

# 3rd INTERNATIONAL CONFERENCE

On Recent Trends in Engineering & Management Science  
(ICRTEM - 2026)



Organised by :

**SAI SPURTHI**  
**INSTITUTE OF TECHNOLOGY**

Sathupally, Khammam

27th & 28th March 2026.

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**PROCEEDINGS BOOK**

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**3<sup>rd</sup> International Conference  
on**



# **Recent Trends in Engineering & Management Science**

**(ICRTEM-2026)**

**27<sup>th</sup> & 28<sup>th</sup> March 2026**

**Hybrid Mode**

**PROCEEDINGS BOOK**



Organized by

**SAI SPURTHI INSTITUTE OF TECHNOLOGY  
(AUTONOMOUS INSTITUTION)**

**SATHUPALLY**

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## **CHAIRMAN'S MESSAGE**

*Dear Participants,*

It gives me immense pleasure to extend my warm greetings to all the delegates, researchers, academicians, and industry professionals participating in the **3rd International Conference on Recent Trends in Engineering & Management Science (ICRTEM-2026)**.

In today's fast-paced and technology-driven world, the convergence of engineering innovations and management practices is essential for addressing complex global challenges. Conferences like ICRTEM-2026 play a significant role in fostering intellectual exchange, promoting research excellence, and encouraging collaborative efforts among experts from diverse domains.

I firmly believe that this conference will serve as a valuable platform for sharing innovative ideas, presenting cutting-edge research, and discussing practical solutions that contribute to sustainable development and technological advancement. Such initiatives are crucial in nurturing young minds and empowering them to become future leaders and innovators.

I sincerely appreciate the dedication and hard work of the organizing committee in bringing together this prestigious event. I am confident that the conference will be highly productive and inspiring for all participants.

I extend my best wishes for the grand success of ICRTEM-2026.

**Dr. B. Pardha Saradhi Reddy**  
Chairman, SSIT.

**Sri D. Prabhakar Reddy**

Secretary & Correspondent of SSIT



### **SECRETARY MESSAGE**

*Dear Participants,*

It gives me great pleasure to extend my warm greetings to all participants of the **3rd International Conference on Recent Trends in Engineering & Management Science (ICRTEM-2026)**.

In today's rapidly evolving technological landscape, the integration of engineering innovations with effective management practices has become essential for sustainable growth and development. Conferences like ICRTEM-2026 provide an excellent platform for academicians, researchers, industry professionals, and students to come together, share knowledge, and discuss emerging trends that shape the future.

I believe that this conference will encourage meaningful discussions, inspire innovative thinking, and promote collaborative research across various domains. Such academic gatherings play a crucial role in enhancing professional competence and addressing real-world challenges through research-driven solutions.

I sincerely appreciate the efforts of the organizing committee for their dedication and commitment in organizing this prestigious event. Their hard work and vision have made it possible to bring together experts from diverse fields under one platform.

I extend my best wishes to all participants for a successful, enriching, and intellectually rewarding conference experience.

- **Sri D. Prabhakar Reddy**  
Secretary & Correspondent, SSIT

**Smt. Bandi Anvida**  
Management Trustee



### **MANAGEMENT TRUSTEE MESSAGE**

It is a great honor and pleasure to extend my warm greetings to all the participants of the **3rd International Conference on Recent Trends in Engineering & Management Science (ICRTEM-2026)**.

In the present era of rapid technological advancement and global transformation, it is essential to encourage platforms that promote innovation, research, and knowledge sharing. This conference serves as an excellent opportunity for academicians, researchers, industry experts, and students to exchange ideas, explore emerging trends, and contribute to the advancement of engineering and management sciences.

I firmly believe that such initiatives play a vital role in nurturing talent, fostering creativity, and encouraging interdisciplinary collaboration. The exchange of knowledge and experiences in forums like ICRTEM-2026 will undoubtedly contribute to academic excellence and societal progress.

I appreciate the dedicated efforts of the organizing committee in successfully planning and executing this conference. Their commitment reflects the institution's vision of promoting quality education and research.

I extend my best wishes to all the participants for a fruitful, engaging, and successful conference.

**Smt. Bandi Anvida**  
Management Trustee, SSIT

**Prof. Dr. V.S.R. Kumari**

PRINCIPAL, Program Chair & Convener



### **CONVENOR MESSAGE**

It gives me great pleasure to welcome all participants to the **3<sup>rd</sup> International Conference on Recent Trends in Engineering & Management Science (ICRTEM-2026)**.

The primary objective of this conference is to provide a dynamic platform for researchers, academicians, students, and industry professionals to present their innovative research, exchange ideas, and discuss the latest advancements in engineering and management domains. The interdisciplinary nature of this conference encourages collaboration and the integration of knowledge across various fields.

We have received a wide range of quality research contributions from different parts of the country and abroad, reflecting the growing interest and advancements in these domains. The technical sessions, keynote addresses, and discussions are designed to offer valuable insights and foster meaningful interactions among participants.

I sincerely thank all authors, reviewers, session chairs, and organizing members for their invaluable support and contribution. Their collective efforts have been instrumental in shaping this conference.

I hope that ICRTEM-2026 will be a fruitful and inspiring experience for all attendees.

**Dr. V.S.R. Kumari**

Principal, SSIT

Program Chair & Convener

**Dr. T. VEERANNA,**  
Co-Convenor of ICRTEM26



*Dear Participants and Guests,*

It is my privilege to welcome all participants to the **ICRTEM-2026**.

This conference serves as a significant platform for exchanging knowledge, fostering innovation, and promoting research excellence in the fields of engineering and management science. It provides an opportunity for both young researchers and experienced professionals to present their work, interact with experts, and explore new ideas and technologies.

The diversity of topics covered in this conference highlights the rapid advancements and evolving trends in various domains. I am confident that the discussions and presentations will inspire participants and contribute to their academic and professional growth.

