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ORIGINAL ARTICLE

Synthesis and characterization of Cobalt Oxide nanoparticles using *Momordica charantia* and its photocatalytic activity

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Abstract

Synthesizing plant-derived nanoparticles attract attention due to both their broad spectrum biological applications and sustainable production. This paper describes the production of Cobalt oxide nanoparticles (Co_3O_4 NPs) using M. charantia leaf extract. The UV–Vis absorption spectrum of them has peaks at 309 and 595nm. FTIR spectroscopy reveals bands at 580cm^{-1} and 667cm^{-1} and confirms the formation of Co_3O_4. The particle size was determined by XRD to be between 44.68 and 89.20nm. The Field Emission Scanning Electron Microscopy (FESEM) showed that Co_3O_4 NPs were irregular in shape and between 40 and 90nm in size. Further, the dye degrading capacity of this nanoparticle was ascertained. The dye degrading capacity of Co_3O_4 NPs exhibited was 81.50% obtained at 90 minutes of light irradiation.

Keywords: *Dye Degradation; FESEM; Green Synthesis; Momordica Charantia; Photocatalytic Activity; XRD.*

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NTRODUCTION

Nanomaterials are fine sized particles neasured at nanoscale having efficiency in :atalytic reaction, non-linear optical activity, :hermal conductivity and chemical stability ittributed to its increased surface area to volume ratio. Particles with diameter less than 100 nm are considered as nanomaterials and they known :o contain special properties [1-4]. Nanoparticles are of paramount importance as they are known for their innumerable applications over different fields including engineering, medicine, catalysis and environmental remediation. The generation of metallic nanoparticles can be achieved through physical, chemical and biological methods [5] and these methods fall under two categories such as top-down approach and bottom-up approach [6]. The process of nanoparticle generation in top-down approach is through size reduction of the material, whereas in the case of bottom-up approach, involves self-assembly of particles of atomic size to grow to nano size particle [7].

Synthesizing nanoparticles by chemical methods require chemicals such as metallic precursors, stabilizing and reducing agents and certain physical methods as well employed such as microwave irradiation, ultrasonication, electrochemical approaches *etc.* for the size reduction of the material [8-11]. There are certain disadvantages present in the physical methods such as consuming long time to achieve thermal stability, lot of energy consumption for temperature increase around source material,

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A study of antioxidant and antibacterial activity using honey mediated Chromium oxide nanoparticles and its characterization

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ABSTRACT

Honey is authenticated as the world's prehistoric food source with incomparable therapeutic, biochemical, physical, and curative values. Chromium oxide nanoparticles were precipitously generated by reduction of potassium dichromate solution in collaboration with natural honey holding carbohydrates as a chief component which perform as reducing agent. The outcome suggests that water soluble carbohydrates have aldehyde group cause the formation of Cr_2O_3 nanoparticles. The properties of the prepared Cr_2O_3 nanoparticles were characterized using several techniques such as UV–Visible, FT-IR, SEM, EDAX, XRD and AFM. The FT-IR studies reveals that the broad band of low intensity at 1165.00 cm^{-1} can be found to be the surface Cr-O stretching vibrations. The SEM image illustrates the rocky structure of the prepared nanoparticle. The AFM image exhibits the topography of Cr_2O_3nanoparticles in 3.13 μm resolution for 2D and 3D view with current passing over the probe with the scanning area of 9.842 pm^2. The XRD result concludes the average size of Cr_2O_3 nanoparticles as 24.7205 nm. The antioxidant study shows the fluctuation in percentage of antioxidant activity as the concentration varies. The antibacterial activity explains clearly that the prepared sample has zone inhibition with the 3 pathogens studied. Thus the honey medicated nanoparticle synthesis provides a simple, cost effective, reproducible, rapid, and safe method with numerous applications.

Selection and peer-review under responsibility of the scientific committee of the International Conference On Impact Of Innovations In Science And Technology For Societal Development: Materials Science.

1. Introduction

Nanoparticles have attracted great interest recently due to their unique physical and chemical properties, which are different from those of either the bulk materials or single atoms [1]. In recent years, many have focused on Chromium oxide (Cr_2O_3) due to their applications in several areas of research. Chromium oxide nanoparticles have several applications such as catalysis of CO and H_2S [2], thermal protection, wear resistance, in glasses, inks and paints, it acts as the colorant in 'chrome green' and 'institutional green'. With growing applications of Cr_2O_3NPs in biological perspectives, Cr_2O_3NPs were evaluated for diverse bio potentials [3]. The antibacterial effect of Cr_2O_3 nanoparticles against Escherichia coli was investigated as a model for gram-negative bacteria. The Cr_2O_3 nanoparticles by reduction of potassium dichromate solution with *Mukiamaderaspatana* plant extract. Therefore, the transition metal nanoparticles have been researched widely because of their good antimicrobial activity [3]. The antioxidant activity was performed by the green synthesized Chromium oxide nanoparticle [4]. It was used to measure the Total Antioxidant Concentration. It is the measure of the ability of NPs to quench reactive oxygen species (ROS). The percentage inhibition of reduction by the nanoparticle was calculated [5] by using the formula:

$$\%\text{Antioxidant activity} = [1 - (OD_{sample} \backslash OD_{control})] \times 100$$

Chromium oxide nanoparticles were rapidly synthesized by reduction of potassium dichromate solution with natural honey containing carbohydrates as a major component which act as reducing agent. Honey mediated green synthesis is a relatively novel concept used during the past few years to synthesize gold, silver, carbon, platinum, and palladium nanoparticles [6]. Honey is one of the healthiest food sources since immemorial time. It consists of 80–85% carbohydrate mainly glucose and fructose, 15–17% water. Honey acts as both a stabilizing and a reducing agent and importantly functions as a precursor in nanoparticle synthesis. This method usually requires room temperature and does not produce

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Eco-friendly synthesis and characterization of cobalt oxide nanoparticles by sativum species and its photo-catalytic activity

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Cobalt oxide nanoparticles (Co_3O_4-C and Co_3O_4-A)
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ABSTRACT

Coriandrum sativum and *Allium sativum*are belong to family alliaceae which is famous for its culinary and medicinal properties. These two sativum species' seeds and cloves extracts are chosen to synthesize the cobalt oxide nanoparticles because it is eco- benign, secure as well as cost – effective method. The reducing sugar such as glucose which is present naturally in the extract used as reducing agent instead a harmful chemicals as reducing agent. The synthesized cobalt oxide nanoparticles using sativum species were characterization using UV–Visible spectroscopy, FT-IR spectroscopy, EDAX and SEM. The optical absorption spectrum for Co_3O_4 nanoparticles are studied using UV–Visible spectroscopy. The FT-IR spectrum confirms the presence of functional group in cobalt oxide nanoparticles. Scanning Electron Microscopy was employed to analyze the morphology, it shows that synthesized cobalt oxide nanoparticles show different morphology, which depends on the nature of the extract and of the compound present the extract. The EDAX studies show that the presence of cobalt and oxygen elements in the synthesized nanoparticles. Photo - catalytic activity of the synthesized nanoparticles was evaluated by degradation of Rhodamine B dye.

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1. Introduction

Green synthesis of nanoparticles makes use of environmental friendly non-toxic and safe reagents. Ecological synthesis techniques use moderately pollutant-free chemicals for synthesis nanomaterials and embrace the use of being solvent like water, natural extracts. This principle focuses on choosing reagent that façade the least risk and generate only benevolent by products. Though physical and chemical methods are trendier for nanoparticles synthesis, the biogenic fabrication is a better choice due to eco-friendliness [1,2].

