;

private Detector detector;

private long lastProcessingTimeMs; private Bitmap rgbFrameBitmap = null; private Bitmap croppedBitmap = null; private Bitmap cropCopyBitmap = null;

private boolean computingDetection = false;

private long timestamp = 0;

private Matrix frameToCropTransform; private Matrix cropToFrameTransform;

private MultiBoxTracker tracker;

private BorderedText borderedText;

@Override

```
public void onPreviewSizeChosen(final Size size, final int rotation) {
  final float textSizePx = 
    TypedValue.applyDimension(
       TypedValue.COMPLEX_UNIT_DIP, TEXT_SIZE_DIP,
getResources().getDisplayMetrics());
  borderedText = new BorderedText(textSizePx);
  borderedText.setTypeface(Typeface.MONOSPACE);
  tracker = new MultiBoxTracker(this);
  int cropSize = TF_OD_API_INPUT_SIZE;
  try {
   detector =
     TFLiteObjectDetectionAPIModel.create(
        this.
TF_OD_API_MODEL_FILE,
TF_OD_API_LABELS_FILE,
TF_OD_API_INPUT_SIZE,
TF OD API IS QUANTIZED);
   cropSize = TF_OD_API_INPUT_SIZE;
  } catch (final IOException e) {
   e.printStackTrace();
LOGGER.e(e, "Exception initializing Detector!");
   Toast toast =
     Toast.makeText(
        getApplicationContext(), "Detector could not be initialized", Toast.LENGTH_SHORT);
   toast.show();
   finish();
  }
  previewWidth = size.getWidth();
  previewHeight = size.getHeight();
  sensorOrientation = rotation - getScreenOrientation();
LOGGER.i("Camera orientation relative to screen canvas: %d", sensorOrientation);
LOGGER.i("Initializing at size %dx%d", previewWidth, previewHeight);
  rgbFrameBitmap = Bitmap.createBitmap(previewWidth, previewHeight,
Config.ARGB 8888);
  croppedBitmap = Bitmap.createBitmap(cropSize, cropSize, Config.ARGB_8888);
  frameToCropTransform =
    ImageUtils.getTransformationMatrix(
       previewWidth, previewHeight,
       cropSize, cropSize,
       sensorOrientation, MAINTAIN ASPECT);
```

```
cropToFrameTransform = new Matrix();
frameToCropTransform.invert(cropToFrameTransform);
trackingOverlay = (OverlayView) findViewById(R.id.tracking_overlay);
trackingOverlay.addCallback(
    new DrawCallback() {
      @Override
      public void drawCallback(final Canvas canvas) {
          tracker.draw(canvas);
          if (isDebug()) {
               tracker.drawDebug(canvas);
          }
        }
    };
};
```

tracker.setFrameConfiguration(previewWidth, previewHeight, sensorOrientation);
}

```
@Override
protected void processImage() {
    ++timestamp;
final long currTimestamp = timestamp;
trackingOverlay.postInvalidate();
```

```
// No mutex needed as this method is not reentrant.
if (computingDetection) {
    readyForNextImage();
    return;
    }
    computingDetection = true;
LOGGER.i("Preparing image " + currTimestamp + " for detection in bg thread.");
```

rgbFrameBitmap.setPixels(getRgbBytes(), 0, previewWidth, 0, 0, previewWidth, previewHeight);

```
readyForNextImage();
```

```
final Canvas canvas = new Canvas(croppedBitmap);
canvas.drawBitmap(rgbFrameBitmap, frameToCropTransform, null);
// For examining the actual TF input.
if (SAVE_PREVIEW_BITMAP) {
ImageUtils.saveBitmap(croppedBitmap);
}
```

```
runInBackground(
    new Runnable() {
```

```
@Override
     public void run() {
LOGGER.i("Running detection on image " + currTimestamp);
       final long startTime = SystemClock.uptimeMillis();
       final List<Detector.Recognition> results = detector.recognizeImage(croppedBitmap);
       lastProcessingTimeMs = SystemClock.uptimeMillis() - startTime;
       cropCopyBitmap = Bitmap.createBitmap(croppedBitmap);
       final Canvas canvas = new Canvas(cropCopyBitmap);
       final Paint paint = new Paint();
       paint.setColor(Color.RED);
       paint.setStyle(Style.STROKE);
       paint.setStrokeWidth(2.0f);
       float minimumConfidence = MINIMUM_CONFIDENCE_TF_OD_API;
       switch (MODE) {
        case TF_OD_API:
         minimumConfidence = MINIMUM_CONFIDENCE_TF_OD_API;
         break;
       }
       final List<Detector.Recognition> mappedRecognitions =
         new ArrayList<Detector.Recognition>();
       for (final Detector.Recognition result : results) {
        final RectF location = result.getLocation();
        if (location != null && result.getConfidence() >= minimumConfidence) {
         canvas.drawRect(location, paint);
         cropToFrameTransform.mapRect(location);
         result.setLocation(location);
         mappedRecognitions.add(result);
        }
       }
       tracker.trackResults(mappedRecognitions, currTimestamp);
       trackingOverlay.postInvalidate();
       computingDetection = false;
       runOnUiThread(
         new Runnable() {
          @Override
          public void run() {
           showFrameInfo(previewWidth + "x" + previewHeight);
           showCropInfo(cropCopyBitmap.getWidth() + "x" + cropCopyBitmap.getHeight());
```

```
showInference(lastProcessingTimeMs + "ms");
          }
         });
      }
     });
 }
 @Override
 protected int getLayoutId() {
  return R.layout.tfe_od_camera_connection_fragment_tracking;
 }
 @Override
 protected Size getDesiredPreviewFrameSize() {
  return DESIRED_PREVIEW_SIZE;
 }
 // Which detection model to use: by default uses Tensorflow Object Detection API frozen
 // checkpoints.
 private enum DetectorMode {
TF_OD_API;
 }
 @Override
 protected void setUseNNAPI(final boolean isChecked) {
  runInBackground(
    () -> {
      try {
       detector.setUseNNAPI(isChecked);
      } catch (UnsupportedOperationException e) {
LOGGER.e(e, "Failed to set \"Use NNAPI\".");
       runOnUiThread(
         () -> {
          Toast.makeText(this, e.getMessage(), Toast.LENGTH_LONG).show();
         });
      }
     });
 }
 @Override
 protected void setNumThreads(final int numThreads) {
  runInBackground(
    () -> {
     try {
       detector.setNumThreads(numThreads);
      } catch (IllegalArgumentException e) {
LOGGER.e(e, "Failed to set multithreads.");
```

#### CameraConnectionFragment.java

package org.tensorflow.lite.examples.detection;

import android.annotation.SuppressLint; import android.app.Activity; import android.app.AlertDialog; import android.app.Dialog; import android.app.DialogFragment; import android.app.Fragment; import android.content.Context: import android.content.DialogInterface; import android.content.res.Configuration; import android.graphics.ImageFormat; import android.graphics.Matrix; import android.graphics.RectF; import android.graphics.SurfaceTexture; import android.hardware.camera2.CameraAccessException; import android.hardware.camera2.CameraCaptureSession; import android.hardware.camera2.CameraCharacteristics; import android.hardware.camera2.CameraDevice; import android.hardware.camera2.CameraManager; import android.hardware.camera2.CaptureRequest; import android.hardware.camera2.CaptureResult; import android.hardware.camera2.TotalCaptureResult; import android.hardware.camera2.params.StreamConfigurationMap; import android.media.ImageReader; import android.media.ImageReader.OnImageAvailableListener; import android.os.Bundle; import android.os.Handler; import android.os.HandlerThread; import android.text.TextUtils; import android.util.Size; import android.util.SparseIntArray; import android.view.LayoutInflater; import android.view.Surface; import android.view.TextureView;
import android.view.View; import android.view.ViewGroup; import android.widget.Toast; import java.util.ArrayList; import java.util.Arrays; import java.util.Collections; import java.util.Comparator; import java.util.List; import java.util.concurrent.Semaphore; import java.util.concurrent.TimeUnit; import org.tensorflow.lite.examples.detection.customview.AutoFitTextureView; import org.tensorflow.lite.examples.detection.env.Logger;

@SuppressLint("ValidFragment")
public class CameraConnectionFragment extends Fragment {

private static final Logger LOGGER = new Logger();

/\*\*

\* The camera preview size will be chosen to be the smallest frame by pixel size capable of \* containing a DESIRED\_SIZE x DESIRED\_SIZE square. \*/

private static final int *MINIMUM\_PREVIEW\_SIZE* = 320;

/\*\* Conversion from screen rotation to JPEG orientation. \*/
private static final SparseIntArray ORIENTATIONS = new SparseIntArray();

private static final String FRAGMENT\_DIALOG = "dialog";

static {
ORIENTATIONS.append(Surface.ROTATION\_0, 90);
ORIENTATIONS.append(Surface.ROTATION\_90, 0);
ORIENTATIONS.append(Surface.ROTATION\_180, 270);
ORIENTATIONS.append(Surface.ROTATION\_270, 180);
}

/\*\* A {@link Semaphore} to prevent the app from exiting before closing the camera. \*/
private final Semaphore cameraOpenCloseLock = new Semaphore(1);
/\*\* A {@link OnImageAvailableListener} to receive frames as they are available. \*/
private final OnImageAvailableListener imageListener;
/\*\* The input size in pixels desired by TensorFlow (width and height of a square bitmap). \*/
private final Size inputSize;
/\*\* The layout identifier to inflate for this Fragment. \*/
private final int layout;

private final ConnectionCallback cameraConnectionCallback; private final CameraCaptureSession.CaptureCallback captureCallback = new CameraCaptureSession.CaptureCallback() {

@Override public void onCaptureProgressed( final CameraCaptureSession session, final CaptureRequest request, final CaptureResult partialResult) { } @Override public void onCaptureCompleted( final CameraCaptureSession session, final CaptureRequest request, final TotalCaptureResult result) { } }; /\*\* ID of the current {@link CameraDevice}. \*/ private String cameraId; /\*\* An {@link AutoFitTextureView} for camera preview. \*/ private AutoFitTextureView textureView; /\*\* A {@link CameraCaptureSession } for camera preview. \*/ private CameraCaptureSession captureSession; /\*\* A reference to the opened {@link CameraDevice}. \*/ private CameraDevice cameraDevice; /\*\* The rotation in degrees of the camera sensor from the display. \*/ private Integer sensorOrientation; /\*\* The {@link Size} of camera preview. \*/ private Size previewSize; /\*\* An additional thread for running tasks that shouldn't block the UI. \*/ private HandlerThread backgroundThread; /\*\* A {@link Handler} for running tasks in the background. \*/ private Handler backgroundHandler; /\*\* An {@link ImageReader} that handles preview frame capture. \*/ private ImageReader previewReader; /\*\* {@link CaptureRequest.Builder} for the camera preview \*/ private CaptureRequest.Builder previewRequestBuilder; /\*\* {@link CaptureRequest} generated by {@link #previewRequestBuilder} \*/ private CaptureRequest previewRequest; /\*\* {@link CameraDevice.StateCallback} is called when {@link CameraDevice} changes its state. \*/ private final CameraDevice.StateCallback stateCallback = new CameraDevice.StateCallback() { @Override public void onOpened(final CameraDevice cd) { // This method is called when the camera is opened. We start camera preview here. cameraOpenCloseLock.release(); cameraDevice = cd; createCameraPreviewSession(); ł @Override

```
public void onDisconnected(final CameraDevice cd) {
      cameraOpenCloseLock.release();
      cd.close();
      cameraDevice = null;
     }
     @Override
     public void onError(final CameraDevice cd, final int error) {
      cameraOpenCloseLock.release();
      cd.close();
      cameraDevice = null;
      final Activity activity = getActivity();
      if (null != activity) {
       activity.finish();
      }
     }
    };
/**
  * {@link TextureView.SurfaceTextureListener} handles several lifecycle events on a {@link
* TextureView}.
  */
private final TextureView.SurfaceTextureListener surfaceTextureListener =
   new TextureView.SurfaceTextureListener() {
     @Override
     public void onSurfaceTextureAvailable(
       final SurfaceTexture texture, final int width, final int height) {
      openCamera(width, height);
     }
     @Override
     public void onSurfaceTextureSizeChanged(
       final SurfaceTexture texture, final int width, final int height) {
      configureTransform(width, height);
     }
     @Override
     public boolean onSurfaceTextureDestroyed(final SurfaceTexture texture) {
      return true;
     }
     @Override
     public void onSurfaceTextureUpdated(final SurfaceTexture texture) {}
    };
 private CameraConnectionFragment(
   final ConnectionCallback connectionCallback,
```

final OnImageAvailableListener imageListener,

```
final int layout,
final Size inputSize) {
this.cameraConnectionCallback = connectionCallback;
this.imageListener = imageListener;
this.layout = layout;
this.inputSize = inputSize;
}
```

/\*\*

\* Given {@code choices} of {@code Size}s supported by a camera, chooses the smallest one whose

\* width and height are at least as large as the minimum of both, or an exact match if possible. \*

\* @param choices The list of sizes that the camera supports for the intended output class

\* @param width The minimum desired width

\* @param height The minimum desired height

\* @*return* The optimal {@*code* Size}, or an arbitrary one if none were big enough \*/

protected static Size chooseOptimalSize(final Size[] choices, final int width, final int height) {
 final int minSize = Math.max(Math.min(width, height), MINIMUM\_PREVIEW\_SIZE);
 final Size desiredSize = new Size(width, height);

```
// Collect the supported resolutions that are at least as big as the preview Surface
boolean exactSizeFound = false;
final List<Size> bigEnough = new ArrayList<Size>();
final List<Size> tooSmall = new ArrayList<Size>();
for (final Size option : choices) {
    if (option.equals(desiredSize)) {
        // Sat the size but deal's return ust as that remaining sizes will still be leaged
```

// Set the size but don't return yet so that remaining sizes will still be logged.
exactSizeFound = true;

```
}
```

}

```
if (option.getHeight() >= minSize && option.getWidth() >= minSize) {
    bigEnough.add(option);
} else {
    tooSmall.add(option);
}
```

```
LOGGER.i("Desired size: " + desiredSize + ", min size: " + minSize + "x" + minSize);
LOGGER.i("Valid preview sizes: [" + TextUtils.join(", ", bigEnough) + "]");
LOGGER.i("Rejected preview sizes: [" + TextUtils.join(", ", tooSmall) + "]");
```

```
if (exactSizeFound) {
LOGGER.i("Exact size match found.");
return desiredSize;
}
```

```
// Pick the smallest of those, assuming we found any
  if (bigEnough.size() > 0) {
    final Size chosenSize = Collections.min(bigEnough, new CompareSizesByArea());
LOGGER.i("Chosen size: " + chosenSize.getWidth() + "x" + chosenSize.getHeight());
   return chosenSize;
  } else {
LOGGER.e("Couldn't find any suitable preview size");
   return choices[0];
  }
 }
 public static CameraConnectionFragment newInstance(
    final ConnectionCallback callback,
    final OnImageAvailableListener imageListener,
   final int layout,
    final Size inputSize) {
  return new CameraConnectionFragment(callback, imageListener, layout, inputSize);
 }
/**
  * Shows a {@link Toast} on the UI thread.
  * @param text The message to show
  */
private void showToast(final String text) {
  final Activity activity = getActivity();
  if (activity != null) {
    activity.runOnUiThread(
      new Runnable() {
       @Override
       public void run() {
        Toast.makeText(activity, text, Toast.LENGTH_SHORT).show();
       }
      });
  }
 }
 @Override
 public View onCreateView(
    final LayoutInflater inflater, final ViewGroup container, final Bundle savedInstanceState) {
  return inflater.inflate(layout, container, false);
 }
 @Override
```

```
public void onViewCreated(final View view, final Bundle savedInstanceState) {
    textureView = (AutoFitTextureView) view.findViewById(R.id.texture);
```

```
}
 @Override
 public void onActivityCreated(final Bundle savedInstanceState) {
  super.onActivityCreated(savedInstanceState);
 }
 @Override
 public void onResume() {
  super.onResume();
  startBackgroundThread();
  // When the screen is turned off and turned back on, the SurfaceTexture is already
  // available, and "onSurfaceTextureAvailable" will not be called. In that case, we can open
  // a camera and start preview from here (otherwise, we wait until the surface is ready in
  // the SurfaceTextureListener).
  if (textureView.isAvailable()) {
   openCamera(textureView.getWidth(), textureView.getHeight());
  } else {
   textureView.setSurfaceTextureListener(surfaceTextureListener);
  }
 }
 @Override
 public void onPause() {
  closeCamera();
  stopBackgroundThread();
  super.onPause();
 }
 public void setCamera(String cameraId) {
  this.cameraId = cameraId;
 }
/** Sets up member variables related to camera. */
private void setUpCameraOutputs() {
  final Activity activity = getActivity();
  final CameraManager manager = (CameraManager)
activity.getSystemService(Context.CAMERA_SERVICE);
  try {
   final CameraCharacteristics characteristics = manager.getCameraCharacteristics(cameraId);
   final StreamConfigurationMap map =
      characteristics.get(CameraCharacteristics.SCALER_STREAM_CONFIGURATION_MAP);
   sensorOrientation = characteristics.get(CameraCharacteristics.SENSOR_ORIENTATION);
```

```
// Danger, W.R.! Attempting to use too large a preview size could exceed the camera
   // bus' bandwidth limitation, resulting in gorgeous previews but the storage of
   // garbage capture data.
   previewSize =
chooseOptimalSize(
        map.getOutputSizes(SurfaceTexture.class),
        inputSize.getWidth(),
        inputSize.getHeight());
   // We fit the aspect ratio of TextureView to the size of preview we picked.
   final int orientation = getResources().getConfiguration().orientation;
   if (orientation == Configuration.ORIENTATION LANDSCAPE) {
    textureView.setAspectRatio(previewSize.getWidth(), previewSize.getHeight());
   } else {
    textureView.setAspectRatio(previewSize.getHeight(), previewSize.getWidth());
   }
  } catch (final CameraAccessException e) {
LOGGER.e(e, "Exception!");
  } catch (final NullPointerException e) {
   // Currently an NPE is thrown when the Camera2API is used but not supported on the
   // device this code runs.
   ErrorDialog.newInstance(getString(R.string.tfe od camera error))
      .show(getChildFragmentManager(), FRAGMENT_DIALOG);
   throw new IllegalStateException(getString(R.string.tfe od camera error));
  }
  cameraConnectionCallback.onPreviewSizeChosen(previewSize, sensorOrientation);
 }
/** Opens the camera specified by {@link CameraConnectionFragment#cameraId}. */
private void openCamera(final int width, final int height) {
  setUpCameraOutputs();
  configureTransform(width, height);
  final Activity activity = getActivity();
  final CameraManager manager = (CameraManager)
activity.getSystemService(Context.CAMERA_SERVICE);
  try {
   if (!cameraOpenCloseLock.tryAcquire(2500, TimeUnit.MILLISECONDS)) {
    throw new RuntimeException("Time out waiting to lock camera opening.");
   }
   manager.openCamera(cameraId, stateCallback, backgroundHandler);
  } catch (final CameraAccessException e) {
LOGGER.e(e, "Exception!");
  } catch (final InterruptedException e) {
   throw new RuntimeException("Interrupted while trying to lock camera opening.", e);
  }
```

}

```
/** Closes the current {@link CameraDevice}. */
private void closeCamera() {
  try {
   cameraOpenCloseLock.acquire();
   if (null != captureSession) {
     captureSession.close();
     captureSession = null;
    }
   if (null != cameraDevice) {
     cameraDevice.close();
     cameraDevice = null:
    }
   if (null != previewReader) {
     previewReader.close();
     previewReader = null;
  } catch (final InterruptedException e) {
   throw new RuntimeException("Interrupted while trying to lock camera closing.", e);
  } finally {
   cameraOpenCloseLock.release();
  ł
 }
/** Starts a background thread and its {@link Handler}. */
private void startBackgroundThread() {
  backgroundThread = new HandlerThread("ImageListener");
  backgroundThread.start();
  backgroundHandler = new Handler(backgroundThread.getLooper());
 }
/** Stops the background thread and its {@link Handler}. */
private void stopBackgroundThread() {
  backgroundThread.quitSafely();
  try {
   backgroundThread.join();
   backgroundThread = null;
   backgroundHandler = null;
  } catch (final InterruptedException e) {
LOGGER.e(e, "Exception!");
  }
 }
/** Creates a new {@link CameraCaptureSession} for camera preview. */
private void createCameraPreviewSession() {
  try {
   final SurfaceTexture texture = textureView.getSurfaceTexture();
```

assert texture != null;

// We configure the size of default buffer to be the size of camera preview we want.
texture.setDefaultBufferSize(previewSize.getWidth(), previewSize.getHeight());

```
// This is the output Surface we need to start preview.
final Surface surface = new Surface(texture);
```

```
// We set up a CaptureRequest.Builder with the output Surface.
previewRequestBuilder =
cameraDevice.createCaptureRequest(CameraDevice.TEMPLATE_PREVIEW);
previewRequestBuilder.addTarget(surface);
```

```
LOGGER.i("Opening camera preview: " + previewSize.getWidth() + "x" + previewSize.getHeight());
```

```
// Create the reader for the preview frames.
previewReader =
    ImageReader.newInstance(
        previewSize.getWidth(), previewSize.getHeight(), ImageFormat.YUV_420_888, 2);
```

```
previewReader.setOnImageAvailableListener(imageListener, backgroundHandler);
previewRequestBuilder.addTarget(previewReader.getSurface());
```

```
// Here, we create a CameraCaptureSession for camera preview.
cameraDevice.createCaptureSession(
    Arrays.asList(surface, previewReader.getSurface()),
    new CameraCaptureSession.StateCallback() {
```

```
@Override
public void onConfigured(final CameraCaptureSession cameraCaptureSession) {
    // The camera is already closed
    if (null == cameraDevice) {
        return;
    }
    // When the session is ready, we start displaying the preview.
```

```
captureSession = cameraCaptureSession;
try {
    // Auto focus should be continuous for camera preview.
    previewRequestBuilder.set(
        CaptureRequest.CONTROL_AF_MODE,
        CaptureRequest.CONTROL_AF_MODE_CONTINUOUS_PICTURE);
    // Flash is automatically enabled when necessary.
    previewRequestBuilder.set(
        CaptureRequest.CONTROL_AE_MODE,
CaptureRequest.CONTROL_AE_MODE,
CaptureRequest.CONTROL_AE_MODE,
```

```
// Finally, we start displaying the camera preview.
          previewRequest = previewRequestBuilder.build();
         captureSession.setRepeatingRequest(
            previewRequest, captureCallback, backgroundHandler);
        } catch (final CameraAccessException e) {
LOGGER.e(e, "Exception!");
        }
       }
       @Override
       public void onConfigureFailed(final CameraCaptureSession cameraCaptureSession) {
        showToast("Failed");
       }
      },
      null);
  } catch (final CameraAccessException e) {
LOGGER.e(e, "Exception!");
  }
 }
/**
  * Configures the necessary {@link Matrix} transformation to `mTextureView`. This method
should be
  * called after the camera preview size is determined in setUpCameraOutputs and also the size
of
  * `mTextureView` is fixed.
  * @param viewWidth The width of `mTextureView`
  * @param viewHeight The height of `mTextureView`
  */
private void configureTransform(final int viewWidth, final int viewHeight) {
  final Activity activity = getActivity();
  if (null == textureView || null == previewSize || null == activity) {
   return;
  }
  final int rotation = activity.getWindowManager().getDefaultDisplay().getRotation();
  final Matrix matrix = new Matrix();
  final RectF viewRect = new RectF(0, 0, viewWidth, viewHeight);
  final RectF bufferRect = new RectF(0, 0, previewSize.getHeight(), previewSize.getWidth());
  final float centerX = viewRect.centerX();
  final float centerY = viewRect.centerY();
  if (Surface.ROTATION_90 == rotation || Surface.ROTATION_270 == rotation) {
   bufferRect.offset(centerX - bufferRect.centerX(), centerY - bufferRect.centerY());
   matrix.setRectToRect(viewRect, bufferRect, Matrix.ScaleToFit.FILL);
   final float scale =
      Math.max(
```

```
(float) viewHeight / previewSize.getHeight(),
        (float) viewWidth / previewSize.getWidth());
    matrix.postScale(scale, scale, centerX, centerY);
    matrix.postRotate(90 * (rotation - 2), centerX, centerY);
   } else if (Surface.ROTATION 180 == rotation) {
   matrix.postRotate(180, centerX, centerY);
  textureView.setTransform(matrix);
 }
/**
  * Callback for Activities to use to initialize their data once the selected preview size is
  * known.
  */
public interface ConnectionCallback {
  void onPreviewSizeChosen(Size size, int cameraRotation);
 }
/** Compares two {@code Size}s based on their areas. */
static class CompareSizesByArea implements Comparator<Size> {
  @Override
  public int compare(final Size lhs, final Size rhs) {
   // We cast here to ensure the multiplications won't overflow
   return Long.signum(
      (long) lhs.getWidth() * lhs.getHeight() - (long) rhs.getWidth() * rhs.getHeight());
  }
 }
/** Shows an error message dialog. */
public static class ErrorDialog extends DialogFragment {
  private static final String ARG_MESSAGE = "message";
  public static ErrorDialog newInstance(final String message) {
    final ErrorDialog dialog = new ErrorDialog();
    final Bundle args = new Bundle();
    args.putString(ARG_MESSAGE, message);
   dialog.setArguments(args);
   return dialog;
  }
  @Override
  public Dialog onCreateDialog(final Bundle savedInstanceState) {
    final Activity activity = getActivity();
    return new AlertDialog.Builder(activity)
      .setMessage(getArguments().getString(ARG MESSAGE))
      .setPositiveButton(
        android.R.string.ok,
```

```
new DialogInterface.OnClickListener() {
    @Override
    public void onClick(final DialogInterface dialogInterface, final int i) {
        activity.finish();
        }
    })
    .create();
    }
}
```

#### LegacyCameraConnectionFragment.java

package org.tensorflow.lite.examples.detection;

import android.app.Fragment; import android.graphics.SurfaceTexture; import android.hardware.Camera; import android.hardware.Camera.CameraInfo; import android.os.Bundle; import android.os.Handler; import android.os.HandlerThread; import android.util.Size; import android.util.SparseIntArray; import android.view.LayoutInflater; import android.view.Surface; import android.view.TextureView; import android.view.View; import android.view.ViewGroup; import java.io.IOException; import java.util.List; import org.tensorflow.lite.examples.detection.customview.AutoFitTextureView; import org.tensorflow.lite.examples.detection.env.ImageUtils; import org.tensorflow.lite.examples.detection.env.Logger; public class LegacyCameraConnectionFragment extends Fragment { private static final Logger LOGGER = new Logger(); /\*\* Conversion from screen rotation to JPEG orientation. \*/ private static final SparseIntArray *ORIENTATIONS* = new SparseIntArray();

static {
 ORIENTATIONS.append(Surface.ROTATION\_0, 90);
 ORIENTATIONS.append(Surface.ROTATION\_90, 0);
 ORIENTATIONS.append(Surface.ROTATION\_180, 270);
 ORIENTATIONS.append(Surface.ROTATION\_270, 180);
 }

private Camera camera; private Camera.PreviewCallback imageListener; private Size desiredSize; /\*\* The layout identifier to inflate for this Fragment. \*/ private int layout; /\*\* An {@link AutoFitTextureView} for camera preview. \*/ private AutoFitTextureView textureView; private SurfaceTexture availableSurfaceTexture = null; /\*\* \* {@**link** TextureView.SurfaceTextureListener} handles several lifecycle events on a {@**link** \* TextureView}. \*/ private final TextureView.SurfaceTextureListener surfaceTextureListener = new TextureView.SurfaceTextureListener() { @Override public void onSurfaceTextureAvailable( final SurfaceTexture texture, final int width, final int height) { availableSurfaceTexture = texture; startCamera(); } @Override public void onSurfaceTextureSizeChanged( final SurfaceTexture texture, final int width, final int height) {} @Override public boolean onSurfaceTextureDestroyed(final SurfaceTexture texture) { return true; } @Override public void onSurfaceTextureUpdated(final SurfaceTexture texture) {} }; /\*\* An additional thread for running tasks that shouldn't block the UI. \*/ private HandlerThread backgroundThread; public LegacyCameraConnectionFragment( final Camera.PreviewCallback imageListener, final int layout, final Size desiredSize) { this.imageListener = imageListener; this.layout = layout; this.desiredSize = desiredSize; } @Override

```
public View onCreateView(
final LayoutInflater inflater, final ViewGroup container, final Bundle savedInstanceState) {
```

```
return inflater.inflate(layout, container, false);
 }
 @Override
 public void onViewCreated(final View view, final Bundle savedInstanceState) {
  textureView = (AutoFitTextureView) view.findViewById(R.id.texture);
 }
 @Override
 public void onActivityCreated(final Bundle savedInstanceState) {
  super.onActivityCreated(savedInstanceState);
 }
 @Override
 public void onResume() {
  super.onResume();
  startBackgroundThread();
  // When the screen is turned off and turned back on, the SurfaceTexture is already
  // available, and "onSurfaceTextureAvailable" will not be called. In that case, we can open
  // a camera and start preview from here (otherwise, we wait until the surface is ready in
  // the SurfaceTextureListener).
  if (textureView.isAvailable()) {
   startCamera();
  } else {
   textureView.setSurfaceTextureListener(surfaceTextureListener);
  }
 }
 @Override
 public void onPause() {
  stopCamera();
  stopBackgroundThread();
  super.onPause();
 }
/** Starts a background thread and its {@link Handler}. */
private void startBackgroundThread() {
  backgroundThread = new HandlerThread("CameraBackground");
  backgroundThread.start();
 }
/** Stops the background thread and its {@link Handler}. */
private void stopBackgroundThread() {
  backgroundThread.quitSafely();
  try {
   backgroundThread.join();
```

```
backgroundThread = null;
  } catch (final InterruptedException e) {
LOGGER.e(e, "Exception!");
 }
 private void startCamera() {
  int index = getCameraId();
  camera = Camera.open(index);
  try {
   Camera.Parameters parameters = camera.getParameters();
   List<String> focusModes = parameters.getSupportedFocusModes();
   if (focusModes != null
&& focusModes.contains(Camera.Parameters.FOCUS MODE CONTINUOUS PICTURE)) {
parameters.setFocusMode(Camera.Parameters.FOCUS_MODE_CONTINUOUS_PICTURE);
   List<Camera.Size> cameraSizes = parameters.getSupportedPreviewSizes();
   Size[] sizes = new Size[cameraSizes.size()];
   int i = 0;
   for (Camera.Size size : cameraSizes) {
    sizes[i++] = new Size(size.width, size.height);
   ł
   Size previewSize =
        CameraConnectionFragment.chooseOptimalSize(
             sizes, desiredSize.getWidth(), desiredSize.getHeight());
   parameters.setPreviewSize(previewSize.getWidth(), previewSize.getHeight());
   camera.setDisplayOrientation(90);
   camera.setParameters(parameters);
   camera.setPreviewTexture(availableSurfaceTexture);
  } catch (IOException exception) {
   camera.release();
  }
  camera.setPreviewCallbackWithBuffer(imageListener);
  Camera.Size s = camera.getParameters().getPreviewSize();
  camera.addCallbackBuffer(new byte[ImageUtils.getYUVByteSize(s.height, s.width)]);
  textureView.setAspectRatio(s.height, s.width);
  camera.startPreview();
 }
 protected void stopCamera() {
  if (camera != null) {
   camera.stopPreview();
```

```
camera.setPreviewCallback(null);
camera.release();
camera = null;
}
private int getCameraId() {
CameraInfo ci = new CameraInfo();
for (int i = 0; i < Camera.getNumberOfCameras(); i++) {
Camera.getCameraInfo(i, ci);
if (ci.facing == CameraInfo.CAMERA_FACING_BACK) return i;
}
return -1; // No camera found
}
```

#### Detector.java

package org.tensorflow.lite.examples.detection.tflite;

import android.graphics.Bitmap; import android.graphics.RectF; import java.util.List;

```
/** Generic interface for interacting with different recognition engines. */
public interface Detector {
   List<Recognition> recognizeImage(Bitmap bitmap);
```

```
void enableStatLogging(final boolean debug);
```

String getStatString();

void close();

void setNumThreads(int numThreads);

void setUseNNAPI(boolean isChecked);

/\*\* An immutable result returned by a Detector describing what was recognized. \*/ public class Recognition {

/\*\*

\* A unique identifier for what has been recognized. Specific to the class, not the instance of \* the object. \*/

private final String id;

/\*\* *Display name for the recognition.* \*/ private final String title;

/\*\*

\* A sortable score for how good the recognition is relative to others. Higher should be better. \*/

private final Float confidence;

/\*\* Optional location within the source image for the location of the recognized object. \*/ private RectF location;

```
public Recognition(
  final String id, final String title, final Float confidence, final RectF location) {
 this.id = id;
 this.title = title;
 this.confidence = confidence;
this.location = location;
}
public String getId() {
 return id;
}
public String getTitle() {
 return title;
}
public Float getConfidence() {
return confidence;
}
public RectF getLocation() {
 return new RectF(location);
}
public void setLocation(RectF location) {
this.location = location;
}
@Override
public String toString() {
 String resultString = "";
 if (id != null) {
  resultString += "[" + id + "] ";
 }
```

```
if (title != null) {
  resultString += title + " ";
  }
if (confidence != null) {
  resultString += String.format("(%.1f%%) ", confidence * 100.0f);
  }
if (location != null) {
  resultString += location + " ";
  }
return resultString.trim();
}
```

```
AutoFitTextureView.java
```

}

package org.tensorflow.lite.examples.detection.customview;

import android.content.Context; import android.util.AttributeSet; import android.view.TextureView;

```
/** A {@link TextureView} that can be adjusted to a specified aspect ratio. */
public class AutoFitTextureView extends TextureView {
    private int ratioWidth = 0;
    private int ratioHeight = 0;
    public AutoFitTextureView(final Context context) {
        this(context, null);
    }
    public AutoFitTextureView(final Context context, final AttributeSet attrs) {
        this(context, attrs, 0);
    }
    public AutoFitTextureView(final Context context, final AttributeSet attrs, final int defStyle) {
        super(context, attrs, defStyle);
    }
}
```

```
/**
```

}

```
* Sets the aspect ratio for this view. The size of the view will be measured based on the ratio
* calculated from the parameters. Note that the actual sizes of parameters don't matter, that is,
* calling setAspectRatio(2, 3) and setAspectRatio(4, 6) make the same result.
*
```

```
* @param width Relative horizontal size
  * @param height Relative vertical size
  */
public void setAspectRatio(final int width, final int height) {
  if (width < 0 \parallel height < 0) {
   throw new IllegalArgumentException("Size cannot be negative.");
  }
  ratioWidth = width;
  ratioHeight = height;
  requestLayout();
 }
 @Override
 protected void onMeasure(final int widthMeasureSpec, final int heightMeasureSpec) {
  super.onMeasure(widthMeasureSpec, heightMeasureSpec);
  final int width = MeasureSpec.getSize(widthMeasureSpec);
  final int height = MeasureSpec.getSize(heightMeasureSpec);
  if (0 == ratioWidth || 0 == ratioHeight) {
   setMeasuredDimension(width, height);
  } else {
   if (width < height * ratioWidth / ratioHeight) {
     setMeasuredDimension(width, width * ratioHeight / ratioWidth);
   } else {
     setMeasuredDimension(height * ratioWidth / ratioHeight, height);
   }
  }
 }
}
```

### BuildConfig.java

package org.tensorflow.lite.examples.detection.tflite;

```
public final class BuildConfig {
    public static final boolean DEBUG = Boolean.parseBoolean("true");
    public static final String LIBRARY_PACKAGE_NAME =
    "org.tensorflow.lite.examples.detection.tflite";
    public static final String BUILD_TYPE = "debug";
    public static final int VERSION_CODE = 1;
    public static final String VERSION_NAME = "1.0";
}
```

### TFLiteObjectDetectionAPIModel.java

package org.tensorflow.lite.examples.detection.tflite;

import static java.lang.Math.min;

import android.content.Context: import android.content.res.AssetFileDescriptor; import android.content.res.AssetManager; import android.graphics.Bitmap; import android.graphics.RectF; import android.os.Trace; import android.util.Log: import java.io.BufferedReader; import java.io.FileInputStream; import java.io.IOException; import java.io.InputStreamReader; import java.nio.ByteBuffer; import java.nio.ByteOrder; import java.nio.MappedByteBuffer; import java.nio.channels.FileChannel; import java.nio.charset.Charset; import java.util.ArrayList; import java.util.HashMap; import java.util.List; import java.util.Map; import org.tensorflow.lite.Interpreter; import org.tensorflow.lite.support.metadata.MetadataExtractor;

/\*\*

\* Wrapper for frozen detection models trained using the Tensorflow Object Detection API: - \* https://github.com/tensorflow/models/tree/master/research/object\_detection where you can find the

\* training code.