I extend my sincere gratitude to all contributors, reviewers, and organizing team members for their continuous support and dedication. Their efforts have ensured the successful organization of this event.

I wish all participants a productive, engaging, and memorable conference experience.

**Dr. T. Veeranna**  
Associate Professor & HOD, Dept. of CSE (AI & ML), SSIT  
Co-Convenor

**Mr. R. RANJITH KUMAR**  
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### **ORGANIZING SECRETARY MESSAGE**

*Dear Participants,*

It is an honor and privilege to serve as the Organizing Secretary for the **3rd International Conference on Recent Trends in Engineering & Management Science (ICRTEM-2026)**.

This conference is designed to bring together academicians, researchers, industry experts, and students to share their knowledge, present innovative ideas, and discuss emerging trends in engineering and management. It acts as a catalyst for intellectual growth, collaboration, and technological advancement.

Organizing an international conference of this scale requires teamwork, dedication, and meticulous planning. I sincerely thank all members of the organizing committee, volunteers, and supporting staff for their tireless efforts and commitment.

I also extend my appreciation to all participants for their valuable contributions and enthusiastic participation. Your presence and involvement are key to the success of this conference.

I hope that ICRTEM-2026 will provide a platform for learning, networking, and collaboration, and will leave all participants with enriching experiences and lasting impressions.

**R. Ranjith Kumar**  
Managing Partner, D3 Solutions  
Organizing Secretary

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# DESIGN AND IMPLEMENTATION OF SMART DOOR LOCK SYSTEM USING FINGERPRINT, RFID, KEYPAD, AND MOBILE APPLICATION CONTROL

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**Abstract:** With the increasing demand for advanced security systems in residential, commercial, and industrial sectors, traditional lock-and-key mechanisms are becoming inadequate due to their vulnerability to unauthorized access and duplication. To address these limitations, this paper presents the design and implementation of a multi-level secure smart door lock system that integrates fingerprint authentication, RFID-based access, keypad password entry, and mobile application control using an Arduino-based embedded platform.

The proposed system utilizes a fingerprint module as the primary authentication method, offering high accuracy and reliability due to its unique biometric identification capability. In addition, an RFID reader is incorporated to allow quick and contactless access for authorized users. A keypad interface provides password-based authentication as an alternative method, while a mobile application enables remote access control and monitoring, enhancing system flexibility and user convenience.

The Arduino controller acts as the central processing unit, coordinating the operation of all authentication modules and controlling the door locking mechanism through a relay-based system. The system is designed to support multiple users, store authentication data securely, and provide fast response times for real-time access control. Furthermore, the integration of multiple authentication layers significantly improves system security by reducing the risk of unauthorized entry.

Experimental results demonstrate that the proposed system achieves high authentication accuracy, fast response time, and reliable performance under various operating conditions. The system is cost-effective, scalable, and suitable for deployment in smart homes, offices, and secure facilities.

**Keywords:** Smart Door Lock, Fingerprint Authentication, RFID Access Control, Keypad Security System, Mobile Application Control, Arduino Controller, Embedded Systems.



# **AN ENHANCED MACHINE LEARNING FRAMEWORK FOR EMOTION RECOGNITION USING PAD MODEL AND DEEP LEARNING**

**Dr. T. VEERANNA<sup>1</sup>, Mr. B. PEDDA UPPALAI AH<sup>2</sup>, Mrs. V.LALITHA<sup>3</sup>**

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**ABSTRACT:** Emotion recognition plays an important role in affective computing and human–computer interaction. Previous research has used machine learning techniques to cluster emotions using the Pleasure–Arousal–Dominance (PAD) emotional model. In the existing approach, clustering methods such as K-means and machine learning algorithms like Decision Trees and Support Vector Machines were used to classify emotions based on PAD scores. However, the approach suffers from limitations such as overfitting, limited datasets, and inability to detect mixed emotions. This paper proposes an enhanced emotion recognition framework that integrates deep learning models with hybrid clustering techniques to improve classification accuracy and generalization. The proposed system uses dimensionality reduction, advanced clustering, and neural network–based classifiers to better map PAD scores to emotional categories. Experimental analysis shows that the proposed system improves emotion classification performance and provides a more scalable framework for real-world affective computing applications.

***Index terms:*** emotions, PAD, affective computing, machine learning.



**Paper ID: ICRTEM26-03**

## **CONDUCTIVITY AND DIELECTRIC BEHAVIOR OF CELLULOSE ACETATE-AMMONIUM BROMIDE SOLID POLYMER SYSTEM**

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**ABSTRACT-** Solution casting cellulose acetate and ammonium bromide resulted in a rigid polymer film. At 106 Scm<sup>1</sup>, the polymer solution had the maximum ionic conductivity. Researchers used electrochemical impedance spectroscopy to explore polymer fluids. Insulation and conductivity tests were also performed between 10 Hz and 4 MHz, and between 303 K and 343 K, respectively

**Key words:** Biopolymers, Solid polymer electrolyte, Impedance analysis, Dielectric spectra

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## **SMART GLOVE FOR HEARING AND SPEECH IMPAIRED**

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**Abstract**—Communication can be difficult for people with hearing and speech disabilities, especially when interacting with individuals who are not familiar with sign language. To address this problem, this paper presents the design and development of a wearable smart glove that translates specific hand gestures into both speech and text. The system uses four flex sensors placed on the glove to sense the bending of the fingers and detect different gesture patterns. An Arduino Nano collects the sensor readings, while an ESP32 module processes the data and manages wireless communication. When a gesture is identified, the system produces a corresponding voice message through a speaker and also sends the related text to an Android application. The glove is built using low-cost and easily available electronic components, making it practical for real-world use. Overall, the proposed device provides a compact and user-friendly solution that helps reduce the communication gap between speech-impaired individuals and others without relying on camera-based recognition systems.

