



**Proceedings of  
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**22-23, December 2023**

**Shri Vishnu Engineering College for Women (A)  
Bhimavaram-534202, India**

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## **FOREWORD**



**Dr. P. S. Brahmanandam  
(Anand)**

We are delighted to present the proceedings of the First International Online Conference on Recent Advances in Applied Sciences and Engineering (ICRAAE-2023), held on December 22-23, 2023. This inaugural event has been a resounding success, bringing together researchers, scholars, and practitioners from around the globe to share their latest findings and innovations in the fields of applied sciences and engineering.

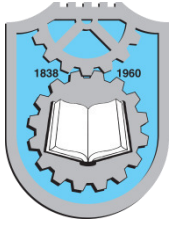
The ICRAAE-2023 conference provided a dynamic platform for the exchange of ideas, fostering collaborations and networking opportunities among participants from diverse backgrounds. Despite being held in a virtual format, the conference maintained a high level of engagement, with attendees actively participating in discussions, presentations, and workshops.

The success of this event is attributed to the hard work and dedication of many individuals and organizations. We extend our heartfelt gratitude to the keynote speakers for their insightful presentations, to the authors for their high-quality contributions, and to the reviewers for their meticulous evaluations. We also thank the organizing committee for their tireless efforts in planning and executing this event.

We hope that the knowledge shared and the connections made during ICRAAE-2023 will inspire future research and collaborations, advancing the frontiers of applied sciences and engineering. We look forward to seeing the continued growth and success of the ensuing conference i.e. ICRAAE-2024 to be held during the last week of November, 2024.

Sincerely,

Organizing Committee Chair  
ICRAAE-2023  
(<http://icraae.svecw.edu.in/>)



# COOPERATIVE POWER EXCHANGE BETWEEN TWO ROOFTOP SOLAR PLANTS INTERFACED WITH ARDUINO IOT CLOUD

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Keywords:

*Cooperative power Exchange; IoT; Arduino IOT cloud, NodeMCU ESP8266; Thing Interactions; Switch Module*

ABSTRACT

*The main aim of this paper is to develop a system which enables the sharing of excess power generated by the solar panels to maximize the use of renewable energy sources and reduce the reliance on traditional power grids. The monitoring system collects data from the two rooftop solar plants and transmits it to the cloud for visualization, retrieval, and data storage. The Arduino IOT Cloud provides a platform for the monitoring of power generation and consumption, and the Node MCU ESP8266 enables communication between the two solar plants. The system implements a cooperative power exchange algorithm that allows the two rooftop solar plants to exchange power based on their energy production levels. The system operates on a peer-to-peer instantaneous energy monitoring, where the two rooftop solar plants can share excess power to each other.*



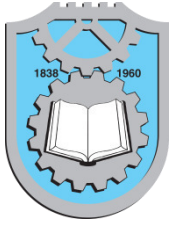
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## 1. INTRODUCTION

In order to minimize the negative environmental effects of conventional energy producing techniques, there has been an increasing focus on renewable energy sources in recent years. Rooftop solar power production has become one of the most popular renewable energy sources because of its accessibility, scalability, and potential for decentralization. The idea of cooperative power exchange (Yamaguchi et al., 2023) between two rooftop solar plants has emerged as a workable solution to this problem. A network of linked solar power plants may be built, allowing excess energy from one plant to be shared with a plant that is facing a deficit, resulting in stable and balanced energy ecology. This collaborative strategy improves the overall efficiency and dependability of the renewable energy infrastructure while

optimizing power use and reducing waste (Strielkowski et al., 2019). In this project, a sophisticated platform for monitoring, managing, and coordinating cooperative power exchange between two rooftop solar plants is provided by the combination of the Arduino IOT Cloud and NodeMCU ESP8266 microcontroller board. Real-time data from solar power plants can be collected and visualized using Arduino IOT Cloud, and NodeMCU ESP8266 allows communication and coordination between the plants to ensure effective power exchange (Li, et al., 2020).

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# EFFECT OF COVID-19 ON PSYCHOSOCIAL BEHAVIOUR OF AUTOMOBILE WORKERS PERFORMANCE - AN ERGONOMIC STUDY

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## ABSTRACT

### Keywords:

*Automobile Employees; Cardiovascular Endurance; Health Care Services; Musculoskeletal Disorders; Psychosocial Behavior; Worker Motivation*

*The COVID-19 lockdown has had a significant negative impact on the automotive industry, particularly on the small and medium-sized businesses and daily wage workers who rely on autonagar industrial area as their main source of income. Employees experienced increased physiological and psychological stress during the lockdown period. Many people lost their jobs, finding work and surviving for food and shelter became worse for daily wagers. To suggest the behavioural changes needed to improve the quality of worker performance there is need of worker motivation during the work that suits the type of work and design of work including adequate rest period needed during a working shift. Consequently, it is felt necessary to study the behaviour including estimation the heart rates of various groups of workers after determining their maximum heart rate including maximum limit of continued work. This comparison can help workers achieve better performance at their workplaces having prescribed training to enhance their work efficiency and health conditions. Out of 307 samples, 110 participants had a limit of continuous work that was less than their maximum working heart rate while performing a task, demonstrating the need for better posture, work rest breaks, and customised work study models to improve performance, persistence and to lower stress levels. Continuous employee monitoring is a challenging task. However, improved worker productivity and employee health benefits support socio-cultural advancement of the firm's products and services.*



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## 1. INTRODUCTION

According to 2021 data, India is fourth largest automobile producer in the world with a target of 4.4 million and has the fifth-highest GDP in the world. Due to the industry's extensive applications in the fields of manufacturing, product development, marketing,

mining, road and transportation, petroleum and gasoline, many new employment avenues have generated in these sectors. The quick economic growth of India has resulted in an enormous rise in the demand for exports. In addition, the government's most well-known programs, such as Digital India, Made in India, Start-up India, the Smart City Mission, and the Atal

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# VARIABILITY OF IONOSPHERIC F2 REGION DUE TO SUDDEN STRATOSPHERIC WARMING EVENT OF 2017

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## Keywords:

*Sudden stratospheric warming (SSW); ionosphere; electron density; stratospheric temperature; quasi-stationary planetary waves.*



## ABSTRACT

*We analyzed the impact of minor Arctic sudden stratospheric warming (SSW) event of 2017 on the ionospheric F2 region, using Digisonde data from a low-mid latitude Indian station, Delhi (28.6°N, 77.2°E, 19.2°N geomagnetic latitude, 42.4°N dip). Our study revealed significant ionospheric changes, with electron densities exhibiting variations of more than 200% during this warming event. To further investigate, we examined the deviation in critical frequency  $\Delta f_oF_2$  from median values in the first six months of 2017 and found that the F2 layer critical frequency experiences maximum and minimum variations during the SSW period. Additionally, we observed periodicities of 7, 11, 14 and 30 days in characteristic F2 layer frequency during this event.*