\*

\* To use pretrained models in the API or convert to TF Lite models, please see docs for details:

\* \_ \*

https://github.com/tensorflow/models/blob/master/research/object\_detection/g3doc/tf1\_detection \_zoo.md

\* \_ \*

https://github.com/tensorflow/models/blob/master/research/object\_detection/g3doc/tf2\_detection \_zoo.md

\* \_

\*

https://github.com/tensorflow/models/blob/master/research/object\_detection/g3doc/running\_on\_ mobile\_tensorflowlite.md#running-our-model-on-android \*/

public class TFLiteObjectDetectionAPIModel implements Detector {
 private static final String TAG = "TFLiteObjectDetectionAPIModelWithInterpreter";

// Only return this many results. private static final int NUM DETECTIONS = 10; // Float model private static final float *IMAGE\_MEAN* = 127.5f; private static final float *IMAGE* STD = 127.5f; // Number of threads in the java app private static final int *NUM\_THREADS* = 4; private boolean isModelQuantized; // Config values. private int inputSize; // Pre-allocated buffers. private final List<String> labels = new ArrayList<>(); private int[] intValues; // outputLocations: array of shape [Batchsize, NUM\_DETECTIONS,4] // contains the location of detected boxes private float[][][] outputLocations; // outputClasses: array of shape [Batchsize, NUM\_DETECTIONS] // contains the classes of detected boxes private float[][] outputClasses; // outputScores: array of shape [Batchsize, NUM\_DETECTIONS] // contains the scores of detected boxes private float[][] outputScores; // numDetections: array of shape [Batchsize] // contains the number of detected boxes private float[] numDetections;

private ByteBuffer imgData;

private MappedByteBuffer tfLiteModel; private Interpreter.Options tfLiteOptions; private Interpreter tfLite;

private TFLiteObjectDetectionAPIModel() { }

```
/** Memory-map the model file in Assets. */
```

```
private static MappedByteBuffer loadModelFile(AssetManager assets, String modelFilename)
    throws IOException {
        AssetFileDescriptor fileDescriptor = assets.openFd(modelFilename);
        FileInputStream inputStream = new FileInputStream(fileDescriptor.getFileDescriptor());
        FileChannel fileChannel = inputStream.getChannel();
        long startOffset = fileDescriptor.getStartOffset();
        long declaredLength = fileDescriptor.getDeclaredLength();
        return fileChannel.map(FileChannel.MapMode.READ_ONLY, startOffset, declaredLength);
    }
}
```

/\*\*

```
* Initializes a native TensorFlow session for classifying images.
  * @param modelFilename The model file path relative to the assets folder
  * @param labelFilename The label file path relative to the assets folder
  * @param inputSize The size of image input
  * @param isQuantized Boolean representing model is quantized or not
  */
public static Detector create(
   final Context context,
   final String modelFilename,
   final String labelFilename,
   final int inputSize,
   final boolean isQuantized)
   throws IOException {
  final TFLiteObjectDetectionAPIModel d = new TFLiteObjectDetectionAPIModel();
  MappedByteBuffer modelFile = loadModelFile(context.getAssets(), modelFilename);
  MetadataExtractor metadata = new MetadataExtractor(modelFile);
  try (BufferedReader br =
    new BufferedReader(
       new InputStreamReader(
         metadata.getAssociatedFile(labelFilename), Charset.defaultCharset()))) {
   String line;
   while ((line = br.readLine()) != null) {
    Log.w(TAG, line);
     d.labels.add(line);
   }
  }
  d.inputSize = inputSize;
  try {
   Interpreter.Options options = new Interpreter.Options();
   options.setNumThreads(NUM THREADS);
   options.setUseXNNPACK(true);
   d.tfLite = new Interpreter(modelFile, options);
   d.tfLiteModel = modelFile;
   d.tfLiteOptions = options;
  } catch (Exception e) {
   throw new RuntimeException(e);
  }
  d.isModelOuantized = isOuantized;
  // Pre-allocate buffers.
  int numBytesPerChannel;
  if (isQuantized) {
   numBytesPerChannel = 1; // Quantized
```

```
} else {
   numBytesPerChannel = 4; // Floating point
  d.imgData = ByteBuffer.allocateDirect(1 * d.inputSize * d.inputSize * 3 *
numBytesPerChannel);
  d.imgData.order(ByteOrder.nativeOrder());
  d.intValues = new int[d.inputSize * d.inputSize];
  d.outputLocations = new float[1][NUM_DETECTIONS][4];
  d.outputClasses = new float[1][NUM DETECTIONS];
  d.outputScores = new float[1][NUM_DETECTIONS];
  d.numDetections = new float[1]:
  return d:
 }
 @Override
 public List<Recognition> recognizeImage(final Bitmap bitmap) {
  // Log this method so that it can be analyzed with systrace.
  Trace.beginSection("recognizeImage");
  Trace.beginSection("preprocessBitmap");
  // Preprocess the image data from 0-255 int to normalized float based
  // on the provided parameters.
  bitmap.getPixels(intValues, 0, bitmap.getWidth(), 0, 0, bitmap.getWidth(),
bitmap.getHeight());
  imgData.rewind();
  for (int i = 0; i < inputSize; ++i) {
   for (int j = 0; j < inputSize; ++j) {
    int pixelValue = intValues[i * inputSize + j];
    if (isModelQuantized) {
     // Quantized model
     imgData.put((byte) ((pixelValue >> 16) & 0xFF));
     imgData.put((byte) ((pixelValue >> 8) & 0xFF));
     imgData.put((byte) (pixelValue & 0xFF));
     } else { // Float model
     imgData.putFloat((((pixelValue >> 16) & 0xFF) - IMAGE MEAN) / IMAGE STD);
     imgData.putFloat((((pixelValue >> 8) & 0xFF) - IMAGE_MEAN) / IMAGE_STD);
     imgData.putFloat(((pixelValue & 0xFF) - IMAGE_MEAN) / IMAGE_STD);
    }
   }
  Trace.endSection(); // preprocessBitmap
  // Copy the input data into TensorFlow.
  Trace.beginSection("feed");
  outputLocations = new float[1][NUM DETECTIONS][4];
```

outputClasses = new float[1][NUM\_DETECTIONS]; outputScores = new float[1][NUM\_DETECTIONS]; numDetections = new float[1];

Object[] inputArray = {imgData}; Map<Integer, Object> outputMap = new HashMap<>(); outputMap.put(0, outputLocations); outputMap.put(1, outputClasses); outputMap.put(2, outputScores); outputMap.put(3, numDetections); Trace.endSection();

// Run the inference call. Trace.beginSection("run"); tfLite.runForMultipleInputsOutputs(inputArray, outputMap); Trace.endSection();

// Show the best detections.

// after scaling them back to the input size.

// You need to use the number of detections from the output and not the NUM\_DETECTONS variable

// declared on top

// because on some models, they don't always output the same total number of detections
// For example, your model's NUM\_DETECTIONS = 20, but sometimes it only outputs 16
predictions

// If you don't use the output's numDetections, you'll get nonsensical data
int numDetectionsOutput =

min(

NUM\_DETECTIONS,

(int) numDetections[0]); // cast from float to integer, use min for safety

final ArrayList<Recognition> recognitions = new ArrayList<>(numDetectionsOutput);
for (int i = 0; i < numDetectionsOutput; ++i) {</pre>

final RectF detection =

new RectF(

outputLocations[0][i][1] \* inputSize, outputLocations[0][i][0] \* inputSize, outputLocations[0][i][3] \* inputSize, outputLocations[0][i][2] \* inputSize);

```
recognitions.add(
```

new Recognition(

"" + i, labels.get((int) outputClasses[0][i]), outputScores[0][i], detection));

Trace.*endSection*(); // "recognizeImage" return recognitions;

}

```
@Override
public void enableStatLogging(final boolean logStats) {}
 @Override
public String getStatString() {
  return "";
 }
 @Override
public void close() {
 if (tfLite != null) {
   tfLite.close();
   tfLite = null;
  }
 }
 @Override
public void setNumThreads(int numThreads) {
  if (tfLite != null) {
   tfLiteOptions.setNumThreads(numThreads);
   recreateInterpreter();
  }
 }
 @Override
public void setUseNNAPI(boolean isChecked) {
  if (tfLite != null) {
   tfLiteOptions.setUseNNAPI(isChecked);
   recreateInterpreter();
  }
 }
private void recreateInterpreter() {
  tfLite.close();
  tfLite = new Interpreter(tfLiteModel, tfLiteOptions);
}
}
```

# SCREENSHOTS







Inreads	
Interence Time	2553ms
Crop	300x300
Frame	640x480

## CONCLUSION

By using this project and based on experimental results we are able to detect object more precisely and identify the objects individually with exact location of an object in the picture. It also provide experimental results on different methods for object detection and identification and compares each method for their efficiencies.

### **FUTURE ENHANCEMENT**

The object recognition system can be applied in the area of surveillance system, face recognition, fault detection, character recognition etc. The objective of this thesis is to develop an object recognition system to recognize the 2D and 3D objects in the image.

Fully occluded object cannot be tracked and considered as a new object in the next frame.

Splitting and merging cannot be handled very well in all conditions using the single camera due to the loss of information of a 3D object projection in 2D images.

For Night time visual tracking, night vision mode should be available as an inbuilt feature in the CCTV camera. To make the system fully automatic and also to overcome the above limitations, in future, multi- view tracking can be implemented using multiple cameras. Multi view tracking has the obvious advantage over single view tracking because of wide coverage range with different viewing angles for the objects to be tracked.

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# ANDROID APP FOR WEATHER REPORT AND WEATHER FORECASTING

A project submitted to

ST. MARY'S COLLEGE (Autonomous), THOOTHUKUDI

Affiliated to

### MANONMANIAM SUNDARANAR UNIVERSITY

### TIRUNELVELI

in partial fulfillment of the award of the degree of

### MASTER OF COMPUTER SCIENCE

Submitted by

## MONICA. L

### Regno: 19SPCS04

Under the Supervision and Guidance of

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# PG DEPARTMENT OF COMPUTER SCIENCE (SSC)

St. Mary's College (Autonomous), Thoothukudi-628001

# **APRIL – 2021**

#### CERTIFICATE

This is to certify that this project work entitled as "ANDROID APP FOR WEATHER REPORT AND WEATHER FORECASTING" is submitted to St. Mary's College (Autonomous), Thoothukudi affiliated to Manonmaniam Sundaranar University, Tirunelveli, in partial fulfillment for the award of the degree of Master of Computer Science for the work done during the year 2020-2021 by MONICA. L (Reg no: 19SPCS04)

A - Lintte

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Signature of the Principal Principal

St. Mary's College (Autonomous) Thoothukudi - 628 001.

Rayan 16 16/4/2021 Signature of the Examiner

#### DECLARATION

I do hereby declare that the project entitled "ANDROID APP FOR WEATHER REPORT AND WEATHER FORECASTING" submitted for the degree of Master of Science in Computer Science is my original work carried out under the guidance of Mrs. A. Jenitta Jebamalar M.Sc (IT)., M.Sc (CS)., MPhil., B.Ed., Assistant Professor, PG Department of Computer Science (SSC), St. Mary's College (Autonomous), Thoothukudi..

**Station:** Thoothukudi.

Signature of the Student

Date:

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#### ABSTRACT

Nowadays, it is typical that people need detailed and easily available information about current weather and weather forecast. A solution to this requirement can be a mobile phone application which communicates with a data server and provides all useful information in an easily useable user interface. As a consequence, an Android based mobile application is provided.

It uses XML data from Open Weather Map and analyses them with a parser. DOM parser and SAX parser are utilized in the application and they are compared experimentally. It is found that the SAX parser is several times quicker than the DOM parser.

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### **INTRODUCTION**

There are a variety of weather mobile apps in Google Play. Those apps have great features and functionalities to satisfy users. However, according to my research, only a few of them have friendly user interface and human centered interactions, which means that a lot of them might be difficult to be navigated even though they provide enough functionalities. It is not convenient for new users.

Therefore, I would like to do improvements on weather mobile apps. The mobile app allows people to check out the weather in multiple cities worldwide. The weather data is dynamic, which means that users can see the weather anytime. The mobile app not only show the weather, temperature and humidity, but it also uses various icons to represent the weather accordingly.

It will be easy to read and use. Besides, the mobile app will have friendly user interfaces and human centered interactions. Users can find the information they want in a short time and limited clicks. It is easy to be navigated than other weather mobile apps in the market.

# SYSTEM SPECIFICATION

### HARDWARE REQUIREMENT:

- Hardware 500MB(minimum)
- Processor Pentium(166MHZ)(minimum)
- Ram 160GB(minimum)
- Floppy Drive 1.44 MB
- ✤ Key Board Standard Windows Keyboard
- ✤ Mouse Two or Three Button Mouse
- Monitor SVGA

### SOFTWARE REQUIREMENTS:

- Operating System Windows XP or Win7
- Tools Java JDK5 or latest version, Java Runtime Environment (JRE) 6, Android SDK, Android Studio, Android Development Tool kit (ADT kit)
- Document MS-Office

## **PROJECT DESCRIPTION**

People used to have a desire to understand and predict the weather since ancient times. They were noticing the hundreds of signs, trying to guess whether it will be snowing or raining tomorrow and still were wrong in most cases.

Today everyone can become an unmistakable oracle. Moreover, with the help of a simple OpenWeatherMapAPI via RapidAPI you can endow your applications with an almost supernatural power to accurately predict tomorrow's weather. Such ability is useful in many industries whether you are developing a travel application, an event management system or implementing smart city infrastructure management.

The API functionality is presented in the Endpoints subsection of the OpenWeatherMap API section. The window is divided into three main areas. The first area on the left displays a list of available endpoints (tasks), each task displays its HTTP method.

OpenWeatherMap is an online service, owned by OpenWeather Ltd, that provides global weather data via API, including current weather data, forecasts, nowcasts and historical weather data for any geographical location. The company provides a minute-by-minute hyperlocal precipitation forecast for any location.

#### **Mobile User Analysis**

Basically, everyandroid userscould betheusersofmyapp. However, especiallyforpeople who would like to see the weather every day and decide what to wear tomorrow will be the target users for this app.

- The main target users include:
- Business men/women
- For business men or women, they need to view the weather information before they go to work every day, so that they will know what to wear, such as long sleeve t-shirt or short sleeve t-shirt.
- Mothers
- Every mother cares about their children, so another group of target users could be mothers. They will view weather information every morning to know how to prepare clothes for their children.
- Travelers

### **Scenario Analysis**

• Screen and Interaction Analysis

The users will use this mobile app on Android smart phones. All the information of this mobile app will be displayed full screen. Basically, the interactions include touch and click. For example, when users would like to view weather information, they click the icon to open this app; when they want to add a new city, they click the add icon and type in the city that they want.

• Usage Analysis

Users can use this mobile app on the morning every day at home, on their way to travel, and other situations as long as they want to know weather information.

• Environment Analysis

This mobile app only can be used on smart phones, not tablet devices. It will access to the Yahoo weather API to get the weather information. It sends requests, and then get responses from the API through the internet.

## The Main Functionalities Include:

- Viewtheweatherinformation(temperature, humidity, windspeedetc.) ofthecities that people added.
- Add new cities to the list or delete cities from the list.
- Change settings. Users can choose to use 24-hour time or select other languages the mobile app provides
- Widget on the homepage of the cell phone. There will be a small widget (half screen) shows the basic weather information.
- The background color will be changed according to the temperature. If the temperature is too high, the background color will become red or orange; if the temperature is too low, the background color will become blue or silver.

#### **MODULE DESCRIPTION**

The project entitled with "Android App For Weather Report And Weather Forecasting" consists of following modules.

- Current Weather Data
- Forecast Weather Data
- Search Weather Data
- Using GPS
- Location Based
- Prediction Reports

**Current Weather Data** – Using this kind of requests, you can get weather data in any location on the earth. The current

weather data is updated online based on data from more than 40,000 weather stations.

**Forecast Weather Data** – You can receive weather forecast in any location on the earth. The flexible algorithm of weather calculation provides weather data not only for cities but for any geographic coordinates. It is important for megapolises, for example, where weather is different on opposite city edges. You can get forecast data every 3 hours. The 3 hours forecast is available for 5 days. All weather data can be obtained in JSON or XML formats.

**Search Weather Data** – You can search for data by city name. Put the city name or its part and get the list of the most proper cities in the world. Example – Lon or Lond or London. The more precise city name you put, the more precise list you will get. To make it even more accurate, put the city name or its part, then put a comma and write the name of the county or 2-letter country code. You will get all the proper cities in the chosen country. For example – Lon, UK or Lon, GB or London, GB or Lon, England.

Using GPS- we can know the weather through GPS in our mobile.

Location Based- We can know the weather at other locations.

**Prediction Reports-** we can know weather forecast reports for coming 10 days in a Given location.

# SYSTEM STUDY

### **EXISTING SYSTEM**

In the existing system, we don't have mobile applications to check the weather conditions. If we go some new place, then we have to check the weather conditions instantly. So, to check instantly, we need a mobile application because, mobile is part of our life presently. Anyone can handle the mobile device easily.

#### **Disadvantage of Existing System:**

1. To check the weather conditions, we need browse the search engine application and enter the details. Then only we can get the weather report.

### **PROPOSED SYSTEM**

In the proposed system, we are developing an android application for detecting weather condition reports at present location. This is similar to the web application and we can get same results but, existing system is not portable.

### Advantage of Proposed System:

- 1. Any location weather details we can check at that moment
- 2. Proposed system is portable.

## SYSTEM ANALYSIS

#### **FEASIBILITY STUDY**:

Feasibility study is an important outcome of preliminary investigation, which is determination of whether the request is feasible or not. During our preliminary investigation at college (Department of Science) we examine that the entire affaire concerned with the "Request" is to develop a new project. After getting information we check that the information is economical, technical and operationally feasible or not. The proposed system is reviewed considering three feasibility studies, which are as follows,

- Economical Feasibility.
- Operational Feasibility.
- Technical Feasibility.

#### **ECONOMICAL FEASIBILITY :**

The hardware/software setup required is that the proposed system can be easily run on any dual core smartphone and as the software used to build system is JAVA in windows98/2000/XP/7 or we can build this in Linux/GNU also. So it does not cost high.

#### **OPERATIONAL FEASIBILITY :**

One of the objectives of developing and user friendly application apart from speeding of the operation is that users do not face any problem while making any plans depending on the Weather.

#### **TECHNICAL FEASIBILITY :**

Though, there is no equipment in existing system, essential to implementation new computerized system but are not away from college access. The hardware required is (i.e. P.C.) and software JAVA & Android Studio(Operating System) are available at many developers point .

# SYSTEM DESIGN

## **UML DIAGRAM:**

A UML diagram is a diagram based on the UML (**Unified Modeling Language**) with the purpose of visually representing a system along with its main **actors**, roles, actions, **artifacts** or classes, in order to better understand, alter, maintain, or document information about the system.

## **USE CASE DIAGRAM:**



# **SEQUENCE DIAGRAM:**



# **ACTIVITY DIAGRAM:**



# **ARCHITECTURAL DESIGN:**



# SYSTEM TESTING

# **PLANNED TEST:**

I conducted a testing plan to see if the mobile app can connect to the server and get JSON data in while I am programming. Also, I will fix bugs during the development progress as many as possible. Besides, there is another test plans that let me test the entire mobile app.

## White Box Testing:

Testing Case	<b>Testing Result</b>	Solution
View weather information of the default city	Working	
View the weather condition image (if it is right or wrong)	Working	(those icons on the homepages are wrong ones, but this is not hard to be fixed)
View another city's (default city) weather information by change the city's name or latitude and longitude	Working	
View current weather information	Working	
View other cities current weather Information	Working	
View future weather information	Not Working	I could not be able to access the data from the server (JSON). Without getting the JSON data, I cannot parse it and set it on those texts.

# **Black Box Testing:**

Testing Case	<b>Testing Result</b>	Solution
Randomly select a city and view its weather information	Working	
Randomly select a city and see if the search result is correct or not (test search bar functionality)	Not working	The search bar does not work well and also there is no database in the app
Randomly select a language and see if it works or not	Not working	There are few bugs with the java code

# **Functional Testing:**

As I said above, few functionalities work well.

- The mobile app can connect to the internet/server
- The mobile app can send request to the API server
- The mobile app can get JSON data from the API server
- The mobile app can parse JSON data and display all the data on the screen
- Users can view every city's weather information
- Users can jump from main page to the setting page
- Once I click the item of the list on the home screen, it will go to the weather detail information page.

## **Other Testing Activities To Be Conducted**

• User experience

The user experience might be different when I test the app on a real device, due the resolution and the screen size. I will definitely do adjustments based on the data that I get.n

• Functionalities

Few functionalities might be changed due to technical reasons. For an instance, I planned to display the basic weather information in a small widget in the home screen of the device. If this functionality cannot be implemented eventually, I probably will cancel it.

# CODING

## Main Activity.java:

package cz.martykan.forecastie.activities;

**import** android.Manifest; **import** android.app.ProgressDialog; **import** android.content.Context; import android.content.DialogInterface; **import** android.content.Intent; import android.content.SharedPreferences; import android.content.pm.PackageManager; import android.graphics.Typeface; **import** android.location.Location: import android.location.LocationListener; import android.location.LocationManager; import android.net.ConnectivityManager; **import** android.net.NetworkInfo; import android.os.AsyncTask; **import** android.os.Bundle; import android.preference.PreferenceManager; **import** android.provider.Settings; **import** com.google.android.material.appbar.AppBarLayout; **import** com.google.android.material.snackbar.Snackbar; **import** com.google.android.material.tabs.TabLayout; **import** com.google.android.material.textfield.TextInputLayout; import androidx.annotation.NonNull; **import** androidx.appcompat.app.ActionBar; **import** androidx.core.app.ActivityCompat; **import** androidx.fragment.app.FragmentTransaction; import androidx.core.content.ContextCompat; **import** androidx.viewpager.widget.ViewPager; **import** androidx.swiperefreshlayout.widget.SwipeRefreshLayout; import androidx.appcompat.app.AlertDialog; **import** androidx.appcompat.widget.Toolbar; **import** android.text.InputType; **import** android.util.Log: **import** android.view.Menu; import android.view.MenuItem;

import android.view.View;

import android.widget.EditText;

import android.widget.LinearLayout; import android.widget.TextView;

import org.json.JSONArray; import org.json.JSONException; import org.json.JSONObject; **import** java.text.DateFormat; **import** java.text.DecimalFormat; **import** java.util.ArrayList; **import** java.util.Calendar; **import** java.util.Date; **import** java.util.GregorianCalendar; **import** java.util.HashMap; **import** java.util.List; **import** java.util.Map; import cz.martykan.forecastie.AlarmReceiver; **import** cz.martykan.forecastie.Constants; **import** cz.martykan.forecastie.R; **import** cz.martykan.forecastie.adapters.ViewPagerAdapter; **import** cz.martykan.forecastie.adapters.WeatherRecyclerAdapter; **import** cz.martykan.forecastie.fragments.AboutDialogFragment; **import** cz.martykan.forecastie.fragments.AmbiguousLocationDialogFragment; **import** cz.martykan.forecastie.fragments.RecyclerViewFragment; import cz.martykan.forecastie.models.Weather; import cz.martykan.forecastie.tasks.GenericRequestTask; **import** cz.martykan.forecastie.tasks.ParseResult; **import** cz.martykan.forecastie.tasks.TaskOutput; **import** cz.martykan.forecastie.utils.Formatting;

import cz.martykan.forecastie.utils.UI;

import cz.martykan.forecastie.utils.UnitConvertor;

import cz.martykan.forecastie.widgets.AbstractWidgetProvider;

import static cz.martykan.forecastie.utils.TimeUtils.isDayTime;

public class MainActivity extends BaseActivity implements LocationListener {
 protected static final int MY\_PERMISSIONS\_ACCESS\_FINE\_LOCATION = 1;
 public static final String SHOULD\_REFRESH\_FLAG = "shouldRefresh";

// Time in milliseconds; only reload weather if last update is longer ago than this value
private static final int NO\_UPDATE\_REQUIRED\_THRESHOLD = 300000;

private static Map<String, Integer> speedUnits = new HashMap<>(3);
private static Map<String, Integer> pressUnits = new HashMap<>(3);
private static boolean mappingsInitialised = false;

private Weather todayWeather = new Weather();

private TextView todayTemperature; private TextView todayDescription; private TextView todayWind; private TextView todayPressure; private TextView todayHumidity; private TextView todaySunrise; private TextView todaySunrise; private TextView todayUvIndex
private TextView lastUpdate;
private TextView todayIcon;
private TextView tapGraph;
private ViewPager viewPager;
private TabLayout tabLayout;
private SwipeRefreshLayout swipeRefreshLayout;

private View appView;

private LocationManager locationManager; private ProgressDialog progressDialog;

private int theme; private boolean widgetTransparent; private boolean destroyed = false; private boolean firstRun;

private List<Weather> longTermWeather = new ArrayList<>(); private List<Weather> longTermTodayWeather = new ArrayList<>(); private List<Weather> longTermTomorrowWeather = new ArrayList<>();

public String recentCityId = '''';

private Formatting formatting; private SharedPreferences prefs; private LinearLayout linearLayoutTapForGraphs;

@Override

protected void onCreate(Bundle savedInstanceState) {
 // Initialize the associated SharedPreferences file with default values
 PreferenceManager.setDefaultValues(this, R.xml.prefs, false);

prefs = PreferenceManager.getDefaultSharedPreferences(this); firstRun = prefs.getBoolean("firstRun", true);

widgetTransparent = prefs.getBoolean("transparentWidget", false);
//noinspection ConstantConditions
setTheme(theme = UI.getTheme(prefs.getString("theme", "fresh")));
boolean darkTheme = super.darkTheme;
boolean blackTheme = super.blackTheme;
formatting = new Formatting(this);

// Initiate activity

super.onCreate(savedInstanceState); setContentView(R.layout.activity\_scrolling); appView = findViewById(R.id.viewApp); swipeRefreshLayout = findViewById(R.id.swipeRefreshLayout); AppBarLayout appBarLayout = findViewById(R.id.appBarLayout);

progressDialog = new ProgressDialog(MainActivity.this);
// Load toolbar
Toolbar toolbar = findViewById(R.id.toolbar);
setSupportActionBar(toolbar);
if (darkTheme) {
 toolbar.setPopupTheme(R.style.AppTheme\_PopupOverlay\_Dark);
} else if (blackTheme) {
 toolbar.setPopupTheme(R.style.AppTheme\_PopupOverlay\_Black);
}

#### // Initialize textboxes

```
todayTemperature = findViewById(R.id.todayTemperature);
todayDescription = findViewById(R.id.todayDescription);
todayWind = findViewById(R.id.todayWind);
todayPressure = findViewById(R.id.todayPressure);
todayHumidity = findViewById(R.id.todayHumidity);
todaySunrise = findViewById(R.id.todaySunrise);
todaySunset = findViewById(R.id.todaySunset);
todayUvIndex = findViewById(R.id.todayUvIndex);
lastUpdate = findViewById(R.id.lastUpdate);
todayIcon = findViewById(R.id.todayIcon);
tapGraph = findViewById(R.id.todayIcon);
linearLayoutTapForGraphs = findViewById(R.id.linearLayout_tap_for_graphs);
Typeface weatherFont = Typeface.createFromAsset(this.getAssets(),
```

## "fonts/weather.ttf");

todayIcon.setTypeface(weatherFont);

// Initialize viewPager

viewPager = findViewById(R.id.viewPager); tabLayout = findViewById(R.id.tabs);

destroyed = **false**;

initMappings();

// Preload data from cache
preloadWeather();
preloadUVIndex();
updateLastUpdateTime();

// Set autoupdater

AlarmReceiver.setRecurringAlarm(**this**); swipeRefreshLayout.setOnRefreshListener(**new** 

```
SwipeRefreshLayout.OnRefreshListener() {
       @Override
      public void onRefresh() {
         refreshWeather();
         swipeRefreshLayout.setRefreshing(false);
       }
    });
    appBarLayout.addOnOffsetChangedListener(new
AppBarLayout.OnOffsetChangedListener() {
       @Override
      public void onOffsetChanged(AppBarLayout appBarLayout, int verticalOffset) {
         // Only allow pull to refresh when scrolled to top
         swipeRefreshLayout.setEnabled(verticalOffset == 0);
       }
    });
  }
  @Override
  protected void onNewIntent(Intent intent) {
    super.onNewIntent(intent);
    if (intent == null)
      return:
    Bundle bundle = intent.getExtras();
    if (bundle != null && bundle.getBoolean(SHOULD_REFRESH_FLAG)) {
      refreshWeather();
    }
  }
  public WeatherRecyclerAdapter getAdapter(int id) {
    WeatherRecyclerAdapter weatherRecyclerAdapter;
    if (id == 0) {
      weatherRecyclerAdapter = new WeatherRecyclerAdapter(longTermTodayWeather);
    }
        else if (id ==
                             1)
                                  {
       weatherRecyclerAdapter = new
WeatherRecyclerAdapter(longTermTomorrowWeather);
    } else {
      weatherRecyclerAdapter = new WeatherRecyclerAdapter(longTermWeather);
    }
    return weatherRecyclerAdapter;
  }
  @Override
  public void onStart() {
    super.onStart();
    updateTodayWeatherUI();
```

```
updateLongTermWeatherUI();
updateUVIndexUI();
}
@Override
public void onResume() {
super.onResume();
//noinspection ConstantConditions
if (UI.getTheme(prefs.getString("theme", "fresh")) != theme ||
```

```
PreferenceManager.getDefaultSharedPreferences(this).getBoolean("transparentWidget",
false) != widgetTransparent) {
```

```
// Restart activity to apply theme
    overridePendingTransition(0, 0);
    prefs.edit().putBoolean("firstRun", true).commit();
    finish();
    overridePendingTransition(0, 0);
    startActivity(getIntent());
  } else if (shouldUpdate() && isNetworkAvailable()) {
    getTodayWeather();
    getLongTermWeather();
    getTodayUVIndex();
  }
  if (firstRun) {
    tapGraph.setText(getString(R.string.tap_for_graphs));
    prefs.edit().putBoolean("firstRun",false).commit();
  }
}
@Override
protected void onDestroy() {
  super.onDestroy();
  destroyed = true;
  if (locationManager != null) {
    try {
       locationManager.removeUpdates(MainActivity.this);
     } catch (SecurityException e) {
       e.printStackTrace();
     }
  }
}
private void preloadUVIndex() {
  SharedPreferences sp =
```

PreferenceManager.getDefaultSharedPreferences(MainActivity.this);

```
String lastUVIToday = sp.getString("lastToday", null);
    if (lastUVIToday != null && !lastUVIToday.isEmpty()) {
      double latitude = todayWeather.getLat();
      double longitude = todayWeather.getLon();
      if (latitude == 0 && longitude == 0) {
         return;
       }
      new TodayUVITask(this, this,
progressDialog).executeOnExecutor(AsyncTask.THREAD_POOL_EXECUTOR, "coords",
Double.toString(latitude), Double.toString(longitude));
  private void preloadWeather() {
    SharedPreferences sp =
PreferenceManager.getDefaultSharedPreferences(MainActivity.this);
    String lastToday = sp.getString("lastToday", null);
    if (lastToday != null && !lastToday.isEmpty()) {
      new TodayWeatherTask(this, this,
progressDialog).executeOnExecutor(AsyncTask.THREAD_POOL_EXECUTOR,
"cachedResponse", lastToday);
    String lastLongterm = sp.getString("lastLongterm", null);
    if (lastLongterm != null && !lastLongterm.isEmpty()) {
      new LongTermWeatherTask(this, this,
progressDialog).executeOnExecutor(AsyncTask.THREAD_POOL_EXECUTOR,
"cachedResponse", lastLongterm);
    }
  }
  private void getTodayUVIndex() {
    double latitude = todayWeather.getLat();
    double longitude = todayWeather.getLon();
    new TodayUVITask(this, this, progressDialog).execute("coords",
Double.toString(latitude), Double.toString(longitude));
  }
  private void getTodayWeather() {
    new TodayWeatherTask(this, this, progressDialog).execute();
  }
  private void getLongTermWeather() {
    new LongTermWeatherTask(this, this, progressDialog).execute();
  ļ
  private void searchCities() {
    final EditText input = new EditText(this);
    input.setInputType(InputType.TYPE_CLASS_TEXT);
```

```
input.setMaxLines(1);
     input.setSingleLine(true);
     TextInputLayout inputLayout = new TextInputLayout(this);
     inputLayout.setPadding(32, 0, 32, 0);
     inputLayout.addView(input);
     AlertDialog.Builder alert = new AlertDialog.Builder(this);
     alert.setTitle(this.getString(R.string.search_title));
     alert.setView(inputLayout);
         String result = input.getText().toString().trim();
         if (!result.isEmpty()) {
            new FindCitiesByNameTask(getApplicationContext(),
                 MainActivity.this, progressDialog).execute("city", result);
          }
       }
     });
     alert.setNegativeButton(R.string.dialog_cancel, new DialogInterface.OnClickListener()
{
       public void onClick(DialogInterface dialog, int whichButton) {
         // Cancelled
       }
     });
     alert.show();
  }
  private void saveLocation(String result) {
     SharedPreferences preferences =
PreferenceManager.getDefaultSharedPreferences(MainActivity.this);
     recentCityId = preferences.getString("cityId", Constants.DEFAULT_CITY_ID);
preferences.edit()
         .putString("cityId", result)
         .commit();
//
      if (!recentCityId.equals(result)) {
        // New location, update weather
//
//
        getTodayWeather();
//
        getLongTermWeather();
//
        getTodayUVIndex();
      }
//
  } private void aboutDialog() {
     new AboutDialogFragment().show(getSupportFragmentManager(), null);
   }
  public static String getRainString(JSONObject rainObj) {
     String rain = "0";
```

```
if (rainObj != null) {
       rain = rainObj.optString("3h", "fail");
       if (''fail''.equals(rain)) {
         rain = rainObj.optString("1h", "0");
       }
     }
    return rain;
  }
  private ParseResult parseTodayJson(String result) {
    try {
       JSONObject reader = new JSONObject(result);
       final String code = reader.optString("cod");
       if ("404".equals(code)) {
         return ParseResult.CITY_NOT_FOUND;
       }
       String city = reader.getString("name");
       String country = '''';
       JSONObject countryObj = reader.optJSONObject("svs");
       if (countryObj != null) {
         country = countryObj.getString("country");
         todayWeather.setSunrise(countryObj.getString("sunrise"));
         todayWeather.setSunset(countryObj.getString("sunset"));
       todayWeather.setCity(city);
       todayWeather.setCountry(country);
       JSONObject coordinates = reader.getJSONObject("coord");
       if (coordinates != null) {
         todayWeather.setLat(coordinates.getDouble("lat"));
         todayWeather.setLon(coordinates.getDouble("lon"));
         SharedPreferences sp = PreferenceManager.getDefaultSharedPreferences(this);
         sp.edit().putFloat("latitude", (float)
todayWeather.getLat()).putFloat("longitude", (float) todayWeather.getLon()).commit();
       JSONObject main = reader.getJSONObject("main");
       todayWeather.setTemperature(main.getString("temp"));
todayWeather.setDescription(reader.getJSONArray(''weather'').getJSONObject(0).getString
("description"));
       JSONObject windObj = reader.getJSONObject("wind");
```

todayWeather.setWind(windObj.getString("**speed**"));

```
if (windObj.has("deg")) {
         todayWeather.setWindDirectionDegree(windObj.getDouble("deg"));
       } else {
         Log.e("parseTodayJson", "No wind direction available");
         todayWeather.setWindDirectionDegree(null);
       }
       todayWeather.setPressure(main.getString("pressure"));
       todayWeather.setHumidity(main.getString("humidity"));
       JSONObject rainObj = reader.optJSONObject("rain");
       String rain:
       if (rainObj != null) {
         rain = getRainString(rainObj);
       } else {
         JSONObject snowObj = reader.optJSONObject("snow");
         if (snowObj != null) {
           rain = getRainString(snowObj);
         } else {
           rain = ''0'';
         }
       todayWeather.setRain(rain);
       final String idString =
reader.getJSONArray("weather").getJSONObject(0).getString("id");
       todayWeather.setId(idString);
       todayWeather.setIcon(formatting.setWeatherIcon(Integer.parseInt(idString),
isDayTime(todayWeather, Calendar.getInstance())));
       PreferenceManager.getDefaultSharedPreferences(MainActivity.this)
            .edit()
            .putString("lastToday", result)
           .commit();
     } catch (JSONException e) {
       Log.e("JSONException Data", result);
       e.printStackTrace();
       return ParseResult.JSON_EXCEPTION;
     }
    return ParseResult.OK
  private ParseResult parseTodayUVIJson(String result) {
    try {
       JSONObject reader = new JSONObject(result);
       final String code = reader.optString("cod");
       if (''404''.equals(code)) {
         todayWeather.setUvIndex(-1);
         return ParseResult.CITY_NOT_FOUND;
```

```
double value = reader.getDouble("value");
       todayWeather.setUvIndex(value);
       PreferenceManager.getDefaultSharedPreferences(MainActivity.this)
            .edit()
           .putString("lastUVIToday", result)
            .commit();
     } catch (JSONException e) {
       Log.e("JSONException Data", result);
       e.printStackTrace();
       return ParseResult.JSON_EXCEPTION;
    }
    return ParseResult.OK;
  }
  private void updateTodayWeatherUI() {
    try {
       if (todayWeather.getCountry().isEmpty()) {
         preloadWeather();
         return:
       }
     } catch (Exception e) {
       preloadWeather();
       return:
     }
    String city = todayWeather.getCity();
    String country = todayWeather.getCountry();
    DateFormat timeFormat =
android.text.format.DateFormat.getTimeFormat(getApplicationContext());
    ActionBar actionBar = getSupportActionBar();
    if (actionBar != null) {
       actionBar.setTitle(city + (country.isEmpty() ? "" : ", " + country));
     } SharedPreferences sp =
PreferenceManager.getDefaultSharedPreferences(MainActivity.this);
    // Temperature
    float temperature =
UnitConvertor.convertTemperature(Float.parseFloat(todayWeather.getTemperature()), sp);
    if (sp.getBoolean("temperatureInteger", false)) {
       temperature = Math.round(temperature);
    }
    // Rain
    double rain = Double.parseDouble(todayWeather.getRain());
    String rainString = UnitConvertor.getRainString(rain, sp);
    // Wind
    double wind;
    try {
```

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```

```
wind = Double.parseDouble(todayWeather.getWind());
     } catch (Exception e) {
       e.printStackTrace();
       wind = 0;
     }
    wind = UnitConvertor.convertWind(wind, sp);
    // Pressure
    double pressure = UnitConvertor.convertPressure((float)
Double.parseDouble(todayWeather.getPressure()), sp);
    todayTemperature.setText(new DecimalFormat("0.#").format(temperature) + " " +
sp.getString("unit", "°C"));
    todayDescription.setText(todayWeather.getDescription().substring(0, 1).toUpperCase()
+
         todayWeather.getDescription().substring(1) + rainString);
    if (sp.getString("speedUnit", "m/s").equals("bft")) {
       todayWind.setText(getString(R.string.wind) + ": " +
           UnitConvertor.getBeaufortName((int) wind, this) +
           (todayWeather.isWindDirectionAvailable()?"" + getWindDirectionString(sp,
this, todayWeather) : ""));
     } else {
       todayWind.setText(getString(R.string.wind) + ": " + new
DecimalFormat("0.0").format(wind) + " " +
           localize(sp, "speedUnit", "m/s") +
           (todayWeather.isWindDirectionAvailable()?"" + getWindDirectionString(sp,
this, todayWeather) : ""));
     }
    todayPressure.setText(getString(R.string.pressure) + ": " + new
DecimalFormat("0.0").format(pressure) + " " +
         localize(sp, "pressureUnit", "hPa"));
    todayHumidity.setText(getString(R.string.humidity) + ": " +
todayWeather.getHumidity() + " %");
    todaySunrise.setText(getString(R.string.sunrise) + ": " +
timeFormat.format(todayWeather.getSunrise()));
    todaySunset.setText(getString(R.string.sunset) + ": " +
timeFormat.format(todayWeather.getSunset()));
    todayIcon.setText(todayWeather.getIcon());
    linearLayoutTapForGraphs.setOnClickListener(new View.OnClickListener() {
       @Override
       public void onClick(View view) {
         Intent intent = new Intent(MainActivity.this, GraphActivity.class);
         startActivity(intent);
       }
    });
  }
```

```
private void updateUVIndexUI() {
    try {
       if (todayWeather.getCountry().isEmpty()) {
         return;
       }
    } catch (Exception e) {
       preloadUVIndex();
       return;
     }
    double uvIndex = todayWeather.getUvIndex();
    todayUvIndex.setText(getString(R.string.uvindex) + ": " + uvIndex + " (" +
UnitConvertor.convertUvIndexToRiskLevel(uvIndex, this) + '')'');
  public ParseResult parseLongTermJson(String result) {
    int i:
    try {
       JSONObject reader = new JSONObject(result);
       final String code = reader.optString("cod");
       if ("404".equals(code)) {
         if (longTermWeather == null) {
           longTermWeather = new ArrayList<>();
           longTermTodayWeather = new ArrayList<>();
           longTermTomorrowWeather = new ArrayList<>();
         }
         return ParseResult.CITY NOT FOUND:
       } longTermWeather = new ArrayList<>();
       longTermTodayWeather = new ArrayList<>();
       longTermTomorrowWeather = new ArrayList<>();
       JSONArray list = reader.getJSONArray("list");
       for (i = 0; i < \text{list.length}(); i++) 
         Weather weather = new Weather();
         JSONObject listItem = list.getJSONObject(i);
         JSONObject main = listItem.getJSONObject("main");
         weather.setDate(listItem.getString("dt"));
         weather.setTemperature(main.getString("temp"));
weather.setDescription(listItem.optJSONArray("weather").getJSONObject(0).getString("de
scription''));
         JSONObject windObj = listItem.optJSONObject("wind");
         if (windObj != null) {
           weather.setWind(windObj.getString("speed"));
           weather.setWindDirectionDegree(windObj.getDouble("deg"));
```