The utilization of oxide nanoparticles has received much attention due to their unique properties, such as extremely smaller size, high surface area-to-volume ratio, surface modifiability, excellent magnetic properties and bio compatibility hence, the production of nanoparticles should be economically visible, environmentally sustainable and well accepted by society [3].

Cobalt oxide nanoparticles appear white in colour and are magnetic p-type semiconductors. The particle will convert into cobalt metal upon heat into 900 °C. In the search for electrical materials and batteries, cobalt oxide nanoparticles generally refer to Nanoscale cobalt (II, III) Co_3O_4 oxide particles with various shapes and crystals the structures. Several physical and chemical methods have been reported for the synthesis of cobalt oxide nanoparticles including, microwave-assisted [4], hydrothermal method [5], sol–gel techniques [6], and solution combustion method [7]. Cobalt oxide nanoparticles have potential applications in lithium-ion batteries [8,9] and electronic gas sensors [10,11].

The effects of quantum confinement and surface effects and variable oxidation state of cobalt have made Co_3O_4nanoparticles find immense applications in areas such as catalysis, intercalation compounds for energy storage in Li-ion batteries, gas sensors, elec-

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Anti-Inflammatory activity of LPAM nano crystals and Hirshfeld impact on crystals

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SPATIAL AND TEMPORAL DIFFERENTIATION OF HEAVY METAL DISTRIBUTION IN MANGROVE SEDIMENT OF THOOTHUKUDI COAST, TN

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Abstract: The present work explained the spatial and temporal variation of heavy metal contamination and its ecological risk assessment in sediments at the Thoothukudi coast. Surface sediments were collected from five different coastal zones of Thoothukudi in different seasons (Post-monsoon, pre-monsoon, and monsoon). The collected samples were analysed for physico-chemical parameters and heavy metal distribution. Metals such as Fe, Mn, Cu, Zn, Pb, Cd and As were detected using atomic absorption spectrophotometer (AAS). The results of the present study showed that the sediments sampled from all stations were moderately contaminated with Fe, Cu, Zn, Pb except As which was detected at non-polluted level. This clearly explained that the metal contamination was mainly attributed to anthropogenic inputs from surrounding environment, especially boat yard, SPIC, thermal power plant etc. The results of metal assessment indices indicated that Thoothukudi coast sediments were moderately contaminated with Cu, Zn and Pb. The average value of metal enrichment levels decreased in the following order, Cu > Pb > Zn > Cd > As. The overall metal concentrations like Cu, Pb, Zn were reported at station I and V during post-monsoon season. The as arsenic distribution was completely absent in stations I, II, III, and V in post-monsoon and pre-monsoon seasons; however, it was reported in monsoon season at station IV. Hence continuous monitoring is required to protect the Thoothukudi coastal environment from heavy metal hazards.

Index Terms **- Spatial and temporal variation, Heavy metal, Geo accumulation index (Igeo).**

I. INTRODUCTION

Coastal environment is one of the most productive ecosystems in the world and hence, they bears many advantages, such as coastal water enrichment, commercial production, coastlines preservation and increasing fisheries production[1]. The IPCC (Intergovernmental Panel on Climate Change) estimated that 23% of the world's population lives within 100 km distance of the coast and their livelihood is based on this ecosystem. besides, it is an ideal location for many industries, particularly power plants and chemical industries. Population growth and distribution, use of chemicals and land use are affecting the coastal environment, particularly the coastal sediments. Sediments play a major role in the determining pollution pattern of aquatic systems[2]; they act as both carriers and sinks for contaminants, reflecting the history of pollution status of the coastal environment[3]. The effluent discharges from various industries, fertilizers, chemical plants and untreated sewage are the main source of nutrient and heavy metal pollution along any coastal ecosystem. Of the various contaminants, heavy metals are highly bio-toxic even at the least level. It is a natural constituent of the earth's crust, but indiscriminate human activities have drastically altered its geochemical cycles and biochemical balance. Heavy metals are accumulated in sediments and then enter the food web via higher consumer and disturb the aquatic environment and affect the adjacent coastal area with major ecological degradation[4,5]. A plenty of scientific data about other coastal environment world over is monitored day-by-day to control the level of pollution[6,7,8,9]. However, in the study area, Thoothukudi coast, the heavy metal distribution had not yet been reported. This, study provides information on seasonal physico-chemical characteristics, including heavy metal distribution and their possible sources were studied. The seasonal accumulation of heavy metal and its relation among parameters was analysed and interpreted through relevant statistics. The pollution load indices such as enrichment factor (EF)[10] and geo accumulation index (Igeo) with reference to coastal baseline data was done to confirm the environmental status.

II. Study Area

Thoothukudi is an industrial town located between latitude 8º 45'N & 9º02'3'N and longitude between 78º07'17'' E and 78º19'18''. This coast is sheltered by Sri Lanka. Thoothukudi port is one of the fastest growing major ports in India and it is an "emerging energy and industrial hub of South India". It is also called "Sea Gateway of Tamil Nadu". The 21 islands between Thoothukudi and Rameswaram shores in the Gulf of Mannar noted as the first Marine Biosphere Reserve of India, have around 36,000 species of flora and fauna in the region covered with mangroves, sandy shores, and sea grass beds that are conducive for turtle nesting. This protected area is called Gulf of Mannar Marine National Park. Fishing is one of the largest contributors to the local economy. In addition, there are several small scale and large scale industries, including Thermal power plants, Sterlite Industries, and Southern Petrochemical Industries Corporation, located along this limited coastal stretch. The study area ranges between Inigo Nagar to Korampallam Creek and falls along Thoothukudi coast (Fig. 1). The study area is a colonized well-flourished mangrove vegetation. However, the mangrove strands form a major dumping ground for municipal waste and sewage disposal activities. Recently, due to salt pan, roads, walking track and other expanding activities, the mangrove vegetation was slowly destroyed; however, the remaining mangroves with stand healthily under these threatened conditions.

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Advanced technologies on the sustainable approaches for conversion of organic waste to valuable bioproducts: Emerging circular bioeconomy perspective

Veeramuthu Ashokkumar [a,b,1,*], G. Flora [c,1], Radhakrishnan Venkatkarthick [d,1], K. SenthilKannan [e], Chandrasekhar Kuppam [f], G. Mary Stephy [c], Hesam Kamyab [g], Wei-Hsin Chen [h,i,j], Jibu Thomas [k], Chawalit Ngamcharussrivichai [b,l,*]

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ABSTRACT

Rapid population growth and other human activities have generated massive waste from various sectors in recent decades. Studies revealed that by 2050, global solid waste generation is expected to reach 70% to 3.4 billion metric tons. Thus, the authorities urgently need to provide a low-cost, efficient technology for treating waste disposal. However, it is evident that only 20% of waste is recycled, and the remaining is still being considered for landfilling. In developing countries, the generated waste is simply disposed of in an open area, which causes a severe threat to humans, animals, and the environment. To date, organic waste and fourth-generation biomass have been investigated for multiple targeted products. Thus, the present review article highlights the emerging problems in organic waste generation, management, and converting them into various value-added bioproducts. This review also deals with the conversion of multiple biofuels such as liquid, solid, gaseous, and bioelectricity from organic waste resources. Besides, the latest approaches in organic waste are also detailly addressed for the production of value-added bioproducts such as bioplastic, bio-compost, and organic acids. Furthermore, the techno-economic analysis (TEA) and life cycle assessment (LCA) of organic waste is also explored. The transformation of organic waste to value-added bioproducts enhances the circular bioeconomy approach by reducing waste, increasing energy production, and other healthcare products. Finally, it is concluded that the utilization of organic waste to value-added bioproducts and biofuels production will be helpful in achieving high energy security, environmental protection, as well as enhancing the bioeconomy perspective.

