



ICRDET-24

4th International Conference on
“Recent Developments in Engineering &
Technology”

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Book of Abstracts

Edited by

Prof. A.K. Dwivedi, Prof. Praveen Agarwal,
Dr. Deepak Bhatia & Prof. Bhavana Mathur



ANAND
INTERNATIONAL COLLEGE
OF ENGINEERING

Jointly Organized
by

Rajasthan Technical University, Kota
&

Anand International College of Engineering, Jaipur



www.anandice.ac.in



**4th International Conference
on
Recent Developments in Engineering & Technology
(ICRDET-2024)**

**Jointly Organized by
Rajasthan Technical University, Kota
&
Anand International College of Engineering**

Venue:

**January 16th-17th, 2024
Anand International College of Engineering, Jaipur, INDIA
(<https://anandice.ac.in/icrdet23/>)**

<https://anandice.ac.in/icrdet23/>

HISTORY OF ICRDET:

History of ICRDET originated when many Engineers and Mathematicians recognized the need to provide greater opportunities to researchers in the field of Engineering and Technology. ICRDET provides a leading forum for the presentation of new advances and research results in the fields of Recent Development in Engineering and Technology. The conference will bring together leading Researchers, Engineers, Scientists and Students from all around the world working in the areas related to the Conference and provide an opportunity to interact and exchange ideas. ICRDET conference series is held annually. With this aim Anand International College of Engineering, established the Organizing Committee of ICRDET.

- Anand International College of Engineering, Jaipur organized the 1st International Conference on Recent Developments in Engineering & Technology in September 14-15, 2019 jointly organized with Rajasthan Technical University, Kota under TEQIP-III RTU (ATU)
- Anand International College of Engineering, Jaipur organized the 2nd (Online) International Conference on Recent Developments in Engineering & Technology in February 26-27, 2021 jointly organized with Rajasthan Technical University, Kota under TEQIP-III RTU (ATU)
- Anand International College of Engineering, Jaipur organized the 3rd (Online) International Conference on Recent Developments in Engineering & Technology in February, 25th -26th , 2022 jointly organized with Rajasthan Technical University, Kota under TEQIP-III RTU (ATU)

Publications

- P. Agarwal, S. Kanemistu, S.D Purohit (eds.), Recent Developments in Engineering & Technology (ICRDET-2019). Conference Proceeding 2019, Anand-ICE, India, ISBN-978-93-5408-571-0
- P. Agarwal, B. Mathur (eds.), Recent Developments in Engineering & Technology (ICRDET-2021). Conference Proceeding 2021, Anand-ICE, India, ISBN-978-81-953996-3-5 (under production)

Special Issue of ICRDET-2021

- Advanced Mathematical Tool-Based Internet of Things (IoT)
- Journal of Nonlinear Sciences and Applications
- Engineering and Applied Science Letters (EASL)
- Communications in Mathematics and Applications
- Applications and Applied Mathematics: An International Journal (AAM)
- Proceeding Book of ICRDET-2021

Special Issue of ICRDET-2022

- Discrete & Continuous Dynamical Systems
- Mathematical Modeling and Control
- Journal of Engineering Science
- Operational Research in Engineering Sciences: Theory and Applications
- Pure and Applied Advances in the Fractional Calculus: Applications

About 4th ICRDET-2024:

The conference will be held at Anand International College of Engineering, Jaipur, India on 16th-17th January, 2024. The objective of 4th ICRDET-2024 is in the line of UN 2030 agenda for Sustainable Development: “Transforming our world” focused on SDG 03, SDG 08 & SDG 12 with the objective to support sustainable development strategies and the implementation of the 2030 Agenda for Sustainable Development. The conference focuses on innovative advancements and sustainability in Engineering and Technology that aims for peace and prosperity for people and the planet, now and into the future. It helps experts, researchers, and industry professionals worldwide to come together to share knowledge and shape the future engineering sustainably.

About Anand International College of Engineering, Jaipur:

Anand International College of Engineering (Anand-ICE), approved by AICTE, is amongst the premier RTU affiliated colleges in Jaipur established in the year 2010. Since its inception, the institute persists its credentials of joyous teaching-learning environs of global standards and offers B-Tech Degree programs in Civil Engineering, Computer Science Engineering, Electrical Engineering, Computer Science and Engineering (Artificial Intelligence), and Mechanical Engineering. The Institute nurtures intellectually inspiring Academic Environment with world-class infrastructure, state-of-the-art laboratories, and a lush green landscaped campus.

While there is a long Jaipur engineering college list, choosing the best college in Rajasthan for B-Tech and M-Tech courses is not a tedious job. You can rely on the brand Anand-ICE to transform your child's life. Anand-ICE falls in the premium Jaipur engineering colleges list that makes it all the more trust-worthy to get into the college assuring secured academic future.

We, at Anand-ICE, do not leave anything to chance. We engage and energize students to deliver in the real world.

About Rajasthan Technical University, Kota:

Rajasthan Technical University (RTU) is located in Kota in the state of Rajasthan. It was established in 2006 by the Government of Rajasthan to enhance the technical education in the state. The university has been established in the campus of University College of Engineering, Kota (previously known as Engineering College, Kota), which is located on the Rawatbhata Road, The university currently affiliates about 68 Engineering Colleges, 03 B.Arch., 16 MCA Colleges, 39 MBA Colleges, 31 M.Tech Colleges, 01 M.Arch and 01 Hotel Management and Catering Institute. The University aims to provide quality technical education which may help Rajasthan in its technical development and will boost technical environment in the country. The University offers almost all the disciplines related to technical education including Bachelor of Technology, Master of Technology, Master of Business Administration, Master of Computer Applications, and Bachelor of Hotel Management and Catering Technology. The University is making steady progress in developing and providing best technical environment for education and will continue to serve the nation in coming years.

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Conference Messages

प्रॉ. एस. के. सिंह
कुलपति
Prof. S.K. Singh
Vice Chancellor



राजस्थान तकनीकी विश्वविद्यालय, कोटा
RAJASTHAN TECHNICAL UNIVERSITY, KOTA

No:RTU/VCS/F(1)26/2023/

Date: 08.01.2024



MESSAGE

It gives me immense pleasure to know that Anand International College of Engineering, Jaipur and Rajasthan Technical University, Kota are jointly organizing the International Conference on Recent Development in Engineering & Technology, ICRDET (Hybrid)-2024 from 16th to 17th January 2024.

The conference is one of its impressive kinds in the academic field. The conference gives an array of innumerable opportunities to the research scholars, academicians, teachers, scientists, and students to widen their horizon of knowledge to get indulged in the new advancements of the engineering field and bloom like a glorified technical knowledge. The college has not only established the milestone among the other colleges across the globe but also provides the pink city and capital of Rajasthan, Jaipur, a moment of pride to organize such an acclaimed international conference.

There have been frequent changes in technology in recent years such as Artificial Intelligent, Quantum Computing, Blockchain Technology and many more. I am confident that this conference would provide a platform to the researchers, academicians and technocrats to move further in this direction.

My confidence says that the conference would be prodigious learning platform to the fervent participants and encourages more to approach such learned events in the near future. My heart warming and uplifting wishes and blessings are there with the college in the form of massive success of the conference.


(Prof. S.K. Singh)
Vice Chancellor

Rawatbhata Road, Kota (Rajasthan) 324010, INDIA

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Mr. Manoj Mittal
Chairman

Anand International College of Engineering

Message

It gives me great pleasure to welcome you to the **ICRDET-2024**, which is being organized at Anand International College of Engineering. It is a privilege to host this International Conference on Recent Developments in Engineering and Technology.

Anand-ICE is renowned for its teaching methodology, career-oriented training programs, and world-class infrastructure. It fosters creativity and supports innovative and unconventional ideas. Academic excellence and a competitive edge are key elements of Anand-ICE's mission, aiming to enable our students to successfully integrate into the global community.

In this context, I am confident that the forthcoming gathering of educators and researchers will provide tremendous benefits to our students. It will also provide them with a platform to learn on an international scale.