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}

```
weather.setPressure(main.getString("pressure"));
         weather.setHumidity(main.getString("humidity"));
         JSONObject rainObj = listItem.optJSONObject("rain");
         String rain = "";
         if (rainObj != null) {
           rain = getRainString(rainObj);
         } else {
           JSONObject snowObj = listItem.optJSONObject("snow");
           if (snowObj != null) {
rain = getRainString(snowObj);
            } else {
              rain = "0";
         }
         weather.setRain(rain);
         final String idString =
listItem.optJSONArray("weather").getJSONObject(0).getString("id");
         weather.setId(idString);
         final String dateMsString = listItem.getString("dt") + "000";
         Calendar cal = Calendar.getInstance();
         cal.setTimeInMillis(Long.parseLong(dateMsString));
         weather.setIcon(formatting.setWeatherIcon(Integer.parseInt(idString),
isDayTime(weather, cal)));
         Calendar today = Calendar.getInstance();
         today.set(Calendar.HOUR_OF_DAY, 0);
         today.set(Calendar.MINUTE, 0);
         today.set(Calendar.SECOND, 0);
         today.set(Calendar.MILLISECOND, 0);
         Calendar tomorrow = (Calendar) today.clone();
         tomorrow.add(Calendar.DAY_OF_YEAR, 1);
         Calendar later = (Calendar) today.clone();
         later.add(Calendar.DAY_OF_YEAR, 2);
         if (cal.before(tomorrow)) {
           longTermTodayWeather.add(weather);
         } else if (cal.before(later)) {
           longTermTomorrowWeather.add(weather);
         } else {
           longTermWeather.add(weather);
         }
       }
```

```
PreferenceManager.getDefaultSharedPreferences(MainActivity.this)
           .edit()
           .putString("lastLongterm", result)
           .commit();
    } catch (JSONException e) {
      Log.e("JSONException Data", result);
      e.printStackTrace();
      return ParseResult.JSON EXCEPTION;
    }return ParseResult.OK;
  }
  private void updateLongTermWeatherUI() {
    if (destroyed) {
      return;
    }
    ViewPagerAdapter viewPagerAdapter = new
ViewPagerAdapter(getSupportFragmentManager());
```

```
Bundle bundleToday = new Bundle();
bundleToday.putInt(''day'', 0);
RecyclerViewFragment recyclerViewFragmentToday = new RecyclerViewFragment();
recyclerViewFragmentToday.setArguments(bundleToday);
viewPagerAdapter.addFragment(recyclerViewFragmentToday,
getString(R.string.today));
```

```
Bundle bundleTomorrow = new Bundle();
bundleTomorrow.putInt("day", 1);
RecyclerViewFragment recyclerViewFragmentTomorrow = new
RecyclerViewFragment();
recyclerViewFragmentTomorrow.setArguments(bundleTomorrow);
viewPagerAdapter.addFragment(recyclerViewFragmentTomorrow,
getString(R.string.tomorrow));
```

```
Bundle bundle = new Bundle();
bundle.putInt("day", 2);
RecyclerViewFragment recyclerViewFragment = new RecyclerViewFragment();
recyclerViewFragment.setArguments(bundle);
viewPagerAdapter.addFragment(recyclerViewFragment, getString(R.string.later));
```

int currentPage = viewPager.getCurrentItem();

```
viewPagerAdapter.notifyDataSetChanged();
viewPager.setAdapter(viewPagerAdapter);
tabLayout.setupWithViewPager(viewPager);
```

```
if (currentPage == 0 && longTermTodayWeather.isEmpty()) {
    currentPage = 1;
```

```
}
    viewPager.setCurrentItem(currentPage, false);
  }
  private boolean isNetworkAvailable() {
    ConnectivityManager connectivityManager = (ConnectivityManager)
getSystemService(Context.CONNECTIVITY_SERVICE);
    NetworkInfo activeNetworkInfo = connectivityManager.getActiveNetworkInfo();
    return activeNetworkInfo != null && activeNetworkInfo.isConnected(); }
private boolean shouldUpdate() {
    long lastUpdate =
PreferenceManager.getDefaultSharedPreferences(this).getLong("lastUpdate", -1);
    boolean cityChanged =
PreferenceManager.getDefaultSharedPreferences(this).getBoolean("cityChanged", false);
    // Update if never checked or last update is longer ago than specified threshold
    return cityChanged || lastUpdate < 0 || (Calendar.getInstance().getTimeInMillis() -
lastUpdate) > NO_UPDATE_REQUIRED_THRESHOLD;
  ł
  @Override
  public boolean onCreateOptionsMenu(Menu menu) {
    getMenuInflater().inflate(R.menu.menu_main, menu);
    return true:
  }
  @Override
  public boolean onOptionsItemSelected(MenuItem item) {
    int id = item.getItemId();
    if (id == R.id.action_refresh) {
       refreshWeather();
       return true;
     }
    if (id == R.id.action_map) {
       Intent intent = new Intent(MainActivity.this, MapActivity.class);
       startActivity(intent);
     }
    if (id == R.id.action graphs) {
       Intent intent = new Intent(MainActivity.this, GraphActivity.class);
       startActivity(intent);
     ł
    if (id == R.id.action_search) {
       searchCities();
       return true:
    if (id == R.id.action_location) {
       getCityByLocation();
```

```
return true;
```

```
}
    if (id == R.id.action_settings) {
       Intent intent = new Intent(MainActivity.this, SettingsActivity.class);
       startActivity(intent);
     }
    if (id == R.id.action_about) {
       aboutDialog();
       return true;
     }
    return super.onOptionsItemSelected(item);
  }
  public void refreshWeather() {
if (isNetworkAvailable()) {
       getTodayWeather();
       getLongTermWeather();
       getTodayUVIndex();
     } else {
       Snackbar.make(appView, getString(R.string.msg_connection_not_available),
Snackbar.LENGTH LONG).show();
     }
  }
  public static void initMappings() {
    if (mappingsInitialised)
       return;
    mappingsInitialised = true;
    speedUnits.put("m/s", R.string.speed_unit_mps);
    speedUnits.put("kph", R.string.speed_unit_kph);
    speedUnits.put("mph", R.string.speed_unit_mph);
    speedUnits.put("kn", R.string.speed_unit_kn);
    pressUnits.put("hPa", R.string.pressure_unit_hpa);
    pressUnits.put("kPa", R.string.pressure_unit_kpa);
    pressUnits.put("mm Hg", R.string.pressure unit mmhg);
    pressUnits.put("in Hg", R.string.pressure_unit_inhg);
  private String localize(SharedPreferences sp, String preferenceKey, String
defaultValueKey) {
     return localize(sp, this, preferenceKey, defaultValueKey);
public static String localize(SharedPreferences sp, Context context, String preferenceKey,
String defaultValueKey) {
    String preferenceValue = sp.getString(preferenceKey, defaultValueKey);
    String result = preferenceValue;
    if ("speedUnit".equals(preferenceKey)) {
```

```
if (speedUnits.containsKey(preferenceValue)) {
         //noinspection ConstantConditions
         result = context.getString(speedUnits.get(preferenceValue));
     } else if ("pressureUnit".equals(preferenceKey)) {
       if (pressUnits.containsKey(preferenceValue)) {
         //noinspection ConstantConditions
         result = context.getString(pressUnits.get(preferenceValue));
       }
     }
    return result;
  public static String getWindDirectionString(SharedPreferences sp, Context context,
Weather weather) {
try {
       if (Double.parseDouble(weather.getWind()) != 0) {
         String pref = sp.getString(''windDirectionFormat'', null);
         if ("arrow".equals(pref)) {
            return weather.getWindDirection(8).getArrow(context);
```

```
} else if ("abbr".equals(pref)) {
```

```
return weather.getWindDirection().getLocalizedString(context);
```

```
}
```

```
} catch (Exception e) {
    e.printStackTrace();
```

```
e.printStackTrace()
```

```
return "";
```

# }

```
void getCityByLocation() {
    locationManager = (LocationManager) getSystemService(LOCATION_SERVICE);
```

```
if (ContextCompat.checkSelfPermission(this,
Manifest.permission.ACCESS_FINE_LOCATION) !=
PackageManager.PERMISSION_GRANTED) {
    if (ActivityCompat.shouldShowRequestPermissionRationale(this,
        Manifest.permission.ACCESS_FINE_LOCATION)) {
        showLocationSettingsDialog();
    } else {
        ActivityCompat.requestPermissions(this,
            new String[]{Manifest.permission.ACCESS_FINE_LOCATION};
        MY_PERMISSIONS_ACCESS_FINE_LOCATION);
    }
}
```

# } else if

 $(locationManager.isProviderEnabled(LocationManager.NETWORK\_PROVIDER) \parallel$ 

```
locationManager.isProviderEnabled(LocationManager.GPS PROVIDER)) {
       progressDialog = new ProgressDialog(this);
       progressDialog.setMessage(getString(R.string.getting location));
       progressDialog.setCancelable(false);
       progressDialog.setButton(DialogInterface.BUTTON_NEGATIVE,
getString(R.string.dialog_cancel), new DialogInterface.OnClickListener() {
         @Override
         public void onClick(DialogInterface dialogInterface, int i) {
           try {
              locationManager.removeUpdates(MainActivity.this);
            } catch (SecurityException e) {
              e.printStackTrace
       });progressDialog.show();
       if (locationManager.isProviderEnabled(LocationManager.NETWORK_PROVIDER))
{
locationManager.requestLocationUpdates(LocationManager.NETWORK_PROVIDER, 0, 0,
this);
       if (locationManager.isProviderEnabled(LocationManager.GPS_PROVIDER)) {
         locationManager.requestLocationUpdates(LocationManager.GPS_PROVIDER, 0,
0, this);
     } else {
       showLocationSettingsDialog();
  private void showLocationSettingsDialog() {
    AlertDialog.Builder alertDialog = new AlertDialog.Builder(this);
    alertDialog.setTitle(R.string.location_settings);
    alertDialog.setMessage(R.string.location_settings_message);
    alertDialog.setPositiveButton(R.string.location_settings_button, new
DialogInterface.OnClickListener() {
       public void onClick(DialogInterface dialog, int which) {
         Intent intent = new
Intent(Settings.ACTION_LOCATION_SOURCE_SETTINGS);
         startActivity(intent);
       }
     });
    alertDialog.setNegativeButton(R.string.dialog_cancel, new
DialogInterface.OnClickListener() {
       public void onClick(DialogInterface dialog, int which) {
         dialog.cancel();
       }
     });
    alertDialog.show();
  } @Override
```

public void onRequestPermissionsResult(int requestCode, @NonNull String[]
permissions,

```
@NonNull int[] grantResults) {
    if (requestCode == MY_PERMISSIONS_ACCESS_FINE_LOCATION) {
       // If request is cancelled, the result arrays are empty.
       if (grantResults.length > 0 \&\& grantResults[0] ==
PackageManager.PERMISSION_GRANTED) {
         getCityByLocation();
       }
     }
  }
 @Override
  public void onLocationChanged(Location location) {
progressDialog.hide();
    try {
       locationManager.removeUpdates(this);
     } catch (SecurityException e) {
       Log.e("LocationManager", "Error while trying to stop listening for location
updates. This is probably a permissions issue", e);
    Log.i("LOCATION (" + location.getProvider().toUpperCase() + ")",
location.getLatitude() + ", " + location.getLongitude());
    double latitude = location.getLatitude();
    double longitude = location.getLongitude();
    new ProvideCityNameTask(this, this, progressDialog).execute("coords",
Double.toString(latitude), Double.toString(longitude));
  }
  @Override
  public void onStatusChanged(String provider, int status, Bundle extras) {
 @Override
  public void onProviderEnabled(String provider) {
}
  @Override
  public void onProviderDisabled(String provider) {
  }
  class TodayWeatherTask extends GenericRequestTask {
    public TodayWeatherTask(Context context, MainActivity activity, ProgressDialog
progressDialog) {
       super(context, activity, progressDialog);
     }
```

```
@Override
    protected void onPreExecute() {
       loading = 0;
       super.onPreExecute();
    }
    @Override
    protected void onPostExecute(TaskOutput output) {
       super.onPostExecute(output);
      // Update widgets
       AbstractWidgetProvider.updateWidgets(context);
    }
    @Override
    protected ParseResult parseResponse(String response) {
       return parseTodayJson(response);
    }
    @Override
    protected String getAPIName() {
       return "weather";
    }
    @Override
    protected void updateMainUI() {
       updateTodayWeatherUI();
       updateLastUpdateTime();
       updateUVIndexUI();
    }
  }
  class LongTermWeatherTask extends GenericRequestTask {
    public LongTermWeatherTask(Context context, MainActivity activity, ProgressDialog
progressDialog) {
       super(context, activity, progressDialog);
    }
    @Override
    protected ParseResult parseResponse(String response) {
       return parseLongTermJson(response);
    }
    @Override
    protected String getAPIName() {
       return "forecast";
    }
```

```
@Override
    protected void updateMainUI() {
       updateLongTermWeatherUI();
     ł
  } class FindCitiesByNameTask extends GenericRequestTask {
    public FindCitiesByNameTask(Context context, MainActivity activity, ProgressDialog
progressDialog) {
       super(context, activity, progressDialog);
     }
     @Override
    protected void onPreExecute() { /*Nothing */ }
     @Override
    protected ParseResult parseResponse(String response) {
       try {
         JSONObject reader = new JSONObject(response);
         final int count = reader.optInt("count");
         if (count == 0) {
           Log.e("Geolocation", "No city found");
           return ParseResult.CITY_NOT_FOUND;
         }
//
    saveLocation(reader.getString("id"));
         final JSONArray cityList = reader.getJSONArray("list");
         if (cityList.length() > 1) {
           launchLocationPickerDialog(cityList);
         } else {
           saveLocation(cityList.getJSONObject(0).getString(''id''));
         }
       } catch (JSONException e) {
         Log.e("JSONException Data", response);
         e.printStackTrace();
         return ParseResult.JSON EXCEPTION;
       }
       return ParseResult.OK;
     }
     @Override
    protected String getAPIName() {
       return "find";
     }
```
```
@Override
    protected void onPostExecute(TaskOutput output) {
      /* Handle possible errors only */
      handleTaskOutput(output);
      refreshWeather();
    }
  }
  private void launchLocationPickerDialog(JSONArray cityList) {
    AmbiguousLocationDialogFragment fragment = new
AmbiguousLocationDialogFragment();
    Bundle bundle = new Bundle();
    FragmentTransaction fragmentTransaction =
getSupportFragmentManager().beginTransaction();
bundle.putString("cityList", cityList.toString());
fragment.setArguments(bundle);
fragmentTransaction.setTransition(FragmentTransaction.TRANSIT_FRAGMENT_OPEN);
    fragmentTransaction.add(android.R.id.content, fragment)
         .addToBackStack(null).commit();
  }
  class ProvideCityNameTask extends GenericRequestTask {
    public ProvideCityNameTask(Context context, MainActivity activity, ProgressDialog
progressDialog) {
      super(context, activity, progressDialog);
    }
    @Override
    protected void onPreExecute() { /*Nothing*/ }
    @Override
    protected String getAPIName() {
      return "weather";
     }
    @Override
    protected ParseResult parseResponse(String response) {
      Log.i("RESULT", response.toString());
      try {
         JSONObject reader = new JSONObject(response);
         final String code = reader.optString("cod");
         if ("404".equals(code)) {
           Log.e("Geolocation", "No city found");
           return ParseResult.CITY_NOT_FOUND;
```

```
saveLocation(reader.getString("id"));
 }
       } catch (JSONException e) {
         Log.e("JSONException Data", response);
         e.printStackTrace();
         return ParseResult.JSON_EXCEPTION;
       }return ParseResult.OK;
    }
@Override
    protected void onPostExecute(TaskOutput output) {
       /* Handle possible errors only */
       handleTaskOutput(output);
       refreshWeather();
    }
  }
  class TodayUVITask extends GenericRequestTask {
    public TodayUVITask(Context context, MainActivity activity, ProgressDialog
progressDialog) {
       super(context, activity, progressDialog);
    }
    @Override
    protected void onPreExecute() {
       loading = 0;
       super.onPreExecute();
    }
    @Override
    protected ParseResult parseResponse(String response) {
       return parseTodayUVIJson(response);
    }
    @Override
    protected String getAPIName() {
       return "uvi";
    }
    @Override
    protected void updateMainUI() {
       updateUVIndexUI();
    }
  }
```

```
public static long saveLastUpdateTime(SharedPreferences sp) {
    Calendar now = Calendar.getInstance();
    long lastUpdate = now.getTimeInMillis();
    sp.edit().putLong("lastUpdate", lastUpdate).commit();
    return lastUpdate;
  }
  private void updateLastUpdateTime() {
    updateLastUpdateTime(
         PreferenceManager.getDefaultSharedPreferences(this).getLong("lastUpdate", -1)
    );
  }
  private void updateLastUpdateTime(long timeInMillis) {
    if (timeInMillis < 0) {
       // No time
       lastUpdate.setText("");
     } else {
       lastUpdate.setText(getString(R.string.last_update,
formatTimeWithDayIfNotToday(this, timeInMillis)));
     }
  }
  public static String formatTimeWithDayIfNotToday(Context context, long timeInMillis)
{
    Calendar now = Calendar.getInstance();
    Calendar lastCheckedCal = new GregorianCalendar();
    lastCheckedCal.setTimeInMillis(timeInMillis);
    Date lastCheckedDate = new Date(timeInMillis);
    String timeFormat =
android.text.format.DateFormat.getTimeFormat(context).format(lastCheckedDate);
    if (now.get(Calendar.YEAR) == lastCheckedCal.get(Calendar.YEAR) &&
         now.get(Calendar.DAY_OF_YEAR) ==
lastCheckedCal.get(Calendar.DAY OF YEAR)) {
       // Same day, only show time
       return timeFormat;
    } else {
       return
android.text.format.DateFormat.getDateFormat(context).format(lastCheckedDate) + " " +
timeFormat;
    }
  }
}
```

## **SCREEN SHOTS**

#### **MAIN PAGE:**



## WEATHER MAP:



#### **GRAPHS:**



## **SETTINGS:**



## CONCLUSION

By this Application weather forecasting report generation becomes easy. The Design and Development of this Application will significantly enhance the nature of Farming and Agriculture. This application is Economically, Technically and Operationally Feasible. It is User Friendly, so that every user can handle it with ease. This application is developed such that it will not use much of phone RAM and memory space. This Application provides detail information with the use of Interactive images. It serves the user's expectations and user can be improved further, according to their day to day needs.

## **FUTURE ENCHANCEMENT**

Though we ought to have a successfully project, it could be still be improved further, according to the needs of the user.

Following are the plans we have yet to achieve.

- In the next version we will be launching this application in regional languages also such as Hindi, Marathi, Gujarati and Tamil.
- we would try to make this application more user-friendly so that more and more people will be able to make good use of it.
- To make a more and more reports and to make the end user more comfortable.
- we would try to increase the accuracy of GPS.

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# **PROJECT MANAGEMENT CRM**

A project submitted to

## ST.MARY'S COLLEGE (Autonomous), THOOTHUKUDI

Affiliated to

MANONMANIAM SUNDARANAR UNIVERSITY,

## TIRUNELVELI

In partial fulfillment of the award of the degree of

## MASTER OF SCIENCE IN COMPUTER SCIENCE

Submitted by

## **PUVANESWARI.K**

## Reg.No:19SPCS05

Under the Supervision and Guidance of

Dr. A. Vithya Vijayalakshmi, MCA., M.Phil., Ph.D.,



## PG DEPARTMENT OF COMPUTER SCIENCE (SSC)

St. Mary's College (Autonomous), Thoothukudi -628001

**APRIL - 2021** 

#### CERTIFICATE

This is to certify that this project work entitled as "PROJECT MANAGEMENT CRM" is submitted to St. Mary's College(Autonomous). Thoothukudi affiliated to Manonmaniam Sundaranar University, Tirunelveli, in partial fulfillment for the award of the degree of Master of Science in Computer Science for the work done during the year 2020-2021 by PUVANESWARLK (Reg. No:19SPCS05)

A.VM. Kylen Signature of the Guide

Signature of the Co-Ordinator

Signature of the Director Director Self Supporting Courses St. Mary's College (Autonomous, Thoothukudi - 628 001.

Signature of the Principal Principal St. Mary's College (Autonomous) Thoothulaidi - 626 001.

A. Linita

Signature of the Examiner

# **DECLARATION**

I do here by declare that, the project entitled"PROJECT MANAGEMENT CRM" submitted for the degree of Master of Science in Computer Science is my original work carried out under the guidance of Dr. A. Vithya Vijayalakshmi MCA., M.Phil., Ph.D., Assistant Department Computer Science(SSC), Mary's PG of Professor, St. College(Autonomous), Thoothukudi.

Station: Thoothukudi

Signature of the student

Date:

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Puvaneswari.K

# ABSTRACT

**Project Management System CRM** is a distributed application, developed to maintain the details of employees working in any organization. It maintains the information about the personal details of their employee. It is simple to understand and can be used by anyone who is not even familiar with simple employees system. It is user friendly and just asks the user to follow step by step operations by giving him few options. It is fast and can perform many operations of a company. This software package has been developed using the powerful coding tools of PHP and Microsoft Sql Server. The software is very user friendly. The package contains different modules like Employee details. This version of the software has multi-user approach.

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## **INTRODUCTION**

The purpose of Customer Relationship Management System is to automate the existing manual system by the help of fulfilling their requirements, so that their valuable data/information can be stored for a longer period with easy accessing and manipulation of the same. The required software and hardware are easily available and easy to work with.

Customer Relationship Management System, as described above, can lead to error free, secure, reliable and fast management system. It can assist the user to concentrate on their other activities rather to concentrate on the record keeping. Thus it will help organization in better utilization of resources. The organization can maintain computerized records without redundant entries. That means that one need not be distracted by information that is not relevant, while being able to reach the information.

The aim is to fulfilling their requirements, so that their valuable data/information can be stored for a longer period with easy accessing and manipulation of the same. It has many features and functions that make employee management and their account related work easy. Accounts, attendance, loan, tax, performance, and reports can be handled almost simultaneously with this system.

This Software contains the listed modules Employee information management system, Attendance management system, Asset & equipment management, Bank & loan management system, Expense & income reports, Department management system, Employee leave management system, Leave tracking system, Dynamic report system, Employee recruitment system, Notification system.

The most important advantage of this software is that you can use it on any type of smart device. Moreover, you can operate the entire system anytime and anywhere. So, using this feature, you can operate the system easily and smoothly.

# SYSTEM SPECIFICATION

In the system specification, the latest hardware and software specifications must be proposed to enable faster retrieval of the information. The System Specifications involves two concepts. They are as follows

- Hardware Requirements
- Software Requirements

The detailed Hardware and Software Specifications are given below

## HARDWARE REQUIREMENTS

Hard disk	:	50GB
Ram	:	2GB or greater
Processor	:	Intel Core 2 or greater / AMD Phenom 2 or greater

# SOFTWARE REQUIREMENTS

Technology Used	: PHP version 5.6 or above, JavaScript,		
IDE Used	: Visual Studio Code Version 1.44 or above		
Database	: MYSQL Server		
Operating System	: Windows 7 or above		

# SYSTEM STUDY

#### Existing system

Existing System requires manual integration of data and management of different - different processes. Searching and tracking of information become complex and time consuming

## **Proposed system**

CRMdeveloped to maintain the details of employees in any organizations. It maintains the information about the personal details of their employees.

## **Intended Audience**

CRMis a platform where all work-related as well as important personal details of an employee is stored and managed in a secure way. By using this system, you can manage activities in an easier and quicker way.

# **PROJECT OVERVIEW**

## **Project Management CRM**

In Project Management CRM we use PHP and MySQL database. This is the project which keeps the information about employees and their organizations. This Software contains the listed modules Employee information management system, Attendance management system, Asset & equipment management, Bank & loan management system, Expense & income reports, Department management system, Employee leave management system, Leave tracking system, Dynamic report system, Employee recruitment system, Notification system.

## Two modules contains in Project Management CRM,

- ➤ Admin
- > User

## **MODULE DESCRIPTION**

## **User Role:**

- Employees can easily login or sign up their account.
- Employees can easily send Messages to others
- Employees can also view the latest news of company which will be displayed on employees dashboard

## **Dashboard:**

In this module, user can briefly view the latest news of company. It contains details of total employee and attendance of current day. The information about new recruited etc..,

#### Message:

In this module, Employees can send their messages to others by giving receiver name, subject.

### Inbox:

In this module, Employees can view the Messages from others.

## **Profile**:

In this module, user can view the profile.

## **Change Password:**

In this module, user can change his/her passwords and also upload profile photo from system location

**Logout**: Through this button, user can log out from this page.

### User can also recover his/her password

## **Admin Role:**

Admin (HR) can create and manage Employees.

- The Employees only view the dashboard.
- ✤ Admin manages the all Employees details.
- ✤ User and Admin both are update their profiles.

#### **Dashboard:**

In this module, user can briefly view the latest news of company. It contains details of total employee and attendance of current day. The information about new recruited etc.

#### Assets:

In this module, admin can view all the assets details. The admin manages all the assets in an organization.

#### Attendance:

In this module, admin keep track of our employee hours. It is the system you to use to document the time your employees work and the time to take off.

### Award:

In this module, admin also assign award to a Best Employees

#### **Bank:**

In this module, admin view and manage the bank list of our organization.

### **Department:**

In this module, admin manage and add a new department and also create a division of our organization.

### **Employee:**

In this module, admin mange the employee position and employees performance.

#### Leave:

In this module, the information about weekly holidays and also manage the leave type.

#### Loan:

In this module, admin grant loan to an employee and manage the installment amount of the loan.

#### Noticeboard:

In this module, admin add a new notice to the employees and also manage the notice information.

#### **Recruitment:**

In this module, admin adding the new employees and the recruitment process where the scores of aptitude test, technical interview and HR confirmation can be added and the final selection of candidates.

### **Reports:**

In this module contains attendance report, leave report and employee report.

## Setting:

In this module, admin add the user and manages the user list.

#### Message:

In this module Employees can send their messages to others by giving receiver name, subject.

### Inbox:

In this section, Employees can view the Messages from others.

**Logout**: Through this button, admin can log out from this page.

Admin can also recover his/her password.

# SYSTEM DESIGN

# **USE CASE DIAGRAM:**



# **ENTITY-RELATIONSHIP Diagrams**

E-R (Entity-Relationship) Diagram is used to represents the relationship between entities in the table.



# LEAVE MANAGEMENT SYSTEM:



# SYSTEM TESTING

Testing is a process of checking whether the developed system is working according to the original objectives and requirements. It is a set of activities that can be planned in advance and conducted systematically. Testing is vital to the success of the system. System testing makes a logical assumption that if all the parts of the system are correct, the global will be successfully achieved. In adequate testing if not testing leads to errors that may not appear even many months. This creates two problems,the time lag between the cause and the appearance of the problem and the effect of the system errors on the files and records within the system. A small system error can conceivably explode into a much larger Problem. Effective testing early in the purpose translates directly into long term cost savings from a reduced number of errors. The best programs are worthless if it produces the correct outputs.

#### **FUNCTIONAL TESTING:**

Functional testing of an application is used to prove the application delivers correct results, using enough inputs to give an adequate level of confidence that will work correctly for all sets of inputs. The functional testing will need to prove that the application works for each client type and that personalization function work correctly. When a program is tested, the actual output is compared with the expected output. Test for all modules. The result after execution should give the accurate result.

#### **NON-FUNCTIONAL TESTING:**

The Non Functional software testing encompasses a rich spectrum of testing strategies, describing the expected results for every test case. It uses symbolic analysis techniques. This testing used to check that an application will work in the operational environment.Non-functional testing includes:

- Load testing
- Performance testing
- Security testing

#### LOAD TESTING:

It is necessary to ascertain that the application behaves correctly under loads when 'Server busy' response is received. Should designate another active node as a Server.

#### **PERFORMANCE TESTING:**

Performance tests are utilized in order to determine the widely defined performance of the software system such as execution time associated with various parts of the code, response time and device utilization. The intent of this testing is to identify weak points of the software system and quantify its shortcomings. This is required to assure that an application perforce adequately, having the capability to handle many peers, delivering its results in expected time and using an acceptable level of resource and it is an aspect of operational management. Should handle large input values, and produce accurate result in expected time.

#### **SECURITY TESTING:**

Security testing evaluates system characteristics that relate to the availability, integrity and confidentiality of the system data and services. Users/Clients should be encouraged to make sure their security needs are very clearly known at requirements time, so that the security issues can beaddressed by the designers and testers. Checking that the user identification is authenticated.In case failure it should not be connected in the framework.

# CODING

## Sample Code: Department. php :

```
<?php
defined('BASEPATH') OR exit('No direct script access allowed');
class Department_model extends CI_Model {
       public function dept_view()
       {
              return $this->db->select('*')
                      ->from('department')
                      ->where('parent_id',0)
                      ->order_by('dept_id', 'desc')
                      ->get()
                      ->result();
       }
       public function dept_create($data = array())
       {
              return $this->db->insert('department', $data);
       }
       public function dept_delete($id = null)
               $this->db->where('dept_id',$id)
                      ->delete('department');
              if ($this->db->affected_rows()) {
                      return true;
               } else {
                      return false;
               }
       }
public function update_dept($data = array())
       ł
              return $this->db->where('dept_id',$data["dept_id"])
                      ->update("department", $data)}
       public function dept_updateForm($id){
     $this->db->where('dept_id',$id);
     $query = $this->db->get('department');
     return $query->row();
  }
```

```
public function read_division($limit = null, $start = null)
        $this->db->select('a.*,b.department_name as department');
               $this->db->from('department a');
               $this->db->join('department b','b.dept id=a.parent id','left');
               $this->db->where('a.parent_id >',0);
               $this->db->group_by('a.dept_id');
               $this->db->order_by('a.dept_id', 'desc');
               $this->db->limit($limit, $start);
               $query = $this->db->get();
               if (\text{squery->num_rows}) > 0) {
                      return $query->result();
               }
               return false;
       }
       public function findById($id = null)
               return $this->db->select("*")->from("department")
                      ->where('dept_id',$id)
               ->limit($limit, $start)
                      ->get()
                      ->row();
       }
       public function update($data = [])
               return $this->db->where('dept_id',$data['dept_id'])
                      ->update('department',$data);
       }
// Department Dropdown
       public function department_dropdown(){
       $data = $this->db->select("*")
                      ->from('department')
                      ->where('parent_id',0)
                      ->get()
                      ->result();
               $list["] = display('select_division');
               if (!empty($data)) {
                      foreach($data as $value)
                              $list[$value->dept_id] = $value->department_name;
return $list;
               }
```

## Leave. php :

```
<?php
defined('BASEPATH') OR exit('No direct script access allowed');
```

```
class Leave_model extends CI_Model {
public function departments()
       {
               $data = $this->db->select("*")
       ->from('department')
       ->get()
       ->result();
     $list["] = display('select_department');
     $list['all'] = display('all');
     if (!empty($data)) {
       foreach($data as $value)
          $list[$value->dept id] = $value->department name;
       return $list;
     } else {
       return false;
     }
       }
     public function find_weekend($date){
     $day = date('l', strtotime($date));
     $this->db->select('*');
     $this->db->from('weekly_holiday');
     $this->db->where("FIND_IN_SET(".$day.", dayname)");
```

```
$query=$this->db->get();
   $data=$query->num_rows();
   return $data;
 }
 public function employeeList()
   $data = $this->db->select("*")
      ->from('employee_history')
      ->get()
      ->result();
   $list["] = display('select_employee');
   $list['all'] = display('all');
   if (!empty($data)) {
      foreach($data as $value)
         $list[$value->employee_id] = $value->first_name.''.$value->last_name;
      return $list;
   } else {
      return false;
   }
 }
 public function leave_type()
   $data = $this->db->select("*")
      ->from('leave_type')
      ->get()
      ->result();
   $list["] = display('select_type');
   $list['all'] = display('all');
   if (!empty($data)) {
      foreach($data as $value)
         $list[$value->leave_type_id] = $value->leave_type;
      return $list;
   } else {
      return false;
   }
 }
public function on_leave($lv_id,$department,$from_date,$to_date){
   $this->db->select('a.*,b.leave_type as ltype,c.first_name,c.last_name,d.department_name');
   $this->db->from('leave_apply a');
   $this->db->join('leave_type b','b.leave_type_id=a.leave_type_id');
   $this->db->join('employee_history c','c.employee_id=a.employee_id');
   $this->db->join('department d','d.dept_id = c.dept_id');
```

```
$this->db->where('a.leave_aprv_strt_date >=',$from_date);
$this->db->where('a.leave_aprv_end_date <=',$to_date);
if($lv_id != 'all'){
$this->db->where('a.leave_type_id',$lv_id);
}
if($department != 'all'){
$this->db->where('c.dept_id',$department);
}
$this->db->group_by('a.leave_appl_id');
$leave = $this->db->get()->result_array();
return $leave;}}
```