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## 1. INTRODUCTION

Ionosphere is the part of Earth's upper atmosphere extending from ~ 60km to above 500km, mainly created by incoming high frequency solar radiations (EUV and X-ray) and the particle precipitation from the Sun. Significant numbers of electrons and ions that are present in the ionosphere influence the radio signals, satellite signals and Global Navigation Satellite Systems (GNSS) passing through it. One of the primary causes of error in GPS precise positioning and navigation is the ionospheric delay in the propagation of GPS signals. However, ionosphere shows variability in density, composition, and distribution of the ionized gases over time that causes delay in GPS signal and results in positioning error in single frequency GPS. Yu & Liu,

2021 reported ~7.1 to~7.9 times positioning error relative to ionospheric quiet day in GPS signal during 2013 tropical cyclone Usagi event in the Hong Kong region. Besides the diurnal and seasonal variations, ionosphere undergoes changes during severe space weather events such as solar flares and geomagnetic storms (Uma et al., 2012). In addition to the upper atmospheric phenomena such as solar flares and geomagnetic storms known for primarily perturbing the ionosphere, ionospheric variability is also driven by planetary waves, gravity waves under stable solar and geomagnetic conditions (Hocke & Schlegel, 1996). Studies such as (Gupta & Upadhyaya, 2017; Tulasi Ram et al., 2017) reported ionospheric variability associated with seismological events.

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# Investigation of Anomalous Ionospheric Signature as Possible Precursor to Earthquakes

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## ABSTRACT

### Keywords:

Earthquake, Ionospheric response,  
Seismo-ionosphere precursor, Critical  
Parameter ( $f_oF_2, h_mF_2$ ) Digisonde, Delhi

We have examined the ionospheric response to a magnitude 6.6 earthquake that occurred in the Hindu Kush region of Afghanistan on March 21, 2023. This seismic event impacted the ionosphere in the Indian region. Our analysis utilized critical parameters of the F2 layer ( $f_oF_2, h'F$ ), obtained through Digisonde measurements from a low-mid latitude Indian station located in New Delhi (28.6°N, 77.2°E, 19.2°N geomagnetic latitude, 42.4°N dip). The routine day-to-day fluctuations in the ionosphere are removed by computing variations in the critical frequency and peak height of the F layer ( $\Delta f_oF_2, \Delta h'F$ ) in comparison to its standard normal behaviour during quiet periods. We observe noteworthy disturbances in the ionospheric F2 region over Delhi about 8 days before the earthquake event, leading to a substantial variation in peak electron density of approximately 90%. These observed perturbations suggest the potential existence of seismo-ionospheric coupling, given the solar and geomagnetic indices remained relatively quiet and stable during the period. Notably, the precursory impact of the earthquake was observed beyond the earthquake preparation zone, as given by Dobrovolsky et al. (1979).



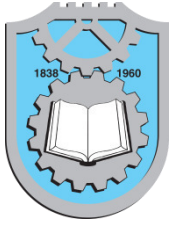
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## 1. INTRODUCTION

The most devastating natural event, earthquakes, arise from the abrupt release of energy in the Earth's crust, producing seismic waves. Predicting an impending earthquake is a significant scientific challenge, and

reliably forecasting them with high accuracy remains an ongoing pursuit. The notion of ionospheric anomalies as earthquake precursors was initially introduced by Antselevich in 1971. Subsequent to this, several lithosphere-atmosphere-ionosphere coupling mechanisms have been postulated, involving factors

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## FPGA IMPLEMENTATION OF HYBRID ADDER

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### ABSTRACT

#### Keywords:

*Hancarlson Adder; Weinberger Adder; Energy Efficient Design; Binary to Excess-1 Converter (BEC); Hybrid Adder*

*In applications of Digital Electronics, the primary aim is precision, emphasizing accurate outcomes while concurrently minimizing power dissipation and latency. This precision is especially crucial in arithmetic operations, notably addition and multiplication, where the critical path plays a substantial role in influencing the delay of electronic devices. To enhance the speed of these operations, various adder architectures such as Linear Carry Select Adder (CSELA), Square Root CSELA (SQRT CSELA), Ling, Hancarlson, and Weinberger adders are surveyed. This survey serves as motivation for the development of a hybrid adder, which combines different addition techniques to optimize the speed of addition. The proposed hybrid adder architecture is synthesized and simulated using the Xilinx Vivado 2017.2 ISIM tool, with subsequent hardware implementation on the Zedboard. Experimental findings indicate that the introduced hybrid adder exhibits improved speed compared to other conventional adders.*



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### 1. INTRODUCTION

The fundamental building block extensively employed in computer arithmetic, originating from Digital Signal Processing (DSP) Filters to Ultra Low Power Biomedical Frequency Low Pass Filters, is the binary adder (Anil Kumar et al., 2023) The Ripple Carry Adder (RCA) (Koyada et al., 2017) is recognized as the most fundamental and straightforward binary adder. Nevertheless, a significant drawback of ripple carry adders lies in their speed dependence on the time needed to propagate a carry throughout the entire adder. Consequently, the Carry Select Adder (CSLA) finds extensive use due to its enhanced computational speed, particularly in integrated systems (Sreevani et al., 2021). CSLA incorporates both adders and multiplexers in its

structure. Describing CSLA as an alternative to regular adders, it emphasizes the simultaneous computation of multiple intermediate values, leading to a more rapid addition process. The Carry Select Adder (CSLA), while effective in its function, is noted for its inefficiency in terms of area utilization. This inefficiency arises from the use of multiple Ripple Carry Adder (RCA) pairs, which generate partial sum and carry data by considering carry information. The final sum and carry are then selected using multiplexers (mux) (Balasubramanian and Mastorakis, 2018). To address this issue and enhance area efficiency while minimizing power consumption, the conventional RCA is replaced with a Binary to Excess-1 Converter (BEC) in the regular CSLA. This substitution achieved a more streamlined and resource-efficient design, optimizing the overall performance of the adder. The integration of

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# ASSESSMENT OF DRIVING BEHAVIOUR AT TOLL PLAZA UNDER HETEROGENEOUS TRAFFIC CONDITIONS USING VISSIM

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## ABSTRACT

Keywords:

*Traffic Simulation; Heterogeneous Traffic; Calibration; Driving behavior; VISSIM.*