As the Chairman of Anand International College of Engineering, my vision is to create future global technocrats and world thinkers who bring pride to our nation in every industry - technology, management, information technology, etc., not only nationally but also globally.

I am grateful to have Prof. Praveen Agarwal, Conference General Chair, and Prof. Bhavana Mathur, Organizing Chair, for elevating Anand-ICE to another level in the education sector through their commendable efforts. I would also like to extend a special welcome to the International Advisory Board, International Committee Members, National Organizing Committee, Conference Speakers, and all the delegates attending this conference.

Acknowledging the support and efforts of the Committee Members, I would like to extend my heartfelt wishes for yet another successful Conference at Anand-ICE.



Ms. Monika Mittal Agarwal

Vice Chairperson

Anand International College of Engineering

Message

Anand International College of Engineering is extremely honored to be the host of the 4th. hybrid ICRDET-2024. I would like to welcome each and every national and international delegate to our Campus. This conference offers a unique chance for Researchers to communicate their most recent discoveries and forge new partnerships. It is an international forum for professionals in the domains of Mechanical, Civil, Electrical, Computer Engineering, Artificial Intelligence and Basic Sciences.

The students and faculty of Anand International College of Engineering form a unique community committed to exchanging ideas and providing high- quality education to instill in our students a desire to excel so they can lead their professional careers to the pinnacle of excellence.

This kind of exposure will definitely impact the thinking and intellectual development of our budding engineers. Also, I am sure that we will be able to satisfy the urge of newer learning and erudite communication among all the participants in this two-day Conference.

I appreciate the efforts of Prof. Dr. Praveen Agarwal and Prof. Bhavana Mathur for making this event happen at Anand-ICE and I must also mention that the dedication of the Program Committee members towards the successful execution of this event is commendable.

I once again welcome all the participants and wish them a pleasant stay in Jaipur.

Good Luck and my heartiest wishes for the success of this Conference!!



RAJASTHAN TECHNICAL UNIVERSITY, KOTA
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Prof. A.K. Dwivedi

Dean

Faculty Affairs & Student Welfare



MESSAGE

It's always been a moment of pride and contentment to be a part of the scholarly learning and this time Rajasthan Technical University, Kota and Anand International College of Engineering, Jaipur, has given me this undeniable opportunity to be a part of the 4th International Conference on Recent Development in Engineering & Technology, ICRDET (Hybrid)-2024 on 16th to 17th January, 2024.

As we are familiar with the objective of 4th ICRDET-2024 that is to provide a world class platform to present and discuss all the latest research and results of scientists related to Mechanical, Civil, Electrical, Electronics, Computer Engineering and Basic Sciences.

Hence, I confidently believe that this conference is going to provide the openings to all the delegates belonging to the different scientific fields to share new ideas and to uncover worldwide cohorts for future alliance. Anand International College of Engineering, Jaipur has always given the knowledgeable efforts.

This conference is going to serve as a tool to all the scholars, academicians, scientists and mathematicians as an update of the technology. The conference will indisputably give the result as the noteworthy contribution to the knowledge in the advancements in the science and technology. The college also offers such an ideal platform for the scholars around the globe every year and I really appreciate such organizations like Anand ICE, Jaipur for putting in such educated endeavors. I am extremely delighted to be a part of such a great conference.

I would like to thank Hon'ble Vice-Chancellor, RTU, Kota (Prof. S.K Singh) for his guidance and support in organizing such kind of events. Further, I would to thank the Prof. Praveen Agarwal his extra ordinary efforts to making this event happen.

I would like to extend my warm thanks to the Management of Anand-ICE for this grand event and an absolute success for it.

(Prof. A.K. Dwivedi)



Dr. Deepak Bhatia
General Chair ICRDET-2024
Rajasthan Technical University

Message

It's always been a moment of pride and contentment to be a part of the scholarly learning and this time Rajasthan Technical University, Kota and Anand International College of Engineering, Kanota, Jaipur, has given me this undeniable opportunity to be a part of the 4th International Conference on Recent Development in Engineering & Technology, ICRDET (Hybrid)-2024 on 16th to 17th January, 2024 as one of the General Chair of the conference.

As we are familiar with the objective of 4th ICRDET-2024 that is to provide a world class platform to present and discuss all the latest research and results of scientists related to Mechanical, Civil, Electrical, Electronics, Computer Engineering and Basic Sciences. Hence, I firmly believe that this conference is going to provide the openings to all the delegates belonging to the different scientific fields to share new ideas and to uncover worldwide cohorts for future alliance.

Anand International College of Engineering, Jaipur has always given the untiring efforts in bringing the knowledgeable nectar around the globe by organizing the conferences, seminars, workshop, and other events. This time also the college has nailed their efforts by organizing the ICRDET'24.

I would like to thank the honorable Vice-Chancellor, RTU, Kota (Prof. S.K Singh) for their guidance and support in organizing such kind of events. Further, I would to thank the Prof. Praveen Agarwal his extra ordinary efforts to making this event happen.

I would like to extend my warm thanks to the Management of Anand-ICE for this grand event and an absolute success for it.

My heart is puffed with a sense of gratitude for the Management of Anand-ICE and all the ardent participants who are unquestionably going to make this conference a gigantic success.



Prof. Vijay K Sharma
Principal

Anand International College of Engineering

Message

It is quite gratifying to note that Anand International College of Engineering is organizing its 4th International Conference on Recent Developments in Engineering and Technology (ICRDET-2024), in association with Rajasthan Technical University, Kota on 16 - 17 January 2024.

Organizing such an event at this point of time reinforces our objective of developing an environment for the exchange of ideas towards technological developments. I wish the conference would be able to deliberate on current issues of national and international relevance, particularly in the field of manufacturing, structural design, data mining, networks, electric systems, big data analytics etc.

There have been unprecedented numbers of quality papers that are to be presented in the conference. I am sure that this occasion will provide an affable environment for the researchers and academicians to freely exchange the views and ideas with others. I convey my warm greetings and felicitations to the organizing committee and the participants and extend my best wishes for the success of the conference.

Finally, I am sure this conference will contribute towards our glorious prime minister vision of Viksit Bharat@2024.

**Prof. Praveen Agarwal**

Vice Principal

General Chair, ICRDET-2024

Anand International College of Engineering

Message

I welcome the participants of ICRDET'24. The main goal of organizing this conference is to share and enhance the knowledge of each and every individual in this growing world. We have given a good opportunity for those who have a thirst in knowing the present technological developments and also share their ideas. Furthermore, this conference will also facilitate the participants to expose and share various novel ideas in the line of UN 2030 agenda for Sustainable Development to support sustainable development strategies and the implementation of the 2030 Agenda for Sustainable Development.

The conference aims to bridge the researchers working in academia and other professionals through research presentations and keynote addresses in current technological trends. It reflects the growing importance of Engineering & Technology as a field of research and practice. You will get ample opportunities to widen your knowledge and network. Outside of the conference, I hope that you would/will enjoy some of the many attractions found in and around our beautiful campus Anand-ICE. Such a large conference event is the culmination of many individuals. I thank the conference committee for extending their valuable time in organizing the program and all the authors, reviewers, and other contributors for their sparkling efforts and their belief in the excellence of ICRDET'24.

I pay my sincere thanks to the honorable Vice-Chancellor of RTU, Kota and honorable Chairman of the Anand-ICE for their support in conducting this event.

**Prof. Bhavana Mathur**

Organizing Chair, ICRDET-2024
Anand International College of Engineering

Message

It is extremely a great moment of honor and pleasure to announce for the 4th International Conference on Recent Development in Engineering Technology (ICRDET-2024) jointly organized by Anand International College of Engineering, Kanota, Jaipur and Rajasthan Technical University Kota on 16th - 17th January, 2024 and also publishing an Abstract book.

ICRDET is a vast canvas that basically involves independent innovations in Engineering and science arena as well as from other technical and scientific streams which intuitively provide excellent opportunities of collaboration to bring about high potentiality for the future.

I extend my heartfelt wishes for the grand success of ICRDET-2024.