1. Introduction

The growing global population, with the majority of people living in

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ORIGINAL ARTICLE **OPEN ACCESS**

Impact of freezing on the Nutritive Content of *Penaeus indicus* in Thoothukudi Coastal Region of Tamil Nadu, India

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ABSTRACT
Shrimps are an extremely good source of protein, making them a healthy choice of food. They are low in fat and calories. Minerals are an important part of shrimp nutrition. Freezing is a phase transition where a liquid turns into a solid. The present study was carried out to investigate the impact of the freezing process on the nutritive content of the flesh of white shrimp (Penaeus indicus) in the Thoothukudi coastal region of Tanil Nadu. The biochemical analysis of the flesh was done periodically (7, 14, 21,28 and 35 days) according to the standard procedures of Association of Official Analytical Chemists (AOAC) methods. In the fresh shrimp, calcium (121.3 mg/100g), potassium (45.7 mg/100g), magnesium (10.11 mg/100g), sodium (55.3 mg/100g) and iron (3.42 mg/100g) contents were recorded. Changes in moisture, ash, protein, carbohydrate, lipid and minerals values were decreased as the storage days increased. The level of ash, moisture, protein, carbohydrate and lipid was found to be 0.5%, 29.8%, 13.9%, 8.2% and 2% after 35 days of frozen shrimp. The nutritional values exhibited a low variation in the flesh content on continuous freezing of even 35 days. Thus, indeed, consumption of fresh shrimp should be preferred compared to frozen shrimp on the basis of biochemical components.
Keywords: Biochemical Composition, Carbohydrate, Lipid, Minerals, Protein, White Shrimp

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INTRODUCTION

Shrimps are one of the most important types of *seafood* that are consumed worldwide. There are many inorganic elements in the body of shrimp associated with vital physiological functions. It also provides good quality proteins, vitamins A and D for humans and animals. It also contains various dietary minerals such as Ca, Fe, and others [1]. It is also believed that the freezing process plays a key role in causing functional and vital changes in the protein. The change in some properties of the meat upon freezing depends on the events of changes in the susceptibility of the protein. The changes in the specific qualities of the meat was observed that the freeze has a direct effect on the enzymes and protein degradation [2].

Freezing is a prevalent procedure in the meat, fish, and other animal protein-based industries. It preserves quality for a more extended period and provides various benefits such as minimal changes in product dimensions and colour, flavour, and texture [3]. Beroumand and Jooyandeh [4] reported that the types of packaging, maintenance of proper storage temperature and freezing properties of different species are important on the quality of fish. This means that fish should be stored for a short period to retain the taste and to maintain both the protein and fat at the optimal level.

The highest shrimp quality is maintained by freezing immediately after being harvested. There are many commercial methods for freezing shrimp. Although freezing is an effective method of preserving foods, some deterioration in frozen food quality occurs during storage. Nakazawa and Okazaki [5] have reported that the meat of fish and shellfish exhibits a higher moisture content than livestock meat, and the proteins, lipids, and tissue structures are highly unstable, leading to substantial-quality changes during freezing and thawing.

The present work was undertaken to determine the variation in the biochemical components like moisture, ash, protein, carbohydrate, lipid and mineral contents based on freezing in commercially important species of white shrimp *Penaeus indicus*.

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ABSTRACT
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INTRODUCTION

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The present work was undertaken to determine the variation in the biochemical components like moisture, ash, protein, carbohydrate, lipid and mineral contents based on freezing in commercially important species of white shrimp *Penaeus indicus*.

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Synthesis and diffraction, computational exposure, hardness and interaction studies of EN2MNYM3NA crystalline material for mechanized, electronic and bio utilities

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Abstract

(E)-N-[(2-methoxynaphthalen-1-yl) methylidene]-3-nitroaniline - EN2MNYM3NA crystal is grown by slow evaporation solution growth method. The studies such as single crystal XRD, PXRD, unit cell, 3Dimensional pattern, Fourier impact and Laplace level interactive as well as Hirshfeld interactions data with the finger print profile, the weak force blow and profile are completed. The lattice constants with a, b, c values as 12.8482Å, 15.4087Å, 7.6234Å and beta as 98.04^{O} and volume as 1509.23Å^{3} with material's chemical formula as $C_{18}H_{14}N_2O_3$ The weak interactions of 50% and 75% are well enunciated with value of n as 2.93 for hardness coefficient; the anti-diabetic value for macro scaled EN2MNYM3NA as 39.92 (IC_{50}) and the resolution and the elevated Isovalue value is 0.5; Globularity value as 0.721; Asphericity as 0.198; The scalings for the versatile energy and electron densities are well measured and reported properly.

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Pleurotus cultivation: a sustainable way to utilize agrowaste

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***Pleurotus* cultivation: a sustainable way to utilize agrowaste**

Abstract: In the present study two species of *Pleurotus* namely *Pleurotus florida* (Mont.) Singer and *Pleurotus ostreatus* (Jacq.) P.Kumm. were cultivated using three different agro waste substrates such as paddy straw, sugarcane bagasse, banana leaves and its mixture in equal proportion. The fastest colonization and maximum numbers of heads were produced on paddy straw substrate. Banana leaves and paddy straw substrates reported the highest yield of mushroom fruitbodies, biological efficiency and biomass loss in *P. florida* and *P. ostreatus*. It was noticed that the growth and development of fruitbodies on sugarcane bagasse was minimum and development of competitor moulds was observed on it. In the selected substrates banana leaves posses the highest percentage of nitrogen, carbon and cellulose. The results showed the possibility of utilizing different agrowaste for cultivation of oyster mushroom, which will boost the income of farmers.

Key words: growth parameters; mushrooms cultivation; yield; different substrates; oyster mushroom

Gojenje ostrigarjev (*Pleurotus*): trajnosten način uporabe odpadkov iz kmetijstva

Izvleček: V raziskavi sta bili gojeni dve vrsti ostrigarja (*Pleurotus*), *Pleurotus florida* (Mont.) Singer in *Pleurotus ostreatus* (Jacq.) P.Kumm. na treh različnih gojiščih iz kmetijskih odpadkov in sicer na riževi slami, odpadkih predelave sladkornega trsa, listih bananovca in njihovih mešanicah v enakih deležih. Najhitrejša kolonizacija in največje število trosnjakov sta bila dosežena, ko je bil substrat riževa slama. Mešanica listov bananovca in riževe slame sta dali največji pridelek trosnjakov, največjo biološko učinkovitost in največjo izgubo biomase pri gojenju obeh vrst. Opaženo je bilo, da sta bila rast in razvoj trosnjakov najslabša na substratu iz ostankov predelave sladkornega trsa zaradi kompeticije s plesnimi. Izbrani listi bananovca so imeli največji odstotek dušika, ogljika in celuloze. Rezultati so pokazali možnost uporabe različnih odpadkov v kmetijstvu za gojenje ostrigarjev, kar bi povečalo prihodke kmetov.

Ključne besede: rastni parametri; gojenje gob; pridelek; različni substrati; ostrigarji

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Multimedia Tools and Applications
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Salient object based visual sentiment analysis by combining deep features and handcrafted features

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Abstract
With the rapid growth of social networks, the visual sentiment analysis has quickly emerged for opinion mining. Recent study reveals that the sentiments conveyed by some images are related to salient objects in them, we propose a scheme for visual sentiment analysis that combines deep and handcrafted features. First, the salient objects are identified from the entire images. Then a pre-trained model such as VGG16 is used to extract deep features from the salient objects. In addition, hand-crafted features such as Visual texture, Colourfulness, Complexity and Fourier Sigma are extracted from all the salient objects. Deep features are combined individually with all the handcrafted features and the performance is measured. The sentiment is predicted using Convolutional Neural Network Classifier. The proposed method is tested on ArtPhoto, Emotion6, Abstract, IAPS datasets, Flickr and Flickr & Instagram datasets. The experimental results substantially proved that the proposed method achieves higher accuracy than other methods.