*Traffic Simulating and Evaluating Traffic Patterns at heterogeneous traffic Situations in the Indian Context is extremely increasing. Many researchers from all over the world are trying to explore driving behavior and simulate traffic flow conditions under heterogeneous traffic environments. Simulating Traffic at a Microscopic Level with VISSIM is used in this study identifying every element that contributes to traffic at various traffic stages. Further, the VISSIM model was calibrated based on the desired safety distance and car-following theory. Traffic metrics including flow volume, speed, acceleration, and deceleration were all input parameters in the VISSIM model for simulation purposes. Furthermore, the analysis part of different cases of driving behavior models, such as the default case, and calibration values based on measurement were compared to find out if there was a significant improvement. Moreover, the linear regression model was proposed to understand the calibrated model versus the default case parameters, and it was identified that it is significant when plotting the data. The proposed study results highlighted driving behavior under heterogeneous traffic conditions using VISSIM at Toll Plaza.*



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# DIELECTRIC STUDIES ON TSP: $\text{NaNO}_3$ BIOPOLYMER-BASED POLYMER ELECTROLYTES

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## Keywords:

TSP,  $\text{NaNO}_3$ , conductivity, impedance analysis, dielectric constant.



## ABSTRACT

The solution cast method made free-standing tamarind seed polysaccharide (TSP): Sodium Nitrate ( $\text{NaNO}_3$ ) based solid polymer electrolyte films with various weight percentages. The conductance and dielectric properties of the polymer films were evaluated using AC impedance spectroscopy. This polymer electrolyte's conductance varied with temperature. By raising the temperature for different concentrations, the conductivity was increased. The maximum conductivity was obtained for 70:30 films at 373 K. According to dielectric studies, dielectric constants and dielectric loss were higher at low frequencies and lower at higher frequencies. At 303 K, the dielectric constant ( $\epsilon'$ ) was 899.1, and the dielectric loss ( $\epsilon''$ ) was 1393.8 for 70:30 (TSP:  $\text{NaNO}_3$ ) composition. The minimal tangent loss was  $1.54 \times 10^{-4}$  for 30% film.

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## 1. INTRODUCTION

Solid biopolymer electrolytes (SBPE) are a thrust area compared to other research domains. There are several benefits to using these electrolytes. These material samples can be easily prepared in a lab. Solid polymer electrolytes are mechanically strong, offer more conductivity, and have less leakage (Singh et al., 2016). Over the past few decades, substantial research has been carried out on electrolytes using synthetic polymers (Raju et al. 2019). These polymers, therefore, take a very long time to decompose.

Consequently, biopolymers overcome the issue above (Park et al., 2003). Proteins, polyesters, and

polysaccharides are the three subcategories of biopolymers. Pectin, starch, agar-agar, cellulose, chitosan, and agarose are some such polysaccharides (Kulkarni et al., 2021) Polysaccharide-based biopolymers are extremely useful in electrochemical devices since they are eco-friendly, quickly degrading materials. Tamarind Seed Polysaccharide (TSP) is a special biopolymer with outstanding properties and uses. For example, effective gelling agents, simple film-forming abilities, etc. A lot of polar groups are present in this highly branched polysaccharide. 3:1:2 molar ratios of glucose, galactose, and xylose sugar monomers can be found in TSP (Saha et al., 2023). Numerous applications of TSP have been the subject of substantial research. Recent studies on TSP for various medicine formulations

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# TEXT DESCRIPTION TO IMAGE GENERATION USING GENERATIVE ADVERSARIAL NETWORK

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## ABSTRACT

Keywords:

*Generative Adversarial Network (GAN), Attention Generative Adversarial Network, Generator, Discriminator, Style based Generator, Text to image*

*The progression of translating text into images has been an imperative topic of research. The significant challenges arise from translating visual to textual information and vice versa. High-quality images can be generated from text using a Generative Adversarial Network (GAN), however, there are challenges associated with accurately portraying the content of the sentence provided to the model. Text-to-image conversion strategies can produce examples that closely reflect the descriptions' intended meaning. The user descriptions may however lack crucial details. To create the conditioned text descriptions, this study employs an Attention-Generative Adversarial Network to generate 256\*256-pixel images that are image-sensitive. In the initial phase of GAN sketches, the input text descriptions serve solely to inform the basic form and color scheme of the devices. The information gleaned from the first stage, along with the textual descriptions, is fed into a GAN which generates images with high resolution and realistic detail. The conditional GAN training may be stabilized using conditioning augmentation, and the generated samples can have higher quality. Using Style based Generator, samples for each style of the image can be drawn. The proposed system can generate photorealistic visuals of an object when the user inputs the textual descriptions in the application's GUI.*



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## 1. INTRODUCTION

Image Caption generator is one of the most prevalent topics in Natural Language processing and computer Vision. Similarly, generating images from natural language as text is the vice versa process. These are research problems in a broad sense, identical to those that arise during linguistic translation. Like different languages can convey the same meaning in different ways, images and text can encode similar information. Because of the multimodal characteristics issues, text-image and image-text conversions are not the same. The

text description stating, "This is a magnificent red flower", has few possible translations into English. A broad variety of mental images could correspond to this description if one tried to create one. This multimodal behaviour is not exclusive to image captioning challenges, nonetheless, the sequential nature of language simplifies the difficulty there. The text-to-image structure is more tedious than image captioning. Potential uses for image synthesis based on natural language are vast, once the technology is ready for widespread use. By using the existing textual descriptions(words) as a basis for generating new ones, the proposed system can be put to good use. Instead of



# MOLECULAR DOCKING SIMULATIONS ON EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR) WITH POTENTIAL LEAD MOLECULES

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## ABSTRACT

### Keywords:

*Lung Adenocarcinoma, Molecular Docking, Epidermal Growth Factor Receptor, Inhibitors, Lead Ligands.*



*The Epidermal Growth Factor Receptor (EGFR) has received significant interest in the field of lung cancer due to its pivotal involvement in the development and progression of certain types of the illness, particularly non-small cell lung cancer (NSCLC). The study used molecular docking simulations to examine the molecular interactions between ten lead compounds and the EGFR protein. In the study of EGFR inhibitors, Tepotinib had the most advantageous docking energy of -7.92 Kcal/mol (IC-1.57 μM), whereas Dacomitinib and Lazertinib demonstrated docking energies of -6.96 Kcal/mol (IC-7.91 μM) and -6.63 Kcal/mol (IC-13.77 μM), respectively, which were in close proximity. The binding affinities of these medicines towards the EGFR, as observed, suggest their potential efficacy as inhibitors. The results obtained from this research suggest that several lead medications, specifically Tepotinib, Dacomitinib, Lazertinib, and Sotorasib, demonstrate promise as inhibitors of the EGFR in the context of therapy for prostate cancer.*

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## 1. INTRODUCTION

Lung adenocarcinoma is a frequently diagnosed disease and a leading contributor to cancer-related mortality on a global scale (Thai et al. 2021). In the global context, it is projected that there will be around 2.2 million newly diagnosed cases of lung cancer in the year 2020, constituting approximately 11.4% of the total number of cancer cases (Liu et al. 2023). Although smoking is well recognized as the primary contributor to the development of lung cancer, it is important to acknowledge that this disease is frequently diagnosed among those who engage in smoking behavior (Thandra et al. 2021). It is widely recognized that tobacco smoking is the primary preventable factor contributing

to mortality on a global scale. Research has found that tobacco smoking is responsible for up to 90% of lung cancer cases. If current trends persist, tobacco consumption is expected to contribute to a rise in cancer rates worldwide, particularly impacting developing countries like China, Russia, and India.