**Keywords**—Smart Glove, Gesture Recognition, Flex Sensors, Arduino Nano, ESP32, Assistive Technology, Speech Output.



**Paper ID: ICRTEM26-05**

## **AUTOMATED STUDENT ATTENDANCE AND ACADEMIC TRACKING SYSTEM USING FACE RECOGNITION TECHNOLOGY**

**Mr. V.B. GOPALA KRISHNA, Assistant Professor  
TORLAPATI RAMYA, BANNE SAI MEGHANA, GORLA JAYANTH REDDY  
ECE DEPARTMENT,  
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B. Gangaram, Sathupalli mandal, Khammam District, Telangana.**

**ABSTRACT:** - Attendance plays vital role in figuring out the persons activeness and attentiveness. Whether it is a school or a college or a workplace, attendance is often required to keep track of their student and employees. This system is an android application that allows teachers to take attendance of the student registered in their class. Online attendance system is the system of marking attendance of students who are present for the class. The features like one time one screen will help in avoiding proxy. Not just for colleges or schools but attendance matters everywhere it has now taken an important place even in universities. The output after using this system is really very good. This updated method gives quiet easy way to maintain a student's record properly.

**Keywords:** - One Time One Screen, Intelligent Notice Board, Institute Notice, Course Material, Performance.



## **DESIGN AND PERFORMANCE ANALYSIS OF AN AUTOMOTIVE MUFFLER FOR NOISE REDUCTION AND EMISSION CONTROL**

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**ABSTRACT:** The rapid growth of the automotive industry has led to increased concerns regarding noise pollution and harmful exhaust emissions. The automotive muffler plays a critical role in attenuating exhaust noise while maintaining optimal engine performance. This study presents the design and performance analysis of an automotive muffler aimed at achieving effective noise reduction and improved emission control. The proposed muffler model is developed using advanced design methodologies and analyzed through Computational Fluid Dynamics (CFD) and acoustic simulation techniques. The internal geometry of the muffler, including chamber configuration, perforated tubes, and baffle arrangements, is optimized to enhance sound attenuation while minimizing backpressure. The acoustic performance is evaluated in terms of transmission loss and noise reduction levels across a wide frequency range. Simultaneously, flow characteristics such as velocity distribution, pressure drop, and turbulence behavior are analyzed to ensure minimal impact on engine efficiency. The results demonstrate that the optimized muffler design significantly reduces exhaust noise levels without adversely affecting engine performance. Additionally, improved exhaust flow contributes to better combustion efficiency, indirectly supporting emission reduction.

**Keywords:** Automotive Muffler, Noise Reduction, Emission Control, Computational Fluid Dynamics (CFD), Acoustic Analysis, Backpressure, Transmission Loss, Exhaust System Design)



## DEVELOPMENT OF A WEATHERPROOF SOLAR- POWERED YELLOW WARNING LIGHT WITH OPTIMIZED FLICKER FREQUENCY

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**Abstract:** Road safety is a critical concern, especially in low-visibility conditions such as nighttime, fog, rain, and construction zones. This paper presents the design and development of a solar-powered yellow warning light system with high visibility and intelligent flicker control. The proposed system utilizes a GU4 LED bulb delivering approximately 800 lumens to ensure enhanced brightness and long-distance visibility. An Arduino-based control unit is employed to automate the operation of the warning light, including flicker generation at a frequency of 39–40 flashes per minute, which is optimized for human attention and safety signaling standards. The system is powered by a solar charging unit capable of fully charging within 6–8 hours of sunlight, providing continuous operation for up to 7 days without additional charging. To ensure durability and reliability in outdoor environments, the device is designed with a waterproof and weatherproof enclosure, making it suitable for deployment in harsh climatic conditions. The automatic operation eliminates the need for manual intervention, enhancing usability in remote and unattended locations.

The proposed system is energy-efficient, cost-effective, and highly suitable for applications such as road safety warnings, construction zones, accident-prone areas, and emergency signaling systems. Experimental results demonstrate stable performance, long backup duration, and consistent flicker visibility under various environmental conditions.

**Keywords:** *Solar Power, Warning Light, Arduino, GU4 LED, Flicker Mode, Road Safety, High Visibility, Waterproof System, Renewable Energy, Automatic Control, LED Beacon, Smart Lighting.*



**Paper ID: ICRTEM26-08**

# **FINGER PRINT BASED SMART ATTENDANCE SYSTEM**

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**ABSTRACT:** - Abstract - Student attendance system is the system of tracking the attendance of the student on basis of presence in class. Successful industries, schools, universities begin by engaging students and making sure that they will come regularly so the attendance rate become very important. In this paper, a smart student attendance system is designed and implemented based on android operating system. In comparison with other traditional attendance systems, the proposed system provides faster, cheaper and reachable system for online student attendance and generate the attendance report automatically.

**Key Words:** *Android, student list, session, instructor, course management.*



## **IOT BASED PROFESSIONAL DISPLAY FOR STAFF**

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**Abstract:** A Professional IoT-Based Display System for Staff Information is designed to modernize and automate the way organizational information is presented in workplaces such as offices, institutions, and industries. This system utilizes an Arduino microcontroller integrated with an IoT module (such as ESP8266/ESP32) and an LED display panel to dynamically update and showcase staff-related information in real time. The proposed solution replaces traditional notice boards and manual update methods with a smart, wireless, and centralized communication system. The system allows administrators to remotely update staff details, announcements, schedules, or important notifications through a web or mobile interface. The IoT module enables seamless internet connectivity, ensuring that updates are instantly reflected on the LED display without physical intervention. Arduino acts as the core controller, processing incoming data and driving the LED display efficiently. This approach enhances communication efficiency, reduces manual effort, and ensures timely dissemination of information. It is cost-effective, scalable, and easy to deploy across multiple departments. Additionally, the system can be extended with features like authentication, scheduling, and multi-display synchronization. Overall, the IoT-based professional display system provides a reliable and intelligent solution for real-time staff information management in modern organizations.