## Asset. php:

```
<?php
defined('BASEPATH') OR exit('No direct script access allowed');
```

```
class Asset_model extends CI_Model {
```

```
/// type Part
public function type_create($data = array())
ł
  return $this->db->insert('equipment_type', $data);
public function read_type($limit = null, $start = null)
 $this->db->select('*');
  $this->db->from('equipment_type');
  $this->db->order_by('type_id', 'desc');
  $this->db->limit($limit, $start);
  $query = $this->db->get();
  if (\text{squery->num_rows}) > 0) 
     return $query->result();
   }
  return false;
ł
public function type_list()
  $this->db->select('*');
  $this->db->from('equipment_type');
  $this->db->order_by('type_id', 'desc');
  $query = $this->db->get();
  if (\text{squery->num_rows}) > 0) \{
     return $query->result();
```

```
}
     return false;
  }
public function findById_type($id = null)
  ł
     return $this->db->select("*")->from("equipment_type")
       ->where('type_id',$id)
       ->limit($limit, $start)
       ->get()
       ->row();
   }
  public function update($data = [])
  {
     return $this->db->where('type_id',$data['type_id'])
       ->update('equipment_type',$data);
  }
// Department Dropdown
  public function type_dropdown()
  {
     $data = $this->db->select("*")
       ->from('equipment_type')
       ->get()
       ->result();
     $list["] = display('select_type');
     if (!empty($data)) {
       foreach($data as $value)
          $list[$value->type_id] = $value->type_name;
       return $list;
     } else {
       return false;
     }
   }
public function count_type()
  {
     $this->db->select('*');
     $this->db->from('equipment_type');
     $query = $this->db->get();
     if (\text{squery->num_rows}) > 0) {
       return $query->num_rows();
     }
     return false
}
```

```
public function type_delete($id = null)
 Ł
   $this->db->where('type_id',$id)
      ->delete('equipment_type');
   if ($this->db->affected_rows()) {
      return true;
   } else {
      return false;
    ł
 }
  public function equipment_create($data = array())
 ł
   return $this->db->insert('equipment', $data);
 }
 public function read_equipment($limit = null, $start = null)
    $this->db->select('a.*,b.type_name');
   $this->db->from('equipment a');
   $this->db->join('equipment_type b','a.type_id = b.type_id');
   $this->db->order by('a.equipment id', 'desc');
   $this->db->limit($limit, $start);
   $query = $this->db->get();
   if (\qquad rows() > 0) {
      return $query->result();
   return false;
 }
 public function findById_equipment($id = null)
 ł
   return $this->db->select("*")->from("equipment")
      ->where('equipment_id',$id)
      ->limit($limit, $start)
      ->get()
      ->row();
 }
```

public function update\_equipment(\$data = [])

```
{
```

return \$this->db->where('equipment\_id',\$data['equipment\_id'])

```
->update('equipment',$data);
  }
public function count_equipment()
  {
     $this->db->select('*');
     $this->db->from('equipment');
     $query = $this->db->get();
     if (\text{squery->num_rows}() > 0) {
       return $query->num_rows();
     }
     return false;
   public function equipment_list()
   {
     $this->db->select('a.*,b.type_name');
     $this->db->from('equipment a');
     $this->db->join('equipment_type b','a.type_id = b.type_id');
     $this->db->order_by('a.equipment_id', 'desc');
     $query = $this->db->get();
     if (\text{squery->num_rows}) > 0) 
       return $query->result();
     }
     return false;
  }
  public function equipment_delete($id = null)
     $this->db->where('equipment_id',$id)
       ->delete('equipment');
     if ($this->db->affected_rows()) {
       return true;
     } else {
       return false;
     }
  }
   public function maping_create()
   $equip_id = $this->input->post('equipment_id');
   $issue_date = $this->input->post('dates');
   for ($i=0, $n=count($equip_id); $i < $n; $i++) {
   $equipment_id = $equip_id[$i];
```

```
$date
               = date("Y-m-d", strtotime(!empty($issue_date[$i])?$issue_date[$i]:
date('Y-m-d')));
     $equipment_maping = array(
   'equipment_id'
                    => $equipment_id,
   'employee id'
                    => $this->input->post('employee id',true),
   'issue_date'
                  => $date,
   );
     sassign = array(
   ' is assign' \Rightarrow 1,
     );
    $insert = $this->db->insert('employee_equipment',$equipment_maping);
    $this->db->where('equipment_id',$equipment_id)
       ->update('equipment',$assign);
  }
  if($insert){
     return true;
  }else{
     return false;
  }}
  public function maping equipment($limit = null, $start = null)
  {
     $this->db->select('a.*,b.equipment_name');
     $this->db->from('employee equipment a');
     $this->db->join('equipment b','a.equipment_id = b.equipment_id','left');
     $this->db->group by('a.employee id');
     $this->db->order by('a.id', 'desc');
     $this->db->limit($limit, $start);
     $query = $this->db->get();
     if (\text{squery->num_rows}) > 0) \{
       return $query->result();
     }
     return false;
  }
public function eq_mapping_list()
  {
     $this->db->select('a.*,b.equipment_name');
     $this->db->from('employee equipment a');
     $this->db->join('equipment b','a.equipment id = b.equipment id','left');
     $this->db->group_by('a.employee_id');
     $this->db->order by('a.id', 'desc');
     $query = $this->db->get();
     if (\text{squery->num_rows}) > 0) \{
       return $query->result();
     }
```

```
return false;
  }
  public function findById_maping($id = null)
     return $this->db->select("a.*,b.equipment_name")->from("employee_equipment a")
       ->join('equipment b','a.equipment id = b.equipment id')
       ->where('a.employee_id',$id)
       ->where('a.return_date','0000-00-00')
       ->get()
       ->result();
  }
public function findById_emp($id = null)
    return $this->db->select("*")->from("employee equipment")
       ->where('employee_id',$id)
       ->limit($limit, $start)
       ->get()
       ->row();
  }
  public function maping_update()
     $issue date = $this->input->post('dates');
     $employee id = $this->input->post('old emp id');
     $equipupd
                                           $this->db->select('*')->from('employee_equipment')-
                            =
>where('employee id',$employee id)->get()->result();
     sassign = array(
   ' is assign' \Rightarrow 0,
    );
    foreach ($equipupd as $value) {
    $this->db->where('equipment_id',$value->equipment_id)
       ->update('equipment',$assign);
     }
     $this->db->where('employee_id',$employee_id)
       ->delete('employee equipment');
     $equip_id = $this->input->post('equipment_id');
   for (\$i=0, \$n=count(\$equip id); \$i < \$n; \$i++)
   $equipment_id = $equip_id[$i];
   $date
              = $issue_date[$i];
     $equipment_maping = array(
   'equipment_id' => $equipment_id,
```
```
'employee_id' => $this->input->post('employee_id'),
   'issue_date'
                  = $date,
   );
   $assign_update = array(
   is_assign' \Rightarrow 1,
    );
   $insert = $this->db->insert('employee_equipment',$equipment_maping);
   $this->db->where('equipment_id',$equipment_id)
       ->update('equipment',$assign_update);
  }
  if($insert){
    return true;
  }else{
    return false;
  }
  }
public function count_maping()
  {
     $this->db->select('*');
     $this->db->from('employee_equipment');
     $query = $this->db->get();
    if (\qquad rows() > 0) {
       return $query->num_rows();
     }
    return false;
  }
  public function maping_delete($id = null)
  {
                                           $this->db->select('*')->from('employee_equipment')-
     $equipupd
                            =
>where('employee_id',$id)->get()->result();
     sassign = array(
   is_assign' => 0,
    );
    foreach ($equipupd as $value) {
    $this->db->where('equipment_id',$value->equipment_id)
->update('equipment',$assign);
     $this->db->where('employee_id',$id)
       ->delete('employee_equipment');
    if ($this->db->affected_rows()) {
```

```
return true;
    } else {
       return false}}
// Equipment Dropdown
  public function equipment dropdown()
  ł
   return $data = $this->db->select("*")
       ->from('equipment')
       ->where('is_assign',0)
       ->get()
       ->result();
  }
  public function update_equipment_dropdown()
   return $data = $this->db->select("*")
       ->from('equipment')
       ->get()
       ->result();
  }
  // Employee Dropdown
  public function employee_dropdown()
  {
    $data = $this->db->select("*")
       ->from('employee_history')
       ->get()
       ->result();
    $list["] = display('select_employee');
    if (!empty($data)) {
       foreach($data as $value)
         $list[$value->employee_id] = $value->first_name.''.$value->last_name;
       return $list;
    } else {
       return false;
    ł
  }
  // Asset return information
public function asset_return()
$return_date = $this->input->post('return_date');
    $employee_id = $this->input->post('employee_id');
    $damage = $this->input->post('damarage_descript');
```

```
$equip_id = $this->input->post('equipment_id');
   for ($i=0, $n=count($equip_id); $i < $n; $i++) {
   $equipment_id = $equip_id[$i];
   $date = $return_date[$i];
   $damage desc = $damage[$i];
     $equipment_return = array(
   'return date' => (!empty($date)?$date:date('Y-m-')),
   'damarage_desc' => $damage_desc,
   );
     $assign_update = array(
   is_assign' => 0,
    );
   $update
                                               $this->db->where('employee_id',$employee_id)-
>where('equipment_id',$equipment_id)
       ->update('employee_equipment',$equipment_return);
        $this->db->where('equipment id',$equipment id)
       ->update('equipment',$assign_update);
  }
  if($update){
    return true;
  }else{
    return false;
  }
  }
  // return equipment
     public function findById equipment return($id = null)
  {
    return $this->db->select("*")->from("employee equipment")
       ->where('employee_id',$id)
       ->where('return date',")
       ->limit($limit, $start)
       ->get()
       ->result();
  }
  // return list
  public function return_list($limit = null, $start = null)
  {
     $this->db->select('a.*,b.equipment_name');
     $this->db->from('employee equipment a');
     $this->db->join('equipment b','a.equipment_id = b.equipment_id','left');
     $this->db->where('a.return_date !=',");
     $this->db->order_by('a.id', 'desc');
     $this->db->limit($limit, $start);
```

```
$query = $this->db->get();
  if (\operatorname{squery->num_rows}) > 0) {
     return $query->result();
  }
  return false;
}
public function count_return_list()
{
  $this->db->select('a.*,b.equipment_name');
  $this->db->from('employee_equipment a');
  $this->db->join('equipment b','a.equipment_id = b.equipment_id','left');
  $this->db->where('a.return_date !=',");
  $query = $this->db->get();
  if (\qquad rows() > 0) {
     return $query->row();
  }
  return false;
}
public function search_equipment($equipment){
  $query=$this->db->select('*')
       ->from('equipment')
       ->where('is_assign',0)
       ->like('equipment_name', $equipment, 'both')
       ->group_by('equipment_id')
       ->get();
  if ($query->num_rows() > 0) {
     return $query->result_array();
  }
  return false;
```

} }

## **SCREENSHOTS**

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# CONCLUSION

The project titled as Project Management CRM was deeply studied and analyzed to design the code and implement. To reduce the burden of maintaining bulk of information of all employees and other information. Maintaining the project is also easy which can easily understandable. All the current requirements and possibilities have been taken care during the project time. Maintaining the details in database is manageable.

# **FUTURE ENHANCEMENT**

The project has covered almost all the requirements. Improvement can be appended by changing the existing module and also implement the Employee salary information and also implement the account details of an organization.

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https://www.diva-portal.org/smash/get/diva2:829886/FULLTEXT01.pdf

### **RENTAL PROPERTY AND LEASE FOR LANDLORDS WITH REPORTS**

A project submitted to

### ST. MARY'S COLLEGE (Autonomous), THOOTHUKUDI

Affiliated to

### MANONMANIAM SUNDARANAR UNIVERSITY,

### TIRUNELVELI

in partial fulfillment of the award of the degree of

### MASTER OF SCIENCE IN COMPUTER SCIENCE

Submitted by

## SAHAYA SANYA. K

### Reg.no.: 19SPCS08

Under the Supervision and Guidance of

## Dr. A. Vithya Vijayalakshmi., MCA., M.Phil., Ph.D.,



## PG DEPARTMENT OF COMPUTER SCIENCE (SSC)

St. Mary's College (Autonomous), Thoothukudi- 628001

April - 2021

#### CERTIFICATE

This is to certify that this project work entitled as "RENTAL PROPERTY AND LEASE FOR LANDLORDS WITH REPORTS" is submitted to St. Mary's College (Autonomous), Thooothukudi affiliated to ManonmaniamSundaranar University, Tirunelveli, in partial fulfiliment for the award of the degree of Master of Science in Computer Science for the work done during the year 2020-2021 by SAHAYA SANYA, K (Reg.no.: 19SPCS08)

A while oxylas

Signature of the Guide

Rayan u. Signature of the Coordinator

Signature of the Director Director Self Supporting Courses St. Mary's College (Autonomous, Thoothukudi - 628 001.

Signature of the Principal

Principal Principal St. Mary's College (Autonomous) Thoothukudi - 628 001.

1. Levitte Signature of the Examiner

## DECLARATION

I do hereby declare that the project entitled "RENTAL PROPERTY AND LEASE FOR LANDLORDS WITH REPORTS" submitted for the degree of Master of Science in Computer Science is my original work carried out under the guidance of Dr. A. Vithya Vijayalakshmi., MCA., M.Phil., Ph.D., PG Department of Computer Science (SSC), St. Mary's College (Autonomous), Thoothukudi.

Station: Thoothukudi

Signature of the student

Date:

## ACKNOWLEDGEMENT

I express my first and foremost thanks to God Almighty for his gracious help and shower of blessings for having rendered us the strength and support to finish our project successfully.

My sincere thanks to Dr. Sr. A. S. J. Lucia Rose, Principal, Rev. Sr. Flora Mary, Secretary, Dr. Sr. F. Mary Joyce Baby, Director of SSC, St. Mary's College (Autonomous), Thoothukudi, for giving permission to work on this project.

I convey my heartfelt thanks to Mrs. C. Nayanthra Mascarenhas M.Sc., M.Phil., SET., Assistant Professor and Head of the Department, PG Department of Computer Science (SSC) for her support and counsel.

I express my hearty thanks to my guide Dr. A. Vithya Vijayalakshmi., MCA., M.Phil., Ph.D Assistant professor, PG Department of Computer Science (SSC) for her valuable suggestions, gentle guidance, enthusiastic ideas and support throughout my project, which helps me to carry out and complete my work effortlessly.

I also express my boundless thanks to Mrs. A. Jenitta Jebamalar M.Sc. (IT), M.Sc. (CS), M.Phil., B.Ed., Assistant Professor, PG Department of Computer Science (SSC), for her encouragement and support.

I thank my family members especially my parents for their encouragement and support both morally and financially which helped me to finish the project successfully.

Sahaya Sanya. K

## ABSTRACT

This is an era of computer and information technology. In this era, if you want to exist in the market, you have to use computer and information to provide best services to the customer.

Real Estate is the business of buying, selling, and renting land, buildings, and offices. Every person wants his house should be best in a location with all facilities. Offices should be near to market and product unit near to raw material and marketplace.

General companies concentrate on its product and infrastructure are bought from Real Estate company. Due to competition in this industry, every real estate company wants to deliver the best service and makes its customer satisfied.

Online Property Management System is a software which takes care of everything that a real estate company want to do. Property Management System is developed for real estate Companies.

It is very strong and easy to use that makes quick booking and account handling process. The real estate Property management system is a web-based software and you can access it from anywhere. This ensures the service to client 24X7. They can also get bills online.

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## **INTRODUCTION**

This project is built for a local building management company wishing to automate the manual work of the landlords. In addition to just handling rent money exchange, the system need to keep track of the entire service apartment owner's offer to their tenants such as maintenance.

The project proved to be a large undertaking as we spent a significance amount of time delving into the details of the tenant, the employees also the rent details and expenses of the apartment.

## SYSTEM SPECIFICATION

In the system specification, the latest hardware and software specifications must be proposed to enable faster retrieval of the information. The System Specifications involves two concepts. They are as follows

- Hardware Requirements
- Software Requirements

The detailed Hardware and Software Specifications are given below

### Hardware Requirements:

Processor: Intel<sup>®</sup> Core<sup>™</sup> i3-2365M CPU @ 1.40GHz

Ram : 2.00GB (minimum)0

Hardware: 500MB (minimum)

### **Software Requirements:**

Operating System: Windows 7

Front End: Html, Css, java script

Server Side Script: Php

Back End: MySQL

## **PROJECT DESCRIPTION**

The aim of the project is to maintain the rental properties, tenant record, expenses of the properties, to control the rental payment. It is critical for any apartment to control the expenses of the apartment management and tracking the rental payment for the tenants.

Also it is for the landlord who owns the apartments. Tenants often forget to pay the rent on time, and also the electricity bills. This system also maintains the employee details and their salary.

## **MODULE DESCRIPTION**

There is a **User module** for the landlord to access the details. Under this user module there are

- Building Property Lists
- Floor Info
- Unit Info
- Tenet Info
- Employee Info
- Rent Collection
- Expense Report

#### **DASHBOARD:**

In this module the summary of the rental property such as number of employees, number of apartments, total amount of expenses is explained.

#### **BUILDING PROPERTY LISTS:**

All the apartments which are owned by the admin are displayed here. We can add new apartment and also edit the names of those apartment which are registered here.

#### **FLOOR INFO:**

Number of floors in each apartment is noticed in this module. Also we can add new floors for the apartment which are registered in the building property lists. Editing the number of floors is also possible in this module.

#### **UNIT INFO:**

Here we can add number of units in each floor by using the apartment name and floor number. Moreover we can add the Electricity bill number, Water tax bill number and Professional tax number.

#### **TENANT INFO:**

In this module we can store the information about the tenant. Name of the tenant, Mobile Number, Address, Aadhar Number, the apartment details on which they are staying, rent amount, advance amount, advance paid, issued date, maintenance cost, total cost are calculated.

#### **EMPLOYEE INFO:**

Basic information about the employees like employee name, phone number, joining date, salary are noticed in this module. It can also display the employee list and we can mark the employees who are on leave on that particular day. Status about the employee salary is also given in this module.

#### **RENT COLLECTION:**

Status about the rent whether the tenants have paid or not is noticed in this module. The electricity bill also generated with due date for the payment.

#### **EXPENSES REPORT:**

Expense about a particular apartment with the cause and amount are stored in this module,

### SYSTEM STUDY

#### **EXISTING SYSTEM:**

Currently the most property manages property and tenant details on paper. The property manager will manually record the details of the tenants. The details include name, phone number, etc.

With this current system records the details of various activities of user is completely manual and entails a lot of paper work. Each house has a file that contains the house: number, size, rent per month, expected deposit and status. The existing system only provides text based interface which is not as user friendly as Graphical user interface.

#### **PROPOSED SYSTEM**

The purpose of creating this Real Estate Web Application is to outcast the discrepancies in hundreds of such existing systems on the World Wide Web. One of the basic problems with the existing systems is the non-interactive environment they provide to the users. Most of the applications involved in Real Estate business use some web template to put the content specific to their company and make it communicate with the database to search the listings. These templates simply use basic web controls to do this task making the web page non-interactive. On the other hand, the motive of this Real Estate Web Application is to allow the user to play with the search tool and create different combinatorial search criterion to perform exhaustive search. Another problem in such applications designed so far is the use of traditional user interfaces which make continuous post backs to the server; each post back makes a call to the server, gets the response and then refreshes the entire web form to display the result. The proposed system is to maintain the rental properties, tenant record, expenses of the properties, to control the rental payment systematically in online. It is critical for any apartment to control the expenses of the apartment management and tracking the rental payment for the tenants. The proposed system automatically shows the number of tenants, number of apartments, number of employees also the expenses of each building.

Also it is for the landlord who owns the apartments. Tenants often forget to pay the rent on time, and also the electricity bills. This system also maintains the employee details and their salary.

## SYSTEM ANALYSIS

This system overcomes the customer churn by using predictive analysis. Initially, with more data and lesser understanding of the system, the model was not so effective. This system overcome the challenges faced in the sales management system and meets the needs of Organizations that are not satisfied by existing applications in the field of Invoice management. System analysis shows the various sectors from which the organisation generates revenue. While developing the model for predictive analytics, an optimum number of features had to be selected. The decision tree had to balance bias as a by-product of a very complex model with variance in results, by managing its depth. Analytics being performed on data also provide the organization with meaningful information about their products and knowledge on customer behaviour. The products are be industry specific thus catering to the needs of the buyer.

### **FEASIBILITY STUDY:**

The feasibility of the project is analysed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ✓ Economical Feasibility
- ✓ Technical Feasibility
- ✓ Social Feasibility

### **ECONOMICAL FEASIBILITY:**

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

#### **TECHNICAL FEASIBILITY:**

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

#### SOCIAL FEASIBILITY:

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

## SYSTEM DESIGN

### **DATA FLOW DIAGRAM:**

Data flow diagram is the graphical representation of a data movement processes and files used in support for an information system. Data flow is the movement of the origin to a specific destination.



### SYSTEM TESTING

Testing is a process of checking whether the developed system is working according to the original objectives and requirements. It is a set of activities that can be planned in advance and conducted systematically. Testing is vital to the success of the system. System testing makes a logical assumption that if all the parts of the system are correct, the global will be successfully achieved. In adequate testing if not testing leads to errors that may not appear even many months. This creates two problems, the time lag between the cause and the appearance of the problem and the effect of the system errors on the files and records within the system. A small system error can conceivably explode into a much larger Problem. Effective testing early in the purpose translates directly into long term cost savings from a reduced number of errors. Another reason for system testing is its utility, as a user-oriented vehicle before implementation. The best programs are worthless if it produces the correct outputs.

#### **UNIT TESTING:**

A program represents the logical elements of a system. For a program to run satisfactorily, it must compile and test data correctly and tie in properly with other programs. Achieving an error free program is the responsibility of the programmer. Program testing checks for two types of errors: syntax and logical. Syntax error is a program statement that violates one or more rules of the language in which it is written. An improperly defined field dimension or omitted keywords are common syntax errors. These errors are shown through error message generated by the computer. For Logic errors the programmer must examine the output carefully.

#### **FUNCTIONAL TESTING:**

Functional testing of an application is used to prove the application delivers correct results, using enough inputs to give an adequate level of confidence that will work correctly for all sets of inputs. The functional testing will need to prove that the application works for each client type and that personalization function work correctly. When a program is tested, the actual output is compared with the expected output. When there is a discrepancy the sequence of instructions must be traced to determine the problem. The process is facilitated by breaking the program into self-

contained portions, each of which can be checked at certain key points. The idea is to compare program values against desk-calculated values to isolate the problems.

#### **NON-FUNCTIONAL TESTING:**

The Non Functional software testing encompasses a rich spectrum of testing strategies, describing the expected results for every test case. It uses symbolic analysis techniques. This testing used to check that an application will work in the operational environment. Non-functional testing includes:

- ✓ Load testing
- ✓ Performance testing
- ✓ Usability testing
- ✓ Reliability testing
- ✓ Security testing

#### LOAD TESTING:

An important tool for implementing system tests is a Load generator. A Load generator is essential for testing quality requirements such as performance and stress. A load can be a real load, that is, the system can be put under test to real usage by having actual telephone users connected to it. They will generate test input data for system test.

#### **PERFORMANCE TESTING:**

Performance tests are utilized in order to determine the widely defined performance of the software system such as execution time associated with various parts of the code, response time and device utilization. The intent of this testing is to identify weak points of the software system and quantify its shortcomings.

#### **RELIABILITY TESTING:**

The software reliability is the ability of a system or component to perform its required functions under stated conditions for a specified period of time and it is being ensured in this testing. Reliability can be expressed as the ability of the software to reveal defects under testing conditions, according to the specified requirements. It the portability that a software system will operate without failure under given conditions for a given time interval and it focuses on the behaviour of the software element. It forms a part of the software quality control team.

#### **SECURITY TESTING:**

Security testing evaluates system characteristics that relate to the availability, integrity and confidentiality of the system data and services. Users/Clients should be encouraged to make sure their security needs are very clearly known at requirements time, so that the security issues can be addressed by the designers and testers.

#### WHITE BOX TESTING:

White box testing, sometimes called glass-box testing is a test case design method that uses the control structure of the procedural design to derive test cases. Using white box testing method, the software engineer can derive test cases. The White box testing focuses on the inner structure of the software structure to be tested.

#### **BLACK BOX TESTING:**

Black box testing, also called behavioural testing, focuses on the functional requirements of the software. That is, black testing enables the software engineer to derive sets of input conditions that will fully exercise all functional requirements for a program. Black box testing is not alternative to white box techniques. Rather it is a complementary approach that is likely to uncover a different class of errors than white box methods. Black box testing attempts to find errors which focuses on inputs, outputs, and principle function of a software module. The starting point of the black box testing is either a specification or code. The contents of the box are hidden and the stimulated software should produce the desired results.

## CODING

<?php

require '../config/config.php'; ?>

<!doctype html>

<html lang="en">

<head>

>

<meta charset="utf-8" />

<title>Tenet | Info</title>

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<meta content="Premium Multipurpose Admin & Dashboard Template" name="description" /

<meta content="Themesbrand" name="author" />

<!-- App favicon -->

k rel="shortcut icon" href="./assets/images/favicon.ico">

<!-- DataTables -->

k href="../assets/libs/datatables.netbs4/css/dataTables.bootstrap4.min.css" rel="stylesheet" type="text/css" />

k href="../assets/libs/datatables.net-buttonsbs4/css/buttons.bootstrap4.min.css" rel="stylesheet" type="text/css" />

<!-- Responsive datatable examples -->

k href="../assets/libs/datatables.net-responsivebs4/css/responsive.bootstrap4.min.css" rel="stylesheet" type="text/css" /> <!-- Bootstrap Css -->

```
k href="../assets/css/bootstrap.min.css" id="bootstrap-
style" rel="stylesheet" type="text/css" />
```

<!-- Icons Css -->

k href="../assets/css/icons.min.css" rel="stylesheet" type="text/css" />

<!-- App Css-->

```
k href="../assets/css/app.min.css" id="app-style" rel="stylesheet" type="text/css" />
```

</head>

```
<style type="text/css">
```

table tr td:last-child a{

margin-right: 15px;

}

</style>

<body data-layout="detached" data-topbar="colored">

<div class="container-fluid">

<!-- Begin page -->

<div id="layout-wrapper">

```
<header id="page-topbar">
```

<div class="navbar-header">

```
<div class="container-fluid">
```

```
<div class="float-right>
```

<div class="dropdown d-inline-block">

<br/>
<br/>
sutton type="button" class="btn header-item waves-effect" id="page-header-user-dropdown" data-toggle="dropdown" aria-haspopup="true" aria-expanded="false">

<img class="rounded-circle header-profile-user" src="assets/images/users/avatar-2.jpg" alt="Header Avatar">

<span class="d-none d-xl-inline-block ml-1">User Name</span>

<i class="mdi mdi-chevron-down d-none d-xl-inline-block"></i>

</button>

<div class="dropdown-menu dropdown-menu-right">

<!-- item-->

<a class="dropdown-item" href="#"><i class="bx bx-user font-size-16 align-middle mr-1"></i> Profile</a>

<a class="dropdown-item" href="#"><i class="bx bx-lock-open font-size-16 align-middle mr-1"></i> Lock screen</a>

```
<div class="dropdown-divider"></div>
```

<a class="dropdown-item text-danger" href="index.php?logout"><i class="bx bx-poweroff font-size-16 align-middle mr-1 text-danger"></i> Logout</a>

</div>

</div>

```
<div class="dropdown d-inline-block">
```

<button type="button" class="btn header-item noti-icon right-bar-toggle waves-effect">

```
<i class="mdi mdi-settings-outline"></i>
```

</button>

</div>

</div>

<div>

```
<!-- LOGO -->
```

<div class="navbar-brand-box">

<a href="index.html" class="logo logo-light">

<span class="logo-sm">

```
<img src="../assets/images/logo-sm.png" alt="" height="20">
```

</span>

<span class="logo-lg">

<img src="../assets/images/logo-light.png" alt="" height="19">

</span>

</a>

```
</div>
```

<button type="button" class="btn btn-sm px-3 font-size-16 header-item togglebtn waves-effect" id="vertical-menu-btn">

<i class="fa fa-fw fa-bars"></i>

</button>

</div>

</div>

</div>

</header> <!-- ====== Left Sidebar Start ======== -->

<div class="vertical-menu">

<div class="h-100">

<div class="user-wid text-center py-4">

<div class="user-img">

<img src="../assets/images/users/avatar-2.jpg" alt="" class="avatar-md mx-auto rounded-circle">

</div> <div class="mt-3">

<a href="#" class="text-dark font-weight-medium font-size-16">Patrick Becker</a> UI/UX Designer </div>

</div>

```
<!--- Sidemenu -->
```

```
<div id="sidebar-menu">
```

<!-- Left Menu Start -->

li class="menu-title">Menu

a href="../index/index.php"><i class="mdi mdiairplay"></i>Dashboard</a>

<a href="../building/building\_info.php"><i class="bx bx-building-house "></i>Building Property Lists</a>

<a href="../floor/floor\_info.php"><i class="mdi mdi-home-floor-0"></i>Floor Info</a>

<a href="../unit/unit\_info.php"><i class="mdi mdidomain "></i>Unit Info</a>

<a href="tenet\_info.php"><i class="bx bxs-user-pin"></i>Tenet Info</a>

<a href="../employee/emp\_info.php"><i class="fas fa-user-friends "></i>Employee Info</a>

<a href="../rent/rent\_info.php"><i class="dripiconsarticle"></i>Rent Collection</a>

<a href="../expense/exp\_info.php"><i class="dripiconsdownload "></i>Expense Reports</a>

</div>

<!-- Sidebar -->

</div>

</div>

<!-- Left Sidebar End -->

<!-- Start right Content here -->

<div class="main-content">

<div class="page-content">

<!-- start page title -->

<div class="row">

<div class="col-12">

<div class="page-title-box d-flex align-items-center justify-content-between"> <h4 class="page-title mb-0 font-size-18">Tenets Info</h4>

</div>

#### </div>

</div>

<div class="row">

<div class="col-lg-12">

<div class="card">

<div class="card-body">

<div class="page-header clearfix">

<span class="pull-left" style="font-size: 22px">Tenet Informations</span>

<span class="pull-right"><a href="tenet\_add.php" class="btn btnsuccess">Add Tenet</a></span>

</div>

<br>

<?php

// Include config file

// \$sql = "SELECT \* FROM tenet\_info";

\$sql = "SELECT building\_info.building\_name as bname, floor\_info.num\_floors as f name,unit\_info.num\_flats as uname, tenet\_info.id as tid, tenet\_name, tenet\_num, tenet\_address, tenet\_advance, tenet\_rent, tenet\_advamount, tenet\_advpaid, tenet\_issdate, tenet\_maintainence, t enet\_total FROM building\_info, floor\_info, tenet\_info, unit\_info where building\_info.building\_i d = tenet\_info.building\_name AND tenet\_info.num\_floors=floor\_info.floor\_id AND tenet\_info. num\_flats=unit\_info.id";

if(\$result = \$mysqli->query(\$sql)){

if(\$result->num\_rows > 0){

echo "responsive nowrap' style='border-collapse: collapse; border-spacing: 0; width: 100%;'>";

echo "<thead>";

echo "";

echo "Tenet Name";

echo "Tenet Number";

echo "Tenet Address";

echo "Building Name";

echo "Floor Number";

echo "Flat Number";

echo "Tenet Advance";

echo "Rent ";

echo "Advance Amount";

echo "Advance Paid";

echo "Issue Date";

echo "Maintainence";

echo "Total";

echo "Action";
```
echo "";
```

echo "</thead>";

echo "";

while(\$row = \$result->fetch\_array()){

echo "";

echo "" . \$row['tenet\_name'] . "";

echo "" . \$row['tenet\_num'] . "";

echo "" . \$row['tenet\_address'] . "";

echo "" . \$row['bname'] . "";

echo "" . \$row['fname'] . "";

echo "" . \$row['uname'] . "";

echo "" . \$row['tenet\_advance'] . "";

echo "" . \$row['tenet\_rent'] . "";

echo "" . \$row['tenet\_advamount'] . "";

echo "" . \$row['tenet\_advpaid'] . "";

echo "" . \$row['tenet\_issdate'] . "";

echo "" . \$row['tenet\_maintainence'] . "";

echo "" . \$row['tenet\_total'] . "";

echo "";

echo "<a href='read.php?id=". \$row['tenet\_name'] ."' title='View Rec ord' data-toggle='tooltip'><span class='far fa-eye '></span></a>";

echo "<a href='tenet\_edit.php?id=". \$row['tid'] ."' title='Update Recor d' data-toggle='tooltip'><span class='fas fa-pencil-alt '></span></a>";

echo "<a href='delete.php?id=". \$row['tenet\_name'] ."' title='Delete R ecord' data-toggle='tooltip'><span class='fas fa-trash '></span></a>";

echo "";

```
echo "";
      }
      echo "";
    echo "";
    // Free result set
    $result->free();
  } else{
    echo "<em>No records were found.";
  }
} else{
  echo "ERROR: Could not able to execute $sql. " . $mysqli->error;
}
// Close connection
$mysqli->close();
?>
      </div>
    </div>
```

</div>

<div class="col-lg-4">

</div>

</div>

<!-- end page title -->

</div>

<!-- End Page-content -->

```
<footer class="footer">
```

```
<div class="container-fluid">
```

<div class="row">

<div class="col-sm-6">

<script>document.write(new Date().getFullYear())</script> © Tenet.

</div>

```
<div class="col-sm-6">
```

<div class="text-sm-right d-none d-sm-block">

Login Technique

</div>

</div>

</div>

</div>

</footer>

</div>

<!-- end main content-->

</div>

<!-- END layout-wrapper -->

</div>

<!-- end container-fluid -->

<!-- Right Sidebar -->

<!-- /Right-bar -->

<!-- Right bar overlay--> <div class="rightbar-overlay"></div>

#### <!-- JAVASCRIPT -->

<script src="../assets/libs/jquery/jquery.min.js"></script> <script src="../assets/libs/bootstrap/js/bootstrap.bundle.min.js"></script> <script src="../assets/libs/metismenu/metisMenu.min.js"></script> <script src="../assets/libs/metismenu/metisMenu.min.js"></script> <script src="../assets/libs/simplebar/simplebar.min.js"></script> <script src="../assets/libs/simplebar/simplebar.min.js"></script>

<!-- Required datatable js -->

<script src="../assets/libs/datatables.net/js/jquery.dataTables.min.js"></script>

<script src="../assets/libs/datatables.net-bs4/js/dataTables.bootstrap4.min.js"></script>

<!-- Buttons examples -->

<script src="../assets/libs/datatables.net-buttons/js/dataTables.buttons.min.js"></script> <script src="../assets/libs/datatables.net-buttons-bs4/js/buttons.bootstrap4.min.js"></script> <script src="../assets/libs/jszip/jszip.min.js"></script>

<script src="../assets/libs/pdfmake/build/pdfmake.min.js"></script>

<script src="../assets/libs/pdfmake/build/vfs\_fonts.js"></script>

<script src="../assets/libs/datatables.net-buttons/js/buttons.html5.min.js"></script>

<script src="../assets/libs/datatables.net-buttons/js/buttons.print.min.js"></script>

<script src="../assets/libs/datatables.net-buttons/js/buttons.colVis.min.js"></script>

<!-- Responsive examples -->

<script src="../assets/libs/datatables.net-responsive/js/dataTables.responsive.min.js"></script>

<script src="../assets/libs/datatables.net-responsivebs4/js/responsive.bootstrap4.min.js"></script>

<!-- Datatable init js -->

<script src="../assets/js/pages/datatables.init.js"></script>

<!-- App js -->

<script src="../assets/js/app.js"></script>

<script type="text/javascript">

\$(document).ready(function(){

\$('[data-toggle="tooltip"]').tooltip();

});

</script>

</body>

</html>

<!doctype html>

<html lang="en">

<head>

<meta charset="utf-8" />

<title>Tenet | Info</title>

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<meta content="Premium Multipurpose Admin & Dashboard Template" name="description" /

>

<meta content="Themesbrand" name="author" />

<!-- App favicon -->

k rel="shortcut icon" href="./assets/images/favicon.ico">

<!-- Bootstrap Css -->

k href="./assets/css/bootstrap.min.css" id="bootstrapstyle" rel="stylesheet" type="text/css" />

<!-- Icons Css -->

k href="./assets/css/icons.min.css" rel="stylesheet" type="text/css" />

<!-- App Css-->

k href="./assets/css/app.min.css" id="app-style" rel="stylesheet" type="text/css" />

</head>

<body data-layout="detached" data-topbar="colored">

<div class="container-fluid">

<!-- Begin page -->

<header id="page-topbar">
 <div class="navbar-header">
 <div class="container-fluid">
 <div class="container-fluid">
 <div class="float-right">
 <div class="float-right">
 <div class="dropdown d-inline-block">
 <div class="dropdown d-inline-block">
 <div class="dropdown d-inline-block">
 </div class="btn header-item waves-effect" id="page </div class="dropdown" aria-haspopup="true" aria-expanded="false">
 </div class="dropdown" aria-haspopup="true" aria-expand

<img class="rounded-circle header-profileuser" src="assets/images/users/avatar-2.jpg" alt="Header Avatar">

<span class="d-none d-xl-inline-block ml-1">User Name</span>

<i class="mdi mdi-chevron-down d-none d-xl-inline-block"></i>

</button>

<div class="dropdown-menu dropdown-menu-right">

<!-- item-->

<a class="dropdown-item" href="#"><i class="bx bx-user font-size-16 align-middle mr-1"></i> Profile</a>

<a class="dropdown-item" href="#"><i class="bx bx-lock-open font-size-16 align-middle mr-1"></i> Lock screen</a>

<div class="dropdown-divider"></div>

<a class="dropdown-item text-

danger" href="index.php?logout"><i class="bx bx-power-off font-size-16 align-middle mr-1 text-danger"></i> Logout</a>

</div>

</div>

<div class="dropdown d-inline-block">

<i class="mdi mdi-settings-outline"></i>

</button>

</div>

</div>

<div>

<!-- LOGO -->

<div class="navbar-brand-box">

<a href="index.html" class="logo logo-light">

<span class="logo-sm">

<img src="./assets/images/logo-sm.png" alt="" height="20">

</span>

<span class="logo-lg">

<img src="./assets/images/logo-light.png" alt="" height="19">

</span>

</a>

</div>

<button type="button" class="btn btn-sm px-3 font-size-16 header-item togglebtn waves-effect" id="vertical-menu-btn">

<i class="fa fa-fw fa-bars"></i>

</button>

</div>

</div>

</div>

</header> <!-- ====== Left Sidebar Start ========= -->

<div class="vertical-menu">

<div class="h-100">

<div class="user-wid text-center py-4">

<div class="user-img">

<img src="./assets/images/users/avatar-2.jpg" alt="" class="avatar-md mxauto rounded-circle">

</div>

<div class="mt-3">

<a href="#" class="text-dark font-weight-medium font-size-16">Patrick Becker</a>

UI/UX Designer

</div>

</div>

<!--- Sidemenu -->

<div id="sidebar-menu">

<!-- Left Menu Start -->

<l

li class="menu-title">Menu

#### 

a href="../index/index.php"><i class="mdi mdiairplay"></i>Dashboard</a>

### 

<a href="building\_info.php"><i class="bx bx-buildinghouse "></i>Building Property Lists</a>

<a href="employee.html"><i class="fas fa-userfriends "></i>Employee Info</a>

<a href="rent.html"><i class="dripicons-article"></i>Rent Collection</a>

<a href="expreports.html"><i class="dripiconsdownload "></i>Expense Reports</a>

</div>

<!-- Sidebar -->

</div>

</div>

<!-- Left Sidebar End -->

<!-

<!-- Start right Content here -->

<!-

--->

<div class="main-content">

<div class="page-content">

<!-- start page title -->

```
<div class="row">
```

<div class="col-12">

<div class="page-title-box d-flex align-items-center justify-content-between"> <h4 class="page-title mb-0 font-size-18">Dashboard</h4>

</div>

SSS

</div>

</div>

<div class="row">

<div class="col-lg-8">

<div class="card">

<div class="card-body">

<h4 class="card-title">Basic example</h4>

For basic styling—

light padding and only horizontal dividers-add the base class <code>.table</code> to any

<code>&lt;table&gt;</code>.

<div class="table-responsive">

<thead>

#

First Name

Last Name

Username

</thead>

1

Mark

Otto

@mdo

2

Jacob

Thornton

@fat

3

Larry

the Bird

@twitter

</div>

</div>

</div>

</div>

<div class="col-lg-4">

</div>

</div>

<!-- end page title -->

#### </div>

<!-- End Page-content -->

<footer class="footer">

<div class="container-fluid">

<div class="row">

<div class="col-sm-6">

<script>document.write(new Date().getFullYear())</script> © Tenet.

</div>

<div class="col-sm-6">

<div class="text-sm-right d-none d-sm-block">

Login Technique

</div>

</div>

</div>

</div>

</footer>

</div>

<!-- end main content-->

</div>

<!-- END layout-wrapper -->

</div>

<!-- end container-fluid -->

<!-- Right Sidebar -->

<!-- /Right-bar -->

<!-- Right bar overlay-->

<div class="rightbar-overlay"></div>

#### <!-- JAVASCRIPT -->

<script src="./assets/libs/jquery/jquery.min.js"></script>

<script src="./assets/libs/bootstrap/js/bootstrap.bundle.min.js"></script>

<script src="./assets/libs/metismenu/metisMenu.min.js"></script>

<script src="./assets/libs/simplebar/simplebar.min.js"></script> <script src="./assets/libs/node-waves/waves.min.js"></script>

<!-- App js -->

<script src="./assets/js/app.js"></script>

</body>

</html>

# SCREENSHOTS

### DASHBOARD

& QOVEX				Diffeader Avatar User Name 👻	\$
	DASHBOARD			Dash	brand
Patrick Becker	Apartments	Total Employees	Total Tenants	Total Expenses	
MENU MENU	4	10	11	1000	
Dashboard					
Building Property Lists					
Floor Into					
unit info					
E Tenet Info					

# BUILDING PROPERTY LISTS

C QOVEX				CH	ader Avatar User Name	- 🕸
	BUILDING	INFO			19	- Ł
Patrick Becker UI/UX Designer	Buildi	NGS Add Building				
MENU	#	Name	Action			
Dashboard	-1	Apartment1	0/1			
Building Property Lists	2	Building2	• / •			
@ Floor Info	3	Building3	0/1			
D Unit Info	4	JK Building	@ / T			

# FLOOR INFO

C QOVEX				PHeader Avatar User Name	- 🕸
	FLOOR INFO				
Patrick Becker	Buildings Floor	Add Floors to Building			
MENU	Building Name	No.of Floors	Action		
	Apartment1	firstfloor	• / •		
LJ Dashboard		301	. / .		
Dashboard     Building Property Lists	Building2	001			
Dashboard     Building Property Lists     Floor Info	Building2 Apartment1	101			
Dashboard     Building Property Lists     Floor Info     Unit Info	Building2 Apartment1 Building3	101	0 / T 0 / T		

### **UNIT INFO**

GUVEN								RHeader Avatar User N	Name 👻 🥵
	FLATS INFO	1					iiei U		
Patrick Becker U/UX Designer	Buildings	Flats	id Flats to B	uilding					
MENU	Building Name	Floor Number	Number of Flats	EB Number	P.T Number	W,C Number	Action		
Dashboard	Apartment1	firstfloor	10				æ		
Building Property Lists							4		
Floor Info	Apartment1	firstfloor	101	34456576	32445366	34234	۲		
T Unit Info							-		
and critic title									

## **TENANT INFO**

Data Entry Job - Ear 📀 Genera	a 🗿 Dailiyonlinejobs Bes	Earn money solving.	PDF to Word Conve	igits		R R
Ô	TENETS INFO					
Patrick Becker UI/UX Designer	Tenet Informa	ations Add Tenes				
MENU	Copy Excel P	DF Column visibility			Search:	
Dashboard	Tenet Name   1.	Tenet Number	Tenet Address	Building Name	Floor Number	Flat Number
Building Property Lists	• •	8719838	asdasd	Apartment1	firstfloor	10
1 Floor Info	<b>O</b> h	8719838	asdas	Apartment1	firstfloor	10
D Unit Info	<b>O</b> c	8719838	dasdas	Apartment1	firstfloor	10
B Tenet Info	• hai	32123	əsdəsd	Apartment1	firstfloor	10
Employee Info	ManiM	8739162	sadsa	Apartment1	firstfloor	10
Rent Collection	ManiMoorthy	8739182	sadsa	Apartment1	firstfloor	10
🛃 Expense Reports	ManiMoorthy	8719838	daasd	Apartment1	firstfloor	10
	() moorthy	828727	astast	Anartment1	finition	101

# **EMPLOYEE INFO**

C ① 127.0.0.1/rental/employee	/emp_info.php ③ Dailyonlinejobs Bes 🍒 Earn money solving	I 📕 PDF to Word Conve 📄 igits		🕸 🌸
C QOVEX			RHeader Avatar User Name 👻	\$
	EMPLOYEE INFO			
Patrick Becker	Employee Information			
UI/UX Designer	Add Employee Employee List	Employee Leave Employee Salary		
MENU	Employee Mana	Ohana Mumhar	Pullding Marris	
Dashboard	Employee Name	Phone Number	building Name	
Building Property Lists	Employye 1	912378	Apartment1	
O Elect Infe	Employye 1	912378	Apartment'i	
	Employye 3	131234	Building3	
Linit Info	Employye 1	131234	Building2	
🛱 Tenet Info	Employee 2	103105	Bulleton A	
State Employee Info	Ешфюууе э	123123	Brinowitz	
	Employve 3	912378	Building?	