CONFERENCE SCHEDULE

Day-1 (16.01.2024- Tuesday)		
ZOOM LINK: https://zoom.us/j/99982731065?pwd=WWdZdDBRd3JkZ2tEaXRIUzhFN1V3Zz09		
Timing & Location	Description	
10:30am-11:30pm (L-13, Basement)	Registration & Hi-Tea	
11:30am-12:25pm (Seminar Hall-02)	Conference Inaugural Ceremony	
Timing & Location	Keynote/Invited Speaker	Presentation Titles
12:30 pm-01:15 pm (Seminar Hall-02)	Keynote Talk- 1 Prof. Ali Taheri University of Sussex, United Kingdom	Mathematics of Material and Crystals: Open Problems, Puzzles and Challenges Session Chair by – Dr. Deepak Bhatia RTU, Kota Moderator – Prof. Praveen Agarwal
01:15pm-02:00pm	LUNCH	
02:05 pm- 02:35pm (Seminar Hall-02)	Invited Talk-1 Dr. Sanyog Rawat Central University, Rajasthan	Wearable Devices: Potential Breakthroughs and Transformative Technologies Session Chair by – Mr. Vivek Bhojak Moderator - Dr. Diksha
02:35 pm- 03:05pm (Seminar Hall-02)	Invited Talk-2 Dr. Vahideh Vahidifar University of Sussex, United Kingdom	Dynamic Modelling and Control of Surgical Robots using Leap Motion Sensor and Machine Learning Methods Session Chair by – Prof. Bhavana Mathur Moderator – Dr. Ravi Sharma
03:05pm-03:15pm	Tea Break	
Parallel Paper Presentation Sessions (Online/Offline) 3:15pm – 4:30pm		
Track & Location	Session Chair / Moderator	Online Session Link
Track-1@ SH-2	Session Chair by – Dr. Nitesh Kaushik Moderator – Ms. Akansha Chaturvedi	https://meet.google.com/qtd-ztrf-xck
Track-2@ Computer Center	Session Chair by – Mr. Pramil Sinha Moderator – Mr. Anil Bhargav	https://meet.google.com/mbg-cbwo-hyk
Track-3@ GD Room-1	Session Chair by – Prof. Anil Dhawan Moderator – Dr. Prakash Singh	https://meet.google.com/ktz-aqyh-epp
Track-4@ GD Room-2	Session Chair by – Prof. Sanjana Chug Moderator – Dr. Ravi Sharma	https://meet.google.com/cwc-hdfx-xmk
Track-5@ Computer Center	Session Chair by – Mr. Shiv Kumar S Moderator – Mr. Shahnawaz Ansari	https://meet.google.com/mbg-cbwo-hyk

Day-2 (17.01.2024 - Wednesday)		
ZOOM LINK: https://zoom.us/j/99982731065?pwd=WWdZdDBRd3JkZ2tEaXRIUzhFN1V3Zz09		
Timing & Location	Keynote/Invited Speaker	Presentation Titles
10:30am-11:15am (Seminar Hall-02)	Keynote Talk- 2 Prof. Mahmoud Abdel-Aty Sohag University, Egypt	Recent Advances on Quantum Information and Nanomechanics Session Chair by – Prof. Praveen Agarwal Moderator –Mr. Vivek Bhojak
11:15am-11:45am (Seminar Hall-02)	Invited Talk-3 Prof. Rajesh Kumar MNIT, Jaipur	Issues with AI for Healthcare Session Chair by – Dr. Minal Bafna Moderator – Prof. Anil Dhawan
11:45am-12:00pm	Tea Break	
12:00pm-12:45pm (Seminar Hall-02)	Keynote Talk- 3 Prof. Juan Luis Garcia Guirao Technical University of Cartagena, Spain	Shannon-Whittaker-Kotel'nikov's Theorem Generalized Session Chair by – Prof. Ali Taheri Moderator – Mr. Pramil Sinha
12:45pm-01:00pm	Break	
1:00pm-01:45pm (Seminar Hall-02)	Keynote Talk- 4 Dr. Bhaskar Roy Vice President and Global Ops Leader, Genpact, India	Applications of Artificial Intelligence to drive ESG strategies for industrial companies Session Chair by – Prof. Praveen Agarwal Moderator – Mr. Dharmendra Kumar
01:45pm – 02:15pm (Boys Mess)	LUNCH	
02:15 pm– 02:45pm (Seminar Hall-02)	Invited Talk-4 Dr. Jagdish Chand Bansal South Asian University, New Delhi	Drone Swarm: Concept, Challenges and Applications Session Chair by – Dr. Nitesh Kaushik Moderator - Prof. Sushmita Sharma
02:45pm-03:00pm	Tea Break	
03:00pm– 03:30pm (Seminar Hall-02)	Invited Talk-5 Dr. Jeevan Kaffle Tribhuvan University, Kathmandu, Nepal	Advancements in Scientific Computing: Mathematical Modeling with Differential Equations for Mass Transport Session Chair by – Prof. Bhavana Mathur Moderator - Dr. Shruti Soni
Parallel Paper Presentation Sessions (Online/Offline) 3:15pm – 4:20pm		
Track & Location	Session Chair / Moderator	Online Session Link
Track-1@ SH-2	Session Chair by – Dr. Nitesh Kaushik Moderator – Ms. Akansha Chaturvedi	https://meet.google.com/qtd-ztrf-xck
Track-2@ Computer Center	Session Chair by – Mr. Pramil Sinha Moderator – Mr. Anil Bhargav	https://meet.google.com/mbg-cbwo-hyk
Track-3@ GD Room-1	Session Chair by – Prof. Anil Dhawan Moderator – Dr. Prakash Singh	https://meet.google.com/ktz-aqyh-epp
Track-4@ GD Room-2	Session Chair by – Prof. Sanjana Chug Moderator – Dr. Ravi Sharma	https://meet.google.com/cwc-hdfx-xmk
Track-5@ Computer Center	Session Chair by – Mr. Shiv Kumar S Moderator – Mr. Shah Nawaz Ansari	https://meet.google.com/mbg-cbwo-hyk
04:20pm-04:30pm (Seminar Hall-02)	VALEDICTORY SESSION	

Abstracts of Keynote Talks



Prof. Juan Luis Garcia Guirao

Technical University of Cartagena, Spain

Title: Shannon- Whittaker- Kotel'nikov's Theorem Generalized

Abstract: We proposed a generalization of the sampling theorem by means of a Shannon type asymptotic recomposition formula for signals and necessarily band-limited. We show, by giving two alternating proves, that Gaussian-type signals satisfy it and we postulate that there are many more signals that can be recomposed by this method.

Keynote Talk: ICRDET-001



Prof. Ali Taheri

University of Sussex, United Kingdom

Title: Mathematics of Material and Crystals: Open Problems, Puzzles and Challenges

Abstract: In this talk I start by going through the mathematical foundations of materials, namely, solid mechanics and nonlinear elasticity. I will describe some of the sophisticated tools, techniques and ideas in the subject that are borrowed from and deeply intertwined with the theory of partial differential equations, calculus of variations and geometric analysis. I will then describe some of the latest advances and developments in the field with direct applications to mathematics, sciences and engineering. I will present some outstanding open problems, curious puzzles and technical challenges in the theory and will describe the links between these questions and other areas of mathematics.

Keynote Talk: ICRDET-002



Prof. Mahmoud Abdel-Aty

Vice-President of African Mathematical Union,
Sohag University, Egypt

Title: Recent Advances on Quantum Information and Nanomechanics

Abstract: In this work, we highlight the recent advancements in the fields of quantum information and nanomechanics. It discusses the latest progress and breakthroughs in utilizing quantum information for various applications, as well as the integration of nanomechanics in quantum systems. The work provides a glimpse into the cutting-edge research and technological developments in these rapidly evolving fields, demonstrating the potential for quantum information and nanomechanics to revolutionize information processing, sensing, and computing.