**Keywords:** *With Arduino, Led Display, IOT Module.*



# SMART SOLAR-POWERED CCTV SURVEILLANCE SYSTEM USING IOT AND GSM NETWORK CONNECTIVITY

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**Abstract:** The increasing demand for reliable and continuous surveillance systems has led to the development of energy-efficient and remotely accessible security solutions. This project presents an IoT-based solar-powered CCTV surveillance system integrated with SIM card communication for real-time monitoring in remote and off-grid locations. The system utilizes a solar panel as the primary power source, ensuring uninterrupted operation even in areas without conventional electricity. An Arduino microcontroller serves as the central processing unit, interfacing with a CCTV camera, GSM module, and IoT communication module. The GSM module, equipped with a SIM card, enables wireless data transmission, allowing users to receive alerts, images, or video feeds via mobile networks. The IoT module facilitates remote access and monitoring through cloud platforms or mobile applications. The system is designed to detect motion or unusual activity and instantly notify users through SMS or internet-based notifications. By combining renewable energy with wireless communication technologies, the proposed solution enhances security while maintaining low operational costs and high reliability. This system is particularly suitable for rural areas, construction sites, agricultural fields, and border surveillance, where continuous monitoring is required but power and internet infrastructure are limited. The project demonstrates an effective integration of IoT, solar energy, and embedded systems for smart surveillance applications.

**Keywords:** *solar panel, Arduino, CCTV, GSM, IOT module.*



# **MULTI-LEVEL SECURE SMART DOOR LOCK SYSTEM USING FACIAL RECOGNITION, RFID AUTHENTICATION, AND EMBEDDED CONTROL**

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**ABSTRACT:** In recent years, the demand for advanced security systems has significantly increased due to rising safety concerns in residential, commercial, and industrial environments. Traditional locking mechanisms based on mechanical keys are becoming obsolete due to their vulnerability to theft, duplication, and unauthorized access. To address these challenges, this paper presents a facial recognition-based smart door lock system integrated with multiple authentication layers including RFID, keypad entry, and mechanical key override. The proposed system utilizes a high-resolution camera module to capture and process facial images for real-time recognition. The system is capable of storing up to 4000 facial profiles, enabling large-scale deployment in organizations such as offices, hostels, and institutions. In addition to facial authentication, an RFID reader supports up to 500 registered RFID tags, providing an alternative and quick access mechanism. A keypad interface allows password-based entry, while a traditional key lock ensures manual access during system failures. The system is controlled using an Arduino-based embedded controller, ensuring efficient processing and integration of multiple input modules. A built-in display unit inside the door provides real-time visualization of captured faces, enhancing user awareness and monitoring. Furthermore, the system incorporates a battery backup module, ensuring uninterrupted operation during power outages, thereby improving reliability. The proposed solution enhances security through multi-factor authentication, reduces unauthorized access, and provides flexibility in access control.

**Keywords:** *Facial Recognition, Smart Door Lock, RFID Authentication, Arduino Controller, Multi-Level Security, Embedded Systems, Biometric Security.*



**Paper ID: ICRTEM26-12**

# **SMART SOLAR STREET LIGHT WITH POWER SAVER**

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**Abstract** – All in One Solar Street light is a compact integrating Solar panels, LED light, Battery, RTC, Arduino, Gas sensor and a PIR motion sensor. Due to its compact size, this light can be easily mounted on pole top by anyone. Light is operated on automatically with using RTC. The light has automatic dusk to dawn operation and needs negligible maintenance once installed. The All-in-One Solar Street light uses high quality material and is designed for Indian environments. They also provide external Theft Protection for solar kit and indication are provided by Buzzer.

**Key words:** *Solar Panel, Battery, ATmega328, TC, PIR Sensor, pollution Sensor, Theft Protection.*



# SOLAR BASED SMART STREET LIGHT WITH HUMAN RECOGNITION

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**Abstract:** - The street lighting is one of the largest energy expenses for a city. Streetlights helps in giving better vision of roads and streets at night time, Streetlights are an important part of a city. An intelligent street lighting system can cut municipal street lighting costs as much as 50% - 70%. The present system is like the lights will be switched on in the evening before the sunset and they are switched off next day in the morning after there is sufficient light on the outside. But the actual timing for these lights to be switched on are when there is absolute darkness. With this, the power will be wasted up to some extent. In sunny and rainy days, ON and OFF time is different which is one of the significant hindrances of the present street lights systems. To Reduce This Wastage of Electricity, We Need an Automated Street Light Monitoring System Using human recognition. The main aim of the project "Solar Street Lightning Monitoring System" is to provide a power with solar energy during night time. The energy consumption in entire world is increasing at the fastest rates due to population growth and economic development and the availability of energy sources remains woefully constrained. We use the word "smart" because the system not only provide power to the street lights but also helps in detecting the direction of movement of the pedestrian and helps him by means of illuminating the path of movement till the near next street light.

To solve this problem, continuous monitoring of the solar and battery voltage needs to be done. With the implementation of this work, precautionary alerts can be given to the service department on the designed website. Arduino Uno module is employed as the main controller of the system. A relay is employed to switch ON and OFF the LED. The prototype is designed and found excellent results.



## **IOT-BASED SOLAR-POWERED CCTV SURVEILLANCE SYSTEM WITH SIM CARD COMMUNICATION**

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**Abstract:** In recent years, the demand for intelligent surveillance systems has significantly increased due to rising security concerns in remote and urban areas. Conventional CCTV systems rely heavily on continuous power supply and wired internet connectivity, which limits their deployment in rural, isolated, or disaster-prone regions. To overcome these challenges, this paper presents an IoT-based solar-powered CCTV surveillance system integrated with SIM card communication for real-time monitoring and data transmission. The proposed system utilizes solar energy as the primary power source, ensuring uninterrupted operation even in areas without grid electricity. A high-efficiency solar panel charges a rechargeable battery, which powers the surveillance camera and control unit. The system is integrated with an IoT-enabled microcontroller and a GSM/4G SIM module, allowing live video streaming, alerts, and data transmission over cellular networks without requiring Wi-Fi infrastructure. The surveillance unit captures real-time video and images, which are transmitted to a remote user via a mobile application or web interface. Motion detection algorithms are implemented to enhance efficiency by activating the camera only when movement is detected, thereby conserving power and storage. Additionally, the system can send instant alerts through SMS or mobile notifications in case of suspicious activities. The proposed design is cost-effective, energy-efficient, and highly scalable, making it suitable for applications such as agricultural land monitoring, border security, construction sites, and smart city infrastructure.