Tobacco smoking is widely recognized as the leading cause of preventable death worldwide. It is responsible for a significant proportion, up to 90%, of lung cancer cases. Tobacco consumption is expected to cause a global increase in cancer rates, particularly in developing countries like China, Russia, and India. The EGFR mutation is widely prevalent in cases of non-small-cell lung cancer. The acronym EGFR represents

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# SYNTHESIS AND PHOTOLUMINESCENCE STUDIES OF YTTRIUM ZIRCONATE (YZO) PHOSPHORS POWDERS DOPED WITH $\text{Bi}^{3+}$ IONS

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Keywords:

*Photoluminescence; Emission;*

*Excitation; Concentration Quenching;  
Chromaticity.*



## ABSTRACT

In this research work, Yttrium Zirconate ( $\text{Y}_2\text{Zr}_2\text{O}_7 = \text{YZO}$ ) phosphors doped with varying percentages of  $\text{Bi}^{3+}$  ions ( $x = 1.0, 1.5, 2.0, \text{ and } 2.5$ ) were successfully synthesized using simple co-precipitation method and subsequently annealed at  $1300^\circ\text{C}$ . Through X-ray diffraction, it was determined that the pure YZO sample had an average crystallite size of  $0.63 \text{ nm}$ , whereas the  $\text{Bi}^{3+}$  doped YZO samples averaged at  $18.36 \text{ nm}$ . Scanning electron microscopy (SEM) revealed the prepared samples as spherical agglomerate with particle sizes ranging between  $110 \text{ nm}$  and  $120 \text{ nm}$ . Exciting the samples at a wavelength of  $305 \text{ nm}$ , the photoluminescence emission spectra displayed a peak at  $430 \text{ nm}$  (blue), attributed to the  $^3\text{P}_1 \rightarrow ^1\text{S}_0$  transition of  $\text{Bi}^{3+}$  ions. Emission intensity increased beyond a doping concentration of  $1.5 \text{ at. } \%$   $\text{Bi}^{3+}$ , indicating a concentration quenching effect, establishing the optimal doping concentration at  $1.5 \text{ at. } \%$ . Additionally, CIE color chromatic parameters were computed for the  $\text{Bi}^{3+}$  doped samples, pinpointing the optimized  $\text{Bi}^{3+}$  content ( $1.5 \text{ at. } \%$ ) within the "Cyan" region, showcasing its potential use in near-ultraviolet (NUV) blue emitting chips for display applications.

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## 1. INTRODUCTION

Yttrium zirconate ( $\text{Y}_2\text{Zr}_2\text{O}_7 = \text{YZO}$ ) is a promising fluorescent material with a wide bandgap ( $5.3 \text{ eV}$ ) and excellent chemical stability (Zhang, Lü, Qiu, Zhou, & Ma, 2008). It has been extensively studied as a host for several rare earth dopants such as  $\text{Eu}^{3+}$ ,  $\text{Dy}^{3+}$  and  $\text{Tb}^{3+}$  that emit visible light when excited with UV radiation (Q. Du, Zhou, Zhou, Jia, & Zhou, 2013; Gao et al., 2011; Papan, Vuković, Ahrenkiel, Jovanović, & Dramićanin, 2017). This type of mixed oxide is usually from the pyrochlore system (space group  $\text{Fd-}3\text{m}$ ) or the fluorite system (space group  $\text{Fm-}3\text{m}$ ). As the bond radius ratio decreases, the structure of  $\text{A}_2\text{B}_2\text{O}_7$  gradually changes from fully ordered pyrochlore structure to disordered defective pyrochlore structures (Q. Du, Zhou, Zhou, & Yang, 2012; Xiao et al., 2021). The material exhibits remarkable optical transparency across an extensive wavelength range. Its substantial unit cell allows for extensive doping with trivalent

lanthanide elements. Moreover, it can be co-doped with  $\text{Bi}^{3+}$  or  $\text{Ce}^{3+}$  to enhance fluorescence sensitivity (Ting, Chiu, Chang, & Chuang, 2011; Tong, Chen, Wang, & Huo, 2015).

$\text{Bi}^{3+}$  ions are also known as photoactive activators and have been used to activate various host networks including YZO. When doped in YZO,  $\text{Bi}^{3+}$  ions can emit blue light through the  $^3\text{P}_1 \rightarrow ^1\text{S}_0$  (Whittle, Cranswick, Redfern, Swainson, & Lumpkin, 2009) transition. According to the results of many researchers, the emission spectra of  $\text{Bi}^{3+}$  ions are broad and the peaks range from blue to green for different host lattices, because the outer  $6\text{S}^2$  electronic structures of  $\text{Bi}^{3+}$  ions depend on their environmental conditions, namely covalent and coordination No. etc. and place are equal. Therefore, from the results,  $\text{Bi}^{3+}$  ions can be used as a sensitizer to transfer their energy to the surrounding dopant ions and increase the doping emission intensity. Therefore,  $\text{Bi}^{3+}$  ion proved to be a

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# ESTIMATING COMMON PARAMETERS OF DIFFERENT CONTINUOUS DISTRIBUTIONS

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Keywords:

*Maximum likelihood estimation;  
Confidence interval; Gamma  
distribution; Weibull distribution;  
Rayleigh distribution; Lomax  
distribution.*

ABSTRACT

*Estimating a common parameter is the most essential and quite fascinating task across various probability distributions. This article addresses the challenge of estimating this parameter through the application of Maximum Likelihood Estimation (MLE). Numeric determination of common parameters is conducted for several distributions, including the Lomax distribution, Gamma distribution, Rayleigh distribution, and Weibull distribution. In cases where distributions lack a closed-form solution, estimation of MLEs is achieved using the Newton-Raphson technique. Furthermore, asymptotic confidence intervals are computed utilizing the Fisher information matrix tailored to each distribution. The performance evaluation of these estimators centers on the assessment of bias and mean squared error. To enable a numerical comparison of these estimators, the Monte Carlo simulation method is employed. Finally, these techniques are applied to real-time rainfall data to assess parameter estimates for each distribution.*



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## 1. INTRODUCTION

Measuring the entire population would be too difficult, parameters serve as descriptive measures of the population as a whole. Consequently, we resort to estimating parameters by selecting a sample from the population since we lack knowledge of their exact values. Various popular methods for parameter estimation include Bayes estimation, least square estimation, method of moments, uniformly minimal variance unbiased estimation (UMVUE) method, and others. However, owing to its distinctive characteristics, the most effective and renowned method for parameter estimation is the Maximum Likelihood (ML) approach.