Keynote Talk: ICRDET-003



Dr. Bhaskar Roy

Vice President and Global Ops Leader
Genpect India

Title: Applications of Artificial Intelligence to drive ESG strategies for industrial companies

Abstract: Corporate sustainability has become an increasingly important aspect of business operations as companies strive to balance their economics, social and environmental impacts. One of the key tools for measuring and communicating a company's sustainability performance is ESG reporting, which stands for environmental, social and governance factor. By integrating AI into ESG risk management and strategies, organizations can not only achieve their sustainability goals, but also unlock new avenues for driving both sustainable development and organizational innovation. In this section, we will discuss some cutting edge work done in AI and Gen AI to help companies create energy transition strategies.

Keynote Talk: ICRDET-004

Abstracts of Invited Talks



Prof. Rajesh Kumar
MNIT, Jaipur

Title: Issues with AI for Healthcare

Abstract: While Artificial Intelligence (AI) holds immense promise for revolutionizing healthcare, its integration presents significant challenges that require careful consideration. This presentation outlines the key issues surrounding AI in healthcare, including data privacy, algorithmic bias, lack of transparency, job displacement, and ethical concerns. Addressing these challenges through responsible development, fair algorithms, continuous monitoring, workforce training, and public engagement is crucial to ensuring AI's potential to benefit all and create a more personalized, efficient, and equitable healthcare system. The journey towards integrating AI into healthcare demands a collaborative effort. Scientists, technologists, policymakers, and healthcare professionals must work together to develop ethical frameworks, address data privacy concerns, and ensure equitable access to these powerful technologies.



Dr. Vahideh Vahidifar
University of Sussex, United Kingdom

Title: Dynamic Modelling and Control of Surgical Robots using Leap Motion Sensor and Machine Learning Methods

Abstract: The recent developments in medicine, engineering, and computer science has resulted in an increase in the propensity to laparoscopic surgery and the number of surgical robots in the operating rooms day by day. This naturally necessitates a significant interaction between surgeon and robot. Considering workspace restrictions and the importance of maintaining sterility in the operating rooms, the presence of contactless user interfaces is of paramount importance in order to establish efficient interaction between the surgeon and surgical robot. In our approach, a vision-based contactless user interface named Leap Motion Controller was studied which is able to track position, velocity, and orientation of the surgeon's hand and detect gestures and movements of each finger and then, transmit the data to a computer. Afterward, a

surgical robot arm was controlled using LM's received data which was classified through programming. The telesurgery can be operated by using this controller beside a surgical robot. In addition to the mentioned capabilities for LM, some characteristics such as low price, acceptable accuracy (approximately 0.1 mm), and high-rate data collecting and processing (more than 100 fps) have made this device utilizable and efficient. In this study, surgical robotic systems and natural human-computer user interfaces are introduced. The sensor characteristics, the way to set up the controller, some examples of Leap Motion utilization in the operating rooms, and the advantages and disadvantages of the sensor are investigated as well. Afterward, the displacement of the hand's palm center is set as a criterion for the displacement of the 5-DoF surgical robot simulator end-effector. Moreover, the angle forms between thumb and index finger is used as a command to open or close the laparoscopic grasper.

To enable effective collaboration with humans in dynamic settings, robots must swiftly acquire and apply new motion skills, especially in adapting to unforeseen challenges like obstacle navigation. Our innovative approach involves learning motion patterns from human demonstrations through a Riemannian manifold perspective, implemented with a variational autoencoder (VAE). Geodesic motion skills, derived from this approach, allow robots to seamlessly plan movements and dynamically avoid obstacles. Testing with a 5-DoF robotic manipulator demonstrates successful acquisition and reproduction of realistic skills, showcasing adaptability in navigating obstacles and generating novel movements in diverse scenarios.



Dr. Sanyog Rawat

Central University of Rajasthan, India

Title: Wearable Devices: Potential Breakthroughs and Transformative Technologies

Abstract: This presentation embarks on an exciting journey into the world of wearable devices, where cutting-edge technology intersects with healthcare and communication. These versatile gadgets have demonstrated profound potential in transforming the landscape of modern healthcare, offering unparalleled convenience, accessibility, and accuracy in health monitoring. Furthermore, they have facilitated seamless communication between patients and healthcare professionals, breaking down barriers and transcending geographical boundaries. In this presentation, we will explore the myriad applications of wearable devices in healthcare and communication, diving deep into their impact on patient care, remote monitoring, and the future of digital health.



Dr. Jeevan Kafle

Central Department of Mathematics,
Tribhuvan University, Kathmandu, Nepal

Title: Advancements in Scientific Computing: Mathematical Modeling with Differential Equations for Mass Transport

Abstract: This talk explores the versatile use of Differential Equations in modeling heat and multiphase mass transfer. We focus on geophysical mass flows, biomechanical fluids, and dispersion of air/water pollutants. We discuss the evolution of modeling techniques, including adaptations of Navier-Stokes Equations for blood flow and modified advection-diffusion equations and the fractional calculus for pollutant dispersion. Additionally, numerical methods, simulations and laboratory experiments pertaining to diverse mass transport scenarios will be elaborated.



Dr. Jagdish Chand Bansal

Associate Professor, India

Title: Drone Swarm: Concept, Challenges and Applications

Abstract: Recently, swarm intelligence has emerged as an efficient problem-solving strategy. An interacting autonomous group of drones assigned to perform a/some task(s) is usually referred to as a drone swarm. Swarms of drones are fundamental future agenda and will be adopted with time. The most crucial challenge for drone swarm is the inter-drone communication topology. Apart from the various possible inter-drone communication topologies, this talk will discuss the formal definition and requirements of the drone swarm. I will also address the types of drone swarms. Potential applications of drone swarm will also be covered.

Abstract of Oral Presentation

Paper code: ICRDET-T1-1001

Hand Symbol Recognition Using Canny Edge Algorithm and Convolutional Neural Network

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Abstract—Hand symbol recognition is a pivotal component in the domain of computer vision, with far-reaching applications spanning sign language interpretation, human-computer interaction, and accessibility. This research paper discusses the approach with the integration of the Canny Edge algorithm and Convolutional Neural Network. The significance of this study lies in its potential to enhance communication and accessibility for individuals with hearing impairments or those engaged in gesture-based interactions with technology. In the experiment mentioned, the data is manually collected by the authors from the webcam using Python codes, to increase the dataset augmentation is applied to original images which makes the model more compatible and advanced. Further, the dataset of about 6000 coloured images distributed equally in 5 classes (i.e., 1, 2, 3, 4, 5) are pre-processed first to gray images and then by the Canny Edge algorithm with threshold 1 and 2 as 150 each. After successful data building, this data is trained on the Convolutional Neural Network model giving Accuracy: 0.97834, Precision: 0.97841, Recall: 0.9783, and F1 score: 0.97832. For user purposes, a block of codes is built in Python to enable a window for hand symbol recognition. This research, at its core, seeks to advance the field of computer vision by providing a novel perspective on hand sign recognition. By leveraging the capabilities of the Canny Edge algorithm and Convolutional Neural Network, this study contributes to the ongoing efforts to create more accurate, efficient, and accessible solutions for individuals with diverse communication needs.

Paper code: ICRDET-T1-1002

Mean Normalized Scaling Stochastic Neighbor Embed Federated Learning for Efficient Disease Diagnosis

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Abstract -Disease diagnosis is an essential one in present living lifestyle to avoid unexpected deaths and maintain average life expectation. Several methods are introduced for efficient disease diagnosis. But, early disease detection with minimum time is the major challenging problem. Consequently, a novel method is required for performing accurate disease diagnosis with minimum time. A novel method termed Mean Normalized Scaling Stochastic Neighbor Embed Federated Learning (MNSSNEFL) Method is introduced for improving the disease diagnosis performance through enhanced accuracy and minimum time consumption. Initially, the proposed MNSSNEFL Method carried out data preprocessing using mean normalized scaling through data cleaning, scaling, normalization and transformation process. After that, stochastic

neighbor embedding feature selection is performed in MNSSNEFL Method to choose relevant features for efficient classification. Lastly, classification is performed using broken-stick regressive federated learning to perform efficient disease diagnosis. This in turn aids to enhance accuracy and minimize the error. Experimental evaluation is performed by RSNA Pneumonia Detection Challenge dataset on disease diagnosis accuracy, space complexity, error rate as well as disease diagnosis time. Discussed outcomes confirm which the MNSSNEFL Method provides improved performance in terms of achieving enhanced disease diagnosis accuracy and minimum time consumption when compared to conventional methods.