# **RENT COLLECTION**

& QOVEX			y sorring.		- <b>-</b> 79/0		PHeader Avatar Us	er Name ~ 🔞
	RENT INFO							
Patrick Becker Ul/UX Designer	Rent Inform Generate	nations n Rent	ent Info Electr	ricity Bill				
MENU	Building Name	Floor Number	Flat Numberd	Total Cost	Rent Status	Change Status	Change Status	
Building Property Lists	Apartment1	1	t	21000	paid	O paid	O NotPaid	
12 Floor Info	Apartment1	3	1	21000		Opaid	O NotPaid	
<ul> <li>Unit Info</li> <li>Terret Info</li> </ul>	Apartment1	1	2	3000		O paid	○ NotPaid	

# **EXPENSE INFO**

& QOVEX			PHeader :	Avatar User Name - 🚳
	EXPENSE INFO			- e
Patrick Becker UI/UX Designer	Expenses Informati	ON Add Expenses		
MENU	Building Name	Expense	Amount	
Dashboard	Apartment1	1000		
剧 Building Property Lists	Expense by Desc	cription		
Elast Infe	Building Name	Expense description	Expense Amount	
Unit Info	Apartment1	water	1000	

# CONCLUSION

Efficiently resolving the apartment issues is important to the tenant's long term future, the Rental Property management app will be an important tool for creating rental housing stability for the landlords.

The goal of this project is to reduce the paper work for the landlords while managing the apartment which can be achieved through this project.

This system would definitely reduce labor and make business profitable and promising to client

# **FUTURE ENHANCEMENT**

In the future this app

- can include several apartment database
- can add persons to the apartment by selecting email id of the registered user
- can be extended to IOS platform.

# **BIBILIOGRAPHY**

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 Beginning PHP5, Apache, and MySQL Web Development (Programmer to Programmer) by Elizabeth Naramore
 MySQL/PHP Database Applications, 2nd Edition by Brad Bulger
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# CT IMAGE BASED INSTANT CORONA PREDICTION USING MACHINE LEARNING APPROACH

A project submitted to

# ST. MARY'S COLLEGE (Autonomous), THOOTHUKUDI

Affiliated to

## MANONMANIAM SUNDARANAR UNIVERSITY

## TIRUNELVELI

in partial fulfillment of the award of the degree of

### MASTER OF SCIENCE IN COMPUTER SCIENCE

Submitted by

### **ROSE MERLIN SHEEBA.G**

## Regno: 19SPCS06

Under the Supervision and Guidance of

## Ms.C.Nayanthra Mascarenhas M.Sc., M.Phil., SET.,



# PG DEPARTMENT OF COMPUTER SCIENCE (SSC)

St. Mary's College (Autonomous), Thoothukudi-628001

**APRIL-2021** 

#### CERTIFICATE

This is to certify that this project work entitled as "CT IMAGE BASED INSTANTCORONA PREDICTION USING MACHINE LEARNING APPROACH" is submitted to St Mary's College (Automomous). Thoothukudi affiliated to Manonmaniam Sundaranar University. Trunelveli, in partial fulfiltment for the award of the degree of Master of Science in Computer Science for the work done during the year 2020-2021 by ROSE MERLIN SHEEBA G (Regno. 19SPC 806).

Rlagar V Signature of the Guide

Rlayar M. Signature of the Co-Ordinator

Signature of the Director Director Self Supporting Courses St. Mary's College (Autonomous Thoothukudi - 628 001.

Lucia Rose

Signature of thePrincipal Principal St. Mery's College (Autonomous) Thoothukudi - 628 001.

A. 1949 - Kyle "16/4/21

Signature of the Examiner

### DECLARATION

I do hereby declare that the project entitled **"CT IMAGE BASEDINSTANT CORONA PREDICTION USING MACHINE LEARNINGAPPROACH"** submitted for the degree of Master of Science in Computer Science in my original work carried out under the guidance of **Ms. C.Nayanthra Mascarenhas M.Sc.,M.Phil.,SET.,**Assistant Professor and SSC Coordinator,PG Department of Computer Science (SSC),St. Mary's College (Autonomous), Thoothukudi.

Station: Thoothukudi.

Signature of the Student

Date:

#### ACKNOWLEDGEMENT

I express my first and foremost thanks to God Almighty for his gracious help and shower ofblessings for having rendered us the strength and support to finish our project successfully.

My sincere thanks to Dr. Sr. A. S. J. Lucia Rose M.Sc., PGDCA., M.Phil.,Ph.D., Principal, Sr. Flora Mary, Secretary, Dr.Sr. F. Mary Joyce Baby, Director of SSC, St. Mary's College(Autonomous), Thoothukudi,for giving permission to work on this project.

I express my hearty thanks to my guide,Mrs.C.NayanthraMascarenhas M.Sc., M.Phil., SET.,Assistant Professor and SSC Coordinator,PG Department of Computer Science (SSC),for her encouragement,guidance and beneficial criticisms which significantly helped me in scheming the project in a constructive manner.

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I also express my boundless thanks toDr. A. Vithya Vijayalakshmi., MCA., M.Phil., Ph.D., Assitant Professor,PG Department of Computer Science (SSC),for their kind cooperation in successful completion of the project.

I am much indebted to Dr.P.Johnson Durai Raj for his untiring effort, Immense knowledge and priceless contribution without which I couldn't have finished my work effectively on time.

I thank my family members especially my parents for their encouragement and support both morally and financially which helped me to finish the project successfully.

#### ABSTRACT

Classification is one of the most important research and applications of machine learning techniques. Research in the area of human-machine interaction and machine learning contributed to the success recovery of patients. This research concentrates on some of the most important developments in machine learning classification research and the issues of Corona virus Disease. This study attempted to detect Corona patients using CT SCAN image and Deep Convolution Neural Network(CNN) learning techniques, so that suitable better treatment can be given to the patients. Results are evaluated and shown the performance results. This study is to serve the society suffering from corona. In this paper we have proposed a Deep Convolutional Neural Network based solution which can detect the Covid-19 +ve patients using data images. To test the efficacy of the solution we have used publicly available data images of Covid +ve and -ve cases. 1252 images of Covid +ve patients and 1229 images of Covid -ve patients have been divided into 80% trainable images and 20% testing images. Our solution gave a classification accuracy of 95.7% and sensitivity of 98% in the test set-up. We have developed a GUI application for public use. This application can be used on any computer by any medical personnel to detect Covid +ve patients using Data images within a very few seconds.

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#### **INTRODUCTION**

Covid-19 continues to have catastrophic effects on the lives of human beings throughout the world. To combat this disease it is necessary to screen the affected patients in a fast and inexpensive way. One of the most viable steps towards achieving this goal is through radiological examination, Data being the most easily available and least expensive option. In this paper we have proposed a Deep Convolutional Neural Network based solution which can detect the Covid-19 +ve patients using data images. To test the efficacy of the solution we have used publicly available data images of Covid +ve and -ve cases. 1252 images of Covid +ve patients and 1229 images of Covid -ve patients have been divided into 80% trainable images and 20% testing images. Our solution gave a classification accuracy of 95.7% and sensitivity of 98% in the test set-up. We have developed a GUI application for public use. This application can be used on any computer by any medical personnel to detect Covid +ve patients using Data images within a very few seconds.

Corona virus, as confirmed by WHO [1], records the first official case in Wuhan, the largest metropolitan area of the Hubei province in China. It has already taken several thousands of lives till date and has millions of confirmed cases across the world. An epidemic which took the shape of a pandemic, has a catastrophic effect on health and welfare of the global population. This has caused Severe Acute Respiratory Syndrome coronavirus (SARS-CoV) and the infirmity is known as coronavirus disease 2019 (acronym Covid-19) [3]. This coronavirus belongs to the same family as that of SARS and MERS, but with a more virulent and aggressive nature (2019-nCoV). This contagious infection spreads much faster (through respiratory droplet infection) than other normal flu. Right now, the majority of tests being used to diagnose Covid-19 are genetic tests known as Reverse Transcription Polymerase Chain Reaction (RT-PCR). These tests are very accurate. Even if there is only a tiny amount of virus in the patient sample, it can be detected and measured. However, it is worth noting that PCR test is very complicated, time consuming and costly. So not all healthcare facilities have the ability to perform it. Perceiving these limitations, a stand-in approach to detect the disease can be radiography scanning, where data radiography images can be analyzed to detect the presence of, or the symptoms of the novel coronavirus

### SYSTEM SPECIFICATION

#### HARDWAREREQUIREMENT:

- Processor Pentium –IV
- Speed 1.1 GHz
- ✤ RAM 512 MB (min)
- ✤ Hard Disk 40 GB
- Floppy Drive 1.44 MB
- Key Board Standard Windows Keyboard
- ✤ Mouse Two or Three Button Mouse
- Monitor SVGA

## SOFTWARE REQUIREMENTS:

- ✤ Operating System : Windows XP or Win7
- Tools : Python, OpenCV, Tensorflow
- ✤ Document : MS-Office 2007

### **PROJECT DESCRIPTION**

COVID-19 has been causing a massive health crisis all over the world resulted in many confirmed and death COVID-19 cases. Clinical experts say that COVID-19 patients to be diagnosed in early-stage to save their lives.Covid-19 continues to have catastrophic effects on the lives of human beings throughout the world. To combat this disease it is necessary to screen the affected patients in a fast and inexpensive way. One of the most viable steps towards achieving this goal is through radiological examination, Data being the most easily available and least expensive option. In this paper we have proposed a Deep Convolutional Neural Network based solution which can detect the Covid-19 +ve patients using data images. To test the efficacy of the solution we have used publicly available data images of Covid +ve and -ve cases. 1252 images of Covid +ve patients and 1229 images of Covid -ve patients have been divided into 80% trainable images and 20% testing images. Our solution gave a classification accuracy of 95.7% and sensitivity of 98% in the test set-up. We have developed a GUI application for public use. This application can be used on any computer by any medical personnel to detect Covid +ve patients using Data within a very few seconds.Classification is one of the most important research and applications of machine learning techniques. Research in the area of human-machine interaction and machine learning contributed to the success recovery of patients. This research concentrates on some of the most important developments in machine learning classification research and the issues of Coronavirus Disease 2019 (COVID-19).

### **MODULE DESCRIPTION**

# The project "CT IMAGE BASED INSTANT CORONA PREDICTION USING MACHINE LEARNING APPROACHE" has the following modules:

- Data Transformation
- Training the ML Model
- Diagnosis Result
- Prediction Model

### **Data Transformation**

Data transformation is the application of a deterministic mathematical function to each point in a data set—that is, each data point zi is replaced with the transformed value yi = f(zi), where f is a function. Transforms are usually applied so that the data appear to more closely meet the assumptions of a statistical inference procedure that is to be applied, or to improve the interpretability or appearance of graphs.Nearly always, the function that is used to transform the data is invertible, and generally is continuous. The transformation is usually applied to a collection of comparable measurements. For example, if we are working with data on peoples' incomes in some currency unit, it would be common to transform each person's income value by the logarithm function.

### **Training the ML Model**

Training a model simply means learning (determining) good values for all the weights and the bias from labeled examples. In supervised learning, a machine learning algorithm builds a model by examining many examples and attempting to find a model that minimizes loss; this process is called empirical risk minimization.Loss is the penalty for a bad prediction. That is, loss is a number indicating how bad the model's prediction was on a single example. If the model's prediction is perfect, the loss is zero; otherwise, the loss is greater. The goal of training a model is to find a set of weights and biases that have low loss, on average, across all examples.

#### **Diagnosis Result**

We would like to express our appreciation for the well orchestrated study of Sasank Chilamkurthy and colleagues1 and the insights into deep learning for the identification of critical findings in head CT. Their retrospective analysis provides evidence that deep learning has high sensitivity in detecting critical findings in large datasets, and avoids many of the shortcomings of previous, smaller studies. If this deep learning approach were to indicate false positive critical findings, it has the potential to become an obstacle to clinical workflow; conversely, reduced attention might result from negative predictions. A statistical analysis of diagnostic predictive values to help understand effects in clinical use is lacking in the report

#### **Prediction Model**

"Prediction" refers to the output of an algorithm after it has been trained on a historical dataset and applied to new data when forecasting the likelihood of a particular outcome, such as whether or not a customer will churn in 30 days. The algorithm will generate probable values for an unknown variable for each record in the new data, allowing the model builder to identify what that value will most likely be. The word "prediction" can be misleading. In some cases, it really does mean that you are predicting a future outcome, such as when you're using machine learning to determine the next best action in a marketing campaign. Other times, though, the "prediction" has to do with, for example, whether or not a transaction that already occurred was fraudulent. In that case, the transaction already happened, but you're making an educated guess about whether or not it was legitimate, allowing you to take the appropriate action.

#### SYSTEM STUDY

#### **EXISTING SYSTEM**

In existing work, presents a deep learning based approach, named Frequency neural network (FreNet), for facial expression recognition. Based on the property of Discrete cosine transform (DCT), it utilizes multiplication layers and summarization layer to construct the Basic- FreNet, which can yield high-level features on the widely used DCT feature. Finally, to further achieve better performance on Basic- FreNet, it proposed the Block- FreNetin which the weight-shared multiplication kernel is designed for feature learning and the block sub-sampling is designed for dimension reduction. The experimental results show that the Block- FreNetnot only achieves better performance.

#### **Disadvantages:**

- High Computation cost is required for recognition
- Requires more memory to store the Transformed frames

#### **PROPOSED SYSTEM**

The proposed work presents a deep learning based approach, named frequency neural network (FreNet), for facial expression recognition. Different from convolutional neural network in spatial domain, FreNet inherits the advantages of processing image in frequency domain, such as efficient computation and spatial redundancy elimination. First, we propose the learnable multiplication kernel and construct multiple multiplication layers to learn features in frequency domain. Second, a summarization layer is proposed following multiplication layers to further yield high-level features. Third, based on the property of Fast Fourier transform (FFT), we utilize multiplication layers and summarization layer to

construct the Basic- FFNet, which can yield high-level features on the widely used FFT feature. Finally, to further achieve better performance on Basic- FFNet, we propose the Block- FFNet in which the weight-shared multiplication kernel is designed for feature learning and the block sub-sampling is designed for dimension reduction. The experimental results show that the Block- FFNet not only achieves superior performance, but also greatly reduces the computational cost. To our best knowledge, the proposed approach is the first attempt to fill in the blank of frequency based deep learning model for facial expression recognition.

### Advantages:

- Less Computation cost is required for recognition
- Requires less memory to store the Transformed frames
- Fast transformation of input frames.
### SYSTEM ANALYSIS

System analysis is a problem solving technique that decomposes a system into component pieces of purpose of studying how well those component parts work and interact to accomplish their purpose the following chapter provides the detail description of the existing system. It also provides an overview of the proposed system and feasibility of the banking bot.

### **FEASIBILITY STUDY:**

An analysis and evaluation of a proposed project to determine if it is technically feasible, is feasible within the estimated cost, and will be profitable. Feasibility studies are almost always conducted where large sums are at stake. A feasibility study aims to objectively and rationally uncover the strengths and weaknesses of an existing banking applications and threats present in the environment, the resources required to carry through, and ultimately the prospects for success in the banking bot

### **Tests of Feasibility**

Feasibility study is conducted once the problem clearly understood. Feasibility study is necessary to determine that the proposed system in banking bot is feasible by considering the technical, operational, and economical factors. By having a detailed feasibility study the management in the will have a clear-cut view of the proposed system of the banking bot. Feasibility study encompasses the following things:

- Technical Feasibility
- Economical Feasibility
- Operational feasibility

### **Technical Feasibility**

A large part of determining resources has to do with assessing technical feasibility. It considers the technical requirements of the proposed project of banking bot. The technical requirements are then compared to the technical capability of the banking system. The systems project is considered technically feasible if the internal

technical capability is sufficient to support the banking system's requirements. The analyst must find out whether current technical resources can be upgraded or added to in a manner that fulfils the request under consideration.

The essential questions that help in testing the operational feasibility of a system include the following:

- Is the project feasible within the limits of current technology?
- Does the technology exist at all?
- Is it available within given resource constraints?
- Is it a practical proposition?
- Manpower- programmers, testers & debuggers
- Software and hardware
- Are the current technical resources sufficient for the new system?
- Can they be upgraded to provide to provide the level of technology necessary for the new system?

### **Operational Feasibility**

Operational feasibility is dependent on human resources available for the project and involves projecting whether the system will be used if it is developed and implemented. Operational feasibility is a measure of how well a proposed system in banking bot solves the problems, and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of banking bot development.

The essential questions that help in testing the operational feasibility of a system include the following:

- Does current mode of operation provide adequate throughput and response time?
- Does current mode provide end users and managers with timely, pertinent, accurate and useful formatted information?
- Does current mode of operation provide cost-effective information services to the business?
- Could there be a reduction in cost and or an increase in benefits?

### **Economical Feasibility**

Economic analysis could also be referred to as cost/benefit analysis. It is the most frequently used method for evaluating the effectiveness of a new system of the

banking bot. In economic analysis the procedure is to determine the benefits and savings that are expected from a candidate system and compare them with costs.

If benefits outweigh costs, then the decision is made to design and implement the banking bot. An entrepreneur must accurately weigh the cost versus benefits before taking an action.

Possible questions raised in economic analysis are:

- Is the system cost effective?
- Do benefits outweigh costs and system study?

# SYSTEM DESIGN



### SYSTEM TESTING

## **PLANNED TEST:**

A Test Plan is a detailed document that describes the test strategy, objectives, schedule, estimation, deliverables, and resources required to perform testing for a software product. Test Plan helps us determine the effort needed to validate the quality of the application under test. The test plan serves as a blueprint to conduct software testing activities as a defined process, which is minutely monitored and controlled by the test manager.

As per ISTQB definition: "Test Plan is A document describing the scope, approach, resources, and schedule of intended test activities."

Making Test Plan document has multiple benefits

- Help people outside the test team such as developers, business managers, customers understand the details of testing.
- Test Plan guides our thinking. It is like a rule book, which needs to be followed.
- Important aspects like test estimation, test scope, Test Strategy are documented in Test Plan, so it can be reviewed by Management Team and re-used for other projects.

Resource plan is a detailed summary of all types of resources required to complete project task. Resource could be human, equipment and materials needed to complete a projectThe resource planning is important factor of the test planning because helps in determining the number of resources (employee, equipment...) to be used for the project. Therefore, the Test Manager can make the correct schedule & estimation for the project

### WHITE BOX TESTING:

White Box Testing is software testing technique in which internal structure, design and coding of software are tested to verify flow of input-output and to improve design, usability and security. In white box testing, code is visible to testers so it is also called Clear box testing, Open box testing, Transparent box testing, Code-based testing and Glass box testing. It is one of two parts of the Box Testing approach to software testing. Its counterpart, Blackbox testing, involves testing from an external or end-user type perspective. On the other hand, White box testing in software engineering is based on the inner workings of an application and revolves around internal testing.

The term "WhiteBox" was used because of the see-through box concept. The clear box or WhiteBox name symbolizes the ability to see through the software's outer shell (or "box") into its inner workings.

White box testing involves the testing of the software code for the following:

- Internal security holes
- Broken or poorly structured paths in the coding processes
- The flow of specific inputs through the code
- Expected output
- The functionality of conditional loops
- Testing of each statement, object, and function on an individual basis

The testing can be done at system, integration and unit levels of software development. One of the basic goals of whitebox testing is to verify a working flow for an application. It involves testing a series of predefined inputs against expected or desired outputs so that when a specific input does not result in the expected output, you have encountered a bug.White Box Testing Techniques

A major White box testing technique is Code Coverage analysis. Code Coverage analysis eliminates gaps in a Test Case suite. It identifies areas of a program that are not exercised by a set of test cases. Once gaps are identified, you create test cases to verify untested parts of the code, thereby increasing the quality of the software product. There are automated tools available to perform Code coverage analysis. Below are a few coverage analysis techniques a box tester can use:

Statement Coverage:- This technique requires every possible statement in the code to be tested at least once during the testing process of software engineering.

Branch Coverage - This technique checks every possible path (if-else and other conditional loops) of a software application.

Apart from above, there are numerous coverage types such as Condition Coverage, Multiple Condition Coverage, Path Coverage, Function Coverage etc. Each technique has its own merits and attempts to test (cover) all parts of software code. Using Statement and Branch coverage you generally attain 80-90% code coverage which is sufficient.

Following are important WhiteBox Testing Techniques:

- Statement Coverage
- Decision Coverage
- Branch Coverage
- Condition Coverage
- Multiple Condition Coverage
- Finite State Machine Coverage

- Path Coverage
- Control flow testing
- Data flow testing

\Types of White Box Testing

White box testing encompasses several testing types used to evaluate the usability of an application, block of code or specific software package. There are listed below --

- Unit Testing: It is often the first type of testing done on an application. Unit Testing is performed on each unit or block of code as it is developed. Unit Testing is essentially done by the programmer. As a software developer, you develop a few lines of code, a single function or an object and test it to make sure it works before continuing Unit Testing helps identify a majority of bugs, early in the software development lifecycle. Bugs identified in this stage are cheaper and easy to fix.
- Testing for Memory Leaks: Memory leaks are leading causes of slower running applications. A QA specialist who is experienced at detecting memory leaks is essential in cases where you have a slow running software application.
- Apart from above, a few testing types are part of both black box and white box testing. They are listed as below
- White Box Penetration Testing: In this testing, the tester/developer has full information of the application's source code, detailed network information, IP addresses involved and all server information the application runs on. The aim is to attack the code from several angles to expose security threats
- White Box Mutation Testing: Mutation testing is often used to discover the best coding techniques to use for expanding a software solution.

# Advantages of White Box Testing:

- Code optimization by finding hidden errors.
- White box tests cases can be easily automated.
- Testing is more thorough as all code paths are usually covered.
- Testing can start early in SDLC even if GUI is not available.

# **Disadvantages of WhiteBox Testing:**

• White box testing can be quite complex and expensive.

- Developers who usually execute white box test cases detest it. The white box testing by developers is not detailed can lead to production errors.
- White box testing requires professional resources, with a detailed understanding of programming and implementation.
- White-box testing is time-consuming, bigger programming applications take the time to test fully.

# **BLACK BOX TESTING:**

Black Box Testing is a software testing method in which the functionalities of software applications are tested without having knowledge of internal code structure, implementation details and internal paths. Black Box Testing mainly focuses on input and output of software applications and it is entirely based on software requirements and specifications. It is also known as Behavioral Testing.

## How to do BlackBox Testing

Here are the generic steps followed to carry out any type of Black Box Testing.

- Initially, the requirements and specifications of the system are examined.
- Tester chooses valid inputs (positive test scenario) to check whether SUT processes them correctly. Also, some invalid inputs (negative test scenario) are chosen to verify that the SUT is able to detect them.
- Tester determines expected outputs for all those inputs.
- Software tester constructs test cases with the selected inputs.
- The test cases are executed.
- Software tester compares the actual outputs with the expected outputs.
- Defects if any are fixed and re-tested.

# **Types of Black Box Testing:**

There are many types of Black Box Testing but the following are the prominent ones -

- Functional testing This black box testing type is related to the functional requirements of a system; it is done by software testers.
- Non-functional testing This type of black box testing is not related to testing of specific functionality, but non-functional requirements such as performance, scalability, usability.
- Regression testing Regression Testing is done after code fixes, upgrades or any other system maintenance to check the new code has not affected the existing code.

# **Black Box Testing Techniques:**

Following are the prominent Test Strategy amongst the many used in Black box Testing

- Equivalence Class Testing: It is used to minimize the number of possible test cases to an optimum level while maintains reasonable test coverage.
- Boundary Value Testing: Boundary value testing is focused on the values at boundaries. This technique determines whether a certain range of values are acceptable by the system or not. It is very useful in reducing the number of test cases. It is most suitable for the systems where an input is within certain ranges.
- Decision Table Testing: A decision table puts causes and their effects in a matrix. There is a unique combination in each column.

## **FUNCTIONAL TESTING:**

Functional testing is a type of software testing that validates the software system against the functional requirements/specifications. The purpose of Functional tests is to test each function of the software application, by providing appropriate input, verifying the output against the Functional requirements.Functional testing mainly involves black box testing and it is not concerned about the source code of the application. This testing checks User Interface, APIs, Database, Security, Client/Server communication and other functionality of the Application Under Test. The testing can be done either manually or using automation.

The prime objective of Functional testing is checking the functionalities of the software system. It mainly concentrates on -

- Mainline functions: Testing the main functions of an application
- Basic Usability: It involves basic usability testing of the system. It checks whether a user can freely navigate through the screens without any difficulties.
- Accessibility: Checks the accessibility of the system for the user
- Error Conditions: Usage of testing techniques to check for error conditions. It checks whether suitable error messages are displayed.

## CODING

### Main.py:

import numpy as np # linear algebra import pandas as pd # data processing, CSV file I/O (e.g. pd.read csv) import os import numpy as np import pandas as pd import matplotlib.pyplot as plt #%matplotlib inline import seaborn as sns import cv2 import os from tqdm import tqdm from sklearn.metrics import confusion matrix from sklearn.model\_selection import train\_test\_split from keras.utils.np utils import to categorical from keras.models import Model, Sequential, Input, load\_model keras.layers import Dense, Dropout, Flatten, from Conv2D, MaxPool2D, BatchNormalization, AveragePooling2D, GlobalAveragePooling2D from keras.optimizers import Adam from keras.preprocessing.image import ImageDataGenerator from keras.callbacks import ModelCheckpoint, ReduceLROnPlateau from keras.applications import DenseNet121 disease\_types=['COVID', 'non-COVID'] data dir = 'Data' train\_dir = os.path.join(data\_dir) train\_data = [] for defects\_id, sp in enumerate(disease\_types): for file in os.listdir(os.path.join(train\_dir, sp)): train\_data.append(['{ }/{ }'.format(sp, file), defects\_id, sp]) train = pd.DataFrame(train\_data, columns=['File', 'DiseaseID', 'Disease Type']) train.head() SEED = 42train = train.sample(frac=1, random\_state=SEED) train.index = np.arange(len(train)) # Reset indices train.head() plt.hist(train['DiseaseID']) plt.title('Frequency Histogram of Species') plt.figure(figsize=(12, 12)) plt.show()

```
def plot_defects(defect_types, rows, cols):
  fig, ax = plt.subplots(rows, cols, figsize=(12, 12))
  defect_files = train['File'][train['Disease Type'] == defect_types].values
  n = 0
  for i in range(rows):
     for j in range(cols):
       image_path = os.path.join(data_dir, defect_files[n])
       ax[i, j].set_xticks([])
       ax[i, j].set_yticks([])
       ax[i, j].imshow(cv2.imread(image_path))
       n += 1
# Displays first n images of class from training set
plot_defects('COVID', 5, 5)
def plot_defects(defect_types, rows, cols):
  fig, ax = plt.subplots(rows, cols, figsize=(12, 12))
  defect_files = train['File'][train['Disease Type'] == defect_types].values
  n = 0
  for i in range(rows):
     for j in range(cols):
       image_path = os.path.join(data_dir, defect_files[n])
       ax[i, j].set_xticks([])
       ax[i, j].set_yticks([])
       ax[i, j].imshow(cv2.imread(image_path))
       n += 1
# Displays first n images of class from training set
plot_defects('non-COVID', 5, 5)
IMAGE_SIZE = 64
def read_image(filepath):
  return cv2.imread(os.path.join(data_dir, filepath)) # Loading a color image is the default
flag
# Resize image to target size
def resize image(image, image size):
  return cv2.resize(image.copy(), image_size, interpolation=cv2.INTER_AREA)
X_train = np.zeros((train.shape[0], IMAGE_SIZE, IMAGE_SIZE, 3))
for i, file in tqdm(enumerate(train['File'].values)):
  image = read_image(file)
  if image is not None:
     X_train[i] = resize_image(image, (IMAGE_SIZE, IMAGE_SIZE))
# Normalize the data
X Train = X train / 255.
print('Train Shape: { }'.format(X_Train.shape))
Y train = train['DiseaseID'].values
Y_train = to_categorical(Y_train, num_classes=2)
BATCH_SIZE = 64
```

```
# Split the train and validation sets
X train, X_val, Y_train, Y_val = train_test_split(X_Train, Y_train, test_size=0.2,
random state=SEED)
fig, ax = plt.subplots(1, 3, figsize=(15, 15))
for i in range(3):
  ax[i].set_axis_off()
  ax[i].imshow(X_train[i])
  ax[i].set_title(disease_types[np.argmax(Y_train[i])])
  EPOCHS = 2
SIZE=64
N ch=3
def build_densenet():
  densenet = DenseNet121(weights='imagenet', include_top=False)
input = Input(shape=(SIZE, SIZE, N_ch))
  x = Conv2D(3, (3, 3), padding='same')(input)
  x = densenet(x)
x = GlobalAveragePooling2D()(x)
  x = BatchNormalization()(x)
  x = Dropout(0.5)(x)
  x = Dense(256, activation='relu')(x)
  x = BatchNormalization()(x)
  x = Dropout(0.5)(x)
# multi output
  output = Dense(2, activation = 'softmax', name='root')(x)
 # model
  model = Model(input,output)
optimizer = Adam(lr=0.002, beta 1=0.9, beta 2=0.999, epsilon=0.1, decay=0.0)
  model.compile(loss='categorical_crossentropy',
                                                                   optimizer=optimizer,
metrics=['accuracy'])
  model.summary()
  return model
model = build densenet()
               ReduceLROnPlateau(monitor='val_accuracy',
annealer
           =
                                                              factor=0.5.
                                                                            patience=5,
verbose=1, min_lr=1e-3)
checkpoint = ModelCheckpoint('model.h5', verbose=1, save best only=True)
# Generates batches of image data with data augmentation
datagen = ImageDataGenerator(rotation_range=360, # Degree range for random rotations
              width_shift_range=0.2, # Range for random horizontal shifts
              height_shift_range=0.2, # Range for random vertical shifts
              zoom_range=0.2, # Range for random zoom
              horizontal flip=True, # Randomly flip inputs horizontally
              vertical_flip=True) # Randomly flip inputs vertically
datagen.fit(X_train)
# Fits the model on batches with real-time data augmentation
hist = model.fit_generator(datagen.flow(X_train, Y_train, batch_size=BATCH_SIZE),
```

```
steps_per_epoch=X_train.shape[0] // BATCH_SIZE,
         epochs=EPOCHS,
         verbose=2,
         callbacks=[annealer, checkpoint],
         validation_data=(X_val, Y_val))
#model = load_model('../output/kaggle/working/model.h5')
final_loss, final_accuracy = model.evaluate(X_val, Y_val)
print('Final Loss: {}, Final Accuracy: {}'.format(final_loss, final_accuracy))
Y_pred = model.predict(X_val)
Y_pred = np.argmax(Y_pred, axis=1)
Y_true = np.argmax(Y_val, axis=1)
cm = confusion_matrix(Y_true, Y_pred)
plt.figure(figsize=(12, 12))
ax
       =
             sns.heatmap(cm,
                                   cmap=plt.cm.Greens,
                                                             annot=True,
                                                                              square=True,
xticklabels=disease_types, yticklabels=disease_types)
ax.set_ylabel('Actual', fontsize=40)
ax.set_xlabel('Predicted', fontsize=40)
# accuracy plot
plt.plot(hist.history['accuracy'])
plt.plot(hist.history['val accuracy'])
plt.title('model accuracy')
plt.ylabel('accuracy')
plt.xlabel('epoch')
plt.legend(['train', 'test'], loc='upper left')
plt.show()
# loss plot
plt.plot(hist.history['loss'])
plt.plot(hist.history['val_loss'])
plt.title('model loss')
plt.ylabel('loss')
plt.xlabel('epoch')
plt.legend(['train', 'test'], loc='upper left')
plt.show()
```

## app.py:

import os import tensorflow as tf import numpy as np from tensorflow import keras from skimage import io from tensorflow.keras.preprocessing import image

```
# Flask utils
from flask import Flask, redirect, url_for, request, render_template
from werkzeug.utils import secure_filename
from gevent.pywsgi import WSGIServer
# Define a flask app
app = Flask(___name___)
# Model saved with Keras model.save()
# You can also use pretrained model from Keras
# Check https://keras.io/applications/
model =tf.keras.models.load_model('model.h5',compile=False)
print('Model loaded. Check http://127.0.0.1:5000/')
def model_predict(img_path, model):
  img = image.load img(img path, grayscale=False, target size=(64, 64))
  show_img = image.load_img(img_path, grayscale=False, target_size=(64, 64))
  x = image.img_to_array(img)
  x = np.expand_dims(x, axis=0)
  x = np.array(x, 'float32')
  x /= 255
  preds = model.predict(x)
  return preds
@app.route('/', methods=['GET'])
def index():
  # Main page
  return render_template('index.html')
@app.route('/predict', methods=['GET', 'POST'])
def upload():
  if request.method == 'POST':
    # Get the file from post request
    f = request.files['file']
# Save the file to ./uploads
    basepath = os.path.dirname(___file___)
    file_path = os.path.join(
       basepath, 'uploads', secure_filename(f.filename))
    f.save(file_path)
# Make prediction
    preds = model_predict(file_path, model)
    print(preds[0])
\# x = x.reshape([64, 64]);
    disease_class = ['Covid-19','Non Covid-19']
    a = preds[0]
    ind=np.argmax(a)
    print('Prediction:', disease_class[ind])
    result=disease_class[ind]
```

```
return result
return None
if __name__ == '__main__':
    # app.run(port=5002, debug=True)
# Serve the app with gevent
http_server = WSGIServer((", 5000), app)
http_server.serve_forever()
app.run()
```

# **SCREENSHOTS**



### CONCLUSION

COVID-19 has been causing a massive health crisis all over the world resulted in many confirmed and death COVID-19 cases. Clinical experts say that COVID-19 patients to be diagnosed in early-stage to save their lives. This study attempted to detect COVID-19 patients using machine learning techniques, so that suitable treatment can be given to the patients to save their lives. Results are evaluated and shown the performance results. This study is to serve the society suffering from COVID-19.One of the most viable steps towards achieving this goal is through radiological examination, Data being the most easily available and least expensive option. In this paper we have proposed a Deep Convolutional Neural Network based solution which can detect the Covid-19 +ve patients using data images. To test the efficacy of the solution we have used publicly available data images of Covid +ve and -ve cases. 1252 images of Covid +ve patients and 1229 images of Covid -ve patients have been divided into 80% trainable images and 20% testing images.

### **FUTURE ENCHANCEMENT**

In this work, only axial slices from CT images were used; however, it will be interesting to see how inclusion of other slices contributes to giving further information from the images. Also, with the availability of CT images with labeled information of other lung diseases, combining with COVID19 CT images might give more reliable systems. For now, we consider these are the limitations of the used dataset and these limitations will be addressed in the future work.

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# REAL TIME EYE TRACKING FOR MONITORING DRIVER FATIGUE

A project submitted to

# ST. MARY'S COLLEGE (Autonomous), THOOTHUKUDI

Affiliated to

# MANONMANIAM SUNDARANAR UNIVERSITY

# TIRUNELVELI

in partial fulfillment of the award of the degree of

# MASTER OF COMPUTER SCIENCE

Submitted by

# TRIFINA. N

# Regno: 19SPCS09

Under the Supervision and Guidance of

# Mrs. A. JenittaJebamalar M.Sc (IT)., M.Sc (CS)., MPhil., B.Ed



# PG DEPARTMENT OF COMPUTER SCIENCE (SSC)

St. Mary's College (Autonomous), Thoothukudi- 628001

# **April – 2021**

### CERTIFICATE

This is to certify that this project work entitled as "REAL TIME EYE TRACKING FOR MONITORING DRIVER FATIGUE" is submitted to St. Mary's College (Autonomous), Thoothukudi affiliated to Manonmanian Sundaranar University. Turunelveh, in partial fulfillment for the award of the degree of Master of Science in Computer Science for the work done during the year 2020-2021 by Trifina N (Reg no.: 19SPCS09).

A. Sentte

Signature of the Guide

Rhujan K. Signature of the Co-Ordinator

Signature of the Director Director Self Supporting Courses St. Many's College (Autonomicule, Thoothukudi - 628 001.

incia the Signature of the Principal

Signature of the Principal Principal St. Mary's College (Autonomous) Thoothukudi - 626 001.

Rayan Hilly 102.1 Signature of the Examiner

# DECLARATION

I do hereby declare that the project entitled "**REAL TIME EYE TRACKING FOR MONITORING DRIVER FATIGUE**" submitted for the degree of Master of Science in Computer Science in my original work carried out under the guidance of **Mrs. A. JenittaJebamalar M.Sc (IT)., M.Sc (CS)., MPhil., B.Ed.,**Assistant Professor, PG Department of Computer Science (SSC), St. Mary's College (Autonomous), Thoothukudi..

Station: Thoothukudi.

Signature of the Student

Date:

## ACKNOWLEDGEMENT

I express my first and foremost thanks to God Almighty for his gracious help and shower of blessings for having rendered us the strength and support to finish our project successfully.

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I express my hearty thanks to my guide Mrs. A. JenittaJebamalarM.Sc (IT)., M.Sc (CS)., M.Phil., B.Ed., Assistant professor, PG Department of Computer Science (SSC), for her support and counsel. For her valuable suggestions, gentle guidance, enthusiastic ideas, to carry out and complete my work entirely.

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I thank my family members especially my parents for their encouragement and support both morally and financially which helped me to finish the project successfully.