Keywords Salient object · Convolutional neural network · Visual sentiment · Clutter

1 Introduction

Nowadays, users share large amount of multimedia data such as images, videos on social networks. Therefore, there is a need for making machines to interpret and relate the multimedia data like humans. Although the exact interpretation of data like humans is complex, it can be

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SOCIO-ECONOMIC STUDY OF PUBLIC TOILET CLEANERS IN THOOTHUKUDI DISTRICT OF TAMILNADU STATE

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Thoothukudi

Abstract

In a developing country with limited resources, such as India, the majority of cleaning in metropolitan areas is still done by hand. The purpose of this article is to examine public toilet cleaners in the Thoothukudi area of Tamilnadu's awareness of educational changes, as well as their socio-economic profile and issues. This article, which is a part of the Indian Council of Social Science Research – Impactful Policy Research in Social Science (ICSSR – IMPRESS), New Delhi aims to comprehend the above-mentioned fundamentals in order to help the policy makers for better education, rights, power and work opportunities for the impoverished. Secondary data was gathered from published books, e-books, periodicals, newspapers, research articles, research journals, e-journals, and other sources. According to the study, the majority of respondents (70.40%) were employed on a long-term basis. Only 29.60% of the workers were on a temporary basis. The study finds that the link between educational change awareness and socioeconomic characteristics, such as sex, personal income, and kind of job, is significant at the 5% level, with a P-value less than 0.05. The null hypothesis has consequently been discarded for these variables. The null hypothesis has therefore been accepted for these variables. It is clear that the sample respondents prioritised the order of health problems when cleaning the public restroom. Using Garrett's score, it can be deduced that. Respondents placed respiratory disease first, followed by allergy disorders, in terms of priority of health problems. Back discomfort, asthma, and other health issues were placed third and fourth, respectively. Eye illnesses were ranked fourth. Public toilet cleaners suffered some injuries while cleaning toilets was ranked sixth, and communicable disorders was placed fifth. Safety precautions, regular medical camps, eliminating manual scavenging, and increasing public awareness of government programmes can all help to improve the quality of life of public toilet cleaners.

Keywords: public toilet, manual scavengers, occupational hazards, respiratory disease, quality of life.

THE STATUS OF DALIT WOMEN: TREND AND GROWTH IN INDIA

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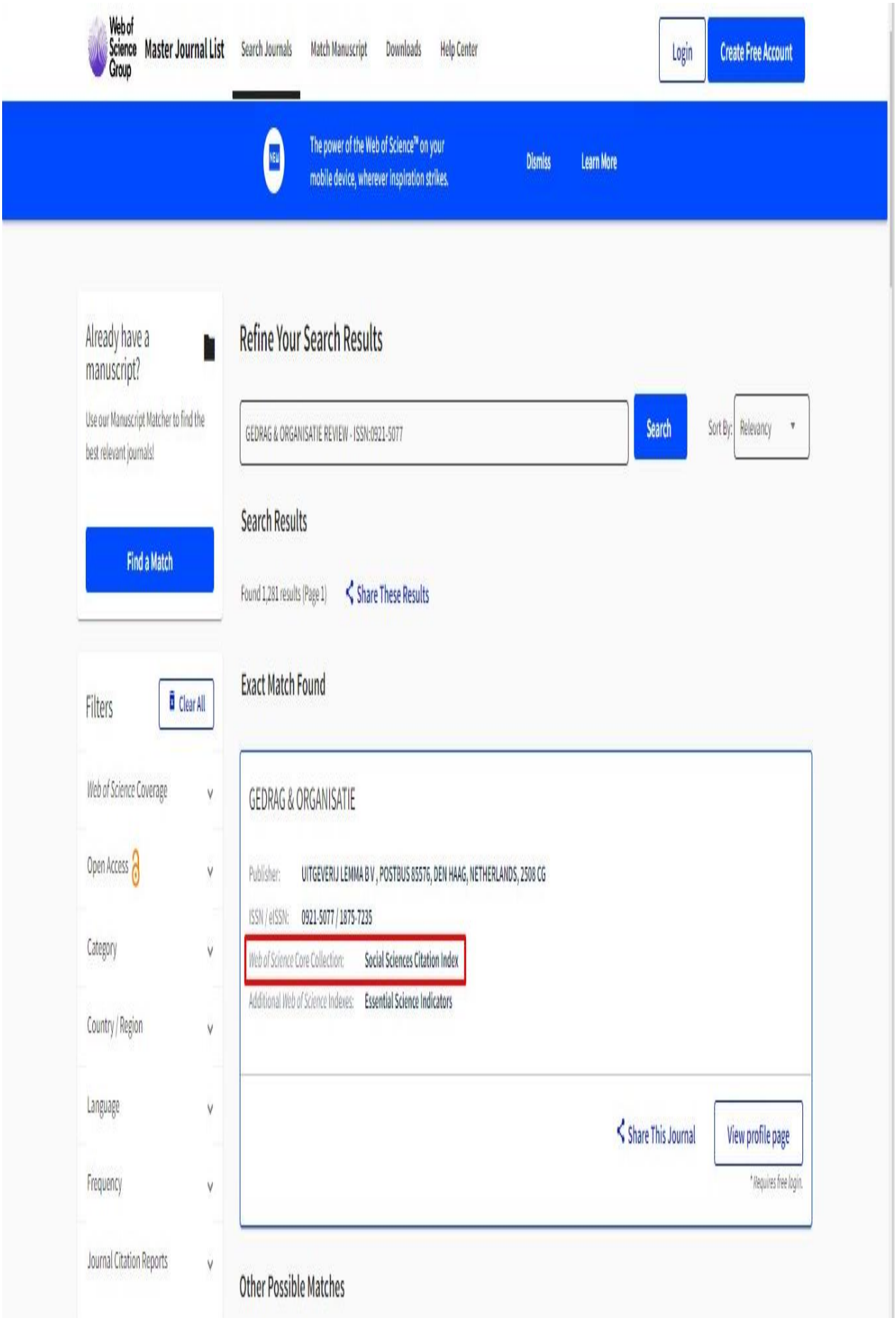
Abstract

When it comes to social mobilisation, Dalit women have a poor level of literacy. They are freed from the shackles of ignorance and superstition by education. In addition to taking care of their households, Dalit women work in agriculture and related fields like livestock raising and food processing, for example. Additionally, they perform construction work, factory work, and other jobs like as poultry and animal husbandry and tailoring. The present article is an try to analyse the trend and growth of state-wise Dalit population in India and commendations for Dalit women problems. The research is based on secondary information. Secondary data is gathered from a variety of sources, including government reports, research reports, journals, libraries, magazines, books, newspapers, and the internet. Percentage analysis, mean, standard deviation, compound growth rate, trend analysis, and coefficient of variation were employed in the study. According to the 2011 census, Punjab, Himachal Pradesh, West Bengal, Uttar Pradesh, and Haryana are the five states with the highest percentage of Dalit population. State-wise participation of male and female Dalit populations in India was determined to have a statistically significant trend coefficient in 2011. On average, the male Dalit population expanded by 3.2% and the female Dalit population by 10.4%. Male and female Dalit population growth rates are 12.11 percent and 10.22 percent, respectively. It is inferred that in Dalit population of India, on an average, male Dalit population during the year 2011 was found to be higher than female Dalit population. The value of co-efficient of variation indicates that the number of male Dalit population are relatively stable during the year 2011 compared to female Dalit population. R2 suggests that the differences in the male and female Dalit populations are responsible for most of the variation in the independent variables. The Government has implemented a number of welfare programmes for the socio-economic development of Dalit women with the goal of accelerating the socio-economic development of Dalit women.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Biosynthesis of ZnO and Ag doped ZnO nanoparticles from *Vitis vinifera* leaf for antibacterial, photocatalytic application