Paper code: ICRDET-T1-1003

Predicting Tuberculosis Treatment Outcome Using Machine Learning Techniques

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Abstract— The cause of tuberculosis can be dangerous and even be a fatal disorder, the mainstream of patients are able to recover with prompt diagnosis and treatment. After a few weeks of treatment, you won't be contagious, and you could start feeling better and as a result most people don't take their TB medications as prescribed by their doctor. Also taking TB medications or not completing the entire therapy could lead to the bacteria still alive in them to develop antibiotics resistance, which is far more dangerous and difficult to treat. In this research, two (2) machine learning algorithms; Logistic Regression (LR) and Random Forest (RF) were employed for predicting tuberculosis treatment outcome in order to ensure treatment completion for favorable outcome. Grid Search was used to improve the model's performance and of the two developed model, both models performed very well with LR having an accuracy of 75%, and RF an accuracy of 55%.

Paper code: ICRDET-T1-1004

Current and Future Trends in Augmented Reality Filter: A Review

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Abstract-Augmented reality (AR) filters are being used on social networks to generate new user experiences. The research previously analysed on the impact of Augmented Reality filters was mainly focused on marketing-based or Individual -based variables. In this Investigation, following the concept of uses and indulgence, the capability of Augmented Reality filters will be examined. The output of both studies joining quality and quantity wise methods given that perceived entertainment and interactivity are the key factors affecting users' satisfaction with AR filters. Specialist must include proper characteristic while creating the AR filters in order to ensure that customer derive delightful experiences, communicate with others, and refresh content. All of them lead to increased customer narrative through pictures.

Paper code: ICRDET-T1-1005

Image Steganography Techniques for Secure Data Transmission: A Survey

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Abstract- This article presents a detailed analysis of existing image steganography techniques, particularly in the transform domain. Recent studies in the steganography techniques focus upon the use of meta-heuristic techniques as a way to improve the quality of generated stego-image. By means of nature inspired algorithms; it is possible to figure out the optimal pixel positions or the frequency coefficients which can be used to embed the hidden message. Moreover, these techniques are also used to maximize the embedding capacity by retaining the imperceptibility of the image within a specified threshold. The benchmark techniques that are meticulously reviewed in this paper include Discrete Wavelet Transform, convolutional network-based techniques, chaotic map-based techniques, and meta-heuristic-based steganography techniques. An attempt has been made to systematically analyze blind and non-blind categories of techniques, measured with respect to the robustness of embedding. The study also focuses on the most common types of attacks like visual attacks and unstructured attacks. The comparison among all techniques has been done on different quality metrics mostly used in the reviewed techniques like PSNR, MSE, Embedding capacity and security etc.

Paper code: ICRDET-T1-1006

Revolutionizing Software Engineering: A Comprehensive Analysis of Artificial Intelligence's Transformative Impact and Integration Strategies

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Abstract- In the dynamic realm of software development, Artificial Intelligence (AI) stands out as a central force, revolutionizing traditional methodologies and introducing unprecedented efficiencies. This research delves into the seamless integration of AI in software development, aiming to illuminate its transformative influence on coding practices, project management, and quality assurance. Our exploration commences with an extensive review of literature, shedding light on the historical evolution and present state of AI applications in the realm of software development. Our methodology encompasses a comprehensive approach, blending qualitative and quantitative analyses. This includes delving into case studies of projects driven by AI and conducting comparative evaluations of AI tools in real-world scenarios. The crux of our research zeroes in on pivotal AI technologies, notably machine learning algorithms and natural language processing. We scrutinize their roles in automating code generation, testing, and debugging processes. The results uncovered significant improvements in efficiency,

accuracy, and complexity management, all attributed to the seamless integration of AI. However, our discussion doesn't shy away from addressing the challenges and ethical considerations that come hand in hand with the adoption of AI. We emphasize the imperative need for balanced and responsible approaches. Looking ahead, we explore emerging trends and potential advancements in the realm of AI, proposing avenues for future research. This study not only underscores the transformative potential of AI in software development but also provides a guiding framework for practitioners and researchers navigating this dynamic field.

Paper code: ICRDET-T1-1007

Ethics and Challenges in Generative AI: Navigating Copyright Concerns

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Abstract:-Generative Artificial Intelligence (AI) has emerged as a revolutionary force, transforming various industries through its ability to create content autonomously. However, as this technology advances, concerns about ethical use and copyright infringement have gained prominence. There is a surge in legal actions related to generative AI and copyright concerns in the United States. The complainant typically needs to demonstrate that AI companies utilized their content and that the output generated by AI is significantly similar. This legal landscape remains largely untested. In India, AI companies are actively collecting vast amounts of content in Indian languages, including English, to replicate models. Unfortunately, many content creators in India are ill-equipped to defend their copyright. There is a pressing need for proactive measures in the legal framework to stay ahead of the curve and establish laws that prevent the exploitation of original content creators, ensuring they are not taken advantage of in the evolving landscape of AI-generated content. This write-up explores the challenges associated with generative AI and emphasizes the importance of respecting intellectual property rights. It delves into the need for responsible practices, legal frameworks, and technological solutions to ensure that generative AI does not have a free pass on mining others' content without permission or payment.

Paper code: ICRDET-T1-1008

LOC-MAC-HASH: A Novel Approach to Generate Environmental Tokens for IT System Security

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Abstract—Enterprise IT systems deployed in the public cloud are subjected to various attacks including inside and outside cloud attacks. This is a common case where the user may access the IT system through multiple stable workstations in different locations i.e. “The user is mobile but the device is stable”. Since location sensing is not

built in a stable workstation therefore context-aware solutions were not proposed for stable workstations. Most of the context-aware solutions are proposed for mobile users and mobile devices only. Since a user may have different working roles in different zones, therefore, we are proposing here a context-aware solution LOC-MAC-HASH for a stable workstation using IoT devices, sensors, and IoT cloud services to create a technology-agnostic secure zone where sensing of environmental parameters like location, temperature, pressure, light, images, sound, etc. are used to create a unique hash of a zone. In the environment, the AWS IoT Green grass core device coordinates with all IoT devices/sensors and creates the hash of a zone. MAC address is hashed using zone-hash to create a unique PC-token/PC-hash for the workstation. The workstation PC-token is mapped with zone-id into the IT system deployed in the cloud through AWS IoT. This PC-token needs to be extracted from the AWS Greengrass Core device through IoT application on the workstation and needs to be shared during login to decide allowed roles for a user in that zone. Since zone-hash is generated periodically with short time intervals therefore unique PC-token for each workstation may be considered as dynamic.

Paper code: ICRDET-T2-2001

Impact of different Generation from first to Fourth generation bio-fuels used in C.I. Engine: A Review

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Abstract- A developing country like India, in which urbanization and population (around 138 crore as of 2020) are both increasing and also increasing the economy of the country, The demand for energy is increasing very rapidly. Most of the power generation in India is generated by fossil fuels, which are responsible for greenhouse gas emissions (GHGs). The most promising fuel is Biodiesel which has similar properties as conventional diesel fuel. It has fewer emissions such as HCs, CO, PM etc. In this paper an overview of the different feedstock of biodiesel with their advantages and disadvantages has been presented. From first to fourth generation of biodiesel which have different impact on combustion and performance. Finally these paper deals the best generation which has the potential to reduce the GHGs also enhance the efficiency.

Paper code: ICRDET- T2-2002

Impact of supply chain practices tools in sustainability of healthcare supply chain: a study.

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Abstract— Supply chain (SC) is one of the most important tools that companies use to develop their performances. Supply Chain (SC) is the relationship and integration between the major stakeholders through major cross-functional business processes. It integrates end user through original suppliers that provide products, services, and information and add value for customers and other stakeholders. Supply chain

sustainability refers to companies' efforts to consider the environmental and human impact of their products' journey through the supply chain, from raw materials sourcing to production, storage, delivery and every transportation link in between. The healthcare supply chain is an extensive network of systems, components, and processes that collectively work to ensure medicines and other healthcare supplies are manufactured, distributed, and provided to patients effectively and efficiently. This study explored the impact of lean, flexible and industry 4.0 practices on the sustainability of supply chain management in the healthcare sector.