### ABSTRACT

In modern days, the increasing number of transportation accidents has become a serious problem for society. The driver fatigue problem has become an important factor for causing traffic accidents not only because it affects those who are driving while drowsy, but because it puts all other road users in danger. Fatigue is not the same as drowsiness, but the desire to sleep may accompany fatigue. To address this problem we propose a real time non-intrusive prototype for drowsiness detection. The proposed system detects the driver fatigue based on eye tracking which comes under an active safety system. The eye is one of the sense organs that can give users better interaction closer to their need by observing the change of the eyes (open or closed). The proposed system consists of 3 major steps, 1) Capturing image fatigue using web cam 2)Face detection using Viola-Jones Algorithm 3) Eye tracking using dynamic template matching. This system can minimize the number of accidents caused by driver's fatigue.

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### INTRODUCTION

Driver drowsiness is one of the biggest safety issues facing the road transport industry today and the most dangerous aspect of driver fatigue is falling asleep at the wheel . Fatigue leads to sleep, it reduces reaction time (a critical element of safe driving). It also reduces vigilance, alertness and concentration so that the ability to perform attention based activities (such as driving) is impaired. The speed at which information is processed is also reduced by sleepiness. The quality of decision making may also be affected. Driver falls in micro sleep, results in collision with object or vehicle, or they can not recognize that he or she has drifted into a wrong lane. The consequences of a drowsy driver are very dangerous and lead to loss of lives, casualties and vehicle damage. The spectra of injuries are insidiously taking a greater toll on human life and property worldwide. Overall 10-15 million people are injured every year in road traffic collisions. It is projected that globally by 2020 RTCs (Road Traffic Crashes) will account for about 23 million deaths and RTIs (Road Traffic Injuries) will be the third leading cause of death and disability as compared to their present ranking of ninth. In Pakistan there are about 26 deaths from road traffic accidents per 100,000 populations, compared to Europe where the death rate averages is 14.5 per 100,000. As the most important safety factor, it is necessary to make some serious measures, in order to improve working conditions of drivers, so that negative consequences subjected by a drowsy driver can be minimized.Driver drowsiness detection system is such an example that can be used as a security measure that alerts the drowsy driver while driving, in order to safeguard himself as well as others.

## SYSTEM SPECIFICATION

### HARDWARE REQUIREMENT:

*	Processor	- I5
*	Speed	- 1.1 GHz
*	RAM	- 512 MB (min)
*	Hard Disk	- 40 GB
*	Floppy Drive	- 1.44 MB
*	Key Board	- Standard Windows Keyboard
*	Mouse	- Two or Three Button Mouse
*	Camera	- Web Camera

### SOFTWARE REQUIREMENTS:

- ✤ Operating System : windows 8
- ✤ Document : MS-Office 2007

### **SOFTWARE DESCRIPTION :**

**MATLAB** (**mat**rix **lab**oratory) is a numerical computing environment and fourth-generation programming language. Developed by MathWorks, MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, Java, and Fortran.

Although MATLAB is intended primarily for numerical computing, an optional toolbox uses the MuPAD symbolic engine, allowing access tosymbolic computing capabilities. An additional package, Simulink, adds graphical multi-domain simulation and Model-Based Design fordynamic and embedded systems. In 2004, MATLAB had around one million users across industry and academia. MATLAB users come from various backgrounds ofengineering, science, and economics. MATLAB is widely used in academic and research institutions as well as industrial enterprises

## **PROJECT DESCRIPTION**

The proposed system will be helpful in preventing many accidents, and consequently save money and reduce personal suffering. The driver Fatigue Detection system automatically analyses the driving characteristics and if they indicate possible fatigue, recommends that the driver takes a break. Fatigue Detection cannot replace the driver's attentiveness. The driver is still legally responsible for the vehicle and therefore determining whether or not they are fit to drive

### **MODULES DESCRIPTION**

### **INPUT CAMERA VIDEOS:**

The input live video is captured and stored in the database. From each of the frame the skin is extracted to detect the face of the driver alone from the frame by eliminating the objects bounding the driver and stored in a separate database. After face detection has been done the eyes are configured by giving the control points around the eyes. The eye template is then cropped and stored. With the stored template as reference we track the eyes of the driver continuously in the live video using dynamic template matching. If the eyes of the drivers are closed for a continuous number of frames then the driver is said to be in fatigue state and an alarm is raised.

#### FACE DETECTION METHOD:

Face detection is the main step in the driver fatigue detection systems. Face detection is a process that aims to locate a human face in an image. The process is applied on stored image or images from a camera. Human face varies from one person to another. This variation in faces could be due to race, gender, age, and other physical characteristics of an individual. Here face detection is done by skin color model.

The use of skin color analysis for initial classification of an image into probable face and non face regions stems from a number of simple but powerful characteristics of skin color. Firstly, processing skin color is simpler than processing any other facial feature. Secondly, under certain

lighting conditions, color is orientation invariant. The major difference between skin tones is intensity e.g. due to varying lighting conditions and different human face.

In order to distinguish the skin color of the user's face from the other image regions in the image, the distribution of the skin color in the chromatic color space must be known prior to employing the system for detecting the human face. Skin color models vary with the skin color of the people, video cameras used and also with the lighting conditions. Skin pixels clustered in the chromatic color can be represented in chromatic color space using a Gaussian distribution.

### **EYE TRACKING METHOD:**

Eye tracking is the process of measuring either the point of gaze (where one is looking) or the motion of an eye relative to the head. An eye tracker is a device for measuring eye positions and eye movement. Eye trackers are used in research on the visual system, in psychology, in cognitive linguistics, marketing, as an input device for human computer interaction, and in product design. There are a number of methods for measuring eye movement. The most popular variant uses video images from which the eye position is extracted. Other methods use search coils or are based on the electrooculogram. Eye tracking method for measuring eye motion is reflected from the eye and sensed by a video camera or some other specially designed optical sensor. The information is then analyzed to extract eye rotation from changes in reflections.

Video-based eye trackers typically use the corneal reflection (the first Purkinje image) and the center of the pupil as features to track over time more sensitive type of eye tracker, the dualpurkinje eye tracker uses reflections from the front of the cornea (first Purkinje image) and the back of the lens (fourth Purkinje image) as features to track. A still more sensitive method of tracking is to image features from inside the eye, such as the retinal blood vessels, and follow these features as the eye rotates. Optical methods, particularly those based on video recording, are widely used for gaze tracking and are favored for being non-invasive and inexpensive.

#### **MATCHING TEMPLATES:**

Eye-Tracking has got two phases namely eye tracking and dynamic template matching is done. Because the value of pixels in eye region is relatively lower than other region of face. We calculate the average gray value along X axis and roughly find the eye region. Thus by symmetrical characteristics of eyes we obtain the eye templates. After we get the eye templates, we use gray scale correlation over eye region to find the position of the eye. Assume the coordinates of left-top of the template is (x,y), then the searching area is original position by expanding 10 pixels in up, down, left, and right directions.

Where N is the number of pixels in the model, M is the model, and 1 is the image against which the pattern is being compared, p is the match score. If p (a,b) is the maximum value within the search area, the point (a,b) is defined as the most matching position and it is the new position of the eye and the new eye template is updated accordingly for eye tracking in the next frame. When tracking, if the maximum o f p is below the acceptance level of match score or the distance between two newly updated eyes doesn't satisfy the constraints of the eyes, it will restart the face and eye detection procedures. Thus from the eye templates obtained we get the states of eyes i.e. opened or closed.

### **FATIGUE DETECTION:**

Once the face of the driver is detected and the eye of the driver is successfully tracked, we continuously monitor the variations of the eye. A pattern matching technique is then used for detecting whether the eyes of the driver are open or closed. Based on the blink threshold and the detection threshold the open and closed variations of the eye are judged. If the eyes remain closed for a certain period of time (3 to 4 seconds), the system determines that the person has fatigue and gives a warning signal. The system also checks for tracking errors; once an error is detected, the system returns to the face detection stage.

The main focus is on the detection of micro-sleep symptoms. This is achieved by monitoring the eyes of the driver throughout the entire video sequence. At this stage, the colors of the eyeballs in the eye templates are used directly for fatigue detection. Since the property that the eyeball colors are much darker is a quite stable feature, the eye templates are converted to the grayscale model. The original darker eyeballs become brighter ones in the converted image. According to the observation, the saturation values of eyeball pixels normally fall between 0.00 and 0.14. This observation is used to distinguish whether a pixel in an eye template is viewed as an eyeball pixel. When the eyes are open, there are some eyeball pixels. When the eyes are closed, there are

no eyeball pixels. By checking the eyeball pixels, it is easy to detect whether the eyes are open or closed.

Update the eye coordinate position each time the frame is successfully tracked, and take this coordinate as the reference of next search range, if it is an eye-open area, take it as next template, then repeat. This is a method which updates template and search range instantaneously to match eye-area dynamically. During the track process, if matched areas in several continuous frames are no longer eye area, it seems tracking is fail and the algorithm needs restart. So far the eye localization and its state detection of driver video sequences has already been finished, which supply basis for fatigue detection. The blink detection algorithm first checks to make sure that a decent correlation exists, then looks for 8 frames in a row where the average darkness of the template image is at least 12 pixels greater than the average darkness of the source image, where upon it outputs the message "Fatigue Detected". If the eye tracker has a low correlation or a blink is detected, the frame counter is set back to 0. An alert is made to the driver once the fatigue state is detected. The system simultaneously checks for fatigue detection. In case the eyes of the subject remain closed for unusually long periods of time, the system gives a fatigue alert. The fatigue alert persists as long as the person doesn't open his eyes. In case all the matches fail, the system decides that there is a tracking failure and switches back to the face localization stage. As the face of the driver doesn't move a lot between frames, we can use the same region for searching the eyes in the next frame.

### SYSTEM STUDY

#### **EXISTING SYSTEM:**

In the last few years many researchers have been working on the development of safety systems using different techniques. The most accurate techniques are based on physiological measures like brain waves, heart rate, pulse rate, respiration, etc. These techniques are intrusive, since they need to attach some electrodes on the drivers, causing annoyance to them. A representative project is MIT SmartCar where several sensors (electrocardiogram, electromyogram, respiration and skin conductance) embedded in a car and visual information for sensors confirmation are used. In ASV (Advanced Safety Vehicle) project, held by Toyota , the driver must wear a wristband in order to measure his heart rate.

In an industrial prototype called Copilot is presented. This system uses infrared LED illumination to find the eyes and it has been tested with truck's drivers in real environments. It uses a simple subtraction process for finding the eyes and it only calculates a validated parameter called PERCLOS (percent eye closure), in order to measure driver's drowsiness. This system currently works under low light conditions.

#### **PROPOSED SYSTEM:**

Vision-based real-time driver fatigue detection for the effective vehicle control is proposed in this paper. The system detects the driver fatigue based on eye tracking which comes under an active safety system. At first, an ordinary color webcam is used to capture the images of the driver for fatigue detection.

First frame is used for initial face detection and eye location. If any one of these detection procedures fails, then go to the next frame and restart the above detection processes. Otherwise, the current eye images are used as the dynamic templates for eye tracking on subsequent frames, and then the fatigue detection process is performed. If eye tracking fails, the face detection and eye location restart on the current frame.

Face detection has been done the eyes are configured by giving the control points around the eyes. The eye template is then cropped and stored. With the stored template as reference we track

the eyes of the driver continuously in the live video using dynamic template matching. If the eyes of the drivers are closed for a continuous number of frames then the driver is said to be in fatigue state and an alarm is raised.

The warning is repeated after 15 minutes if the driver has not taken a break. Fatigue Detection cannot replace the driver's attentiveness. The driver is still legally responsible for the vehicle and therefore determining whether or not they are fit to drive. A driving time of 15 minutes is required in order to assess the driver correctly. The functionality of the system is restricted given a sporty driving style, winding roads and poor road surfaces.

### SYSTEM ANALYSIS

#### **FEASIBILITY STUDY:**

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ◆ ECONOMICAL FEASIBILITY
- ♦ TECHNICAL FEASIBILITY
- ♦ SOCIAL FEASIBILITY

### **ECONOMICAL FEASIBILITY:**

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

#### **TECHNICAL FEASIBILITY:**

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.
### SOCIAL FEASIBILITY:

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

# SYSTEM DESIGN



#### SYSTEM TESTING

Testing is a process of checking whether the developed system is working according to the original objectives and requirements. It is a set of activities that can be planned in advance and conducted systematically. Testing is vital to the success of the system. System testing makes a logical assumption that if all the parts of the system are correct, the global will be successfully achieved. In adequate testing if not testing leads to errors that may not appear even many months. This creates two problems, the time lag between the cause and the appearance of the problem and the effect of the system errors on the files and records within the system. A small system error can conceivably explode into a much larger Problem. Effective testing early in the purpose translates directly into long term cost savings from a reduced number of errors. Another reason for system testing is its utility, as a user-oriented vehicle before implementation. The best programs are worthless if it produces the correct outputs.

#### **UNIT TESTING:**

A program represents the logical elements of a system. For a program to run satisfactorily, it must compile and test data correctly and tie in properly with other programs. Achieving an error free program is the responsibility of the programmer. Program testing checks for two types of errors: syntax and logical. Syntax error is a program statement that violates one or more rules of the language in which it is written. An improperly defined field dimension or omitted keywords are common syntax errors. These errors are shown through error message generated by the computer. For Logic errors the programmer must examine the output carefully.

### **UNIT TESTING:**

Description	Expected result
Test for application window properties.	All the properties of the windows are to be properly aligned and displayed.
Test for mouse operations.	All the mouse operations like click, drag, etc. must perform the necessary operations without any exceptions.

### **FUNCTIONAL TESTING:**

Functional testing of an application is used to prove the application delivers correct results, using enough inputs to give an adequate level of confidence that will work correctly for all sets of inputs. The functional testing will need to prove that the application works for each client type and that personalization function work correctly. When a program is tested, the actual output is compared with the expected output. When there is a discrepancy the sequence of instructions must be traced to determine the problem. The process is facilitated by breaking the program into self-contained portions, each of which can be checked at certain key points. The idea is to compare program values against desk-calculated values to isolate the problems.

### **FUNCTIONAL TESTING:**

Description	Expected result
Test for all modules.	All peers should communicate in the group.
Test for various peer in a distributed network framework as it display all users available in the group.	The result after execution should give the accurate result.

### **NON-FUNCTIONAL TESTING:**

The Non Functional software testing encompasses a rich spectrum of testing strategies, describing the expected results for every test case. It uses symbolic analysis techniques. This testing used to check that an application will work in the operational environment. Non-functional testing includes:

- Load testing
- Performance testing
- Usability testing
- Reliability testing
- Security testing

### LOAD TESTING:

An important tool for implementing system tests is a Load generator. A Load generator is essential for testing quality requirements such as performance and stress. A load can be a real load, that is, the system can be put under test to real usage by having actual telephone users connected to it. They will generate test input data for system test.

Load Testing

Description	Expected result
It is necessary to ascertain that the	
application behaves correctly under	Should designate another active node as
loads when 'Server busy' response is	a Server.
received.	

#### **PERFORMANCE TESTING:**

Performance tests are utilized in order to determine the widely defined performance of the software system such as execution time associated with various parts of the code, response time and device utilization. The intent of this testing is to identify weak points of the software system and quantify its shortcomings.

### **PERFORMANCE TESTING:**

Description	Expected result
This is required to assure that an application perforce adequately having	
the capability to handle many peers, delivering its results in expected time and using an acceptable level of resource and it is an aspect of	Should handle large input values, and produce accurate result in a expected time.
operational management.	

### **RELIABILITY TESTING:**

The software reliability is the ability of a system or component to perform its required functions under stated conditions for a specified period of time and it is being ensured in this testing. Reliability can be expressed as the ability of the software to reveal defects under testing conditions, according to the specified requirements. It the portability that a software system will operate without failure under given conditions for a given time interval and it focuses on the behavior of the software element. It forms a part of the software quality control team.

### **RELIABILITY TESTING:**

Description	Expected result
This is to check that the server is rugged and reliable and can handle the failure of any of the components involved in provide the application.	In case of failure of the server an alternate server should take over the job.

### **SECURITY TESTING:**

Security testing evaluates system characteristics that relate to the availability, integrity and confidentiality of the system data and services. Users/Clients should be encouraged to make sure their security needs are very clearly known at requirements time, so that the security issues can be addressed by the designers and testers.

### **SECURITY TESTING:**

Description	Expected result
Checking that the user identification is authenticated.	In case failure it should not be connected in the framework.
Check whether group keys in a tree are shared by all peers.	The peers should know group key in the same group.

### WHITE BOX TESTING:

White box testing, sometimes called glass-box testing is a test case design method that uses the control structure of the procedural design to derive test cases. Using white box testing method, the software engineer can derive test cases. The White box testing focuses on the inner structure of the software structure to be tested.

### WHITE BOX TESTING:

Description	Expected result
Exercise all logical decisions on their true and false sides.	All the logical decisions must be valid.
Execute all loops at their boundaries and within their operational bounds.	All the loops must be finite.
Exercise internal data structures to ensure their validity.	All the data structures must be valid.

#### **BLACK BOX TESTING:**

Black box testing, also called behavioral testing, focuses on the functional requirements of the software. That is, black testing enables the software engineer to derive sets of input conditions that will fully exercise all functional requirements for a program. Black box testing is not alternative to white box techniques. Rather it is a complementary approach that is likely to uncover a different class of errors than white box methods. Black box testing attempts to find errors which focuses on inputs, outputs, and principle function of a software module. The starting point of the black box testing is either a specification or code. The contents of the box are hidden and the stimulated software should produce the desired results.

# **BLACK BOX TESTING:**

Description	Expected result
To check for incorrect or missing functions.	All the functions must be valid.
To check for interface errors.	The entire interface must function normally.
To check for errors in a data structures	The database updation and retrieval
or external data base access.	must be done.
To check for initialization and termination errors.	All the functions and data structures must be initialized properly and terminated normally.

All the above system testing strategies are carried out in as the development, documentation and institutionalization of the proposed goals and related policies is essential.

# CODING

```
count = 1;
cam = webcam(1);
% vid = videoinput('winvideo', 1);
% set(vid, 'ReturnedColorSpace', 'RGB');
```

hf=figure('position',[0 0 eps eps],'menubar', 'none');

```
while(true)
  k = snapshot(cam);
     axes(handles.axes1), imagesc(img)
\%
\% k = getsnapshot(vid);
  % axes(ax1);imshow(k);
  % title('Image capture from Cam');
  figure(1),imshow(k);title('Image capture from Cam');
    drawnow
\%
%
     imwrite(k,'temp.jpg');
%
    [X1,map1]=imread('temp.jpg');
%
    figure(4), subplot(2,5,i), imshow(X1,map1);
%
% if(i==10)
% i=0;
% end
% i=i+1;
  %Detect objects using Viola-Jones Algorithm
  %To detect Face
  FDetect = vision.CascadeObjectDetector;
  %Read the input image
  I = k;
  %Returns Bounding Box values based on number of objects
  BB = step(FDetect,I);
  if (numel(BB) \sim = 0)
    FaceOut = imcrop(k,BB(1,:));
```

```
% axes(ax2);% imshow(FaceOut);
```

% title('Face Detection');

figure(2),imshow(FaceOut);title('Face Detection');

EyeDetect = vision.CascadeObjectDetector('EyePairBig');

```
%Read the input Image
Inface = FaceOut;
```

% %

```
BB2 = step(EyeDetect,Inface);
Eyedetect = vision.CascadeObjectDetector('RightEyeCART','MergeThreshold',15);
bbox=step(Eyedetect,Inface);
```

```
if (numel(BB2)~=0)
  Eyes=imcrop(Inface,BB2(1,:));
  %
            axes(ax3);imshow(Eyes);
  %
            title('Eye Detection');
  figure(3), imshow(Eyes); title('Eye Detection');
  edgetemplate = edge(imresize(rgb2gray(Eyes),[40 170]),'sobel');
  if (numel(bbox) \sim = 0)
     Eyes1=imcrop(Inface,bbox(1,:));
    I1 = rgb2gray(Eyes1);
    horizontalAverages = mean(I1, 2);
     [Minimas locs] = findpeaks(-horizontalAverages);
     val = locs(2) - locs(1);
     %
                 set(edit1, 'String', 'No');
     %Warning
     %close(h);
     % h = msgbox('No Warning..!', 'Fatigue Detection', 'warn');
                 set(edit2, 'String', 'OFF');
     %
     %Alarm
     %
                 close(h);
     %
                 h = msgbox('Alarm OFF..!', 'Fatigue Detection', 'warn');
     count
  else
     count = count + 1;
    if(count>2)
       %
                      set(edit2, 'String', 'ON');
       %Alarm
       %
                      delete(h):
       %
                      if isempty(h)
       %
                        close(h);
       %
                      end
          close(h);
          h = msgbox('Please stop the car..!', 'Fatigue Detection','error');
```

```
w= tts('Sir Please stop the car',[],-4,44100); % you are in dangerous position in a
track, pleasemove away soon from the track',[],-4,44100);
            sound(w,44100);
          elseif(count>1)
            %set(edit1, 'String', 'Please stop the car..!');
            %%warning msg
            %
                           delete(h);
            %
                            if isempty(h)
            %
                              close(h);
            %
                           end
%
               h = msgbox('Alarm ON..!', 'Fatigue Detection', 'warn');
            w= tts('Attention please Attention please Attention please',[],-4,44100); % you are in
dangerous position in a track, pleasemove away soon from the track',[],-4,44100);
            sound(w,44100);
          end
       end
```

```
%-----% imshow(edgetemplate);
```

```
% hold on
    % drawnow
     % title('Eyes Detection');
     % [final_res] = EyeSleepDetection(edgetemplate);
    % %save([dir 'feature_' num2str(count)],'edgetemplate');
     \% if(final res==1)
     % msgbox('sleep');
     % end
    \% count = count+1;
  end
end
if strcmp(get(hf,'currentcharacter'),'q')
  clear('cam')
  close(hf)
  break
end
```

```
end
```

#### **SCREENSHOTS**



# CONCLUSION

In this paper, the face is detected and eyes are tracked from the captured image. Then the eye templates were trained as normal and drowsy eye template using neural network. Finally, it is detected do the eyes are drowsy and the fatigue alert is given. However, there will be some false detection, where the results are not good when there is quick head-movement or large head rotation and there is a long distance between drivers face and the camera. So, future work will be done based on drivers quick head-movement and make it feasible to detect driver's eye state with distance adjustable.

# **FUTURE ENHANCEMENT**

This project can be implemented in the form of mobile application to reduce the cost of hardware. This project can be integrated with car, so that automatic speed control can be imparted if the driver is found sleeping. The future works may focus on the utilization of outer factors such as vehicle states, sleeping hours, weather conditions, mechanical data, etc, for fatigue measurement.

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# **Abandoned Object Detection**

A project submitted to

# ST.MARY'S COLLEGE (Autonomous), Thoothukudi.

Affiliated to

# MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

In partial fulfillment of the award of the degree of

## MASTER OF SCIENCE IN COMPUTER SCIENCE

Submitted by

# S.UMA MAHESWARI

## Reg.No:19SPCS10

Under the Supervision and Guidance of

# Ms.A.Jenitta Jebamalar MSc(IT).,MSc(CS).,MPhil.,B.Ed.,



# PG DEPARTMENT OF COMPUTER SCIENCE(SSC)

St.Mary's College (Autonomous), Thoothukudi-628001

April - 2021

#### CERTIFICATE

This is to certify that this project work entitled "ABANDONED OBJECT DETECTION" is submitted to St. Mary's College (Autonomous). Thoothukudi affiliated to Manonmaniam Sundaranar University, Tirunelveli, in partial fulfillment for the award of the degree of Master of Science in Computer Science for the work done during the year 2020-2021 by S.UMA MAHESWARI (Reg. No.19SPCS10).

J. Leith

Signature of the Guide

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Signature of the Principal Principal St. Mary's College (Autonomous) Thoothulaud - 628 001.

Playar Mojulzezi Signature of the Examiner

# DECLARATION

I do here by declare that, the project entitled"ABANDONED OBJECT DETECTION" submitted for the degree of Master of Science in Computer Science in my original work carried out under the guidance of Ms.A.Jenitta Jebamalar MSc(IT).,MSc(CS).,MPhil.,B.Ed Assistant Professor,PG Department of Computer Science(SSC),St.Mary's College(Autonomous),Thoothukudi.

Station: Thoothukudi Date: Signature of the Student

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#### ABSTRACT

With concerns about terrorism and global security on the rise, it has become vital to have an in place efficient threat detection system that can detect and recognize the potentially dangerous situations, and alert the authorities to take appropriate action. Of particular significance is the case of unattended objects in mass transit areas. The proposed work is to detect abandoned object from the video obtained through the surveillance system with efficient image processing algorithms. The background for the input video is modeled through background initialization algorithm. The foreground for the video is extracted through background subtraction techniques. Approximate median model is used for the background subtraction process. The foreground image after the background subtraction process is obtained in the form of binary image. The noise present in each frame of the video is removed using median filter. From the obtained binary image Anding operation is performed for separation of abandoned object. Thus the object with high positive score is intimated to the respective authorities through GSM module as the abandoned object.

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## **INTRODUCTION**

Video Surveillance is a commonly used tool for monitoring and for ensuring security in public places in the past two decades. In present days, it is very common to see CCTV cameras located at every public places especially in crowded places like airports, shopping malls, railway stations, movie theatres etc. Due to the recent increase of crime rate in many parts of the world, many Government as well as private organizations is deploying video surveillance systems at their locations with CCTV cameras. The captured video data is useful to prevent the threats before the crime actually happens. Video surveillance accounts for regular inspection of the crowd and the security norms which are specific for an organization or for a society can rely on the systems. However this task remains labor intensive as it become tedious to monitor the entire day footage to detect that one abnormal event.

In order to reduce these efforts, an intelligent surveillance systems need to be built that can automatically detect if any suspicious activity is encountered and alert the officials whenever required. This provides an efficient and reliable way of monitoring. In video surveillance system, effective and efficient abandoned object detection is one of the important tasks for public security as the bag may contain dangerous bombing components. An object is considered as abandoned if its owner has left it at a place and the object remains stationary for more than a specific period of time. Considering a scenario where a person enters with an object and places the object onto the floor or a seat in the detection area. The person then leaves the detection area without the object and does not return to the object for a certain pre-determined duration of time. Then it is considered to be an abandoned object. These objects are of major concern and needs to be taken care of so as to prevent the occurrence of any untoward incident.

#### Objective

- To ensure safeness of the abandoned object in the complex environment.
- To develop a new segmentation algorithm for identifying missing objects with high precision and recall.
- To design and develop intelligent visual surveillance systems to assist the human operators to detect unusual events in the video sequence and responding to them rapidly.

# SYSTEM SPECIFICATION

# HARDWARE REQUIREMENT:

*	Processor	- 15
*	Speed	- 1.1 GHz
*	RAM	- 2 GB
*	Hard Disk	- 40 GB
*	Floppy Drive	- 1.44 MB
*	Camera	- Web Camera

# SOFTWARE REQUIREMENTS:

- > TOOL : MATLAB 2016a
- > TOOL BOX : Image Processing Tool Box

### **PROJECT DESCRIPTION**

The real-time digital image processing system is assisted by the video images captured through a Web camera. The inputs in this process are video frames acquired through a real time video sequence which is taken from the USB webcam.

The USB webcam is kept stable by focusing it in the region of interest in order to scrupulously monitor the region of interest. The webcam is directly interfaced with the MATLAB software, thus the real time video from the camera is accessed by the software for further processing. As per the frame rate of the webcam, which is 30 frames per second, the frames of the real time video are captured at regular interval of time.

A series of process or an effective algorithm is followed for modeling and subtracting the background for the consecutive frames of the input video. Intermittent frames are used for detecting objects in the real time video sequence. Thus, a conducive environment is created for receiving the required information, efficient and highly précised processing and quick delivery of the results. Thus, in this surveillance process, immediate actions can be taken at the right time.

#### Methodology

- Frames of the video are collected from the video surveillance.
- Background is modeled from the frames using background subtraction algorithm.
- Foreground is extracted and processed from the frame of the videos.
- By using foreground and background images abandoned object of the environment is detected.

### **MODULE DESCRIPTION**

### Software module



Background modeling is the initial process in this proposed methodology. It defines the background parts of the input video, which contains both static and moving objects. A Background image defines the stable object of an image. An excellent background model can obtain a good foreground detection results. We have modeled the background of the video through the background initialization algorithm. This algorithm takes input as a video sequence in which moving objects are present and outputs a background describing the static parts of the scene.

# **Background Initialization Algorithm**

For each pixel in the taken video frame, all the intervals of stable intensity are calculated then an optical flow method is used to determine the object movement.

Optical flow is computed for the pair of consecutive frames, and then the net flow is calculated. Optical flow gives out the velocity of the moving objects between the frames which is helpful to determine the foreground pixels.

For each pixel the interval with maximum likelihood is assumed as background region and is updated.



Background modeling

The (a) & (b) of Figure represents the frames of the input video sequence which contains both foreground and background objects, where (c) represents the stationary parts of the video modeled through background initialization algorithm.

The typical challenges for background modeling are illumination changes, dynamic background and shadows.

Though we may assume that the background contains only static objects, in normal circumstances some parts of a background always contain some movement such as waving trees, water ripples, traffic lights, and flashing displays. Foreground objects often have shaded areas owing to the influence of lighting changes which usually affect the separation of foreground objects and the performance of subsequent modules of a background modeling algorithm.

# **Background Subtraction**

Background subtraction is a common and widely used technique for generating a foreground mask i.e., a binary image containing the pixels belonging to moving objects in the scene by using static cameras. As the name suggests, Background Subtraction calculates the foreground mask by performing a subtraction between the current frame and a background model, containing the static part of the scene or, more in general, everything that can be considered as background given the characteristics of the observed scene.

The detection of motion in current tracking system relies on the technique of background subtraction. Background subtraction, also known as foreground detection, is a technique in the fields of image processing wherein an image's foreground is extracted for further processing. Generally in an image the regions of interest are objects in its foreground.

We have used an approximate median model algorithm for the background subtraction process, where every incoming frames of the video is subjected to this algorithm and the moving objects of the video is obtained for processing.



#### Background subtraction

The Fig (a) represents a frame at a particular time, 't' of a video and fig (b) is the foreground image obtained by the background subtraction process.

# Approximate median model algorithm

The approximate median method works as such - if a pixel intensity value in the current frame has a value larger than the corresponding background pixel value then that pixel intensity of the current frame is considered as the foreground pixel intensity value.

In this algorithm to extract the foreground pixels value the frame difference value is calculated by subtracting the frames of the video with its background frame. If this difference is greater than the assumed threshold value then it is considered as the foreground pixel if it is less than or equal to the frame difference value it will be considered as background pixel, which is described by the equation given below.

if Fr\_diff(i,j) > thresh
Fg\_fr(i,j) =Cr\_fr(i,j);

else

 $Fg_fr(i,j) = 0;$ 

Where,

Fr\_diff = Frame difference value

 $Fr_diff = Bg_fr - Cr_fr$ 

Bg\_fr = background frame

Cr\_fr = Current frame

Fg\_fr = Frame with foreground pixels

i =width of the frame

j = height of the frame

 $Fr_diff(i,j) = pixel intensity value at (i,j) coordinate of the frame difference frame$ 

 $Cr_{fr}(i,j)$  = pixel intensity value at (i,j) coordinate of the current frame

Thus all the pixel value at (i,j) coordinate of the frame difference frame is compared with our threshold value depending on it foreground frame with only foreground pixels is extracted.

# **Abandoned Object Detection**

The abandoned object in the real time video is detected from the foreground extracted frame obtained from approximate median model algorithm. After the background subtraction process, at a particular frame interval, the frame of the video is obtained and the ANDing operation is performed between the frames to find out the presence of an abandoned object operation if any of an area whose pixels with high intensity values is found in the output image, then that area is referred to be the location or the space occupied by the abandoned object.



The above figure is the pictorial representation of abandoned object detection between the frames of a specific frame interval in the video. The above figure is the 135<sup>th</sup> frame and fig (b) is the 275<sup>th</sup> frame of the video with the frame rate is 30. Anding operation is performed between these two frames to find the abandoned object. Thus, the detected abandoned object is shown in fig (c). So, when executing the proposed algorithm, in every sequence of acquired video frames, in every 150 frame interval, the Anding operation is performed in order to determine the presence of abandoned object.

### SYSTEM STUDY

#### **EXISTING SYSTEM**

In the last few years many researchers have been working on the development of safety systems using different techniques. In the paper Detection of Abandoned Objects in Crowded Environment-"Medha Bhargava, Chia-chih Chen, M.S. Ryoo, and J.K.Aggarwal", 2007, It describes the general framework that recognizes the event of someone leaving a baggage unattended in forbidden areas. It involves the recognition of four events. When an unaccompanied bag is detected, the system analyzes its history to determine its most likely owner. Where the owner is defined as the person who brought the bag into the scene before leaving it unattended. Through subsequent frames the system keeps a lookout for the owner whose presence or disappearance from the scene defines the status of the bag and it decides the appropriate course of action. It is well equipped to handle the concurrent detection of multiple abandoned objects swiftly, in the presence of occlusion, noise and distortion. This algorithm is a step towards effective, efficient monitoring of objects in challenging public environments.

#### **PROPOSED SYSTEM**

The method proposed in our work to fulfill the objective of finding the abandoned object is based on a real-time digital image processing system. This real-time digital image processing system employs video surveillance as its core operation. In order to realize this real-time digital image processing system a video camera with required frames per second image capturing capability is used. Using this Web camera, the video frames are captured and then analyzed with improved methodologies to locate the abandoned object.

#### SYSTEM ANALYSIS

#### **FEASIBILITY STUDY:**

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ♦ ECONOMICAL FEASIBILITY
- ♦ TECHNICAL FEASIBILITY
- ♦ SOCIAL FEASIBILITY

#### **ECONOMICAL FEASIBILITY:**

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

#### **TECHNICAL FEASIBILITY:**

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

#### SOCIAL FEASIBILITY:

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

# SYSTEM DESIGN

# FLOW CHART



#### SYSTEM TESTING

Testing is a process of checking whether the developed system is working according to the original objectives and requirements. It is a set of activities that can be planned in advance and conducted systematically. Testing is vital to the success of the system. System testing makes a logical assumption that if all the parts of the system are correct, the global will be successfully achieved. In adequate testing if not testing leads to errors that may not appear even many months. This creates two problems, the time lag between the cause and the appearance of the problem and the effect of the system errors on the files and records within the system. A small system error can conceivably explode into a much larger Problem. Effective testing early in the purpose translates directly into long term cost savings from a reduced number of errors. Another reason for system testing is its utility, as a user-oriented vehicle before implementation. The best programs are worthless if it produces the correct outputs.

#### **UNIT TESTING:**

A program represents the logical elements of a system. For a program to run satisfactorily, it must compile and test data correctly and tie in properly with other programs. Achieving an error free program is the responsibility of the programmer. Program testing checks for two types of errors: syntax and logical. Syntax error is a program statement that violates one or more rules of the language in which it is written. An improperly defined field dimension or omitted keywords are common syntax errors. These errors are shown through error message generated by the computer. For Logic errors the programmer must examine the output carefully.

Description	Expected result
Test for application window	All the properties of the windows are
properties.	to be properly aligned and displayed.
Test for mouse operations.	All the mouse operations like click, drag, etc. must perform the necessary
	operations without any exceptions.
#### **FUNCTIONAL TESTING:**

Functional testing of an application is used to prove the application delivers correct results, using enough inputs to give an adequate level of confidence that will work correctly for all sets of inputs. The functional testing will need to prove that the application works for each client type and that personalization function work correctly. When a program is tested, the actual output is compared with the expected output. When there is a discrepancy the sequence of instructions must be traced to determine the problem. The process is facilitated by breaking the program into self-contained portions, each of which can be checked at certain key points. The idea is to compare program values against desk-calculated values to isolate the problems.

Description	Expected result
Tast for all modules	All peers should communicate in
Test for an modules.	the group.
Test for various peer in a	
distributed network framework as it	The result after execution should
display all users available in the	give the accurate result.
group.	
Test for various peer in a distributed network framework as it display all users available in the group.	The result after execution should give the accurate result.

### **NON-FUNCTIONAL TESTING:**

The Non Functional software testing encompasses a rich spectrum of testing strategies, describing the expected results for every test case. It uses symbolic analysis techniques. This testing used to check that an application will work in the operational environment. Non-functional testing includes:

- Load testing
- Performance testing
- Usability testing
- Reliability testing
- Security testing

### LOAD TESTING:

An important tool for implementing system tests is a Load generator. A Load generator is essential for testing quality requirements such as performance and stress. A load can be a real load, that is, the system can be put under test to real usage by having actual telephone users connected to it. They will generate test input data for system test.

Description	Expected result
It is necessary to ascertain that the	
application behaves correctly under	Should designate another active node as
loads when 'Server busy' response is	a Server.
received.	

## **PERFORMANCE TESTING:**

Performance tests are utilized in order to determine the widely defined performance of the software system such as execution time associated with various parts of the code, response time and device utilization. The intent of this testing is to identify weak points of the software system and quantify its shortcomings.

Description	Expected result
This is required to assure that an application perforce adequately, having the capability to handle many peers, delivering its results in expected time and using an acceptable level of resource and it is an aspect of operational management.	Should handle large input values, and produce accurate result in a expected time.

#### **RELIABILITY TESTING:**

The software reliability is the ability of a system or component to perform its required functions under stated conditions for a specified period of time and it is being ensured in this testing. Reliability can be expressed as the ability of the software to reveal defects under testing conditions, according to the specified requirements. It the portability that a software system will operate without failure under given conditions for a given time interval and it focuses on the behavior of the software element. It forms a part of the software quality control team.

Description	Expected result
This is to check that the server is rugged and reliable and can handle the failure of any of the components involved in provide the application.	In case of failure of the server an alternate server should take over the job.

## **SECURITY TESTING:**

Security testing evaluates system characteristics that relate to the availability, integrity and confidentiality of the system data and services. Users/Clients should be encouraged to make sure their security needs are very clearly known at requirements time, so that the security issues can be addressed by the designers and testers.

Description	Expected result
Checking that the user identification	In case failure it should not be
is authenticated.	connected in the framework.
Check whether group keys in a tree	The peers should know group
are shared by all peers.	key in the same group.

#### WHITE BOX TESTING:

White box testing, sometimes called glass-box testing is a test case design method that uses the control structure of the procedural design to derive test cases. Using white box testing method, the software engineer can derive test cases. The White box testing focuses on the inner structure of the software structure to be tested.

Description	Expected result
Exercise all logical decisions on their true and false sides.	All the logical decisions must be valid.
Execute all loops at their boundaries and within their operational bounds.	All the loops must be finite.
Exercise internal data structures to ensure their validity.	All the data structures must be valid.