The British statistician, geneticist, and eugenicist R.A. Fisher, often referred to as the father of statistics, demonstrated (Aldrich, 1977) that the method of

moments may not be effective when calculating the parameters of Pearson Type III distributions. He recommended applying the MLE approach instead. MLE is a straightforward technique for obtaining an estimate of an unknown parameter. A new distribution named as Generalized Exponential (GE) distribution introduced by (Gupta, 2001) estimated the unknown parameters of  $GE(\alpha, \lambda)$  using MLE and compared with other estimation methods. While the estimation of parameters for various continuous distributions has been tackled individually by different authors in distinct ways, the comparative estimation of parameters for different distributions has received little attention. The primary objective of this study is to estimate the common parameter of different populations in order to determine which distribution provides the best estimates for the collected rainfall data, considering their bias and mean squared error.

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# INFERENCES DRAWN ON COMMON SCALE PARAMETER OF TWO POPULATIONS USING RAINFALL DATA

Vijay Kumar Lingutla<sup>1</sup>  
Nadiminti Nagamani  
P. S. Brahmanandam

Keywords:

*Bayes Estimation; Lindley's  
Approximation, Squared Error Loss,  
Linex Loss Functions, Rainfall Data.*

ABSTRACT

*This study investigates into the estimation of a common parameter across distinct probability distributions, including Weibull, Rayleigh, Gamma, and Lomax. The primary objective is to determine the common scale parameter when the shape or location parameters differ for each distribution, employing a Bayesian approach. Due to the impracticality of obtaining an exact expression for Bayes, Lindley's (1980) approximation is utilized for explicit evaluation. Bayesian estimates are derived for the common scale parameter and distinct shape or location parameters for Weibull, Rayleigh, Lomax, and Gamma distributions under both squared error and Linex loss functions. To facilitate this analysis, Gamma priors are employed for Weibull, Rayleigh, and Lomax distributions, guided by relevant references, while an Inverted gamma prior is applied for the Gamma distribution. The outcomes are compared through a Monte-Carlo simulation study, providing a comprehensive evaluation. Real rainfall data is also incorporated into the assessment, further enriching the comparison of results.*



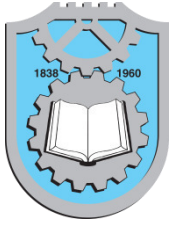
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## 1. INTRODUCTION

Estimation in statistics involves the process of determining unknown characteristics or traits of a population by analyzing sample data. In inferential statistics, a central concept is estimation, which entails using sample data to make inferences or draw conclusions about a larger population. Various estimation approaches exist, such as Bayesian estimation, Method of Moments, Method of Least Squares, Uniformly Minimum Variance Unbiased

Estimation, and Maximum Likelihood Estimation. Since estimates are based on samples and may not precisely match the true parameter value, it's crucial to recognize that estimation inherently carries uncertainty. Nevertheless, employing appropriate sampling methods and statistical inference allows us to obtain accurate estimates and draw meaningful inferences about populations from sample data.

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# CONSISTENCY IMPROVEMENT METHOD FOR FUZZY PAIR-WISE COMPARISON MATRIX IN ANALYTIC HIERARCHY PROCESS

L N P Kumar Rallabandi<sup>1</sup>  
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## ABSTRACT

Keywords:

Defuzzification; AHP; Fuzzy PCM; Consistency.

*Maintaining consistency is a crucial element in ensuring the reliability of pairwise comparisons provided by experts in the Analytic Hierarchy Process (AHP) and Fuzzy AHP. Many researchers have put forth various definitions concerning the c*

*onsistency of fuzzy Pairwise Comparison Matrices (PCMs) using fuzzy set theory. However, in most applications of fuzzy AHP, fuzzy PCM consistency is evaluated by defuzzifying the fuzzy comparisons, similar to the approach used for crisp PCMs. This paper introduces a novel method for transforming fuzzy comparisons into crisp comparisons through defuzzification, specifically utilizing the geometric mean. Furthermore, it proposes a method to enhance the consistency of the PCM. The presented methodology is applied to several problems previously addressed in the literature.*

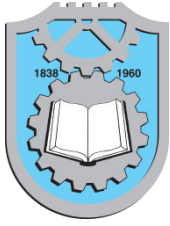


## 1. INTRODUCTION

The Analytic Hierarchy Process (AHP), as introduced by Saaty in 1980, represents a sophisticated approach to Multi Criteria Decision Making (MCDM), encompassing both qualitative and quantitative factors. In the AHP framework, decision makers are tasked with providing judgments regarding paired comparisons of objectives, forming a matrix known as the Pair-wise Comparison Matrix (PCM). In complex systems, decision maker judgments often exhibit linguistic or vague patterns. Consequently, several methods have been devised to address such situations, including AHP with interval judgments, Fuzzy AHP, and Hesitant AHP. Saaty and Vargas (1987) pioneered the incorporation of interval judgments into AHP and derived interval weights through the Monte Carlo

simulation method. Many subsequent researchers have also explored interval AHP (e.g., Salo and Hamalainen in 1992, Islam et al. in 1997, Wang et al. in 2005). In 1983, Van Laarhoven and Pedrycz were the first to apply fuzzy logic principles to AHP, utilizing triangular fuzzy numbers (TFN's) to model pair-wise comparisons and employing the logarithmic least squares method to determine fuzzy weights. This concept was further refined and applied by numerous researchers, including Buckley in 1985 and Chang in 1996, as well as Leung and Cao in 2000. Torra (2010) introduced the concept of hesitancy in Fuzzy sets, which offers the advantage of handling imprecision when multiple sources of vagueness coexist. In recent times, many authors have incorporated hesitant Fuzzy sets into their work. For instance, Zhu (2013) introduced the notion of a hesitant fuzzy preference relation and proposed a regression-