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Abstract

Green synthesis of nanoparticles is gaining importance and has been suggested as possible alternatives to chemical and physical methods. The present work reports low- cost, green synthesis of zinc oxide (ZnO) & Ag doped ZnO nanoparticles using Vitis vinifera leaf extract. The biosynthesized nanoparticles were characterized by SEM, EDX, UV–vis, and FTIR. In the present work, the biosynthesized ZnO nanoparticle & Ag doped ZnO nanoparticles have been used for antibacterial and photocatalytic applications. The antibacterial activity of characterized samples was determined against Gram-positive and Gram-negative bacteria. The obtained results revealed that the bacterial growth decreases with increase in the concentration of biosynthesized ZnO nanoparticles. Also, Gram-positive bacteria seemed to be more sensitive to ZnO & Ag doped ZnO nanoparticles than Gram-negative bacteria. The biosynthesized ZnO nanoparticles showed photocatalytic activity under the UV light enhancing the degradation rate of methylene blue (MB), which is one of the main water- pollutants released by textile industries.

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MAXIMAL IDEALS IN SYMMETRIC SEMIGROUPS

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Abstract: In this note, we define CS-group ,CS-ring, S-ring isomorphism and S-ring homomorphism also we introduce the notion of Maximal ideals as a generalization of symmetric ideals and symmetric prime ideals of symmetric semigroups and CS-ring. We have come to some conclusions about the above concepts. Also we explain the relation between symmetric maximal and prime ideals.

Keywords and Phrases: Symmetric semigroup, symmetric ideals, symmetric Maximal ideal, symmetric prime ideal, CS-group, CS-ring, S-ring isomorphism, S-ring homomorphism.

2020 Mathematics Subject Classification: 20N12, 20N05, 20N10, 20N12.

1. Introduction

There were discussions on the notions of Symmetric Semirings and Semigroups as well as symmetric semigroup ideals in [8]. Symmetric prime ideals' concept discussed in [10].

2. Preliminaries

Definition 2.1. *A symmetric group $S_n, n \geq 3$, with a binary operation of plus circle compo, satisfy the identity and inverse condition and also its satisfy the associative property for some $e +^{\circ} p_i \in S_n, i = 1, 2, \ldots, n$. Then its called a S-group.*

Ratio Mathematica Volume 44, 2022

Outer independent square free detour number of a graph

K. Christy Rani [*]
G. Priscilla Pacifica [†]

Abstract

For a connected graph $G = (V, E)$, a set S of vertices is called an outer independent square free detour set if S is a square free detour set of G such that either $V = S^*$ or $V - S^*$ is an independent set. The minimum cardinality of an outer independent square free detour set of G is called an outer independent square free detour number of G and is denoted by $dn_{\square f}^{oi}(G)$. We determine the outer independent square free detour number of some graphs. We characterize the graph which realizes the result that for any pair of integers α and β with $2 \leq \alpha \leq \beta$, there exists a connected graph G of order $\beta + 3$ with square free detour number α and outer independent square free detour number β.

Keywords: square free detour set; outer independent square free detour set; outer independent square free detour number.

2010 subject classification: 05C12, 05C38[‡]

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Steiner certified domination in fuzzy middle and splitting graphs

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Abstract

In this article some new results on fuzzy steiner certified domination are established. Bounds on fuzzy steiner certified domination number of fuzzy middle graphs and fuzzy splitting graphs of some standard fuzzy graphs are acquired.

AMS Subject Classification 2010: 05C72, 05C69, 51E10

Key words : fuzzy steiner certified domination, fuzzy steiner certified domination number, fuzzy splitting graphs, fuzzy middle graphs

1. Introduction

In crisp graphs, the study of certified domination has been instigated by M.Dettlaff et.al in 2018 [3]. The concept of steiner domination in crisp graphs was studied from [2],[4],[5] and [7]. Domination in fuzzy graphs has been studied from [1] and the notion of fuzzy graph theory has been studied from [6].Fuzzy steiner domination number of a fuzzy graph G is the fuzzy cardinality of a minimum steiner certified dominating set of G. For a connected fuzzy graphG(V, σ, μ), a subset of nodes C of V(G) is said to be steiner certified dominating set if it it is both steiner set as well as certified dominating set. The fuzzy Steiner interval, FI(S) of a non empty subset of nodes S is defined as the set of all nodes which lie in some steiner tree of S. If FI(S)=V(G) then S is called a fuzzy Steiner set of G.A set of nodes C is said to be certified if each node in the set has either zero or two neighbours in $V(G) - C$. A non-empty subset S of V is called a fuzzy Steiner dominating set if S is a fuzzy dominating set and a fuzzy Steiner set of G. The minimum fuzzy cardinality of a minimal steiner certified dominating set is called fuzzy steiner certified dominating number denoted by $\gamma_{scer}^{f}(G)$ and the corresponding set of nodes is called γ_{scer}^{f}-set. The maximum fuzzy cardinality of a minimal steiner certified dominating set is called upper fuzzy steiner certified dominating number denoted by $\Gamma_{scer}^{f}(G)$.

2. Steiner Certified Domination in fuzzy middle graphs

2.1 Definition

Let $G(V, \sigma, \mu)$ be a fuzzy graph with node set V and arc set E. The fuzzy middle graph of G denoted by $M^f(G)(V', \rho, \lambda)$ is defined as follows. It has node set $V' = V_1 \cup V_2$ and arc set $E' = E_1 \cup E_2$ where $V_1 = V$ and $V_2 = E$ and

$$E_1 = \{e_1e_2 / e_1 \& e_2 \text{ are adjacent arcs in } G\}$$

$E_2 = \{ue / u \in V, e \in E \text{ and } e \text{ is incident with } u\}$. Also ρ and λ are defined as

$$\rho(z) = \begin{cases} \sigma(z) & if\ z \in V_1 \\ \mu(z) & if\ z \in V_2 \end{cases} \lambda(e) = \begin{cases} \mu(x) \wedge \mu(y) & if\ e = xy \in E_1 \\ \sigma(u) \wedge \mu(y) & if\ e = uy \in E_2 \end{cases}$$

2.2 Theorem

For a fuzzy path graph P_n^f, the steiner certified domination number of the fuzzy middle graph is $\gamma_{scer}^{f}\left(M^f(P_n^f)\right) = p$ where p is the order of $M^f(P_n^f)$.

FUZZY STEINER μ DIMENSION AND EMBEDDING THEOREM

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ABSTRACT

For a connected fuzzy graph G, the Steiner μ-distance of any two nodes of a non-empty set S ⊆ V (G) is defined as the minimum of sum of reciprocals of arc weights of minimum connected fuzzy sub graphs containing S. These fuzzy sub graphs are called fuzzy Steiner trees for S. In this article fuzzy Steiner μ Dimension is introduced and its properties are analysed.