**Keywords:** *IoT, Solar Power, CCTV Surveillance, GSM Module, SIM Card Communication, Smart Security System, Remote Monitoring, Renewable Energy, Motion Detection, Wireless Surveillance.*



## **TRAINING EFFECTIVENESS AND EMPLOYEE PERFORMANCE: A PREDICTIVE ANALYTICS APPROACH**

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**ABSTRACT:** The goal of this study is to look into the relationship between worker performance and the effectiveness of organizational training programs. Understanding how training programs effect employee performance is critical as more firms recognize the importance of workforce development in attaining their strategic objectives. Using empirical data and a review of the literature, this study investigates how training programs affect a variety of employee performance measures, including productivity, job satisfaction, skill development, and overall organizational success. Other elements that influence training success include organizational culture, employee involvement, training design, and delivery strategies. This study also investigates how performance appraisal systems might be used to evaluate training activities and provide constructive criticism to drive continual progress. This study sheds light on the relationship between training efficacy and worker performance, with significant implications for HR professionals, business executives, and legislators seeking to improve workforce development strategies and maximize organizational success.

**Keywords:** *Performance Management, Key Performance Indicators (KPIs), Performance Evaluation, Performance Metrics, Employee Productivity, Goal Setting.*



**Paper ID: ICRTEM26-16**

# **CUSTOMER BEHAVIOR ANALYTICS: MEASURING ADVERTISING INFLUENCE USING QUANTITATIVE METHODS**

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**ABSTRACT:** Understanding client buying decisions and behavior requires an understanding of FMCG product advertising that successfully delivers relevant product information. This essay looks at how advertisements effect customers. An advertisement effectiveness survey was conducted. The researchers employed convenience sampling to distribute the questionnaire and determine how advertising influences FMCG consumption. A total of 180 Bangalore residents, aged 18 to 45, were surveyed. Five FMCG brands are being investigated: Parle Agro, ITC, Dabur India, HUL, and Britannia. The study discovered a beneficial relationship between advertisements and Bangalore City clients' purchases. According to regression study, brands have a greater impact on client purchases than labeling and outdoor promotion. According to the paper, advertising aims to influence consumer purchasing decisions by targeting their preferences.

**Keywords:** *buying behavior, FMCG products, advertisement, brands.*

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## **MODELING THE IMPACT OF WORK-LIFE BALANCE ON EMPLOYEE RETENTION USING ANALYTICS**

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**ABSTRACT:** These days, the majority of individuals believe that it's important to have a healthy work-life balance. The goal is to strike a balance between one's professional and personal responsibilities. Definition, significance, and potential pitfalls of work-life balance are all covered in this idea. A less stressful and more enjoyable life can be yours by establishing personal and work boundaries, as discussed in this essay. Improving the art of limit setting is the central argument. Finding a balance between one's personal and professional lives is the subject of an extra section of this research. Some examples include prioritizing self-care, effectively managing your time, and creating a flexible strategy. This abstract discusses the merits of an office culture that promotes a healthy balance between work and leisure time. A few advantages include happier workers, more staff retention, and more output per worker. The significance of maintaining a healthy work-life balance for the success and happiness of individuals and organizations is discussed in this abstract. A lucid explanation is required for this.

**Keywords:** *Flexibility, TimeManagement, Boundaries, Well-being, Stress Management.*



**Paper ID: ICRTEM26-18**

# **DEEPGUARD: A DEEP LEARNING FRAMEWORK FOR REAL-TIME VIOLENCE DETECTION IN SMART CITY ENVIRONMENTS**

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**ABSTRACT:** This paper introduces an automated method for detecting violence. By employing cutting-edge deep learning algorithms and real-time video surveillance analytics, it improves public safety in smart cities. The proposed method integrates LSTM networks with CNNs to gather geographical and temporal data from surveillance footage in order to detect violent scenarios, including rioting, physical assaults, and unexpected crowd hostility. In order to distinguish between violent occurrences and arbitrary human interactions in a variety of illumination, occlusion, and crowd density scenarios, the model employs attention techniques for feature representation and transfer learning with pre-trained architectures. In experiments conducted on benchmark datasets, accuracy, precision, and recall are maintained, while computing efficiency is preserved. Consequently, it is the optimal choice for smart city infrastructure that is connected to the periphery. This research improves IUSS by creating a proactive, scalable, and automated method for the detection of violent incidents, which enables quicker reactions and enhanced crime prevention.

**Keywords:** *Automated Violence Recognition, Smart Cities, Deep Learning, Convolutional Neural Networks (CNN), Long Short-Term Memory (LSTM), Video Surveillance,*

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**Paper ID: ICRTEM26-19**

## **A HYBRID MACHINE LEARNING AND DEEP LEARNING APPROACH FOR AD CLICK FRAUD DETECTION IN DIGITAL ADVERTISING**

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**ABSTRACT:** False click detection influences the cost and effectiveness of digital advertising. Marketers lose money as a result of bot, fraudulent, or low-quality clicks, which are often used to conceal the efficacy of their advertisements. This project employs artificial intelligence (AI) to detect and prevent incorrect actions in real time. The proposed system employs deep learning and machine learning to analyze session attributes, traffic anomalies, and user activity. IP activity, click frequency, device fingerprinting, and time-based trends comprise the features. Both supervised and unsupervised algorithms are capable of detecting user deception. The system acquires knowledge from novel attacks on a regular basis. The accuracy of this method surpasses that of rule-based detection. The method enhances the detection of fraud and minimizes the number of false positives. The expansion of pipelines that are effective for processing data from major ad platforms is feasible. Trust in the digital advertising ecosystem is enhanced when it is transparent and reliable.