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# SOLVING INTUITIONISTIC FUZZY TRANSPORTATION PROBLEM USING GM-R METHOD

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P. S. Brahmanandam

## ABSTRACT

### Keywords:

*Intuitionistic fuzzy number; Ranking Method; Intuitionistic fuzzy Transportation Problem; Fuzzy Transportation Problem.*

*In recent years, researchers have focused on the Intuitionistic Fuzzy Transportation Problem (IFTP) due to its significant and indispensable role in the Transportation Problem (TP). An endeavour is performed in this paper to establish a new technique. This technique works with IFTP based on "Geometric Mean-Ranking(GM-R)"method. To provide a comprehensive understanding of the proposed method, we present and solve extensively discussed numerical examples. The acquired outcomes are subsequently subjected to numerical comparison with those of established methods, confirming the effectiveness of the proposed technique. This study validates the flexibility and simplicity of applying the method to real-life IFTPs for decision-makers.*



## 1. INTRODUCTION

In the global context, delivering services such as goods and value-based services from available sources to diverse destinations like individuals, organizations, shops, and supermarkets presents numerous challenges. Achieving this in a profitable manner requires optimization. The TP has proven to be an effective technique in providing optimal solutions for transporting resources from available sources to destinations in need. Traditional TP, however, is designed to handle precise, crisp data.

Upon careful examination of practical TP data, it becomes evident that the data lacks precision; in other words, it contains vagueness or impreciseness, representing a form of uncertainty. Zadeh's Fuzzy Set (FS), introduced in 1965, has proven effective in handling vague or imprecise data. In response to this, the Fuzzy Transportation Problem (FTP) was developed to address TP within a Fuzzy Environment (FE).

Intuitionistic Fuzzy Set (IFS), emerged as extension of FS, has been found to be particularly suitable for analyzing and organizing uncertainty in certain practical problems compared to traditional FS. Consequently, IFTP has emerged as an extension of FTP, leveraging the enhanced capabilities of IFS. The point that Intuitionistic Fuzzy Number (IFN) belongs to the class of IFS, is remarkable.

Hitchcock (1941) pioneered the design of the fundamental TP. Subsequently, Bellman and Zadeh (1970) constructed a platform for understanding how decision is made in a FE. Zimmermann (1983) explained about how to raise the quality in solutions through the amalgamation of Linear Programming Problem (LPP) with fuzzy logic. Hussain and Kumar (2012) produced a method to crack the TP involving supplies and demands represented as Triangular Intuitionistic Fuzzy Numbers (TIFN). They utilized the intuitionistic fuzzy Vogel's approximation method and

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# DESIGN OF SMART TOURISM SYSTEMS TO FORECAST FOREIGN TOURIST ARRIVAL RATE USING DEEP LEARNING TECHNIQUES

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Ravi Kumar. Suggala<sup>1</sup>  
Venkata Nagaraju Datla  
Sri Krishna. Adusumalli

## ABSTRACT

### Keywords:

Deep Learning; DNN; Forecasting;  
Foreign Tourist Arriva;, GRU; LSTM;  
RNN; Tourism

India's tourism potential is vast, driven by its rich history, diverse ecology, and extensive natural beauty. The country offers various niche tourism experiences, including cruises, adventure, medical, wellness, sports, MICE, eco-tourism, film, rural, and religious tourism. Recognized as the third largest foreign exchange earner, India's tourism industry is of paramount importance. However, existing research often neglects critical aspects such as predicting tourism trends, enhancing hospitality, and improving the visitor experience. This research focuses on developing smart tourism systems through data analytics and deep learning techniques, like RNN, LSTM-RNN, GRU-RNN, CNN, and DNN, to forecast foreign tourist arrivals. A detailed comparative analysis of these methods identifies the most suitable technique. Additionally, the study conducts yearly trend analysis for essential parameters like domestic tourism, tourism's impact on GDP, foreign exchange earnings, and government expenditure, using visualization tools. By harnessing technology and data-driven insights, this research aims to ensure the sustained growth and advancement of India's tourism industry, providing a foundation for improved planning and management.



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## 1. INTRODUCTION

Tourism industry is one of the significant domains in improving the economy status and foreign exchange earnings. Since the tourism domain is considered to be most developing and fascinating in India, this industry demands more researchers to contribute towards its enhancement. As an indication of this scenario, India has secured seventh rank among Asia-pacific zones in the

world tourism industry ([https://en.wikipedia.org/wiki/World\\_Tourism\\_rankings](https://en.wikipedia.org/wiki/World_Tourism_rankings)). This has led to the tourism industry to adopt smart tourism systems by using ICT tools and techniques to increase the GDP of the country. To analyze foreign tourist arrivals to understand the trend, demand, Government contribution to tourism, trend of foreign exchange earnings, and yearly contribution of tourism to GDP. A century of Smart Tourism is a kind of massive tourist

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# STABILITY ANALYSIS OF ECOLOGICAL MODELS OF PLANT-ANIMAL INTERACTIONS IN RIPARIAN ZONES

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Rami Reddy Bhavanam  
G. V. Ramana  
K. Venkata Rao

Keywords:

*Ecological Models; Riparian Zones; Predator-Prey Interactions; Herbivores; Stability Analysis.*

ABSTRACT

*The research summarizes the essential findings and open topics from previous stability analyses of models involving Riparian zones. These models are central to tropic interactions, ecological complexity, and species coexistence. Due to land use shifts and pollution, Riparian zones have been an intense subject of stability study of ecological model findings. This study models the interactions between species in Riparian zones, specifically, the interplay between predators and prey, as well as herbivores and their host plants as differential equations. The equilibrium points of the species are then determined and their stability is examined and conditions for stability are established*



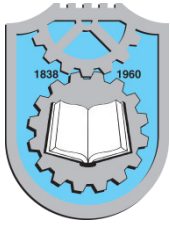
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## 1. INTRODUCTION

A riparian zone is a strip of land beside a river or stream. These areas are crucial for maintaining biodiversity and ecological stability. The intricate interdependencies between plants and animals in riparian zones may be better understood by exploring environmental models of plant-animal interactions. Riparian zones are biologically significant, and ecological models of plant-animal interactions help understand the myriad of factors at play there. Researchers and conservationists make more informed choices about how best to protect and restore riparian

ecosystems by learning more about these mechanisms. The aforementioned ecological models accurately portray the dynamic interplay between plants and animals and their responses to environmental changes in riparian zones. These zones, whether along a river bank or a shoreline, link wet and dry environments. In this regard, the current study thoroughly reviews the stability analysis literature on these models, emphasizing key results and open questions. Trophic interactions, ecological complexity, and coexistence among species are at the center of these models. However, the effects of land use changes and pollutants on the riparian zone are also considered from analyzing