Paper code: ICRDET- T2-2003

GIS-based Hotspot Assessment of Solar Energy Potentials: African Countries clustering

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Abstract— This study introduces an approach to quantify solar energy potential and identify hotspot areas; cluster map the solar energy high potential countries in Africa for sustainable development of solar PV technology-based power using GIS spatial analysis. The research integrated geographical GHI, and DNI data, and other geospatial information to evaluate the total solar potential in the African region. The results revealed that Africa, with a total land area of 3.41×10^7 km², was found to have substantial potential as high of SEGHI at 7.41×10^{10} kWh, and SEDNI at 2.72×10^9 kWh. These results affirm Africa's solar energy potential as a valuable resource to address energy demands, foster economic growth, and reduce greenhouse gas emissions. Additionally, Moran's I was employed to analyses autocorrelation in countries' solar energy resources, revealing spatial patterns. Wealthy solar energy clusters were identified around countries such as Algeria, Chad, South Africa, Niger, Nigeria, Egypt, Sudan, Ethiopia, Central African Republic, South Sudan, and Libya. The study emphasizes the significance of harnessing solar energy to meet Africa's increasing demand for clean and sustainable energy sources. It provides a GIS analysis of Africa's solar energy potential, estimating the sky-available solar energy. This research offers invaluable insights for engineers, technologists, policymakers, investors, and energy planners by detailing the solar energy potential in various African regions and identifying the wealthiest solar energy clusters. This research supports the promotion of solar energy adoption and the utilization of abundant, untapped solar resources, contributing to a cleaner and more sustainable energy landscape in Africa. The implementation of solar photovoltaic systems in the continent presents a substantial economic opportunity, due to its environmental benefits and relative advantages compared to alternative energy generation methods.

Paper code: ICRDET- T2-2004

Lithium ion battery increase of charge concentration

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Abstract- Li-ion batteries (LIBs) have the highest energy density among practical secondary batteries and are widely utilized in electronics, electric vehicles, and even stationary energy storage systems. Along with expanding their demand and application, concern about Li and Co resources is growing. Recently, K-ion batteries (KIBs) have attracted much attention as potential alternatives to LIBs. Lithium-ion (Li-ion) batteries currently represent the state-of-the-art power source for all modern consumer electronic devices. As several new applications for Li-ion batteries emerge like Electric Drive Vehicles (EDVs) and Energy Storage Systems (ESSs), cell design and performance requirements are constantly evolving and present unique challenges to the traditional battery producers. A strong demand for safe and reliable performance of high-energy and high-power density Li-ion batteries thus becomes inevitable. Li-ion batteries are a widely used electrochemical energy storage device. But, catastrophic failure via thermal runaway leads to great flammability and toxicity hazards. As such, there is a need to better understand the thermal runaway process. In doing so, reducing its occurrence and improving predictions of its hazards. To achieve this, we aim to develop a more detailed model of thermal runaway. This is based on fundamental reaction theory. Micro-kinetic modeling techniques are applied to predict the kinetic evolution of the reacting systems on a mechanistic level, based on a detailed analysis of the elementary reaction steps. Using this methodology, we simulate the thermal decomposition of dimethyl carbonate, as a model electrolyte solvent, and predict the product species present in the off-gas. Previous studies have developed positive and negative electrode materials for KIBs and demonstrated several unique advantages of KIBs over LIBs and Na-ion batteries (NIBs). Besides being free from any scarce/toxic elements, the low standard electrode potentials of K⁺/K electrodes lead to high operation voltages competitive to those observed in LIBs. This chapter focuses on the safety aspects of Li-ion batteries on a system level and on a cell level. This demonstrates a method for predictive hazard assessments of Li-ion battery failure. This effectively makes the off-gas safer in terms of explosion hazards.

Paper code: ICRDET- T2-2005

Techno-economic impact of large-scale energy storage on Hybrid Power System operation using Intelligent Techniques

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Abstract: Exponential growth of demand for electrical power and reduction in the dependency on fossil fuel based generation has created interest towards hybrid power system (HPS) operation. The intermittent and uncertain nature of renewable sources produces difficulties in maintaining generation load balance. In this context the inclusion of largescale storage with HPS comes into scenario, which can make the system to operate in an optimal power flow (OPF) framework. To address such issues, this work aims in modelling of thermal-wind generation with the inclusion of large scale storage such as pumped hydro storage (PHS). The objective of the proposed work is to model the system in an OPF framework to minimize generation cost and voltage deviation. To optimize the HPS a recently developed optimization known as brown bear optimization algorithm (BBOA) and flower pollination algorithm (FPA) has been incorporated. The results show the dominance of BBOA over FPA in achieving the objectives. IEEE 30 bus system has been considered as the test system for the present work.

Paper code: ICRDET- T2-2006

Renewable Energy Status in India: A Comprehensive Review

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Abstract: In the present era, energy is the main inspiration for the socio-economic development. Due to the increase in rate of environmental concern renewable energy provide a significant interest. This alternative power source is gaining greater popularity due to continuous reduction in the availability of fossil fuels on earth. Renewable energy is the energy that comes from sun, wind, rain etc. Among the non-conventional/renewable energy sources, solar energy has great potential of conversion into electric power. Maximizing the power output from a solar power system is desirable to increase the efficiency. In order to maximize power output, it is necessary to keep the solar panels aligned with the sun. This paper deals with the generation of electrical power using solar power. In this paper, we have reviewed about the Solar Energy from Sunlight and discussed about their future trends and aspects. The paper also tries to discuss the working, solar panel types; emphasize the various applications and methods to promote the benefits of solar energy.

Paper code: ICRDET- T2-2007

N719 Dye-Coated ZnO Based Device for Enhanced Light Harvesting in Dye-Sensitized Solar Cells

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Abstract This study investigates a N719 dye-coated ZnO based device for potential applications in dyesensitized solar cells (DSSCs). The structural morphology of the device is examined using field-emission scanning electron microscopy (FESEM), providing insights into the surface characteristics and uniformity of the N719 dye deposition on the ZnO substrate. The J-V characteristics demonstrate a reasonable open-circuit voltage of 0.65 V, suggesting the potential for effective energy conversion efficiency i.e., 4.4%.

Paper code: ICRDET- T2-2008

Recent Advances and Applications of Perovskite Materials in Solar cells

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Abstract: The demand for electricity is constantly increasing, renewable resources of energy are continuously sought for this reason. Solar energy is a very promising solution for sustainable development. However, a major drawback is the limited power conversion efficiency of Silicon based photovoltaic solar cells. The discovery of perovskite materials has revolutionized the present generation of photovoltaic devices. Properties of Perovskite materials are high optical absorption properties, longer diffusion length of carriers and balanced charge transport properties. as high as 22 percent is reported as The highest recorded power conversion efficiency of perovskite solar cell. The development of various structures and manufacturing processes for perovskite solar cells has remained an evolving area of research. The aim of this paper is to summarize the present state of art of perovskite solar cells and recommend direction for future research. The underlying phenomenon is summarized followed by different device architectures, fabrication techniques and their comparison. This paper aims to recollect the recent improvements in perovskite solar cells and provide an extensive outlook and broader context of the topic.

Paper code: ICRDET- T2-2009

Fault Occurrence Possibilities in Photo-voltaic System: An Overview

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Abstract—Photo-voltaic system consists of converters, photo-voltaic modules, inverters, connecting wires etc. The faults produced in these systems can have a great impact on the efficiency and the reliability of the system. Installation of photo-voltaic modules in an improper way, lack of maintenance of the system and aging effect are some of the reasons for increase in the occurrence of faults in photo-voltaic system. Faults in the photo-voltaic system can be categorized into three parts: Photo voltaic array faults, AC side faults and DC side faults. To ensure a reliable and economic system there is a need to detect and resolve these faults quickly. This review paper presents photo-voltaic array faults and their resolution techniques.