**Keywords:** *Invalid Click Detection, Click Fraud, Digital Advertising, Artificial Intelligence, Machine Learning, Deep Learning, Anomaly Detection, Fraud Detection*



# DEEP LEARNING-BASED DETECTION OF ONLINE RECRUITMENT FRAUD: A ROBUST AND SCALABLE FRAMEWORK

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**ABSTRACT:** Hybrid deep learning models can assist in identifying online employment scams. These systems utilize convolutional and recurrent neural networks to identify fraud. We may see how individuals interact with job adverts and with each other across time and across different locations. Datasets characterized by significant noise or irregular spacing can be addressed using sophisticated preprocessing and embedding techniques. We acquired this data by the concurrent analysis of job advertisements, posting activities, business profiles, emails, and chat communications. The amalgamation has facilitated the differentiation between efficacious and inefficacious working approaches. ROC-AUC, F1-score, accuracy, and recall are examples of performance measures. These classifiers surpass the leading machine learning models, as evidenced by testing. When individuals comprehend the mechanics of forecasts, they are more inclined to place their trust in them. To enhance confidence, the technology may autonomously detect and notify users of scams on employment platforms.

**Keywords:** *Hybrid Deep Learning, Online Recruitment Fraud Detection, Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN/LSTM), Text Mining*



## **ATTENTION-BASED DEEP LEARNING FRAMEWORK FOR DAMAGE DETECTION IN ROAD INFRASTRUCTURE SYSTEMS**

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**ABSTRACT:** Road auxiliary facilities must be managed effectively to guarantee their safety, functionality, and longevity. Conventional inspection techniques are time-consuming and prone to mistakes, which raises risks and delays maintenance. This work employs attention-enhanced image analysis to intelligently monitor road auxiliary infrastructure. The system recognizes, classifies, and evaluates traffic signs, guardrails, lighting poles, and road markings using deep convolutional neural networks using spatial and channel attention techniques. In order to enhance feature representation and recognition, the attention modules concentrate on critical image characteristics under various weather, lighting, and occlusion conditions. High-resolution mobile and roadside camera images are processed in real time to automate inspections and find errors. The suggested model is more robust and flexible to a variety of traffic situations thanks to transfer learning and data augmentation. Compared to conventional item recognition, experimental results demonstrate superior memory, accuracy, and precision. For condition-based maintenance, the framework finds corrosion, damage, misalignment, and loss of vision. Cloud-based monitoring technologies provide data centralization and predictive maintenance analytics.

**Keywords:** *Smart road monitoring, Road ancillary facilities, Attention-enhanced image analysis, Deep learning, Convolutional neural networks, Spatial attention mechanism*



**Paper ID: ICRTEM26-22**

## **MACHINE LEARNING-BASED MONEY LAUNDERING DETECTION IN BLOCKCHAIN TRANSACTIONS USING GRAPH ANALYTICS**

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**ABSTRACT:** The rapid growth of cryptocurrencies has enabled the use of decentralized networks for complex money laundering activities and the creation of new financial services. In general, the functionality of conventional rule-based monitoring systems is surpassed by contemporary money laundering techniques on blockchain networks. In order to identify anomalous or dubious patterns for widespread application, machine learning can evaluate extensive transaction data. In order to detect behavioral indicators of illicit activity, the proposed methodology implements both supervised and unsupervised models. In order to facilitate identification, it is necessary to acquire critical data, including network architecture, transaction frequency, wallet interactions, and temporal trends. In order to improve the model's stability and accuracy, we implement feature engineering and dimensionality reduction strategies. The algorithm is instructed by annotated datasets that include both legal and illicit transactions. Experimental assessment exhibits superior accuracy and improved information retention when contrasted with conventional detection methods. This method allows for the rapid identification of wallets and transaction patterns that are at a high risk.

**Keywords:** *Cryptocurrency, Money Laundering Detection, Machine Learning, Blockchain Analysis, Anomaly Detection, Financial Crime, Transaction Monitoring*



## **CYBER ATTACK PREDICTION: A COMPARATIVE STUDY OF TRADITIONAL MACHINE LEARNING AND GENERATIVE AI TECHNIQUES**

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**ABSTRACT:** The goal is to find cyber threats by using a predictive analytics framework that uses next-generation AI. To simulate complex, high-dimensional security data streams in real time, people use transformer topologies, deep learning, and graph neural networks. Behavioral analytics and temporal sequence models can find attack patterns before they do a lot of damage. Putting together system logs, network data, and information about people's activities from different sources can help you understand threats better. By combining supervised, self-supervised, and reinforcement learning methods, mixed learning makes data that isn't well labeled more stable. People are ready for any attack because of ideological control and online education. Federated AI and learning that protects privacy make it safe for businesses that are located far away to run. Real-world and benchmark datasets have been used in many tests that have shown high recognition rates and low false alarm rates. The design stops APTs, zero-day vulnerabilities, and malware that can change its form. Alert for the AI module that is well-stated. This lets security professionals make quick decisions. Rapid responses made possible by distributed training and edge-cloud integration make scalability easier.