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## SECURE USER AUTHENTICATION IN THE CLOUD: LEVERAGING FACE RECOGNITION TECHNOLOGY

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Muzamil Raheman Shaik<sup>2</sup>  
Jaya Ram Samavedam<sup>3</sup>  
Anvitha Peddineni<sup>4</sup>  
V V R Maheswara Rao<sup>5</sup>

Keywords:

*User Authentication; Cloud Computing; Face recognition technology; Biometric Authentication.*



### ABSTRACT

*The demand for safe and convenient authentication techniques is critical in a time when cloud computing is becoming more and more prevalent. The usefulness of face recognition technology—more especially, the ArcFace algorithm—as a dependable method for safe user authentication in cloud services is investigated in this work. It analyses the technology's efficacy in light of more established authentication techniques, weighs its advantages and disadvantages, and discusses privacy concerns. This research emphasizes the potential of face recognition technology to meet the changing needs of cloud computing, stressing the critical balance between security and user-friendliness. It accomplishes this by emphasizing the significance of secure cloud-based authentication, taking into account real-world applications, and resolving security and privacy concerns.*

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### 1. INTRODUCTION

The increasing adoption of cloud computing has fundamentally altered how individuals and companies store, access, and manage their data and applications. (Nwobodo, 2016). With this move to the cloud, protecting user data and gaining access to cloud services is of utmost importance. Traditional methods of authentication, which frequently rely on passwords and PINs, have shown to be weak against several attacks and frequently fall short of providing the level of security required for the current cloud environment. In response to these security issues, face recognition technology and other biometric authentication techniques have become increasingly popular as reliable ways to improve cloud security and usability. To address the growing demand for sophisticated

authentication mechanisms in the cloud, this research paper investigates "Secure User Authentication in the Cloud: Leveraging Face Recognition Technology".

The authenticity and security of user identities are crucial in the digital age, where cyber threats and data breaches are a constant danger. This study looks at how face recognition technology might be used in cloud environments as a reliable and effective method of user authentication. When compared to more conventional methods like passwords or PINs, face recognition technology, a subset of biometric authentication, offers a novel method of confirming identity by analyzing distinctive facial features (Mastelic, 2015). The paper examines the many facets of this technology, including its fundamental ideas, benefits, and practical applications.

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# FIRST-TIME OBSERVATIONS OF FINE PARTICLE MATTER ( $PM_{2.5}$ ) AT A RURAL SITE IN SOUTH INDIA – A CASE STUDY

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G. Uma  
Auromeet Saha  
P. S. Brahmanandam  
K. Raghavendra Kumar

## ABSTRACT

Keywords:

*Air Pollution; Particulate matter;  $PM_{2.5}$ ; Fine particles; Diurnal variations; Boundary layer dynamics; Rural site*

*For the first time, atmospheric fine particulate matter ( $PM_{2.5}$ ) concentrations were measured using a low-cost particulate sensor in Bhimavaram (16.55°N; 81.52°E; 17 m above MSL), a rural site and coastal station in the southern state of Andhra Pradesh, India. The study utilized preliminary data collected between April and May 2023. Throughout this period,  $PM_{2.5}$  concentrations exhibited notable temporal variations, with daily mean levels fluctuating between 5 and 60  $\mu\text{g}/\text{m}^3$ . Additionally, there were instances of hourly concentrations reaching as high as 100  $\mu\text{g}/\text{m}^3$ . The diurnal pattern of  $PM_{2.5}$  concentrations revealed a distinct morning peak, a mid-afternoon minimum, and a broad secondary peak in the late evening. The temporal and diurnal variations in  $PM_{2.5}$  concentrations are associated with the local sources (traffic, residential sources), local meteorology, and boundary-layer dynamics. This study provides valuable preliminary data on  $PM_{2.5}$  concentrations in Bhimavaram, highlighting the need for further research to understand the sources, dynamics, and health impacts of air pollution in rural locations.*



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# A CASE STUDY ON USING THREAT MODELING TO SECURE CLOUD COMPUTING DATA

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S. Srinivasa Rao<sup>1</sup>  
P. S. Brahmanandam<sup>2</sup>

## Keywords:

*Cloud computing; Privacy or Security;  
Cloud Service Providers; Encryption  
Methods.*

## ABSTRACT

*Cloud computing (CC) is an easy way to access computer resources, which many businesses increasingly use to outsource their data. Nonetheless, privacy and security are significant concerns in CC when sharing and storing data in a distributed setting. Potential dangers to cloud data security would cause significant disruptions. This paper discusses security challenges and feasible encryption approaches. The workings of a few encryption schemes are also discussed. By identifying and mitigating potential threats, it is possible to reduce the risk of a data breach. In this connection, a case study based on threat model simulations is presented. The CC's future is bright and hopeful, albeit a few loose ends exist. Building an integrated security architecture that can regulate all cloud layers is an immediate requirement for providing highly safe cloud services. A few recommendations to protect cloud data are provided and CC's future research directions are also emphasized.*

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## 1. INTRODUCTION

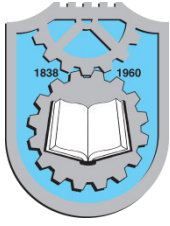
Cloud computing has revolutionized the way businesses and individuals store and access data. Without cloud computing, the modern computing landscape would not be as it is today. Cloud computing development has been aided by the research works of many significant researchers. For instance, one of the earliest and most influential researchers of cloud computing was Joseph Redmon, who developed the MapReduce platform in 2004. MapReduce is a distributed computing platform that allows users to process large datasets in parallel on an array of computers. Redmon's work laid the foundation for the development of cloud computing, as his platform enabled the distributed storage and processing of large datasets on a massive scale.

Another significant researcher was James Hamilton, who developed the concept of distributed cloud

computing in the late 2000s. Hamilton's work focused on the development of virtual machines and the implementation of elastic cloud computing, which allowed businesses to scale their computing resources more efficiently. Hamilton's contributions were instrumental in the development of cloud computing as we know it today. The development of cloud computing has also been aided by significant research from Amitabh Srivastava, Alexey Andreyevich, and Robert Marcus. These researchers have developed new techniques for cloud storage, distributed computing, and cloud security. Their works have enabled businesses to store and process data securely in the cloud and have helped to make cloud computing more efficient and reliable.