Paper code: ICRDET- T2-2010

Battery Management System of Lithium Ion Battery

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Abstract: Battery Management System (BMS) Is an important part of the electric vehicles (EVs) and hybrid electric vehicles (HEVs) nowadays. Battery management systems(BMS) is used in electric vehicle to monitor and control the charging and discharging of rechargeable batteries which makes the operation more economical. Battery management system keeps the battery safe, reliable and increases the senility without entering into damaging state. In order to maintain the state of the battery, voltage, current, ambient temperature different monitoring techniques are used. For monitoring purpose different analog/digital sensors with microcontrollers are used. By reviewing all these methodologies future challenges and possible solutions can be obtained. The Lithium-ion battery all the variety available in the market due to its best characteristics and best performance in the battery management system in EVs now a days. Along with the performance of lithium-ion batteries, it also provides cost reduction safe operation and negative environmental impacts. More informative embedded sensors are desirable for internal state monitoring that provides state of charge (S.O.C) and state of health (S.O.H) estimates an early failure indication. In modern times and also in future generation high performance format pouch sales with embedded FO sensors will be fabricated along with batteries. Sometimes, Gas sensors are also used in lithium and battery systems which helps in battery monitoring system. Thermal management system is crucial for a Lithium-ion battery pack as cycle life, driving range of electric vehicle, usable capacity and safety are heavily dependent on the operating temperature. Optimum operating temperature of Lithium-ion battery pack is about 25–40 °C. Power availability of the battery pack may differ according to the operating temperature. Although air cooling is the simplest and cheapest cooling solution, the cooling capacity is still limited by the low specific heat capacity. This will cause large variation of temperature of cells across the battery pack. When the excess temperature heats the battery, the liquid cooling system also comes into effect in

battery management system of lithium batteries. As a liquid cooling system with a square channel can achieve a lower highest temperature than of a circular channel, so, it helps in thermal dissipation and obtains the thermal distribution which produces cooling effects on the lithium-ion batteries. Simultaneously, as the highest temperature is negatively charged correlated with the rectangular aspect ratio, as the aspect ratio increases, the temperature dispersion of the battery pack initially decreases and increases. So, to avoid the problems resulting from abnormal temperatures, effective cooling system is required through three-dimensional numerical analyses which are performed based on heat transfer characteristics and temperature distribution and thermal conductivity.

Paper code: ICRDET- T2-2011

Comprehensive Review of Power Electronic DC-DC Converters in Electric Vehicle Applications

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Abstract: Emerging electric vehicle (EV) technologies require high-capacity energy storage solutions, efficient electric motors, electrified power train setups, and skilled power converters. This piece conducted a comprehensive analysis of power converter structures, control methodologies, output power metrics, reliability factors, losses, switching frequencies, operational intricacies, charging setups, advantages, and drawbacks, while considering the projections for EV demand and driving scenarios. This document aims to support engineers and researchers in forecasting the usual durations for recharging and discharging, assessing the lifespan of energy storage using control systems and machine learning, and evaluating the feasibility of AlGaN/GaN hetero junction-based high-electron-mobility transistors (HEMTs) in electric vehicle (EV) systems. Upon careful examination of the extensive content, it becomes evident that the Vienna rectifier stands out as a superior performance among AC-DC rectifier converters. The most suitable option for the DC-DC conversion stage is the multi- device interleaved DC-DC boost converter. Among DC-AC converters, the seven-level inverter with injected third harmonic is notably suitable for electric vehicle (EV) propulsion. Moreover, the incorporation of multi-level inverters can obviate the necessity for an intermediary DC-DC converter. This article explored the current state, future possibilities, challenges, and uses of wireless power transfer in hybrid and all-electric vehicles. The document's main objective was to provide a beneficial reference for engineers and researchers in the automobile sector who are involved in forecasting computations.

Paper code: ICRDET- T2-2012

Performance Analysis of Economic load Dispatch using Genetic Algorithm

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Abstract:- Economic Load Dispatch (ELD) is one of the important subjects of concern in power system operation and planning. The main objective of the ELD problems is to present the optimized combination of power outputs of all generating units so as to meet the objective function while taking care of constraints. In conventional computation, the cost function for each unit in ELD problems is solved using mathematical or analytical methods. Generally, these mathematical methods require some marginal cost information to find the global optimal solution. But the fact is that, the real-world input output characteristics of generating units are highly nonlinear and non-smooth because of prohibited operating zones, valve point loadings, and multi-fuel effects, etc. Thus, the actual ELD problem is represented as a non-linear (non-smooth) optimization problem having both equality and inequality constraints, cannot be directly solved by conventional analytical techniques. After the evolution of diversified application of soft computing techniques in order to solve these non-smooth ELD problems, many salient methods have been successfully implemented such as hierarchical numerical method, genetic algorithm, evolutionary programming, neural network approaches, differential evolution, particle swarm optimization, and other hybrid method. Genetic algorithm is proved to be efficient optimization techniques over the past few years. In this paper we have presented the solution of an economic load dispatch problem of thermal generator using Genetic Algorithm (GA) method. The proposed method has been implemented on 3 generator system and 6 generator systems. The system considered here is the lossless system. The results obtained show significant improvement in generator fuel cost as compared to conventional techniques while satisfying various equality and inequality constraints.

Paper code: ICRDET- T2-2013

A Review on Current State of the Art Analysis of the Obstacles Encountered by Electric Vehicles in India

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Abstract: - The emissions from traditional automobiles are a major contributor to the current environmental crisis. The current energy crisis and the inefficiency of traditional automobiles make now an excellent time for breakthroughs in the field of electric vehicles. Although hybrid electric vehicles enhance fuel efficiency over traditional automobiles, going all electric is the long-term goal. Literature reviews on the subject of hybrid electric car technologies are many. Various types of electric vehicles are discussed in this paper, from full-electric to hybrid to plug-in hybrid to battery-electric, with their respective modelling approaches and optimization strategies compared and contrasted. This research stands out because of its attention to the underlying challenges and insufficient charging infrastructure in a developing nation

like India. The innovative Vehicle-to-Grid concept is a backup power supply for times when conventional renewable energy sources are not accessible. Based on our findings, we think those EVs' distinctive characteristics significantly contribute to their mobility.

Paper code: ICRDET- T3-3001

Nonlinear control technique for Synchronization of chaotic systems

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Abstract. The article presents the synchronization for fractional order time derivatives chaotic systems via nonlinear control technique. The numerical simulation results demonstrate that the method is trouble-free to implement and consistent for synchronization of nonlinear systems. Another key feature of the current article is the variation of synchronization time along with variation of fractional order derivative. Adams-Boshforth-Moulton method is used for the computer simulation for integer order as well as fractional order in the Caputo sense. Graphical Results are also displayed to validate the effectiveness of the proposed method.

Paper code: ICRDET- T3-3002

Inverse scattering problem for the indefinite non-self-adjoint differential operator on the axis

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Abstract- The inverse scattering problem for the Sturm-Liouville operator with complex potentials and indefinite discontinuous coefficients on the axis is studied. Using the integral representations for fundamental solutions, the scattering data is defined and the main integral equations of the inverse scattering problem are obtained. The uniqueness theorem for the solution of the inverse problem is proved.