**Keywords:** *Deep Learning, Graph Neural Networks, Transformers, Intrusion Detection Systems, Federated Learning, Next-Generation AI, Cyber Attack Detection, Predictive Analytics*



**Paper ID: ICRTEM26-24**

## **ENCRYPTED METADATA MANAGEMENT WITH DUPLICATION CONTROL FOR CLOUD STORAGE OPTIMIZATION**

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**ABSTRACT:** Cloud service providers allow users store and move data quickly and easily. Cloud service providers are using data de-duplication tools to conserve bandwidth and cut storage expenses. Customers want to use the cloud safely and privately so that their data is safe. So, they encrypt the data before sending it to the cloud. The encryption aim and the de-duplication function don't work well together, making it hard to employ the data de-duplication functionality. The current methods for de-duplication don't work and aren't safe from a security or efficiency point of view. They either cost a lot of processing power or are easy to break into, which lets the attacker get files back. This is what drives us to come up with a safe and effective way to get rid of extra data. Before we talk about the literature, which talks about a lot of different ways to de-duplicate data and the security and efficiency issues that current systems have, we will first explain how de-duplication techniques work and how they are used. Using hashing techniques and the AES-CBC algorithm, our suggested invention makes data de-duplication safer and faster for users. Users' keys are always made safely and consistently, without the help of anyone else. We prove how useful it is by putting the suggested strategy into practice and comparing it to current ways.

**Keywords:** *Data duplication, De-duplication, Cloud computing, Security, Encryption.*



**Paper ID: ICRTEM26-25**

## **TRUST EVALUATION OF USERS BASED ON SOCIAL FEEDBACK AND RATINGS**

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**Abstract:** The purpose of this paper is to examine the criteria individuals use to evaluate the trustworthiness of applications, service providers, and other users in online environments. Trust plays a crucial role in social networking platforms, where users decide whether to interact or share personal information based on perceived reliability. To identify key trust factors, a review of 264 research articles was conducted, among which 100 studies reported significant trust-related attributes. Based on this analysis, the paper presents a set of essential trustworthiness factors that influence user confidence in digital interactions. Furthermore, the study offers guidance for software engineers to select and incorporate appropriate trust features during the requirement analysis phase when designing social networking and similar applications. Considering these factors can help reduce risks such as identity misrepresentation and fraudulent behavior, including issues like catfishing, thereby improving user safety and enhancing the overall credibility of online systems.

**Keywords:** *trustworthiness; trust modeling; computer-mediated introduction; social media applications; software development.*



## **A COMPREHENSIVE FRAMEWORK FOR PRIVACY-SAFE SYNTHETIC DATA GENERATION USING GANS**

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**ABSTRACT:** The increased interest in data privacy-conscious machine-learning processes has promoted the use of synthetic data as an effective substitute to real data. The most popular frameworks in terms of the production of high-fidelity synthetic data have become Generative Adversarial Networks (GANs) because they are capable of capturing complex and high-dimensional distributions. The paper introduces an overall synthetic data generation approach based on adversarial training, including a deep GAN architecture, which is based on the WGAN variant of the architecture, namely, WGAN-GP variant. The quality of the generated data is evaluated by a multi-dimensional evaluation framework which includes statistical similarity, utility, and privacy. The experimental outcomes indicate that synthetic datasets created with the help of GAN can reach a high level of similarity to actual data and minimize the risk of privacy considerably. The paper ends with a set of recommendations on how synthetic data pipelines can be deployed in environments where privacy is at stake.

**Keywords—**Synthetic data, privacy-preserving machine learning, Generative Adversarial Networks (GANs), WGAN-GP, adversarial training, statistical similarity, utility evaluation, privacy metrics, tabular data synthesis.



**Paper ID: ICRTEM26-27**

## **EDGE AI IN 2026: A DEEP DIVE INTO SOURCE-LEVEL INTELLIGENCE AND ITS FUTURE PATHWAYS**

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**ABSTRACT:** Edge AI is one of the key paradigm shifts in the implementation of artificial intelligence, moving the inference calculation out of centralized infrastructure in the cloud and the bottom of the network, closer to the source of the data. This paper provides an overview of Edge AI in 2026, reasons it will gain momentum, the multi-tier architecture hierarchy that allows spread of intelligence, specialized hardware environment, and uses of cross-domain applications in manufacturing, healthcare, autonomous systems, retail, and smart infrastructure. We also compare performance standards between Edge AI, Cloud AI and Fog AI implementation, estimate market growth outlook and address challenges that remain unsolved, such as security, model optimization, devices management and regulatory compliance in the EU AI Act. According to our results, Edge AI has passed the inflection point between proof of concept and production grade with purpose-built neural processing units, compressed inference models, and well-developed orchestration systems. We sum up with a prospective study of federated learning integration, 6G synergies and the rise of agentic edge systems.

**Index Terms**—*Edge AI, Edge Computing, Machine Learning Deployment, IoT, Neural Processing Units, Federated Learning, Latency Optimization, TinyML, Autonomous Systems, Real-Time Inference.*



## **REGIONAL WEATHER PREDICTION USING MACHINE LEARNING WITH MULTI-SOURCE ATMOSPHERIC AND SURFACE OBSERVATIONAL DATA**

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**ABSTRACT:** This research introduces a hybrid data-driven weather prediction system that enhances the accuracy and reliability of forecasts by integrating atmospheric numerical weather prediction (NWP) models with near-surface observational datasets. Traditional numerical models lack localized meteorological data, imprecise parameterization, and low spatial resolution. Utilizing state-of-the-art machine learning techniques, the system incorporates numerical atmospheric model outputs with real-time near-surface meteorological data, including humidity, temperature, wind speed, and pressure. In order to more accurately represent intricate atmospheric patterns and local weather fluctuations, the hybrid approach employs physical simulations and data-driven learning. This system is able to better adapt to new environmental conditions, reduce prediction errors, and enhance short-term forecasting by integrating historical data with model outputs. For weather predictions that are precise, practicable, and broadly applicable, we suggest the hybrid approach. Numerical atmospheric models and near-surface data enhance prediction capacity, as demonstrated by experiments.