Apart from cloud computing, the other well-known computing paradigms are cluster computing (proposed

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# DYNAMICS OF ANISOTROPIC SHARMA-MITTAL HOLOGRAPHIC DARK ENERGY MODEL IN BRANS-DICKE THEORY

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Suryanarayana G  
Aditya Y\*  
Divya Prasanthi U Y

## ABSTRACT

### Keywords:

*Holographic dark energy; Bianchi type-II model; Scalar field; Scalar-tensor theory.*

*The Brans-Dicke scalar-tensor theory of gravity (Phys. Rev. 124, 925: 1961) is applied in this work to study the Sharma-Mittal holographic dark energy on a background of anisotropic and spatially homogenous Bianchi type-II space-time. In this scenario, the Brans-Dicke scalar field  $\phi$  is used as a function of the average scale factor  $a(t)$ . To explore the universe's accelerated expansion, the physical behaviour of the model is addressed through a graphical representation. Furthermore, squared sound speed  $v_s^2$  is used to verify the stability of the models. The popular cosmic plane  $\omega_{de} - \omega'_{de}$  is built for our models. It's also important to note that all the findings are in line with current observational data.*

## 1. INTRODUCTION

Accelerating universe expansion has been discovered as a result of recent observational data on the history of cosmic expansion (Perlmutter et al. 1999; Riess et al. 1998). Dark energy (DE), an unusual type of unidentified force with exceptionally strong negative pressure, is considered to be the source. The nature and behaviour of DE, on the other hand, remain a mystery. There are two main strategies for addressing the cosmic acceleration issue: either introducing a dark energy component into the Universe and studying its dynamics (Caldwell 2002; Santhi et al. 2017), or interpreting it as a failure of general relativity and considering modifying Einstein's theory of gravitation.

The holographic dark energy (HDE) model is one of the various dynamical DE models that has gained popularity recently as a method for deciphering the mystery surrounding DE. Its basis was the quantum properties of black holes (BH), which have been studied in great detail in the literature to gain additional insight into quantum gravity. The holographic principle asserts that the bound on the vacuum energy  $\Lambda$  of a system with size  $L$  should not cross the limit of the BH mass of the same size, which leads to the creation of BH in quantum field theory. According to Cohen et al. (1999) the energy density of HDE is described as follows

$$\rho_{de} = 3d^2 m_p^2 L^{-2} \quad (1)$$



# HYBRID CS-XGBOOST: REVOLUTIONIZING TOMATO DISEASE PREDICTION FOR IMPROVED AGRICULTURAL YIELD AND QUALITY

Ramesh Babu Gurujukota<sup>1</sup>  
Gokuldhev M

Keywords:

*Tomato Disease Prediction; Cuckoo Search (CS); XGBoost Hybrid Model; Meta-heuristic Integration; Meta heuristic integration*

## ABSTRACT

*In agricultural informatics, the accurate prediction of tomato diseases is crucial for optimizing yield and maintaining quality. This study introduces an innovative hybrid algorithm that synergistically combines the meta-heuristic Cuckoo Search (CS) with the gradient boosting capabilities of XG Boost. The proposed model aims to predict five distinct states of tomato health: No Disease, Early Blight, Late Blight, Leaf Mold, and Tomato Yellow Leaf Curl Virus. By fusing CS's prowess in optimized feature selection with XG Boost's robustness in classification, the hybrid model endeavors to enhance the predictive precision. A comparative analysis was conducted against benchmark algorithms, namely KNN, SVM, Random Forest, standalone XG Boost, and Cat Boost. Preliminary results, evaluated based on standard metrics like accuracy and F1-score, indicate that the hybrid CS-XG Boost algorithm manifests a marked improvement in prediction accuracy and computational efficiency. This research underscores the potential of integrating meta-heuristic search algorithms with gradient boosting models, providing a new avenue for advancements in agricultural disease prediction.*



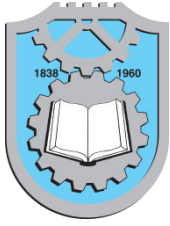
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## 1. INTRODUCTION

Tomatoes, one of the world's most cultivated fruits, play a pivotal role in global agriculture. They form a cornerstone of numerous culinary dishes and are a primary source of essential nutrients for millions. However, the cultivation of tomatoes is not without challenges. Over the past decades, there have been significant advancements in understanding tomato diseases, their etiologies, and their management strategies. Modern agricultural practices have employed a range of technologies, from advanced genetic modifications to innovative farming techniques, to combat these diseases. Yet, with the burgeoning growth of data science and machine learning, there's a paradigm shift in how we approach

disease prediction and management in agriculture (Ali et al., 2018). The recent years have witnessed a surge in the application of machine learning models like KNN, SVM, and Random Forest in predicting tomato diseases. These models, driven by vast amounts of data and computational power, have shown promise in early disease detection and classification. XG Boost and Cat Boost, with their gradient boosting mechanisms, have further elevated the standards of prediction accuracy. However, while these models are proficient, there's an evident gap in optimizing feature selection, which can further fine-tune the prediction outcomes. Meta-heuristic algorithms, like the Cuckoo Search (CS), have demonstrated their prowess in optimization tasks in various domains but are

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# DESIGN AND IMPLEMENTATION OF AN DYNAMIC IOT CLOUD BASED PROCESSING PLATFORM

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K. Soni Sharmila

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UDC-616073.7

## Keywords:

Monitor IoT Device, Data Gathering,  
Sensor Data Gathering, Cloud  
Computing (CC)

## ABSTRACT

*The Internet of Things (IoT) is a pair of technologies which can connect everything from everyday objects to more complex connected devices. The IoT model is continues to increases end-users owned devices. Adoption of smart devices for the IoT, including sensors are growing rapidly. Therefore, storing and processing the amount of data generated on local platforms is becoming increasingly difficult. The scalability of Cloud Computing (CC) offers solutions for this issue. CC makes resources available to users at low cost. However, platform-independent techniques for collecting sensor data and sending it to the cloud are not widely available. This framework represents a cloud-based platform for observing, collecting, and processing data from smart devices. The analysis presents that the detected requirements are data gathering and processing. Hence this analysis achieves best results in terms of security, accuracy, cost and processing time.*

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## 1. INTRODUCTION

The evolution of Web 2.0 has proven that end users can actively participate in community building with no expectations (money, etc.) provided tools as they need to generate, combine, and share content (blogs, wikis, social networks, etc.). It expects users to also work on a recent generation of IoT devices (such as small sensors) that produces needed content for others (close members or anyone else needed this information) like

garden temperature sensors, surveillance cameras, geolocation, health information, and more.

In addition to generating information, citizens will create paths to perform actions for devices, show significant program data on television, turn off a special lamp when your mother sleeps at home, sound an alarm if you fall, or receive voice notifications from your friends.

Today, the IoTs are available a wide variety of forms (data, devices, services, etc.) which can be utilized in