AMS Subject Classification 2010 : 05C72, 05C69, 51E10

Key words : Steiner μ dimension, Steiner μ basis, Steiner μ resolving set, Steiner μ representation

1. INTRODUCTION

Fuzzy graph theory was developed by Rosenfeld in 1975 and has enumerous real life applications. The fuzzy analog of several graph theoretic concepts and strong arcs in fuzzy graphs was elucidated by Rosenfeld [2]. Also he defined some metric aspects using the μ-distance in fuzzy graphs [7]. Distance in graphs was analysed by Harary and Buckley [3]. In this article, the Steiner μ basis is defined for a connected fuzzy graph and its fuzzy cardinality is termed as the steiner μ dimension.

2. Priliminaries

The following are the fundamental definitions which are necessary for this article. The fuzzy Steiner tree of a non empty subset of nodes S of a connected fuzzy graph G(V,σ,μ) is defined as the minimal connected fuzzy subgraphs whose node set contains S. The fuzzy Steiner interval, FI(S) of a non empty subset of nodes S is defined by FI(S) = {u ∈ V (G) / u lies on a fuzzy Steiner tree for S in G}. The fuzzy Steiner μ-distance between any two nodes of a non-empty set S ⊆ V (G) is defined as the minimum of sum of reciprocals of arc weights of minimum fuzzy Steiner tree of S. The fuzzy Steiner μ-distance of S is denoted by $d_{\mu G}(S)$ (or) $d_{\mu S}(u, v)$ where u and v are nodes in S. The fuzzy Steiner μ_k-eccentricity $e_{\mu_k G}(u)$ of a node u in V (G) is given by $e_{\mu_k G}(u) = \max\{d_{\mu S}(u, v)/ S \subseteq V(G), |S| = k \,\&\, u, v \in S\}$.

The fuzzy Steiner μ_k radius of any node u in G is given by $r_{\mu_k G}(G) = \min\{e_{\mu_k G}(u)/ u \in V(G)\}$. The fuzzy Steiner μ_k diameter of a node u in V (G) is given by $diam_{\mu_k G}(G) = \max\{e_{\mu_k G}(u)/ u \in V(G)\}$. A node u is a fuzzy Steiner μ_k diametral node (or) peripheral node if $e_{\mu_k G}(u) = diam_{\mu_k G}(G)$. The fuzzy Steiner μ_k centre $C_{\mu_k}(G)$ of a connected fuzzy graph G is the sub graph induced by the nodes u of V(G) with $e_{\mu_k G}(u) = r_{\mu_k G}(G)$. The node u is called fuzzy Steiner μ_k central node (or)

FUZZY STEINER μ DIMENSION AND EMBEDDING THEOREM

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ABSTRACT

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C_4 Free Detour Distance

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Abstract

For every connected graph G, the square free detour distance SFD (u, v) is the length of a longest u- v square free path in G, where u, v are the vertices of G. A u-v square free path of length SFD(u, v) is called the u-v square free detour. It is found that the square free detour distance differs from the distance , monophonic distance and detour distance. The square free detour distance is found for some standard graphs. Their bounds are determined and their sharpness is checked. Certain general properties satisfied by them are studied.

1. Introduction

For basic graph theoretic terminologies the research refers to [2, 7]. For terminology related to distance and detour distance in graphs Chartrand et.al. [2, 5, 7] are referred to. For any two vertices u and v in a connected graph G, the distance d(u, v) is the length of a shortest u-v path in G. A u-v path of length d(u,v) is called a u-v geodesic in G.

For any two vertices u and v in a connected graph G, a u-v path P is a u-v monophonic path if P contains no chords. The monophonic distance d_m(u, v) from u to v is defined as the length of a longest u-v monophonic path in G. A u-v monophonic path of length d_m(u, v) is called a u-v monophonic.

For any two vertices u and v in a connected graph G, the detour distance D(u, v) is the length of a longest u - v path in G. A u- v path of length D(u, v) is called a u-v detour in G. The following theorem is used in the article

Theorem:1.1[3]An edge e of a graph G is a bridge iff e lies on no cycle of G.

2. C_4 Free Detour Distance

Definition:2.1

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The Edge-To-Vertex Triangle Free Detor Distance in Graphs

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Abstract

For every connected graph G, the triangle free detour distance $D_{\Delta f}(u, v)$ is the length of a longest u- v triangle free path in G, where u, v are the vertices of G. A u-v triangle free path of length $D_{\Delta f}(u, v)$ is called the u-v triangle free detour. In this article, the edge-to-vertex triangle free detour distance is introduced. It is found that the edge -to-vertex triangle free detour distance differs from the edge -to-vertex distance and edge-to-vertex detour distance. The edge-to-vertex triangle free detour distance is found for some standard graphs. Their bounds are determined and their sharpness is checked. Certain general properties satisfied by them are studied.

Keywords: connected graph, edge -to-vertex distance and edge-to-vertex detour distance

2010 AMS subject classification: 05C12, 05C69[3]

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On Intutionistic I – Open Sets In Intutionistic Topological Spaces

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Abstract

The purpose of this paper is to provide the notion of Intutionistic i-open sets in Intutionistic topological spaces and study the relation with some existing Intutionistic open sets. Additionally, we expounded some properties of Intutionistic i-open sets in Intutionistic topological spaces.

MSC 2010 : 54A05

Keywords Intutionistic i-open sets, Intutionistic i-closed sets, Intutionistic i-interior, Intutionistic i-closure, Intutionistic i-neighborhood

1. Introduction

The idea of intutionistic fuzzy sets was introduced by Atanassov[1]. Notion of membership and non membership were discovered by Coker [3] in intuitionistic fuzzy topological spaces, subsequently he modified the crisp sets in entire forms. Later, Coker [5] introduced the intuitionistic topological spaces using intuitionistic sets. This paper is an attempt to define the conception of intutionistic i-open sets in intutionistic topological spaces and some characterizations of intutionistic i-open sets are discussed. Besides, we relate intutionistic i-open sets with other existing intutionistic open sets in intutionistic topological spaces.

2. Preliminaries

Definition 2.1 [2]. Let $\mathcal{K}$ be a non-empty set. An intuitionistic set(IS for short) $\mathcal{H}$ is an object having the form $\mathcal{H} = <\mathcal{K}, \mathcal{H}_1, \mathcal{H}_2>$ where $\mathcal{H}_1, \mathcal{H}_2$ are subsets of $\mathcal{K}$ satisfying $\mathcal{H}_1 \cap \mathcal{H}_2 = \emptyset$. The set $\mathcal{H}_1$ is called the set of members of $\mathcal{H}$, while $\mathcal{H}_2$ is called set of non members of $\mathcal{H}$.

Definition 2.2 [2]: Let $\mathcal{K}$ be a non-empty set and $\mathcal{H}$ and $\mathcal{G}$ are intuitionistic set in the form $\mathcal{H} =< \mathcal{K}, \mathcal{H}_1, \mathcal{H}_2 >$, $\mathcal{G} =< \mathcal{K}, \mathcal{G}_1, \mathcal{G}_2 >$ respectively. Then

1. $\mathcal{H} \subseteq \mathcal{G}$ iff $\mathcal{H}_1 \subseteq \mathcal{G}_1$ and $\mathcal{H}_2 \supseteq \mathcal{G}_2$

2. $\mathcal{H} = \mathcal{G}$ iff $\mathcal{H} \subseteq \mathcal{G}$ and $\mathcal{G} \subseteq \mathcal{H}$

3. $\mathcal{H}^c = < \mathcal{K}, \mathcal{H}_2, \mathcal{H}_1 >$

4. $\tilde{\emptyset} = < \mathcal{K}, \emptyset, \mathcal{K} >, \tilde{\mathcal{K}} =< \mathcal{K}, \mathcal{K}, \emptyset >$

5. $\mathcal{H} \cup \mathcal{G} = < \mathcal{K}, \mathcal{H}_1 \cup \mathcal{G}_1, \mathcal{H}_2 \cap \mathcal{G}_2 >$

6. $\mathcal{H} \cap \mathcal{G} = < \mathcal{K}, \mathcal{H}_1 \cap \mathcal{G}_1, \mathcal{H}_2 \cup \mathcal{G}_2 >$.