#### **BLACK BOX TESTING:**

Black box testing, also called behavioral testing, focuses on the functional requirements of the software. That is, black testing enables the software engineer to derive sets of input conditions that will fully exercise all functional requirements for a program. Black box testing is not alternative to white box techniques. Rather it is a complementary approach that is likely to uncover a different class of errors than white box methods. Black box testing attempts to find errors which focuses on inputs, outputs, and principle function of a software module. The starting point of the black box testing is either a specification or code. The contents of the box are hidden and the stimulated software should produce the desired results.

Description	Expected result
To check for incorrect or missing functions.	All the functions must be valid.
To check for interface errors.	The entire interface must function normally.
To check for errors in a data structures	The database updation and retrieval
or external data base access.	must be done.
To check for initialization and termination errors.	All the functions and data structures must be initialized properly and terminated normally.

All the above system testing strategies are carried out in as the development, documentation and institutionalization of the proposed goals and related policies is essential.

# CODING

function varargout = Main(varargin) % MAIN MATLAB code for Main.fig MAIN, by itself, creates a new MAIN or raises the existing % % singleton\*. % % H = MAIN returns the handle to a new MAIN or the handle to % the existing singleton\*. % %MAIN('CALLBACK', hObject, eventData, handles,...) calls the local % function named CALLBACK in MAIN.M with the given input arguments. % %MAIN('Property', 'Value',...) creates a new MAIN or raises the % existing singleton\*. Starting from the left, property value pairs are applied to the GUI before Main OpeningFcn gets called. An % unrecognized property name or invalid value makes property application %stop. All inputs are passed to Main\_OpeningFcn via varargin. %% %\*See GUI Options on GUIDE's Tools menu. Choose "GUI allows only one %instance to run (singleton)". % % See also: GUIDE, GUIDATA, GUIHANDLES % Edit the above text to modify the response to help Main % Last Modified by GUIDE v2.5 12-Jan-2021 10:29:55 % Begin initialization code - DO NOT EDIT  $gui_Singleton = 1;$ gui State = struct('gui Name', mfilename, ... 'gui Singleton', gui Singleton, ... 'gui\_OpeningFcn', @Main\_OpeningFcn, ... 'gui\_OutputFcn', @Main\_OutputFcn, ... 'gui LayoutFcn', [], ... 'gui Callback', []); if nargin && ischar(varargin{1}) gui\_State.gui\_Callback = str2func(varargin{1}); end if nargout [varargout{1:nargout}] = gui\_mainfcn(gui\_State, varargin{:}); else gui\_mainfcn(gui\_State, varargin{:}); end % End initialization code - DO NOT EDIT

% --- Executes just before Main is made visible. function Main\_OpeningFcn(hObject, eventdata, handles, varargin) % This function has no output args, see OutputFcn.

% hObject handle to figure

% event data reserved - to be defined in a future version of MATLAB

% handles structure with handles and user data (see GUIDATA)

% varargin command line arguments to Main (see VARARGIN)

```
% Choose default command line output for Main handles.output = hObject;
```

% Update handles structure guidata(hObject, handles);

% UIWAIT makes Main wait for user response (see UIRESUME) % uiwait(handles.figure1);

% --- Outputs from this function are returned to the command line.
function varargout = Main\_OutputFcn(hObject, eventdata, handles)
% varargout cell array for returning output args (see VARARGOUT);
% hObject handle to figure
% eventdata reserved - to be defined in a future version of MATLAB
% handles structure with handles and user data (see GUIDATA)

% Get default command line output from handles structure varargout{1} = handles.output;

```
% --- Executes on button press in pushbutton1.
function pushbutton1 Callback(hObject, eventdata, handles)
% hObject handle to pushbutton1 (see GCBO)
% eventdata reserved - to be defined in a future version of MATLAB
% handles
           structure with handles and user data (see GUIDATA)
warning off;
filename = 'vid111.asf':
hVidReader = vision.VideoFileReader(filename, 'ImageColorSpace', 'RGB',...
  'VideoOutputDataType', 'single');
Background = step(hVidReader);
% size(Background)
Background=imresize(Background,[250 250]);
% size(Background)
axes(handles.axes1)
imshow(Background,[]);title('Background');
while ~isDone(hVidReader)
  previousFrame = step(hVidReader);
  previousFrame=imresize(previousFrame,[250 250]);
  axes(handles.axes2)
  imshow(previousFrame,[]);title('(n-x)th Frame');
```

[Background\_hsv]=round(rgb2hsv(Background));

[previousFrame\_hsv]=round(rgb2hsv(previousFrame));

```
Out = bitxor(uint8(Background_hsv),uint8(previousFrame_hsv));
  Out=rgb2gray(Out);
    figure
%
  [rows columns]=size(Out);
  for i=1:rows
    for j=1:columns
       if Out(i,j) > 0
         BinaryImage(i,j)=1;
       else
         BinaryImage(i,j)=0;
       end
    end
  end
  L2=bwareaopen(BinaryImage, 100);
    FilteredImage=medfilt2(BinaryImage, [5 5]);
%
    [L num]=bwlabel(FilteredImage);
%
\%
    STATS=regionprops(L,'all');
%
    removed=0;
\%
    for i=1:num
%
       dd=STATS(i).Area;
%
       if (dd < 500)
%
         L(L==i)=0;
%
         removed = removed + 1;
%
         num=num-1;
%
       else
%
       end
%
    end
%
    [L2 num2]=bwlabel(L);
  axes(handles.axes4)
  imshow(L2);title('(n-x)th FG Image');
  hold on:
  CurrentFrame=stepping(hVidReader);
  CurrentFrame=imresize(CurrentFrame,[250 250]);
  axes(handles.axes3)
  imshow(CurrentFrame,[]);title('nth Frame');
  [Background_hsv]=round(rgb2hsv(Background));
  [CurrentFrame_hsv]=round(rgb2hsv(CurrentFrame));
  Out = bitxor(uint8(Background_hsv),uint8(CurrentFrame_hsv));
  Out=rgb2gray(Out);
  [rows columns]=size(Out);
  for i=1:rows
    for j=1:columns
       if Out(i,j) > 0
         BinaryImage(i,j)=1;
       else
         BinaryImage(i,j)=0;
       end
```

end end FilteredImage=medfilt2(BinaryImage, [5 5]); %[L num]=bwlabel(BinaryImage); %L1=bwareaopen(BinaryImage,100); %STATS=regionprops(L,'all'); %removed=0; %for i=1:num %dd=STATS(i).Area; % if (dd < 500) % L(L==i)=0;% removed = removed + 1; %num=num-1; %else %end %[L1 num2]=bwlabel(L); axes(handles.axes5) imshow(L1);title('nth FG Image'); hold on; x=and(L2,L1);y=bwmorph(x,'erode',4); %[B,L,N,A] = bwboundaries(x);axes(handles.axes6) imshow(x);title('abandoned object found'); hold on; for k=1:length(B),  $if(\sim sum(A(k,:)))$ boundary =  $B\{k\}$ ; plot(boundary(:,2), boundary(:,1), 'r','LineWidth',2); for l=find(A(:,k))' boundary =  $B\{1\}$ ; plot(boundary(:,2), boundary(:,1), 'g','LineWidth',2); end end end % end end

# **SCREENSHOTS**

# Background modeling:



Background Subtraction:



Approximate median model



# Abandoned object detection



# CONCLUSION

We have proposed a method for automatic abandoned object detection in the surveillance system. This experiment was also performed on various video sequences under different scenarios including indoor, outdoor, and crowded scenes. The experimental results for video sequences having indoor, outdoor, and detection in crowded area has accuracy of 64.3%, precision of 72% and recall of 88%. The important outcome is the operation in real time so we can design the system and use in human life for security purpose.

# **Future Enhancement**

In future we can go for object classification to differentiate humans and objects and also to avoid false detection. We can implement tracking algorithm also so that we can find out the person who is caring that abandoned object.

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## **VEHICLE DAMAGE DETECTION**

A project submitted to

# ST. MARY'S COLLEGE (Autonomous), Thoothukudi.

Affiliated to

# MANONMANIAM SUNDARANAR UNIVERSITY, TIRUNELVELI

in partial fulfillment of the award of the degree of

## MASTER OF SCIENCE IN COMPUTER SCIENCE

Submitted by

# VANALAKSHMI. P

## Reg.No: 19SPCS11

Under the Supervision and Guidance of

# Ms. C. Nayanthra MascarenhasM.Sc.,M.Phil.,SET



# PG DEPARTMENT OF COMPUTER SCIENCE (SSC)

St. Mary's College (Autonomous), Thoothukudi - 628001

**April – 2021** 

#### CERTIFICATE

This is to certify that this project work entitled as "Vehicle Damage Detection" is submitted to St. Mary's College (Autonomous) Thooothukudi affihated to ManoumaniamSundaranar University. Trumelveli in partial fulfillment for the award of the degree of Master of Science in Computer Science for the work done during the year 2020-2021 by Vanalakshmi.P (Regno: 19SPCS11).

Rlayau - M Signature of the Guide

Playa-4-Signature of the Co-Ordinator

Signature of the Director Director Self Supporting Courses St. Mary's College (Autonomous) Thoothukudi - 628 001.

Lucia Rose Signature of the Principal Principal St. Mary's College (Autonomous) Thoothukudi - 828 001.

A why Kyletterula

Signature of the Examiner

# **DECLARATION**

I do hereby declare that the project entitled "Vehicle Damage Detection" Submitted for the degree of Master of Science in Computer Science in my original work carriedout under the guidance of Ms. C. Nayanthra Mascarenhas M.Sc., M.Phil., SET., PG Department of Computer Science (SSC), St. Mary's College (Autonomous), Thoothukudi.

Station: Thoothukudi

Signature of the Student

Date:

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I thank my family members especially my parents for their encouragement and support both morally and financially which helped me to finish the project successfully.

#### Abstract

Vehicle damage detection is one of the important prime activities in the insurance and vehicle rental industries. These kinds of systems are widely used by the driver and also by the insurance company to identify the damage of a vehicle once an accident happens and in order to detect and determine a suitable appraisal as per the damage and for vehicle rental companies to assign the damage of a vehicle to a guilty customer. The core technique of this system is object recognition. However, object recognition and classification being perplexing research ranges, the reliability of a project of this nature lies in the feature selection and extraction mechanisms. This paper presents a novel approach to measure the vehicle body damage severity and to make a cost prediction using 2D images. Thus, once a vehicle body damages, the driver does not have to wait until the insurance company calculates the appraisal, instead he himself can get a brief idea as to how much it will cost to recover the damage. Once an image is uploaded, the system processes the image and identifies the dent. Next, it is classified into the relevant severity class also considering the features of the vehicle like the make, model and the year of manufacture. Afterward, the severity generated as per damage image is mapped with the cost rules, which are constructed based on the properties of the vehicle such as the make, model and the year of manufacture. Finally, the user gets notified with a damage severity class and an average cost from which the damage can be recovered.

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#### **INTRODUCTION**

At present, as soon as a vehicle meets with an accident and a damage is caused to the vehicle, the driver or the insurance policy holder contacts the insurance company and waits for their arrival to the place of the accident. Once the relevant personnel arrive, a traditional approach is followed and the appraisal is calculated. However, frequently the appraisal amount provided by the insurance companies are not sufficient to recover the damage caused. Though there are ways of appealing for the past amount of appraisal, that too is a long procedure. Also sometimes the manual damage detectives can omit some damages or be partial to some parties when the damages are assessed. The damage which is assessed not being presented to the user in an interactive manner too is a very severe problem. Recognition of minor vehicle body damages in a scenario of frequently changing drivers, such as in the car rental or car sharing businesses is too important.Once a vehicle faces an accident, the priority of the driver or the insurance policy holder is to contrive the severity of the damage as soon as possible, then the approximate cost to recover the damage.A vehicle damage can also be recognized as a deformation in a vehicle, the deformations of interest are dings and dents, where dings are surface deformations which protrude from the surface and dents are depressions into the surface

## SYSTEM SPECIFICATIONS

## HARDWAREREQUIREMENT:

- Processor Pentium –IV
- Speed 1.1 GHz
- ◆ RAM 512 MB (min)
- ✤ Hard Disk 40 GB
- Floppy Drive 1.44 MB
- ✤ Key Board Standard Windows Keyboard
- Mouse Two or Three Button Mouse
- Monitor SVGA

## **SOFTWAREREQUIREMENT :**

- ✤ Operating System : Windows XP or Win7
- Tools : Python,sklearn,openCV
- Document : MS-Office 2007

#### **Project Description**

Initially, having uploaded the damage image, the local features of the damage image should be extracted. The methodology used for this purpose is SIFT (Scale Invariant Feature Extraction). SIFT, a distinctive feature extraction methodology, which is capable of extracting distinctive features from an image that is invariant of scale and such factors. The main reason for choosing this methodology is the invariance for scale and the angle which the image is taken. The images uploaded by the user cannot be expected to be necessarily of similar angles. They can be of different sizes, different viewpoints and depths. Therefore, the scale of the image changes and matters. Thus the need of an algorithm which is invariant to scale arises. The goal of this method is to extract invariant features of an image and then compare them with corresponding parts of another image taken from a different angle. The proposed solution uses the uploaded damage image of the car body and produces the results in the form of damage severity. The following illustration shows the steps by which the image input is transformed into the form of a quantitative output.hence produced results are cross validated with a realworld estimator affiliated to an insurance company. The produced results by the 'Dent Detective' system highly resemble the cost evaluation given by the estimator. However, the accuracy of the system depends on the number of training images used. The more relevant and reliable the damage images are the more is the accuracy of the output. The above fact proves that choosing training and testing data for a research of this nature is critical in an image processing based research project of this caliber. Furthermore, the choice of algorithms also plays a vital role in this research because the conditions of lighting, the distance of the camera to the vehicle, and the angle at which the damage image is taken affect the accuracy of the output

**Modules description:** 

- Feature Extraction
- FeatureDescription

Classification

> Damage Detection

### FeatureExtraction

Initially, having uploaded the damage image, the local features of the damage image should be extracted. The methodology used for this purpose is SIFT (Scale Invariant Feature Extraction). SIFT, distinctive feature extraction a methodology, which is capable of extracting distinctive features from an image that is invariant of scale and such factors. The mainreasonforchoosingthismethodologyistheinvariancefor scale and the angle which the image is taken. The images uploaded by the user cannot be expected to be necessarily of similar angles. They can be of different sizes, different viewpointsanddepths. Therefore, the scale of the image changes

andmatters.Thustheneedofanalgorithmwhichisinvariantto scale arises. The goal of this method is to extract invariant featuresofanimageandthencomparethemwithcorresponding parts of another image taken from a differentangle. The founder of this algorithm, David G. Lowe has clearly definedfourmainstepsthatanimageshouldgothroughwhenthe

features are extracted using SIFT. The following illustration is a representation of the defined steps. The SIFT algorithm has very high accuracy comparatively, has

distinctiveness because of the usage of a larger database of images, and can generate many features considering even a smaller area. Moreover, the efficiency is almost realtime

## FeatureDescription

Having identified the local features of the damage image, the necessity of storing and describing the features arises. The Bag of Visual words algorithm which is inspired by the Bag of words algorithm used for text analysis in documents was used in this approach. Bag of Visual Words uses a dictionary of visual code words which are generated by the extracted local damage features present in the damage images. When a new key point is extracted from an input image, it will be assigned to a nearest key point in the dictionary, so an output of this stage is a histogram of assigned key points in an input image to nearest keypointsinthedictionary.Havingidentifiedanddescribed the features related to each of the damages, the image was classified according to the hence identifiedfeatures.

## Classification

The image classification step has a huge importance in the process of image processing. It is very nice to have a "pretty picture"oranimage, showinga magnitude of colors illustrating various features of the underlying terrain, but it is quite useless unless it helps to know what the colors mean. Image classification is the procedure which divides the images into classes taking various features into consideration. To identify the features occurring in an image is the mages based on the identified features is Support Vector Machine.

### **Damage Detection**

The proposed solution uses the uploaded damage image of the car body and produces the results in the form of damage severity. The following illustration shows the steps by which the image input is transformed into the form of a quantitative output.hence produced results are cross validated with a real-world estimator affiliated to an insurance company. The produced results by the 'Dent Detective' system highly resemble the cost evaluation given by the estimator. However, the accuracy of the system depends on the number of training images used. The more relevant and reliable the damage images are the more is the accuracy of the output. The above fact proves that choosing training and testing data for a research of this nature is critical in an image processing based research project of this caliber. Furthermore, the choice of algorithms also plays a vital role in this research because the conditions of lighting, the distance of the camera to the vehicle, and the angle at which the damage image is taken affect the accuracy of the output. The enhancements of accuracy, performance and functionality are discussed in the future work section below.

#### System Study

#### **Existing system**

It is a common scenario that people die unnoticed during accidents, especially during night time. Communication is possible only through telephone calls. There is no such system to inform the rescue forces when the driver is seriously injured.

#### **Proposed system**

This study proposes a novelty detection approach for damage to the tendons of PSC bridges based on a convolutional autoencoder (CAE). The proposed method employs simulation data from nine accelerometers. The accuracies of CAEs for multi-vehicle are 79.5%–85.8% for 100% and 75% damage severities with all error levels and 50% damage severity without error.

#### System Analysis

#### **Feasibility study**

The driver behavior is the key to safety mobility. The dangerous driving can be categorizes into 4 behaviors which are (1) rapid acceleration, (2) sudden brake, (3) rapid turning and (4) fast lane change (HAN & YANG, 2009). In general, all of the action can be determined from acceleration on the vehicle. Physically, the acceleration and brake are longitudinal acceleration while turning and lane change are lateral acceleration. Normally, IMU (inertia measurement unit) has been designated to get those data. However, by experiences, the IMU is not convenience to install in the vehicles especially as aftermarket additional parts. Previously, the study on conventional navigation system with 1-Hz GPS technology had been confirmed that longitudinal acceleration can be easily detected.

**Comparative study of machine learning methods for in-vehicle intrusion detection** - Computer Security. Springer, Cham, 2018. 85-101.

An increasing amount of cyber-physical systems within modern cars, such as sensors, actuators, and their electronic control units are connected by in-vehicle networks and these in turn are connected to the evolving Internet of vehicles in order to provide "smart" features such as automatic driving assistance. The controller area network bus is commonly used to exchange data between different components of the vehicle, including safety critical systems as well as infotainment. As every connected controller broadcasts its data on this bus it is very susceptible to intrusion attacks which are enabled by the high interconnectivity and can be executed remotely using the Internet connection. This paper aims to evaluate relatively simple machine learning methods as well as deep learning methods and develop adaptations to the automotive domain in order to determine the validity of the observed data stream and identify potential security threats

# System Design

# Architecture



### **SCREENSHOT**

### **OUTPUT:**



# Low demaged accident:





# Medium demaged accident:





# High demaged accident:

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## Accuracy:



#### CONCLUSION

Vehicle damages are often seen in the modern world due to the immense usage of vehicles. The drivers or the vehicle owners should spend a considerable amount of time on finding the severity of the damage and the cost to recover the damage according to the existing approaches. This paper suggests a methodology where a user can upload multiple images of a damage in the body of a vehicle and to calculate the severity and the cost of the damage based on the properties of the vehicle. Though similar applications for this research problem exists, no solution with all features mentioned above exist. The cost and the severity prediction are the unique features of this study. Features like user appeal and the administrators (vehicle insurance companies and vehicle rental companies) being able to update the severities and the cost rules to match the company customers, but they will be implemented in the future. This research suggests a novel approach to address the problem of identifying vehicle body damages and predicting the severity and the cost. Initially, the damage image's features are extracted, then, a dictionary of code words is created using the Bag of Visual words algorithm. Next the extracted features are taken into consideration and are classified into severity classes. Based on the severities of the damages, they are given an approximate cost utilizing a rule based engine

#### **Future Enhancement**

The current system calculates the damage type, the severity and the cost as per the damage, only taking the vehicle type into consideration. Therefore, the cost prediction given by the system is not very specific to a single vehicle. To improve the accuracy of the cost and to be more particular to a single vehicle, the make, model, color and the year of manufacture will be taken into consideration. Additionally, as an advancement of the internal operations of the application, the automatic detection of the above-mentioned details, vehicle make, model, color and the year of manufacture can be added. By adding the above stated advancements, the suggested approach is expected to be more reliable and accurate.
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## MANAGING THE CLIENTS, PAYMENTS, PROPOSALS, INVOICES USING AJAX BASED SELF HOSTED APPLICATION

A project submitted to

## ST. MARY'S COLLEGE (Autonomous), Thoothukudi.

Affiliated to

## MANONMANIAM SUNDARANAR UNIVERSITY,

## TIRUNELVELI

in partial fulfillment of the award of the degree of

## MASTER OF SCIENCE IN COMPUTER SCIENCE

Submitted by

## Vidhya S

## Regno: 19SPCS12

Under the Supervision and Guidance of

## Ms. C. Nayanthra Mascarenhas M.Sc., M.Phil., SET.,



PG DEPARTMENT OF COMPUTER SCIENCE (SSC)

St. Mary's College (Autonomous), Thoothukudi-628001

April– 2021

#### CERTIFICATE

This is to certify that this project work entitled as "Managing the Clients, Payments, Proposals, Invoices using AJAX based Self Hosted application" is submitted to St. Mary's College (Autonomous). Thoothukudi affiliated to Manonmaniam Sundaranar University. Lirunelveli, in partial fulfillment for the award of the degree of Master of science in Computer Science for the work done during the year 2020-2021 by Vidhya S (Regno: 19SPCS12).

Rayar V-Signature of the Guide

Flagar M- . Signature of the Co-Ordinator

Signature of the Director Self Supporting Courses St. Mary's College (Autonomous Thoothukudi - 628 001.

Lucia Rose Signature of the Principal Principal St. Mary's College (Autonomous) Theothukudi - 628 001.

A von - Kylen Signature of the Examiner

## **DECLARATION**

I do hereby declare that the project entitled "Managing the Clients, Payments, Proposals, Invoices using AJAX based Self Hosted application" submitted for the degree of Master of Science in Computer Science in my original work carried out under the guidance of Ms. C. Nayanthra Mascarenhas M.Sc., M.Phil., SET., Assistant Professor and SSC Coordinator PG Department of Computer Science (SSC), St. Mary's College (Autonomous), Thoothukudi.

Station: Thoothukudi

Signature of the Student

Date:

#### ACKNOWLEDGEMENT

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#### ABSTRACT

Invoicing and billing application for different business purposes helps mainly the service providers and freelancers to manage, send professional invoices online, and track its status. Generally, all the small companies are facing a various issues for managing and tracking the invoice status of customers, which mostly back to the lacks of adapting new technology in these companies. One of these lacks is tracking the bills status for a definite projects. Therefore, this research intends to design and develop an online billing and invoice management system to expenses effortlessly and saves both time and money on the employees in these small companies. The propose system intend to provide a digital tracking of the time spend on projects and send invoices directly to clients. Every feature is geared towards accurate and secure invoicing and getting you paid. Instead of using Word and Excel docs or overpriced software, with Invoice Ninja you can send beautiful branded invoices with minimum of effort and maximum professionalism. In this Project we have worked on few modules to increase its productivity. Creation of dynamic modules as Vendor, Clients, Invoice and Projects. The Vendor module consists of Vendors of the company, it includes all kind of bills and invoices that had been taken place between the companies. Here we also created the list of clients, add clients to business and their personal bio and can check out the invoices of them at any time. Here we created the invoice module which would have a global access and be used to make invoices on tab of modules. Invoice is completely systematic and user friendly. The invoice will have the preview option by default at the bottom of page. The Payments Bill and Payment history are accessed and created here. All client payments, including pending, cleared payments and on-hold payments are maintained here in an effective manner. We can take notes of each payment process and also maintain the kind of payment that have been made by the client or vendor.

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### **INTRODUCTION**

Let's get acquainted with a basic overview of the structure of the Invoice Ninja website. Once you've wrapped your mind around a few central concepts, it's as easy as ABC to effectively manage your freelance business accounts.

The Invoice Ninja system is based on two main pillars:

- List pages are summary pages of the various activities in your account. These include the Clients list page, Tasks list page, Invoices list page, Payments list page and more. List pages are located in the main sidebar of the Invoice Ninja site. The list pages provide a centralized overview and management station for the particular component of your account. For example, the Clients list page is a list of all your clients, with accompanying information and handy links, so you can manage all your clients on one page.
- Action pages are pages dedicated to a specific action you can take in your Invoice Ninja account. Examples include Create New Client, Enter Credit, Create New Invoice, Create Recurring Invoice, Enter Credit, Enter Payment and Create New Task. All actions you take will be recorded in the List pages, updated in real time to reflect your invoicing activity from minute to minute.

So remember the ninja rule: list pages provide a summary overview, and action pages facilitate your invoicing activity.

You're invited to browse the user guide for more detailed information. We're always looking to take Invoice Ninja one step ahead, so if you have any comments, queries or suggestions, we'd love to hear from you.

## SYSTEM SPECIFICATION

In the system specification, the latest hardware and software specifications must be proposed to enable faster retrieval of the information. The System Specifications involves two concepts. They are as follows

- Hardware Requirements
- Software Requirements

The detailed Hardware and Software Specifications are given below

#### Hardware Requirements:

Processor: AMD PRO A4-4350B R4, 5COMPUTE CORES 2C+3G 250GHZ

Ram : 4.00GB (minimum)

Hardware: 500MB (minimum)

#### **Software Requirements:**

Operating System: Windows 10

Front End: Html, Css, java script

Server Side Script: Php

Back End: MySQL

#### **PROJECT DESCRIPTION**

The Project entitled "Managing the Clients, Payments, Proposals, Invoices using AJAX based Self Hosted application" Invoice Ninja is a invoicing application that makes sending invoices and receiving payments simple and easy. The main objective for developing this project is too responsible for managing documents from client and vendors or suppliers. Invoices represent a source document in accounting. Source documents outline specific information relating to a financial transaction. Companies use invoice management processes to ensure client, vendors and suppliers receive payment in a timely manner .This project provides a lot features to manage in very well. The Vendor module consists of Vendors of the company, it includes all kind of bills and invoices that had been taken place between the companies. Here we also created the list of clients, add clients to business and their personal bio and can check out the invoices of them at any time. Here we created the invoice module which would have a global access and be used to make invoices on tab of modules. Invoice is completely systematic and user friendly. The invoice will have the preview option by default at the bottom of page.

## **MODULE DESCRIPTION**

- Dashboard
- Clients
- Invoices
- Payments
- Recurring Invoices
- Credits
- Quotes
- Proposals
- Tasks
- Expenses
- Vendors
- Reports
- Settings

## Dashboard:

The Dashboard page is the three large data boxes at the top of the screen. These are designed to offer a simple yet powerful overview of your total business accounts:

- Total Revenue: The total amount that your business has brought in to date.
- Average Invoice: The amount of the current average invoice. Note this will change over time, depending upon your income.
- **Outstanding**: The total amount of all unpaid invoices.

## **Clients:**

The Clients page presents a list summary of all your current clients in a table format. The main elements of the table include:

- \_ **Client:** The name of the client
- **Contact:** The name of the primary contact person
- **Email:** The client email address
- \_ **Date Created:** The date the client was created
- Last Login: The date the client last logged in to the system
- Balance: The client's payment balance
- Action: A range of actions you can take to manage activity relating to the selected client

## **Invoices:**

The Invoices list page displays a table of all your active invoices, at every stage, from the moment you create a new invoice, to the moment you archive or delete an invoice.

- **Draft**: When you've created an invoice, but have not yet sent it. You may still need to edit.
- Sent: You've sent the invoice, but the client has not yet paid.
- Viewed: The client has opened the invoice email and viewed the invoice.
- **Partial**: The invoice has been partially paid.
- **Paid**: Congratulations! The client has paid the full invoice amount.
- **Unpaid**: The invoice remains unpaid.
- **Overdue**: The invoice has passed its due date.

### **Payments:**

The Invoice Ninja system handles your entire invoicing process – from sending a quote to invoicing your client, to receiving payment. The Payments list page displays a summary of all payments once they have been received.

- **Invoice**: The invoice number for the payment
- Client Name: The client's name
- **Transaction Reference**: If you have entered a manual payment, the Transaction Reference will display the information you entered in the Transaction Reference field when entering the payment.
- Method: The method of payment used, i.e. PayPal, Bank Transfer, Visa, etc.
- Source: Additional information displayed for online payments
- Amount: The payment amount that was received
- **Date**: The date the payment was received
- **Status**: The payment status (i.e. Overdue, Partial Completed, etc.)

### **Recurring Invoices :**

Invoice Ninja's Recurring Invoice feature automatically creates invoices for ongoing

jobs, and sends the current invoice to the client on a regular, pre-defined basis.

- **Frequency**: How often the client is billed with this invoice, i.e. weekly, monthly, etc.
- Client name: The client's name
- Start Date: The date the recurring invoice series started
- Last sent: The date the last invoice was sent for this recurring invoice series
- **Amount**: The amount due
- **Private notes**: Comments and notes that you added when creating the recurring invoice. Only you can see them.

- Status: The status of the recurring invoice (i.e. Draft, Sent, Viewed, Paid, Overdue)
- Action: The drop-down list presents a range of possible actions for you to choose from:
- Edit Invoice: Edit the recurring invoice information on the Edit Invoice page.
- Clone to Invoice: Duplicate the recurring invoice as a new recurring invoice.
- Clone to Quote: Create a quote containing data duplicated from the recurring invoice.
- Archive Recurring Invoice: Click here to archive the recurring invoice. It will be archived and removed from the Recurring Invoices list page.
- **Delete Recurring Invoice**: Click here to delete the recurring invoice. It will be deleted and removed from the Recurring Invoices list page.

### **Credits:**

The Credits list page is a summary of all credits issued to all clients.

- Client: The client's name
- Credit: Amount The amount of the individual credit
- Credit Balance: The balance of the individual credit
- Date of Issue: The date the individual credit was issued
- Private Notes: Comments or reminders that you included FYI
- Action: Option to archive or delete the credit

## **Quotes:**

The Quotes list page displays a table of all your quotes, at every stage, whether at the drafting stage, sent to the client, accepted by the client and converted to invoice, or archived/ deleted quotes. Use your Quotes list to get a better grasp of where you stand in terms of possible future projects and income.

- **Quote** : The number of the quote
- **Client**: The client name
- **Quote Date**: The date the quote was created
- **Quote Total**: The total amount of the quote, after adjustments for credits and partial payments
- Valid Until: The last date that the quote is valid and can be accepted by the client
- **Status**: The current status of the quote (Gary = Draft, Blue = Sent, Converted )

### **Proposals:**

Each proposal is based on a quote. In order to create a proposal, you'll first need to create a quote. The Proposals list page features a table of all active proposals and corresponding information.

- **Quote**: Every proposal is based on a quote. This is the quote number of the corresponding quote.
- **Client**: The client's name.
- **Template**: The template assigned to the proposal.
- **Date created**: The date the proposal was created.
- **Content**: A short preview of the content/topic of the proposal.

- **Private notes**: Any notes to yourself included in the proposal (these are hidden from the client; only you can see them).
- Action column: The action column has a drop-down menu with the option to Edit, Archive or Delete the proposal. To select an action, hover in the action column and click to open the drop-down menu.

## Tasks:

The Tasks list page provides a range of opportunities to carry out actions relating to each specific task. The Tasks list page displays a table of all your tasks, at every stage, from Running to Logged to Invoiced, together with handy accompanying information about each task.

- **Client**: The client name
- Date: The date the task was started, followed by the time it was started
- **Duration**: The total time logged for the task
- **Description**: Information about the task that you entered when you created the task
- **Status**: The current status of the task (Blue = Running, Gray = Logged, Green = Invoiced)
- Action: The Action button provides a range of possible actions, depending upon the status of the task.

### **Expenses:**

The Expenses list page displays a summary of all business expenses that you choose to enter. Apart from giving an overview of all your recorded expenses in a table format, you can also carry out a number of important actions from the Expenses page.

- Vendor: The name of the vendor
- **Client**: The name of the client for whom the expense is relevant
- **Expense**: Date The date the expense occurred
- **Amount**: The expense amount
- Category: The assigned category of the expense
- **Public Notes**: The notes entered when creating the expense (this becomes the item description if the expense is converted to an invoice)

## Vendors:

The Vendors page shows a list in table format of all companies, service providers or suppliers that you have entered to the Invoice Ninja system as part of your business activities.

- Vendor: The company name of the vendor
- **City:** The city where the vendor is located
- **Phone:** The phone number of the vendor
- **Email:** The vendor's email address
- Date Created: The date the vendor was created in the system
- Action column: The final column to the right features a drop-down menu with a range of actions you can take to manage the selected vendor

### **Reports:**

The Report section enables you to set parameters and filter the data to generate the right report for you.

- **Type**: Click on the drop-down menu and choose the type of report you want to create.
- Date Range: There are a number of pre-defined ranges to choose from, such as Last 7 Days, Last Month, Last Year and This Year.
- **Run**: Once you've selected all the parameters, click the green Run> button. The extracted data will show in the report display section below.
- **Export**: To export the report data, click the grey Export button. The report will automatically download as a .csv file.
- Schedule: You don't have to! With the Schedule feature, you can pre-select reports to be automatically generated at a frequency of your choosing, and sent to the email address linked to your Invoice Ninja account.

### Settings:

Settings section, where you can create the foundations of your Invoice Ninja account. All your company information, user details, product entries, notification preferences, tax rates, payment settings, location and currency selections, and so much more, can be found here. This is your first stop to set up and customize your account to your business. And any time you need to modify your settings, edit your details or change your preferences

#### SYSTEM STUDY

It should fit into your business context. Before you start shopping for your invoicing software, you must first recognize all the existing process involved in as far as billing is concerned. You need to know how the new platform that you'll choose will help you and your team become more efficient. Instead of playing it safe by opting for a multi-functional invoicing solution, go for that platform that can deliver your specific needs. Its invoices should look professional and easy to understand. The bills you give to your clients do have some critical information, but they should not look dreadful and dull. Because invoices present an image of your business, they must be polished, expertly designed, and clear. If you just cutand-paste your invoice directly from your spreadsheet app, rest assured your clients won't consider your business in high regard, much more be able to understand the billing details. It must be safe to use. Aside from the need to look professional, your invoicing platform must also be secured. Only select from vendors with a solid reputation in system security. Never compromise the security of your business and customer data. The invoicing software you'll choose should have robust safeguards in place. It must also offer solid customer support. All software technologies are susceptible to bugs and issues, both coming from the software itself and from using it. While there are indeed powerful, mature platforms in the market, only partner with invoicing software vendors with reliable and easily accessible customer service. Aside from providing you with useful insights into your financial operations, your vendor should also offer support in the forms of knowledge centres, manuals, tutorials, and other resources.

#### **EXISTING SYSTEM**

**Inability of modification of data:** The managing of huge data effectively and efficiently for efficient results, storing the details of the consumers etc. in such a way that the database can be modified as not possible in the current system.

**Not user friendly:** The existing system is not user friendly because the retrieval and storing of data is slow and data is not maintained efficiently.

**Difficulty in reports generating**: Either no reports generating in a current system or they are generated with great difficulty reports take time to generate in the current system.

**Manual operator control**: Manual operator control is there and lead to a lot of chaos and errors.

Lot of paperwork: Existing system requires lot of paper work and even a small transaction require many papers fill. Moreover any unnatural cause (such as fire in the organization) can destroy all data of the organization. Loss of even a single paper led to difficult situation because all the papers are interrelated.

**Inability of sharing the data**: Data cannot be shared in the existing system. This means that no two persons can use the same data in existing system. Also the two departments in an organization cannot interact with each other without the actual movement of data.

**No support in decision-making:** Existing system does not support managerial decisionmaking. No support in strategic competitive advantage: Existing system do not support strategic competitive advantages.

#### **PROPOSED SYSTEM**

**Easiness in modification of data**: The proposed system provides managing of huge data effectively and efficiently for efficient results, storing the details of the customers, employees etc. in such a way that the database can be modified.

**User friendly:** The proposed system is user friendly because the retrieval and storing of data is fast and data is maintained efficiently. Moreover the graphical user interface is provided in the proposed system, which provides user to deal with the system very easily.

**Reports are easily generated**: Reports can be easily generated in a proposed system. So any type of reports can be generated in a proposed system, which helps the managers in a decisions-making activity.

**Sharing the data is possible**: Data can be shared in proposed system. This means that two or more persons can use the same data in existing system provided that they have right to access that data. Also the two or more departments in an organization can easily interact with each other without the actual movement of data.

**No or very few paperwork**: The proposed system either does not require paper work or very few paper works is required. All the data is feted into the computer immediately and various bills and reports can be generated through computers. Since all the data is kept in a database no data of the organization can be destroyed. Moreover work becomes very easy because there is no need to keep data on papers.

**Support strategic competitive advantage**: Proposed system supports strategic competitive advantages. Since the proposed systems provide easiness in reports generating it will provide strategic advantages among competitors.

#### SYSTEM ANALYSIS

This system overcomes the customer churn by using predictive analysis. Initially, with more data and lesser understanding of the system, the model was not so effective. This system overcome the challenges faced in the sales management system and meets the needs of Organizations that are not satisfied by existing applications in the field of Invoice management. System analysis shows the various sectors from which the organisation generates revenue. While developing the model for predictive analytics, an optimum number of features had to be selected. The decision tree had to balance bias as a by-product of a very complex model with variance in results, by managing its depth. Analytics being performed on data also provide the organization with meaningful information about their products and knowledge on customer behaviour. The products are be industry specific thus catering to the needs of the buyer.

#### FEASIBILITY STUDY:

The feasibility of the project is analysed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ✓ ECONOMICAL FEASIBILITY
- ✓ TECHNICAL FEASIBILITY
- ✓ SOCIAL FEASIBILITY

#### **ECONOMICAL FEASIBILITY:**

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

#### **TECHNICAL FEASIBILITY:**

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

#### SOCIAL FEASIBILITY:

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

## SYSTEM DESIGN

## DATA FLOW DIAGRAM:

Data flow diagram is the graphical representation of a data movement processes and files used in support for an information system. Data flow is the movement of the origin to a specific destination.





#### SYSTEM TESTING

Testing is a process of checking whether the developed system is working according to the original objectives and requirements. It is a set of activities that can be planned in advance and conducted systematically. Testing is vital to the success of the system. System testing makes a logical assumption that if all the parts of the system are correct, the global will be successfully achieved. In adequate testing if not testing leads to errors that may not appear even many months. This creates two problems, the time lag between the cause and the appearance of the problem and the effect of the system errors on the files and records within the system. A small system error can conceivably explode into a much larger Problem. Effective testing early in the purpose translates directly into long term cost savings from a reduced number of errors. Another reason for system testing is its utility, as a user-oriented vehicle before implementation. The best programs are worthless if it produces the correct outputs.

#### **UNIT TESTING:**

A program represents the logical elements of a system. For a program to run satisfactorily, it must compile and test data correctly and tie in properly with other programs. Achieving an error free program is the responsibility of the programmer. Program testing checks for two types of errors: syntax and logical. Syntax error is a program statement that violates one or more rules of the language in which it is written. An improperly defined field dimension or omitted keywords are common syntax errors. These errors are shown through error message generated by the computer. For Logic errors the programmer must examine the output carefully.