**Keywords:** *Hybrid Weather Prediction, Data-Driven Modeling, Near-Surface Measurements, Numerical Weather Prediction (NWP)*



**Paper ID: ICRTEM26-29**

## **GRID-TIED PV ARRAY WITH BATTERY ENERGY STORAGE FOR EV CHARGING APPLICATIONS**

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**ABSTRACT:** An EV charging station that uses solar panels, batteries, and utility company assistance is proposed in this paper. By doing so, we can build a charging infrastructure that is permanent, dependable, and always on. One way to manage energy use is via a hybrid system that combines photovoltaic (PV) cells, a BESS, and a two-way grid connection. Solar energy is used to directly charge electric vehicles during the sun's peak hours. The utility provider or the battery is credited with any excess energy. When solar power is low or demand is high, the grid and batteries work together to ensure that electricity is always sent where it is required. The utilization of green energy is prioritized and battery charging and discharging are optimized using a sophisticated energy management system (EMS), which facilitates vehicle-to-grid (V2G) connections. To maximize solar power utilization, a bidirectional DC-DC converter and inverter are employed, along with Maximum Power Point Tracking (MPPT). Models run in MATLAB/Simulink reveal the system's efficiency, load balancing capabilities, and power source switching smoothness. The simulations also demonstrate that the system is well-suited for smart charging networks that can withstand the test of time.

**Keywords:** EV charging station, solar energy, battery energy storage system (BESS), grid support, bidirectional converter, energy management system (EMS), Vehicle-to-Grid (V2G), MPPT, renewable energy integration, sustainable mobility, MATLAB/Simulink.



## **RADIAL SYSTEMS INCLUDING DGS ALLOCATION WITH DISTRIBUTION LOSS**

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**ABSTRACT:** The significance of distribution loss allocation (LA) has increased since the deregulation of the energy market and the establishment of distributed generation (DG). This paper proposes a novel approach to the distribution of electricity in radial networks, focusing specifically on the operations of Local Authorities (LA). The proposed methodology comprises three distinct components, employing power flow analysis to incorporate active and reactive power flows on the transmission lines in Los Angeles (LA). The calculation of power loss involves the consideration of every node, starting with the source nodes that generate power beyond their capacity. Consequently, the power dissipation is distributed among the loads connected to each individual node. Based on the data obtained in the previous phase, the aggregate power loss is subsequently attributed to Distributed Generators (DGs). In contrast to the preceding phase, the current stage involves the allocation of power losses to nodes that are connected to sink nodes when the load surpasses the generation capacity. The final stage of the process is normalization. The proposed methodology was implemented and evaluated on two distribution feeders, and the obtained results were subsequently compared to those generated by established methodologies.

**Index Terms:** Distributed generation, lossallocation, radial distribution systems.



**Paper ID: ICRTEM26-31**

## **POWER ELECTRONICS TECHNOLOGY FOR POWER QUALITY IMPROVEMENT IN MODREN POWER SYSTEMS**

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**ABSTRACT:** Recent breakthroughs in power semiconductor devices have fueled recent advances in power electronics. These innovations have had a direct impact on the advancement of power electronics converter technology and its diverse uses. Power electronics includes a wide range of effects on electrical power system networks, including usage, generating levels, distribution, and transmission of alternating current (AC), as well as HVDC transmission systems (e.g. static automated voltage regulation). The goal of this research is to assess the performance of the Dynamic Voltage Restorer (DVR), a power electronics-based Custom Power Controller, within the distribution network. The goal is to increase electricity quality and availability to end users. For simulation and analysis, the inquiry makes use of MATLAB/SIMULINK. The results of simulation tests are also shown, demonstrating how different parameter settings affect the model. These findings show that the Distributed Voltage Regulator (DVR) is helpful in improving the quality of power distribution.

**Keywords:** Dynamic voltage restorer, automatic voltage regulator, flexible alternating current transmission system, high voltage direct current transmission, voltage source converter, static synchronous compensator, unified power flow controller, and voltage source inverter are all abbreviations for similar devices.



**Paper ID: ICRTEM26-32**

## **A STUDY OF ETHNICITY IN ROHINTON MISTRY'S 'TALES FROM FIROZSHA BAAG'**

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**Abstract:** Ethnicity and Cultural identity have become the major issues of discussion and criticism in the postcolonial era. Rohinton Mistry is one of the eminent international postcolonial writers of Parsi origin who is now settled in Canada and writes from there. His primary aim is to analyse the problems of the microscopic Parsi community. Parsi writing in English especially after India's independence has become purely ethnocentric. Mistry is not an exception. His writings are characterized both by ethnocentric and minority traits. He delineates all the concerns of the present day Parsis. The Parsis experience a sense of anxiety by being the minuscule diasporic community in India where Hindus dominate. The anxiety roots from the insecurity and as a result a sense of identity crisis looms large in the hearts of the Parsi people. All the eleven stories of the Tales from Firozsha Baag (1987) address the exigencies of the Zoroastrian community with their several problems and perspectives. The present paper seeks to analyse how the tales of Mistry foregrounds this ethnic anxiety influence which is inherent in the hearts of the Parsi folk.

**Key Words:** *Parsi, Zoroastrian, Ethnicity, Anxiety, Multicultural, Immigrant, Minority, Ambivalence, Diaspora.*



## **APPLICATIONS OF LASER IN AUTONOMOUS VECHILES AND OTHER FIELDS**

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**2.Y.Vijaya, Assistant Professor,**

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**ABSTRACT:** LIDAR is one of the many applications of lasers in recent times. The three main components of an LIDAR are explained first and the uses of drones in mapping and survey, wireless power transfer etc are also explained. Other uses of LIDAR in autonomous vehicles and agriculture are also elaborated.

*Key words: LIDAR, Drone, Autonomous vehicle.*



**Paper ID: ICRTEM26-34**

## **STUDY OF REFLECTION AND TRANSMISSION COEFFICIENTS IN SELF –REINFORCED MEDIUM IN THE PRESENCE OF DISSIPATION**

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**ABSTRACT:** The reflection and transmission coefficients of self-reinforced poroelastic medium in the presence of dissipation are calculated. In this the reflection and transmission coefficients of fast dilatational P-I wave , slow dilatational P-II wave and the shear SV wave are calculated. The results are depicted in the graphs which are in numerical session, for this MATLAB is used to get the numerical results.

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