Furthermore, let $\{A_\alpha / \alpha \in I\}$ be an arbitrary family of intuitionistic sets in $\mathcal{K}$, where $A_\alpha = < \mathcal{K}, \mathcal{H}_\alpha^{(1)}, \mathcal{H}_\alpha^{(2)} >$. Then

(i) $\cap \mathcal{H}_\alpha = < \mathcal{K}, \cap \mathcal{H}_\alpha^{(1)}, \cup \mathcal{H}_\alpha^{(2)} > \mathcal{K}$

$\mathcal{I}i$-CONTINUOUS FUNCTION IN INTUTIONISTIC TOPOLOGICAL SPACES

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Abstract

The intention of this paper is to initiate the concept of $\mathcal{I}i$-continuous function in Intutionistic Topological space and derive their characterizations in terms of $\mathcal{I}i$- closed set, $\mathcal{I}i$- interior and $\mathcal{I}i$-closure. Further, we relate $\mathcal{I}i$-continuous maps with other existing continuous maps.

Keywords $\mathcal{I}i$-continuous, $\mathcal{I}i$-closed , $\mathcal{I}i$-interior , $\mathcal{I}i$-closure, $\mathcal{I}i$-irresolute

1. Introduction

Continuous function is one of the main concepts of Topology. The notion of intutionistic sets and intutionistic points was introduced by Coker[1]. Later he developed and introduced the Intutionistic topological spaces[2] and explained some fundamental properties. Also, he defined intutionistic continuous functions, intutionistic connectedness and intutionistic compactness. Suganya[5] et al introduced and derived some properties of $\mathcal{I}i$-open sets in Intutionistic topological spaces. In this paper we initiate a new class of functions on Intutionistic topological space called $\mathcal{I}i$-continuous functions and explicated their characterizations in terms of $\mathcal{I}i$-closed sets, $\mathcal{I}i$-closure and $\mathcal{I}i$-interior. Besides, we have also define $\mathcal{I}i$-irresolute and expounded some properties in intutionistic topological spaces.

2. Prelimnaries

Definition 2.1. [1] Let $\mathcal{X}$ be a non-empty set. An intuitionistic set(IS for short) $\mathcal{H}$ is an object having the form $\mathcal{H} = <\mathcal{X}, \mathcal{H}_1, \mathcal{H}_2>$ where $\mathcal{H}_1, \mathcal{H}_2$ are subsets of $\mathcal{X}$ satisfying $\mathcal{H}_1 \cap \mathcal{H}_2 = \emptyset$. The set $\mathcal{H}_1$ is called the set of members of $\mathcal{H}$, while $\mathcal{H}_2$ is called set of non members of $\mathcal{H}$.

Definition 2.2. [2] An intuitionistic topology is (for short IT) on a non-empty set $\mathcal{X}$ is a family τ of intutionistic sets in $\mathcal{X}$ satisfying following axioms.

1) $\emptyset, \mathcal{X} \in \tau$
2) $\mathcal{G}_1 \cap \mathcal{G}_2 \in \tau$, for any $\mathcal{G}_1, \mathcal{G}_2 \in \tau$
3) $\cup \mathcal{G}_\alpha \in \tau$ for any arbitrary family $\{\mathcal{G}_i : \mathcal{G}_\alpha / \alpha \in J\}$ where $(\mathcal{X}, \tau)$ is called an intuitionistic topological space and any intuitionistic set is called an intuitionistic open set (for short $\mathcal{I}OS$) in $\mathcal{X}$. The complement $\mathcal{H}^C$ of an $\mathcal{I}OS$ of $\mathcal{H}$ is called an intuitionistic closed set (for short $\mathcal{I}CS$) in X.

Definition 2.3. [1] Let $\mathcal{K}, \mathcal{L}$ be two nonempty sets and f: $(\mathcal{K}, \tau) \to (\mathcal{L}, \tau_1)$ be a function. If $\mathcal{B} = < X, \mathcal{B}_1, \mathcal{B}_2 >$ is an intutionistic set in $\mathcal{L}$, then the preimage of $\mathcal{B}$

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SOME NEW OPEN AND CLOSED MAPS IN INTUTIONISTIC TOPOLOGICAL SPACES

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ABSTRACT

The aim of this paper is to introduce the notion of $\mathcal{I}i$-open map and $\mathcal{I}i$-closed map in Intutionistic Topological Spaces. Further, some of their basic properties and condition for a function to be $\mathcal{I}i$-open(closed) are investigated. Besides, we also define intutionistic strongly i-continuous and intutionistic perfectly i-continuous in intutionistic topological space and their properties are discussed..

Keywords: $\mathcal{I}i$-continuous,$\mathcal{I}i$-open, $\mathcal{I}i$-closed , $\mathcal{I}s.ic.$, $\mathcal{I}p.ic.$

INTRODUCTION

The notion of intutionistic sets and intutionistic points was introduced by Coker[1]. Later he developed and introduced the Intutionistic topological spaces[2] and explained some fundamental properties. Also, he defined intutionistic continuous functions, intutionistic connectedness and intutionistic compactness. Suganya[5] et al introduced and derived some properties of $\mathcal{I}i$-open sets in Intutionistic topological spaces. In this paper we explained a new class of functions on Intutionistic topological space called $\mathcal{I}i$-open(closed) functions and analyze their characterizations in terms of $\mathcal{I}i$-closed sets, $\mathcal{I}i$-closure and $\mathcal{I}i$-interior. Additionally, we also define intutionistic strongly i-continuous and intutionistic perfectly i-continuous in intutionistic topological space and their properties are discussed.

Definition 2.1.[2]Let $(\mathcal{K},\tau)$ and $(\mathcal{L},\tau_1)$ be two intutionistic topological spaces. A mapping $\mathcal{f}:(\mathcal{K},\tau)\to(\mathcal{L},\tau_1)$is $\mathcal{I}$-continuous function on $\mathcal{K}$ if the inverse image of every $\mathcal{I}$-open set in $\mathcal{L}$ is $\mathcal{I}$-open in $\mathcal{K}$.
Definition 2.2.[7] A function $\mathcal{f}:(\mathcal{K},\tau)\to(\mathcal{L},\tau_1)$is $\mathcal{I}$-open map if the image of every $\mathcal{I}$-open set in $\mathcal{K}$ is $\mathcal{I}$-open in $\mathcal{L}$.
Definition 2.3.[4] A function $\mathcal{f}:(\mathcal{K},\tau)\to(\mathcal{L},\tau_1)$is $\mathcal{I}$-closed map if the image of every $\mathcal{I}$-closed set in $\mathcal{K}$ is $\mathcal{I}$-closed in $\mathcal{L}$.
Definition 2.4.[6]A mapping $\mathcal{f}:(\mathcal{K},\tau)\to(\mathcal{L},\tau_1)$is $\mathcal{I}i$-continuous function if the inverse image of every $\mathcal{I}$ open set in $(\mathcal{L},\tau_1)$is $\mathcal{I}i$-open in $(\mathcal{K},\tau)$.
Definition 2.5.[3]A mapping $\mathcal{f}:(\mathcal{K},\tau)\to(\mathcal{L},\tau_1)$is $\mathcal{I}$ stronglycontinuous function if the inverse image of every $\mathcal{I}$ open set in $(\mathcal{L},\tau_1)$is both$\mathcal{I}$-open and $\mathcal{I}$-closed in $(\mathcal{K},\tau)$.
Definition 2.6.[3]A mapping $\mathcal{f}:(\mathcal{K},\tau)\to(\mathcal{L},\tau_1)$is $\mathcal{I}$perfectlycontinuous function if the inverse image of every $\mathcal{I}$ open set in $(\mathcal{L},\tau_1)$is both$\mathcal{I}$-clopen in $(\mathcal{K},\tau)$.
Definition 2.7.[6]A function $\mathcal{f}:(\mathcal{K},\tau)\to(\mathcal{L},\tau_1)$is said to be $\mathcal{I}i$-irresoluteif $\mathcal{f}^{-1}(\mathcal{O})$ is a $\mathcal{I}i$-open in $(\mathcal{K},\tau)$ for every $\mathcal{I}i$-open set $\mathcal{O}$ in $(\mathcal{L},\tau_1)$.
Definition 2.8.[5]Let $(\mathcal{X},\tau)$be an Intutionistic topological space and let $\mathcal{H}\subseteq\mathcal{X}$. The intutionistic