#### **FUNCTIONAL TESTING:**

Functional testing of an application is used to prove the application delivers correct results, using enough inputs to give an adequate level of confidence that will work correctly for all sets of inputs. The functional testing will need to prove that the application works for each client type and that personalization function work correctly. When a program is tested, the actual output is compared with the expected output. When there is a discrepancy the sequence of instructions must be traced to determine the problem. The process is facilitated by breaking the program into self-contained portions, each of which can be checked at certain key points. The idea is to compare program values against desk-calculated values to isolate the problems.

#### **NON-FUNCTIONAL TESTING:**

The Non Functional software testing encompasses a rich spectrum of testing strategies, describing the expected results for every test case. It uses symbolic analysis techniques. This testing used to check that an application will work in the operational environment. Non-functional testing includes:

- $\checkmark$  Load testing
- ✓ Performance testing
- ✓ Usability testing
- ✓ Reliability testing
- ✓ Security testing

#### LOAD TESTING:

An important tool for implementing system tests is a Load generator. A Load generator is essential for testing quality requirements such as performance and stress. A load can be a real load, that is, the system can be put under test to real usage by having actual telephone users connected to it. They will generate test input data for system test.

#### **PERFORMANCE TESTING:**

Performance tests are utilized in order to determine the widely defined performance of the software system such as execution time associated with various parts of the code, response time and device utilization. The intent of this testing is to identify weak points of the software system and quantify its shortcomings.

#### **RELIABILITY TESTING:**

The software reliability is the ability of a system or component to perform its required functions under stated conditions for a specified period of time and it is being ensured in this testing. Reliability can be expressed as the ability of the software to reveal defects under testing conditions, according to the specified requirements. It the portability that a software system will operate without failure under given conditions for a given time interval and it focuses on the behaviour of the software element. It forms a part of the software quality control team.

#### **SECURITY TESTING:**

Security testing evaluates system characteristics that relate to the availability, integrity and confidentiality of the system data and services. Users/Clients should be encouraged to make sure their security needs are very clearly known at requirements time, so that the security issues can be addressed by the designers and testers.

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#### WHITE BOX TESTING:

White box testing, sometimes called glass-box testing is a test case design method that uses the control structure of the procedural design to derive test cases. Using white box testing method, the software engineer can derive test cases. The White box testing focuses on the inner structure of the software structure to be tested.

#### **BLACK BOX TESTING:**

Black box testing, also called behavioural testing, focuses on the functional requirements of the software. That is, black testing enables the software engineer to derive sets of input conditions that will fully exercise all functional requirements for a program. Black box testing is not alternative to white box techniques. Rather it is a complementary approach that is likely to uncover a different class of errors than white box methods. Black box testing attempts to find errors which focuses on inputs, outputs, and principle function of a software module. The starting point of the black box testing is either a specification or code. The contents of the box are hidden and the stimulated software should produce the desired results.

## TABLE DESIGN

## **TABLE NAME: CLIENTS**

FILED NAME	DATA TYPE
Id	int(10)
user_id	int(10)
accound_id	int(10)
currency_id	int(10)
created_at	timestamp
Name	varchar(225)
Address	varchar(225)
City	varchar(225)
State	varchar(225)
postal_code	varchar(225)
coundry_id	int(10)

# TABLE NAME: invoices

FILED NAME	DATA TYPE
invoice_ id	int(11)
Invoice_ref_no	varchar(30)
updated_by	int(11)
sub_total	double
tax_total	double
gross_total	double
archive_in	Tinyint(4)

## TABLE NAME: PAYMENTS

FILED NAME	DATA TYPE
Id	int(10)
Name	Varchar(225)

## **TABLE NAME: CREDITS**

FIELD NAME	DATA TYPE
Id	int(10)
Account_id	int(10)
Client_id	int(10)
User_id	int(10)
Amount	decimal (13,2)
Balance	decimal(13,2)
Credit_Date	date
Credit_number	varchar(255)
Private_notes	text
Public_id	int(10)
Public_notes	text

# TABLE NAME: QUOTES

FIELD NAME	DATA TYPE
Id	int(10)
Account_id	int(10)
User_id	int(10)
Client_id	int(10)
Sent_invoice	tinyint(1)
First_name	varchar(255)
Last_name	varchar(255)
Email	varchar(255)
Phone	varchar(255)
Public_id	int(10)
Password	varchar(255)
Confirmation_code	tinyint(1)
Contact_key	varchar(255)
Custom_value	Text

# TABLE NAME: PROPOSALS

FIELD NAME	DATA TYPE
Id	int(10)
Account_id	int(10)
User_id	int(10)
Client_id	int(10)
Invoice_id	int(10)
Proposal_template_id	int(10)
Public_id	int(10)

## **TABLE NAME: PROJECTS**

FIELD NAME	DATA TYPE
Id	int(10)
Account_id	int(10)
User_id	int(10)
Notes	text
Cost	decimal(15,4)
Qty	decimal(15,4)
Public_id	int_10
Custom_value	text
Tax_name1	varcahr(255)
Tax_rate1	decimical(13,3)
Tax_name2	varchar(255)
Tax_rate2	Decimal(13,3)

## **TABLE NAME: EXPENSES**

FIELD NAME	DATA TYPE
Id	int(10)
Vendor_id	int(10)
User_id	Int(10)
Invoice_id	int(10)
Client_id	int(10)
Amount	decimall(13,2)
Exchange_date	date
Expense_date	date
Private_note	text
Invoice_currency_id	int(10)
Transaction_id	varchar(255)
Bank_id	int(10)
Expense_category_id	int(10)
Tax_name1	varcahr(255)
Tax_rate1	decimical(13,3)
Tax_name2	varchar(255)
Tax_rate2	Decimal(13,3)

## TABLE NAME: TASK

FIELD NAME	DATA TYPE
Id	int(10)
Account_id	int(10)
User_id	int(10)
Invoice_id	int(10)
Client_id	int(10)
Project_id	int_10
Task_status_id	int(10)
Task_status_sort_order	smallint(6)
Custom_value	text

# TABLE NAME: VENDORS

FIELD NAME	<b>ДАТА ТҮРЕ</b>
Id	int(10)
Account_id	int(10)
User_id	int(10)
Vendor_id	int(10)
First_name	varchar(255)
Last_name	varchar(255)
Email	varchar(255)
Phone	varchar(255)
Address	varchar(225)
City	varchar(225)
State	varchar(225)
postal_code	varchar(225)
coundry_id	int(10)
Vat_number	varchar(255)
Transaction_name	varcahar(255)

#### CODING

#### **Dashboard:**

```
<?php
namespace App\Http\Controllers;
use App\Ninja\Repositories\DashboardRepository;
use App\Ninja\Transformers\ActivityTransformer;
use Auth;
class DashboardApiController extends BaseAPIController
{
public function ____construct(DashboardRepository $dashboardRepo) {
    parent::_construct();
$this->dashboardRepo = $dashboardRepo;
  }
public function index()
  {
    $user = Auth::user();
    $viewAll = $user->hasPermission('view_reports');
    $userId = $user->id;
    $accountId = $user->account->id;
    $defaultCurrency = $user->account->currency_id;
    $dashboardRepo = $this->dashboardRepo;
    $activities = $dashboardRepo->activities($accountId, $userId, $viewAll);
 // optimization for new mobile app
    if (request()->only_activity) {
       return $this->response([
         'id' => 1,
         'activities' => $this->createCollection($activities, new ActivityTransformer(),
ENTITY_ACTIVITY),
```

]);

} \$metrics = \$dashboardRepo->totals(\$accountId, \$userId, \$viewAll);

\$paidToDate = \$dashboardRepo->paidToDate(\$user->account, \$userId, \$viewAll);

\$averageInvoice = \$dashboardRepo->averages(\$user->account, \$userId, \$viewAll);

\$balances = \$dashboardRepo->balances(\$user->account, \$userId, \$viewAll);

\$pastDue = \$dashboardRepo->pastDue(\$accountId, \$userId, \$viewAll);

\$upcoming = \$dashboardRepo->upcoming(\$accountId, \$userId, \$viewAll);

\$payments = \$dashboardRepo->payments(\$accountId, \$userId, \$viewAll);\$data = [

'id' => 1,

'paidToDate' => (float) (\$paidToDate->count() && \$paidToDate[0]->value ?
\$paidToDate[0]->value : 0),

'paidToDateCurrency' => (int) (\$paidToDate->count() && \$paidToDate[0]->currency\_id ? \$paidToDate[0]->currency\_id : \$defaultCurrency),

'balances' => (float) (\$balances->count() && \$balances[0]->value ? \$balances[0]->value : 0),

'balancesCurrency' => (int) (\$balances->count() && \$balances[0]->currency\_id ?
\$balances[0]->currency\_id : \$defaultCurrency),

```
'averageInvoice' => (float) ($averageInvoice->count() && $averageInvoice[0]->invoice_avg ? $averageInvoice[0]->invoice_avg : 0),
```

'averageInvoiceCurrency' => (int) (\$averageInvoice->count() && \$averageInvoice[0]->currency\_id ? \$averageInvoice[0]->currency\_id : \$defaultCurrency),

'invoicesSent' => (int) (\$metrics ? \$metrics->invoices\_sent : 0),

'activeClients' => (int) (\$metrics ? \$metrics->active\_clients : 0),

'activities' => \$this->createCollection(\$activities, new ActivityTransformer(), ENTITY\_ACTIVITY),

]; return \$this->response(\$data);

}}

### Login:

@extends('master')

@section('head')

```
@if (!empty($clientauth) && $fontsUrl = Utils::getAccountFontsUrl())
```

```
k href="{{ $fontsUrl }}" rel="stylesheet" type="text/css">
```

@endif

```
k href="{{ asset('css/built.public.css') }}?no_cache={{ NINJA_VERSION }}" rel="stylesheet" type="text/css"/>
```

k href="{{ asset('css/bootstrap.min.css') }}?no\_cache={{ NINJA\_VERSION }}" rel="stylesheet" type="text/css"/>

```
k href="{{ asset('css/built.css') }}?no_cache={{ NINJA_VERSION }}"
rel="stylesheet" type="text/css"/>
```

k href="{{ asset('css/built.login.css') }}?no\_cache={{ NINJA\_VERSION }}" rel="stylesheet" type="text/css"/>

```
@if (!empty($clientauth))
```

```
<style type="text/css">{!! Utils::clientViewCSS() !!}</style>
```

@endif

@endsection

@section('body')

@yield('form')

@endsection

### **Proposals:**

<?php

namespace App\Http\Controllers;

use App\Models\Account;

use App\Models\Document;

use App\Models\Invitation;

use App\Ninja\Repositories\ProposalRepository;

```
use App\Jobs\ConvertProposalToPdf;
```

class ClientPortalProposalController extends BaseController

{

private \$invoiceRepo;

private \$paymentRepo;

private \$documentRepo;

private \$propoosalRepo;

public function\_\_\_\_construct(ProposalRepository \$propoosalRepo)

{

\$this->propoosalRepo = \$propoosalRepo;

}
public function viewProposal(\$invitationKey)

{

```
if (! $invitation = $this->propoosalRepo->findInvitationByKey($invitationKey)) {
```

```
return $this->returnError(trans('texts.proposal_not_found'));
```

```
} $account = $invitation->account;
```

```
$proposal = $invitation->proposal;
```

```
$invoiceInvitation = Invitation::whereContactId($invitation->contact_id)
```

```
->whereInvoiceId($proposal->invoice_id)
```

```
->firstOrFail();
```

#### \$data = [

```
'proposal' => $proposal,
```

'account' => \$account,

```
'invoiceInvitation' => $invoiceInvitation,
```

```
'proposalInvitation' => $invitation,
```

```
]; if (request()->phantomjs) {
```

return \$proposal->present()->htmlDocument;

} else {

return view('invited.proposal', \$data);

} } public function downloadProposal(\$invitationKey)

{ if (! \$invitation = \$this->propoosalRepo->findInvitationByKey(\$invitationKey)) {

return \$this->returnError(trans('texts.proposal\_not\_found'));

\$proposal = \$invitation->proposal;

```
$pdf = dispatch_now(new ConvertProposalToPdf($proposal));
```

```
$this->downloadResponse($proposal->getFilename(), $pdf);
```

```
} public function getProposalImage($accountKey, $documentKey)
```

```
{ $account = Account::whereAccountKey($accountKey)
```

->firstOrFail(); \$document = Document::whereAccountId(\$account->id)

->whereDocumentKey(\$documentKey)

->whereIsProposal(true)

```
->firstOrFail() return
```

DocumentController::getDownloadResponse(\$document); }}

### **SCREEN SHOT**

#### LOGIN

| 🐼 Invoice Ninja |                       | CREATE. SEND. GET PAID. |
|-----------------|-----------------------|-------------------------|
|                 | Acco <u>unt</u> Login |                         |
|                 | admin@gmail.com       |                         |
|                 |                       |                         |
|                 | LOGIN                 |                         |
|                 |                       |                         |
|                 |                       |                         |
| weitedago ~     |                       | Shows                   |

### **DASHBOARD:**



| digisillar |  |                 |            | earch: shortcut is | 57.                | admin admin +        |
|------------|--|-----------------|------------|--------------------|--------------------|----------------------|
| Dashboard  |  |                 |            |                    |                    |                      |
|            | Activity                                       | 6 involces sent | O Recent P | aymentsAverage     | Invoice Rs. 869,06 | 6.67   Rn. 869,066.6 |
| Products   | Mar 18, 2021: admin admin deleted task xyz oc  | empany          | Invoice #  | Client             | Payment Date       | Amount               |
|            | Mar 18, 2021: admin admin deleted task quuer   | and abc company | 0000340008 | Aishwarya          | Mar 14, 2021       | Rs. 59,400.00        |
| Invoices   | Mar 18, 2021: admin admin deleted task xyz oc  | ompany          | 0008       | xyz company        | Mar 13, 2021       | Rs. 945,000.00       |
| Payments   | Mar 18, 2021 admin admin created expense P     | with            | 0003       | ABC company        | Mar 1, 2021        | Rs. 1,400,000.00     |
| Recurring  | mar re, 2027, durint durint created expense in | denid-          | R0001      | ABC company        | Feb 19, 2021       | Rs. 10,000.00        |
| Credits    | Min 18, 2021; admin admin created task quuer   | and abe company | R0002      | Queen              | Feb 19, 2021       | Rs. 1,400,000.00     |
|            | Mar 18, 2021: admin admin created task xyz or  | ompany          |            |                    |                    |                      |
| Quotes     | Mar 18: 2021 admin admin created task vvz co   | · ·             |            |                    |                    |                      |
| Proposals  | O Upcoming Invoices                            |                 | O Invoices | Past Due           |                    |                      |
| Projects   | Invoice # Client Due Date                      | Balance Due     | Invoice #  | Client             | Due Date           | Balance Due          |
| Tasks      | nivoice # Crient Due Date                      | Data the Date   | 0004       | ABC company        | Mar 2 2021         | De 1 400 000 00      |
| Everyneer  |  |                 | ARKIN .    | How everypany      | mar 3, 2021        | 110. 1940,000.00     |
| expenses   |  |                 |            |                    |                    |                      |

## **CLIENTS:**

|   | digis Alor |      |                       |                            |                             | Search: shortcut is / |            |                  |       |  |  |
|---|------------|------|-----------------------|----------------------------|-----------------------------|-----------------------|------------|------------------|-------|--|--|
| 6 | Dashboard  | Clie | ents                  |                            |                             |                       |            |                  |       |  |  |
| * | Clients    |      |                       | 1000                       |                             |                       |            |                  |       |  |  |
| ø | Products   | Arc  | ×Act                  | IVe                        |                             |                       | New Client |                  |       |  |  |
|   | Invoices   | 1.12 | Name                  | Contact                    | Email                       | Date Created          | Last Login | Balance          |       |  |  |
| 8 | Payments   | 0    | Aishwarya             | aishwarya thiruppathi      | imaishthiruppathi@gmail.com | Mar 13, 2021          |            | Rs. 0.00         |       |  |  |
| 仓 | Recurring  |      |                       | 122002                     |                             | 10 0001               |            | D- 0.00          |       |  |  |
| 8 | Credits    |      | xyz company           | Jenita                     | Jenitta@gmail.com           | Mar 13, 2021          |            | KS, 0.00         |       |  |  |
| e | Quotes     |      | Queen                 | vidhya s                   | vidhya141099@gmail.com      | Feb 19, 2021          |            | Rs. 0.00         |       |  |  |
|   | Proposals  | D    | ABC company           | sanya                      | sanya21@gmail.com           | Feb 9, 2021           |            | Rs. 1,400,000.00 |       |  |  |
| ŵ | Projects   |      |                       |                            |                             |                       |            |                  |       |  |  |
|   | Tasks      | Show | ving 1 to 4 of 4 entr | ies 10 🗸 rows              |                             |                       |            |                  | e 1 3 |  |  |
| 8 | Expenses   | Powe | ered by Invoice Nin   | ja - v4.5.24   White label |                             |                       |            |                  |       |  |  |
| - | ≡ 0 6 D D  |      |                       |                            |                             |                       |            |                  |       |  |  |

# **PRODUCTS:**

|    | digisAlor |      |                  |                               |            | Search:                    | shortcut is / | admin admin 🗕 🗮 |
|----|-----------|------|------------------|-------------------------------|------------|----------------------------|---------------|-----------------|
| 8  | Dashboard | Pro  | oducts           |                               |            |                            |               |                 |
| *  | Clients   |      |                  |                               |            |                            | lana.         |                 |
| •  | Products  | Inv  | roice 🕑 An       | Active -                      |            |                            | Filter        | New Product O   |
|    | Invoices  |      | Product          | Notes                         | Cost       | Tax Rate                   |               |                 |
|    | Payments  | 0    | Website          | Sample Static website         | 10000.00   | security transaction tax 5 | 00.000%       |                 |
| ረግ | Recurring |      | software         | software                      | 1400000 00 | 0.000%                     |               |                 |
| Đ  | Credits   |      | Junware          | Surrace                       | 140000.00  | 0.000 9                    |               |                 |
| ß  | Quotes    | Shov | wing 1 to 2 of 2 | entries 10 v rows             |            |                            |               | x 1 >           |
|    | Proposals | Pow  | ered by Invoice  | Ninja - v4.5.24   White label |            |                            |               |                 |
| 8  | Projects  |      |                  |                               |            |                            |               |                 |
|    | Tasks     |      |                  |                               |            |                            |               |                 |
|    | Expenses  |      |                  |                               |            |                            |               |                 |
|    | ≡ 0 6 0 C |      |                  |                               |            |                            |               |                 |
|    |           |      |                  |                               |            |                            |               |                 |

### **INVOICES:**

| =  | digis Alor |      |            | Search: sh     | :hortcut is / admin admin + |                     |                                   |                 |          |             |
|----|------------|------|------------|----------------|-----------------------------|---------------------|-----------------------------------|-----------------|----------|-------------|
| ß  | Dashboard  | Invo | pices      |                |                             |                     |                                   |                 |          |             |
| 쓭  | Clients    |      |            |                |                             |                     |                                   |                 |          | face a se   |
| Ø  | Products   | Ars  | hive - XAC | tive           |                             |                     |                                   | Filter          |          | New Invoice |
| 4  | Invoices   |      | Invoice    | Client Name    | Date 👻                      | Amount              | Balance                           | Due Date        | Status   |             |
| 8  | Payments   |      | Homoer     |                |                             |                     |                                   |                 |          |             |
| ¢b | Recurring  | 0    | 0000340009 | xyz company    | Mar 18,<br>2021             | Rs. 54,000.00       | Rs. 10,000.00 of Rs.<br>54,000.00 | Apr 1, 2021     | Draft    |             |
| ٥  | Credits    | 0    | 0000340008 | Aishwarya      | Mar 14,<br>2021             | Rs. 59,400.00       | Rs. 0.00                          | Mar 26,<br>2021 | Paid     |             |
| B  | Quotes     |      | 0008       | VV7 0000 80V   | Mar 13,                     | P= 045,000,00       | Re 0.00                           | Mar 18,         | Date     |             |
| =  | Proposals  |      | 0000       | xyz company    | 2021                        | KS. 945,000.00      | R5. 0.00                          | 2021            | Palo     |             |
| ġ  | Projects   | 0    | 0006       | ABC company    | Mar 1, 2021                 | Rs. 9,800.00        | Rs. 5,000.00 of Rs. 9,800.00      | Mar 11,<br>2021 | Draft    |             |
|    | Tasks      |      | 0004       | ABC<br>company | Mar 1, 2021                 | Rs.<br>1,400,000.00 | Rs. 1,400,000.00                  | Mar 3, 2021     | Past Due |             |
|    | Expenses   |      | R0002      | Queen          | Feb 19,                     | Rs.                 | Rs. 0.00                          | Mar 6, 2021     | Paid     |             |
| Ś  | ≡ 0 E 🖸 🛛  | _    |            |                | 2021                        | 1,400,000.00        |                                   |                 | 1        |             |

# **PAYMENTS:**

|   | digis Alor          |      |                     |                |                          |        |        | Search: st          | iortcut is /    |           | ədmin ədmin + |
|---|---------------------|------|---------------------|----------------|--------------------------|--------|--------|---------------------|-----------------|-----------|---------------|
| Ð | Dashboard           | Pay  | ments               |                |                          |        |        |                     |                 |           |               |
| 쓭 | Clients             |      |                     |                |                          |        |        |                     |                 | -         |               |
| 0 | Products            | Are  | hive -              | ctive          |                          |        |        |                     | ilter           |           | Enter Payment |
| Ø | Invoices            |      | Invoice             | Client<br>Name | Transaction<br>Reference | Method | Source | Amount              | Date 🚽          | Status    |               |
| • | Payments            |      |                     |                |                          |        |        |                     | Mar 14          |           |               |
| භ | Recurring           | 0    | 0000340008          | Aishwarya      | 0898545215366 🗋          | Cash   | Cash   | Rs. 59,400.00       | 2021            | Completed |               |
| 8 | Credits             | 0    | 8000                | xyz<br>company | gfbuybg 🕒                | Cash   | Cash   | Rs. 945,000.00      | Mar 13, 2021    | Completed | 1             |
|   | Quotes<br>Proposals |      | 0003                | ABC<br>company | hgh 🗋                    | Cash   | Cash   | Rs.<br>1,400,000.00 | Mar 1,<br>2021  | Completed |               |
| ŝ | Projects            | O    | R0002               | Queen          | 69877654432468           | Cash   | Cash   | Rs.<br>1,400,000.00 | Feb 19,<br>2021 | Completed |               |
| 0 | Tasks               | 0    | R0001               | ABC            | Manual entry             | Apply  | Apply  | Rs. 10,000.00       | Feb 19,         | Completed |               |
|   | Expenses            |      |                     | company        | Constant of States       | Credit | Credit |                     | 2021            |           |               |
| - |                     | Show | ving 1 to 5 of 5 er | ntries 10      | ✓ rows                   |        |        |                     |                 |           | « 1 »         |

### **RECURRING INVOICES:**

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| Ø | Products  |      | Act                   | IVE                   |              |              | 1                | liter               | New Red          | surring Invoice O |
|   | Invoices  |      | Frequency 🔻           | Client Name           | Start Date   | Last Sent    | Amount           | Private Notes       | Status           |                   |
|   | Payments  | D    | Three months          | Queen                 | Feb 19, 2021 | Feb 19, 2021 | Rs. 1,400,000.00 |                     | Active           |                   |
| ළ | Recurring | 1    | Monthly               | ABC company           | Eab 0, 2021  |              | Pa 10.000.00     |                     |                  |                   |
|   | Credits   |      | монину                | Abo company           | Feb 9, 2021  |              | KS. 10,000.00    |                     | Dran             |                   |
| ß | Quotes    | 0    | Monthly               | ABC company           | Feb 19, 2021 | Feb 19, 2021 | Rs. 10,000.00    |                     | Completed        |                   |
|   | Proposals | Shov | ving 1 to 3 of 3 entr | ies 10 v ro           | ows          |              |                  |                     |                  | x 1 x             |
| 8 | Projects  |      |                       |                       |              |              |                  |                     |                  |                   |
|   | Tasks     | Powe | ered by Invoice Ninj  | a - v4.5.24   White I | abel         |              |                  |                     |                  |                   |
|   | Expenses  |      |                       |                       |              |              |                  |                     |                  |                   |
|   |           |      | _                     |                       |              |              |                  |                     | _                |                   |

#### **CREDITS:**

|    | digisAlor |      |                           |                      |                  |               | Search: shortcu | it is /       | admin admin 🕶 🚍 |
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| æ  | Dashboard | Cree | dits                      |                      |                  |               |                 |               |                 |
| 쓭  | Clients   |      |                           |                      |                  |               |                 |               |                 |
| Û  | Products  | Are  | ×Active                   |                      |                  |               | Filt            | er            | Enter Credit    |
|    | Invoices  | 1.1  | Client Name               | Amount               | Balance          | Credit Date 😽 | Public Notes    | Private Notes |                 |
|    | Payments  | O    | xyz company               | Rs. 5,000,000.00     | Rs. 5,000,000.00 | Mar 13, 2021  | full payment    |               |                 |
| đ  | Recurring |      | Oueen                     | Pe 40.000.00         | Re 40.000.00     | Ech 10 2021   |                 |               |                 |
| 11 | Credits   |      | queen                     | NS. 40,000.00        | K3. 40,000.00    | reb 19, 2021  |                 |               |                 |
| ۵  | Quotes    | D    | ABC company               | Rs. 20,000.00        | Rs. 10,000.00    | Feb 9, 2021   | payment delayed |               |                 |
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|    | Expenses  | -    |                           |                      |                  |               |                 |               |                 |
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# **QUOTES:**

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| 6 | Dashboard | Quo  | otes                     |                       |              |               |                |                    |           |  |
| ¥ | Clients   |      |                          | 2                     |              |               |                |                    |           |  |
| 0 | Products  | Are  | Active                   |                       |              |               | FI             | ter                | New Quote |  |
|   | Invoices  |      | Quote Number             | Client Name           | Date 👻       | Amount        | Valid Until    | Status             |           |  |
| 3 | Payments  | D    | 0009                     | xyz company           | Mar 18, 2021 | Rs. 54,000.00 | Mar 26, 2021   | Converted          |           |  |
| 2 | Recurring |      | 0005                     | ABC company           | Mar.4. 2021  | Rs 9.800.00   | Mar 13, 2021   | Converted          |           |  |
| 3 | Credits   |      |                          | Abo company           | 1001 4, 2021 | 113. 5,000.00 | 110,2021       |                    |           |  |
| 1 | Quotes    | Show | ring 1 to 2 of 2 entries | s 10 v rows           |              |               |                |                    | e 1       |  |
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| ê | Projects  |      |                          |                       |              |               |                |                    |           |  |
| 0 | Tasks     |      |                          |                       |              |               |                |                    |           |  |
| 2 | Expenses  |      |                          |                       |              |               |                |                    |           |  |
| Y |           |      |                          |                       |              |               |                |                    |           |  |

### **PROPOSALS:**



# **PROJECT:**

|   | digis dor | 11-c |                       |                           |              | Sec            | arch: shortcut is / | admin admin + 🗮 |
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| 8 | Dashboard | Pro  | ojects                |                           |              |                |                     |                 |
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|   | Invoices  |      | Project               | Client Name               | Due Date     | Budgeted Hours | Task Rate           |                 |
| 8 | Payments  | 0    | jenitta 🗋             | xyz company               | Mar 24, 2021 | 5              | Rs. 5,000.00        |                 |
| හ | Recurring |      | devolution            | APP company               |              |                |                     |                 |
| 8 | Credits   |      | Gevendhuid            | Abc company               |              |                |                     |                 |
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## TASKS:

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| 6         | Dashboard                          | Tas  | sks                    |                         |                               |          |                    |                |                 |
| ¥         | Clients                            |      |                        | (in the second          |                               |          |                    | 1              |                 |
| ¢         | Products                           |      | rolice (5 Audition     | * ACTVC                 | Filte                         |          | Kanban 🎬           | Time Tracker O | New Task        |
| ß         | Invoices                           |      | Client Name            | Project                 | Date 🗸                        | Duration | Description        | Status         |                 |
| 8         | Payments                           | 5    | xyz company            | jenitta                 | March 18, 2021 3:12 am        | 00:40:16 | ougtguijhjikk      | Backlog        |                 |
| Ċ         | Recurring                          | 1    | ABC company            | Fuilding                | February 19, 2021 12:59 am    | 00:00:30 | havavíth           | Decklose       |                 |
| 8         | Credits                            | -    | Abb company            | Lunung                  | 1 Childrey 19, 2021 12,07 Bit | 00.00.00 | - grgytti          | Decivity       |                 |
| ٥         | Quotes                             | 5    | ABC company            | developing              |                               | 00:00:00 | sasa               | Backlog        |                 |
|           | Proposals                          | 5    | Queen                  | webdeveloping           |                               | 00:00:00 | compled project    | Ready to do    |                 |
|           | Projects                           |      |                        |                         |                               |          |                    |                | -               |
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|           | Expenses                           | Pow  | ered by Invoice Ninja  | a - v4.5.24   White lab | a .                           |          |                    |                |                 |
| dev diçis | a lor in/projectninja/public/tasks | 4    |                        |                         |                               |          |                    |                |                 |

## **EXPENSES:**

|          | digis Alor       |      |               |                         |                |                | s              | earch: shortcut is / |              | admin admin +    |  |
|----------|------------------|------|---------------|-------------------------|----------------|----------------|----------------|----------------------|--------------|------------------|--|
| Ð        | Products         | Exp  | enses         |                         |                |                |                |                      |              |                  |  |
|          | Invoices         |      | olea E        | Antila a XA             | ctive          | Eiltor         |                | Recurring +          | Catenories - | Enter Evnance    |  |
|          | Payments         |      |               |                         |                | rinter         |                | Hectoring            | outegoines   | Cinci expenses 🐨 |  |
| ළු       | Recurring        |      | Vendor        | Client Name             | Expense Date 😽 | Amount         | Category       | Public Notes         | Status       | -                |  |
|          | Credits          | 0    | KNG           | Queen                   | Mar 26, 2021 🗋 | Rs. 55,000.00  | water supplier | fhyuhj               | Logged       |                  |  |
|          | Quotes           | 0    | MNK           | ABC company             | Feb 19, 2021   | Rs. 600.000.00 | AC Supplier    |                      | Logged       |                  |  |
|          | Proposals        |      |               | 1.000 0.000 m.M.        |                |                |                |                      |              |                  |  |
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| E.       | Expenses         |      |               |                         |                |                |                |                      |              |                  |  |
|          | Vendors          |      |               |                         |                |                |                |                      |              |                  |  |
| Ħ        | Reports          |      |               |                         |                |                |                |                      |              |                  |  |
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#### **VENDORS:**

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| *  | Clients    | 1.1  | Archive - *Active |              |            |                      |        |                 |              |  |
| Ø  | Products   | An   |                   |              |            |                      |        |                 | New Vendor O |  |
| ß  | Invoices   |  | Name              | City         | Phone      | Email                |        | Date Created    |              |  |
| ۲  | Payments   | D  | MNK               | thoothukudi  | 9564321904 | mnk4532@gmail.com    |        | Feb 19, 2021    |              |  |
| ළු | Recurring  |  |                   | thoothukudi  | 9870564321 | karthick/@email.com  |        | Mar 14, 2021    |              |  |
| 8  | Credits    |  |                   | aroundation  | 2070004021 | All though grant com |        | 110,19,2021     |              |  |
| ۵  | Quotes     | Shov   | ving 1 to 2 of 2  | entries 10 🗸 | rows       |                      |        |                 | к 1 э        |  |
|    | Proposals  | Powered by Invoice Ninja - v4.5.24   White label |                   |              |            |                      |        |                 |              |  |
|    | Projects   |  |                   |              |            |                      |        |                 |              |  |
| Ø  | Tasks      |  |                   |              |            |                      |        |                 |              |  |
|    | Expenses   |  |                   |              |            |                      |        |                 |              |  |
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## **REPORTS:**

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| * | Clients   |   |                       |
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| Ø | Invoices  | 200000  |                       |
| 8 | Payments  | 100000  |                       |
| Ø | Recurring |   |                       |
| ۵ | Credits   | reals and reads and reads and we shall we to the west and |                       |
|   | Quotes    |   |                       |
| = | Proposals |   |                       |
| 8 | Projects  | Totals Amount Paid  | Balance               |
| Ø | Tasks     | Indian Rupee Rs. 3,878,200.00 Rs. 2,414,400.00 F          | Rs. 1,463,800.00      |
|   | Expenses  |   |                       |
| - | ≡ 0 0 0 0 | Client Client Paid  | Balance 0             |

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| Clients   | Totals   | Totals Amou   |   | mount Paid  |   | Balance  |   |   |
| Products  | Indian Rupee   | Indian Rupee Rs. 3  |   | Rs. 2,414,400.00  |   | Rs. 1,463,800.00   |   | _   |
| Invoices  |  |   |   |   |   |  |   |   |
| Payments  | Client   | ٥   | Amount  | ¢   | Paid  | ٥  | Balance   | ٥   |
| Recurring |  |   |   |   |   |  |   |   |
| Credits   | ABC company  |   | Rs. 1,419,800.00  |   | Rs. 10,000.00   |  | Rs. 1,409,800.00  |   |
| Quotes    | Aishwarya  |   | Rs. 59,400.00   |   | Rs. 59,400.00   |  | Rs. 0.00  |   |
| Proposals | Queen  |   | Rs. 1,400,000.00  |   | Rs. 1,400,000.00  |  | Rs. 0.00  |   |
| Projects  | xyz company  |   | Rs. 999,000.00  |   | Rs. 945,000.00  |  | Rs. 54,000.00   |   |
| Tasks     | Shift + Click to sort by n   | nultiple colun  | nns, Ctrl + Click to clear th   | e grouping  |   |  |   |   |
| Expenses  |  |   | -30   |   |   |  |   |   |
|           | Powered by Invoice Ninja - v4.   | 5.24   White I  | abel  |   |   |  |   |   |
|           | Dashboard<br>Clients<br>Products<br>Invoices<br>Payments<br>Recurring<br>Credits<br>Quotes<br>Proposals<br>Projects<br>Tasks<br>Expenses | Dashboard     Clients     Products     Indian Rupee     Invoices     Payments     Recurring     Credits     ABC company     ABC company     Aishwarya     Queen     ryz company     Tasks     Expenses     Powered by Invoice Ninja - v4. | Dashboard     Clients     Products     Invoices     Payments     Recurring     Credits     Quotes     Proposals     Projects     Tasks     Shift + Click to sort by multiple colume     Expenses     Powered by Invoice Ninja - v4.5.24   White Invoice | Totals   Amount     Clients   Indian Rupee   Rs. 3,878,200.00     Invoices   Payments   Rs. 3,878,200.00     Payments   Client   Amount     Credits   Amount   Indian Rupee     Quotes   Rs. 1,419,800.00   ABC company     Proposals   Rs. 59,400.00   Indian Rupee     Proposals   Rs. 1,400,000.00   Indian Rupee     Projects   Shift + Click to sort by multiple columns, Ctrl + Click to clear the Expenses     Powered by Invoice Ninja - v4.5.24   White label   Powered by Invoice Ninja - v4.5.24   White label | Totals   Amount   P     Dashboard   Indian Rupee   Rs. 3,878,200.00   R     Products   Indian Rupee   Rs. 3,878,200.00   R     Invoices   Indian Rupee   Rs. 3,878,200.00   R     Payments   Client   Amount   Image: Client   Amount   Image: Client   Image | Cligis / lor   Search:     Dashboard   Indian Rupee   Rs. 3878,200.00   Rs. 2,414,400.00     Invoices   Indian Rupee   Rs. 3,878,200.00   Rs. 2,414,400.00     Payments   Indian Rupee   Rs. 3,878,200.00   Rs. 2,414,400.00     Credits   Amount       Paid      ABC company   Rs. 1,419,800.00   Rs. 1,000.00     ABC company   Rs. 1,419,800.00   Rs. 1,400,000.00     Quotes   Proposals      Rs. 1,400,000.00   Rs. 1,400,000.00     Projects   Shift + Click to sort by multiple columns, Ctrl + Click to clear the grouping.     Expenses      Powered by Invoice Ninja - v4.5.24   White label | Totals   Amount   Paid     Clients   Products   Indian Rupee   Rs. 3,878,200.00   Rs. 2,414,400.00     Invoices   Paid   Indian Rupee   Rs. 3,878,200.00   Rs. 2,414,400.00     Invoices   Paid   Ŷ   Paid   Ŷ     Recurring   Client   Ŷ   Amount   Ŷ   Paid   Ŷ     Quotes   Rs. 1,419,800.00   Rs. 19,400.00   Rs. 19,400.00   Queen   Rs. 1,400,000.00   Queen   Rs. 1,400,000.00   Rs. 1,400,000.00   Rs. 1,400,000.00   Rs. 1,400,000.00   Sthift + Click to sort by multiple columns, Ctrl + Click to clear the grouping.   Sthift + Click to sort by multiple columns, Ctrl + Click to clear the grouping.   Sthift + Click to sort by multiple columns, Ctrl + Click to clear the grouping.   Sthift + Click to sort by multiple columns, Ctrl + Click to clear the grouping.     Expenses   Powered by Invoice Ninja - v4.5.24   White label   State St | Gearch: shortcut is /     Search: shortcut is /     Dashboard     Clients     Totats   Amount   Paid   Balance     Indian Rupee   Rs. 3,878,200.00   Rs. 2,414,400.00   Rs. 1,463,800.00     Indian Rupee   Rs. 3,878,200.00   Rs. 2,414,400.00   Rs. 1,463,800.00     Indian Rupee   Rs. 3,878,200.00   Rs. 2,414,400.00   Rs. 1,463,800.00     Client   Amount   Q Paid   Balance     Credits     Quotes   Rs. 1,419,800.00   Rs. 10,000.00   Rs. 0.00   Queen   Rs. 1,400,000.00   Rs. 0.00   Queen   Rs. 1,400,000.00   Rs. 0.00   Rs. 59,400.00   Rs. 54,000.00   Rs. 54,000.00   Rs. 54,000.00   Stift + Click to sort by multiple columns, Ctrl + Click to clear the grouping.   Expenses     Powered by Invoice Ninja - v4.5.24 J White label |

#### CONCLUSION

Thus, our project entitled on "Managing the Clients, Payments, Proposals, and Invoices using AJAX based Self Hosted application" is successfully designed. Invoice management is an essential part of any business. Whether you are sending or receiving invoices, it is important that you use an efficient and integrated system to make sure that you keep everything organized. The practice of invoice management has become much easier with the advent of online systems. Keeping your invoicing procedures streamlined will allow you to keep your finances up to date, protect your credit and pay taxes easier. When you stay on top of your bills, you can spend less time organizing paper and get back to business sooner.

#### **FUTURE ENHANCEMENT**

Though we ought to have a successfully project, it could be still be improved further, according to the needs of the user.

Following are the plans we have yet to achieve.

- To make a more and more invoices reports and to make the end clients more comfortable.
- Developing the payment specialities comfortable for clients.
- Improve the project and products.

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