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A New Notion of Closed Sets in Intuitionistic Topological Space

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ABSTRACT

In this paper is to introduce a new concept of $I\alpha_g^{\wedge}$-closed set in intuitionistic topological spaces and investigate some of their basic properties and give characterizations for these spaces. We also study the relationship between $I\alpha_g^{\wedge}$-closed sets and the other intuitionistic closed sets are also discussed.

Keywords: I$\alpha_g^{\wedge}$-closed, I$\alpha_g^{\wedge}$-open, $I\alpha_g^{\wedge}$-closure and $I\alpha_g^{\wedge}$-interior.

1 INTRODUCTION

The concept of intuitionistic sets in topological spaces was first introduced by Coker[2] in 1996. He also introduced the concept of intuitionistic points and investigated some fundamental properties of closed sets in intuitionistic topological spaces. In 2009 J .Younis Yaseen and G.Asmaa Raouf [5] has given some results in intuitionistic generalized closed sets in intuitionistic topological spaces. K.Meena and V.P.Anuja,[7] was introduced the concept of alpha ^ generalized closed sets in topological spaces. The purpose of this paper is to develop alpha ^ generalized closed sets in intuitionistic topological spaces and discuss some properties related to $I\alpha_g^{\wedge}$-closed set in intuitionistic topological spaces.

2 PRELIMINARIES

Definition 2.1 [2]. Let $\mathcal{H}$ be a non-empty set. An intuitionistic set (IS for short) $\mathcal{A}$ is an object having the form $\mathcal{A} =< \mathcal{H}, \mathcal{A}_1, \mathcal{A}_2 >$ Where , $\mathcal{A}_2$ are subsets of $\mathcal{H}$ satisfying $\mathcal{A}_1 \cap \mathcal{A}_2 = \varphi$. The set $\mathcal{A}_1$ is called the set of members of $\mathcal{A}$, while $\mathcal{A}_2$ is called set of non members of $\mathcal{A}$.

Definition 2.2 [2]: Let $\mathcal{H}$ be a non-empty set and $\mathcal{A}$ and $\mathfrak{B}$ are intuitionistic set in the form $\mathcal{A} =< \mathcal{H}, \mathcal{A}_1, \mathcal{A}_2 >$, $\mathfrak{B} =< \mathcal{H}, \mathfrak{B}_1, \mathfrak{B}_2 >$ respectively. Then

a) $\mathcal{A} \subseteq \mathfrak{B}$ iff $\mathcal{A}_1 \subseteq \mathfrak{B}_1$ and $\mathcal{A}_2 \supseteq \mathfrak{B}_2$

b) $\mathcal{A} = \mathfrak{B}$ iff $\mathcal{A} \subseteq \mathfrak{B}$ and $\mathfrak{B} \subseteq \mathcal{A}$

c) $\mathcal{A}^C = < \mathcal{H}, \mathcal{A}_2, \mathcal{A}_1 >$

d) $\mathcal{A} - \mathfrak{B} = \mathcal{A} \cap \mathfrak{B}^C$

e) $\varphi =< \mathcal{H}, \varphi, \mathcal{H} >, \mathcal{H} =< \mathcal{H}, \mathcal{H}, \varphi >$

f) $\mathcal{A} \cup \mathfrak{B} =< \mathcal{H}, \mathcal{A}_1 \cup \mathfrak{B}_1, \mathcal{A}_2 \cap \mathfrak{B}_2 >$

A New Notion Of Closed Sets In Intuitionistic Topological Spaces

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ABSTRACT

The purpose of this paper is to introduce a new concept of $\mathfrak{I}\widehat{w}$- closed sets in intuitionistic topological spaces.We explore the fundamental properties of $\mathfrak{I}\widehat{w}$- closed sets and their relationships with other known intuitionistic closed sets, contributing to a deeper understanding of intuitionistic topological spaces.

Keywords: Intuitionistic sets, Intuitionistic topological spaces,$\mathfrak{I}\widehat{w}$- closed, $\mathfrak{I}\widehat{w}$- open.
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1 INTRODUCTION

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In this paper,we introduce $\mathfrak{I}\widehat{w}$-closed sets in intuitionistic topological spaces and discuss some properties related to $\mathfrak{I}\widehat{w}$-closed sets in intuitionistic topological spaces.

2 PRELIMINARIES

Definition 2.1 [2]: Let $\mathcal{M}$ be a non-empty set. **An intuitionistic set** (shortly $\mathfrak{IS}$) $\mathcal{A}$ is an object having the form $\mathcal{A} = <\mathcal{M},\mathcal{A}_1,\mathcal{A}_2>$ Where $\mathcal{A}_1,\mathcal{A}_2$ are subsets of $\mathcal{M}$ satisfying $\mathcal{A}_1 \cap \mathcal{A}_2 = \varphi$. The set $\mathcal{A}_1$ called the set of members of $\mathcal{A}$, while $\mathcal{A}_2$ iscalled set of nonmembers of $\mathcal{A}$.

Definition 2.2 [2]: Let $\mathcal{M}$ be a non-empty set. Let $\mathcal{A}$ and $\mathfrak{B}$ be intuitionistic set in the form$\mathcal{A} = <\mathcal{M},\mathcal{A}_1,\ \mathcal{A}_2>,\ \mathfrak{B} = <\mathcal{M},\mathfrak{B}_1,\mathfrak{B}_2>$ respectively. Then

a) $\mathcal{A} \subseteq \mathfrak{B}$ iff $\mathcal{A}_1 \subseteq \mathfrak{B}_1$and $\mathcal{A}_2 \supseteq \mathfrak{B}_2$
b) $\mathcal{A} = \mathfrak{B}$ iff $\mathcal{A} \subseteq \mathfrak{B}$and $\mathfrak{B} \subseteq \mathcal{A}$
c) $\mathcal{A}^C = <\mathcal{M},\mathcal{A}_2,\mathcal{A}_1>$
d) $\mathcal{A} - \mathfrak{B} = \mathcal{A} \cap \mathfrak{B}^C$
e) $\tilde{\varphi} = <\mathcal{M},\varphi,\mathcal{M}>,\ \tilde{\mathcal{M}} = <\mathcal{M},\mathcal{M},\varphi>$
f) $\mathcal{A} \cup \mathfrak{B} = <\mathcal{M},\mathcal{A}_1 \cup \mathfrak{B}_1,\mathcal{A}_2 \cap \mathfrak{B}_2>$
g) $\mathcal{A} \cap \mathfrak{B} = <\mathcal{M},\mathcal{A}_1 \cap \mathfrak{B}_1,\mathcal{A}_2 \cup \mathfrak{B}_2>$