Paper code: ICRDET- T3-3003

A Weighted Tan-G Method for Introducing New Probability Distributions: Model, Theory, and Applications

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Abstract-This paper introduces a new family of distributions by incorporating a trigonometric function. The proposed family may be called the weighted tan- G family of distributions. The advantage of the weighted tan- G family over some other methods is that it has no extra additional parameter. Numerous mathematical properties of the weighted tan- G family are derived. For illustrative purposes, a special model of the weighted tan- G family using the Weibull model as a baseline model is studied. The special model of the weighted tan- G family may be called the weighted tan-Weibull distribution. A brief simulation study is conducted to assess the behavior of the estimators of the weighted tan-Weibull distribution. Finally, two applications from different sectors are considered to show the practicability of the weighted tan-Weibull distribution. Based on different decision tools, it is shown that the weighted tan-Weibull distribution outperforms other well-known variants of the Weibull distribution

Paper code: ICRDET- T3-3004

A New Probabilistic Approach with Physical Implementations: Model, Theory and Identifiability Characteristics

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Abstract- So far in the literature, numerous probabilistic models and families of probabilistic models have been suggested and implemented. Most of these probabilistic models are developed and updated by introducing new parameters ranging from one to five. There are only a few methods that are introduced without adding additional parameters. This paper also contributed to the development of a probabilistic model without adding additional parameters. The proposed model is introduced by incorporating the weighted distributional strategy and the weighted Ramos-Louzada distribution. Thus, the new model may be called the generalized weighted Ramos-Louzada distribution. The maximum likelihood estimators of the new model are derived. Certain distributional properties of the generalized weighted Ramos-Louzada distribution are derived. Finally, the proposed distribution is illustrated using two applications from the physical sciences. We consider four statistical tests to show the superiority of the proposed model over some well-known established distributions. Based on the selected statistical tests, it is observed that the proposed model repeatedly outperforms the rival distributions.

Paper code: ICRDET- T3-3005

A New Trigonometric Method for Generating New Family of Distributions: Model, Theory and Practical Applications

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Abstract- Introducing novel families of statistical distributions for data modeling in the medical sector is an interesting research topic. For such activities, numerous methods have been introduced and implemented. Most of these methods are based on one or more additional parameters. However, the addition of new parameters leads to certain consequences such the re-parametrization problems etc. This paper also introduces a new family of distributions for generating statistical models. The proposed family is based on a trigonometric function and may be called the weighted tangent family of distributions. The beauty of the weighted tangent family is that it has no extra parameter. Some mathematical properties of the weighted tangent family are derived. The maximum likelihood estimators of the weighted tangent distributions are obtained. A special case of the weighted tangent family, namely, the weighted tangent Weibull distribution, is studied. A simulation study of the weighted tangent Weibull distribution is provided to assess the performances of its estimators. Finally, three applications from the medical sector are considered to illustrate the weighted tangent Weibull distribution. The practical illustrations of the weighted tangent Weibull distribution show that the weighted tangent method significantly improves the fitting power of the classical models.

Paper code: ICRDET- T3-3006

Certain Integral Transforms For The K- Hypergeometric Functions

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Abstract- This paper aims to establish certain integral transforms like the k -beta transform, Laplace transform, Varma transform, Whittaker transform and Elzaki transform involving the extended k -hypergeometric functions. When we put the particular value of parameter $\beta = 1$, we get all transforms of another definition of extended k -hypergeometric functions which is a special case of our main result.

Paper code: ICRDET- T3-3007

Analyzing Ψ -Caputo fractional impulsive differential equations with the use of a variational approach.

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Abstract- This paper is dedicated to providing sufficient conditions for the existence of at least one solution to a Ψ -Caputo fractional initial value problem. The approach employed involves critical point theory and a variational methodology.

Paper code: ICRDET- T3-3008

On One Dimensional Advection - Diffusion Equation with Variable Diffusivity

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Abstract- In this paper, we address a time-dependent one-dimensional linear advection diffusion equation with Dirichlet homogeneous boundary conditions. The equation is solved both analytically, using separation of variables, and numerically, employing the finite difference method. The computational output includes three dimensional (3D) plots for solutions, focusing on pollutants such as Ammonia, Carbon monoxide, Carbon dioxide, and Sulphur dioxide. Concentrations, along with their respective diffusivities, are analyzed through 3D plots and actual calculations. To comprehend the diffusivity-concentration relationship for predicting pollutant movement in the air, the domain is divided into two halves. The study explores the behavior of pollutants with higher diffusivity entering regions with lower diffusivity, and vice versa, using 2D and 3D plots. This task is crucial for effective pollution control strategies, and safeguarding the environment and public health.

Paper code: ICRDET- T3-3009

A new solution approach of fuzzy transportation problems with generalized trapezoidal fuzzy numbers

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Abstract- Numerous techniques are given in the literature to address transportation problems (TP) in fuzzy environments; however, in each of these algorithms, the parameters are introduced by conventional fuzzy numbers. We used generalized fuzzy numbers to solve TP in this research paper. Numerous articles in the literature use generalized fuzzy numbers (GFN) to work out on problems in real life. In this research, the two objective functions are presented as generalized fuzzy numbers and solved for different weights. Here, we set out to achieve a compromise solution between the two objective functions with the assigned weight.

Paper code: ICRDET- T3-3010

On q-double modified Laplace transform

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Abstract-We introduce the concept of double modified Laplace transform in q-calculus namely q-double modified Laplace transform and establish some properties. Furthermore, several propositions concerned with the properties of q-double modified Laplace transform are explored.

Paper code: ICRDET- T3-3011

Environmental resilience in the dynamics of Tuberculosis: A fractal fractional perspective

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Abstract- This paper deals with the mathematical analysis of Tuberculosis by using fractal fractional operator.

Mycobacterium TB is the bacteria that cause tuberculosis. This airborne illness mostly impacts the lungs but may extend to other body organs. When the infected individual coughs, sneezes or speaks, the bacterium gets released into the air and travels from one person to another. To study dynamics of this disease, five classes have been formulated in terms of S: Susceptible class, I_s: Infected of DS, I_r: Infected of MDR, Q: isolated class, and R: recovered class. To study the suggested fractal fractional model's wellposedness associated with existence results, and boundedness of solutions. Further, the invariant region of the considered model, positive solutions, equilibrium point, and reproduction number R₀. To obtain numerical solutions for the fractional order Tuberculosis model using the Adams-

Bashforth-Moulton method, one would typically employ a fractional calculus approach. The fractional order derivatives in the model can be approximated using appropriate numerical schemes designed for fractional order differential equations (FODEs), such as the Caputo or Riemann-Liouville fractional derivatives.

Paper code: ICRDET- T3-3012

Computer algebra for Prabhakar type Mittag-Leffler function

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Abstract- Many infinite integrals involving the product of several Special Functions have been obtained. Singh and Jain have described four integrals involving the generalized Mittag-Leffler function [1]. Using the same method, in this chapter, we present the computer algebra for generalized integral formulas involving the Prabhakar type Mittag-Leffler function, which are expressed in terms of the generalized Lauricella series due to Srivastava and Daoust.

Paper code: ICRDET- T3-3013

Fixed point results employing implicit relation and e.a property in neutrosophic metric space with application.

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ABSTRACT- This paper introduces fixed-point theorems within the framework of neutrosophic metric spaces. Our results extend and improve existing fixed-point theorem by incorporating weak compatibility along with a set of four alternative conditions for functions satisfying the E.A. property in neutrosophic metric spaces. Also, there is an example and application to validate the practicality of result.

Paper code: ICRDET- T3-3017

Fixed point and common fixed point theorem in neutrosophic bipolar fuzzy metric space by using contravariant map.

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Abstract- Inspired by the notions of contraction mapping, and bipolar metric space, we introduce a new concept neutrosophic fuzzy bipolar metric space and prove some fixed-point theorems for these contraction mappings in the setting of complete neutrosophic fuzzy bipolar metric space. Also, we give some examples to illustrate our results. Furthermore, we apply our results to show the existence and uniqueness of a solution of the nonlinear integral equation.

Paper code: ICRDET- T3-3018

Stochastic two-strain epidemic model with bilinear and non-monotonic incidence rates.

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Abstract- The aim of this paper is the mathematical modeling and analysis of the diseases resulting from multiple strains. It is in this context that we formulate a stochastic model driven by white noise, where, the infection rate of the first and second strains are described by bilinear and non-monotone incidence functions, respectively. First, we begin by examining whether there is a unique global positive solution. Second, the paper moves to the investigation of the extinction and persistence in mean of the two-strain epidemic disease. Finally, diverse numerical simulations are achieved to validate the theoretical findings.

Paper code: ICRDET- T3-3019

Environmental resilience in the dynamics of Tuberculosis: A fractal fractional perspective

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Abstract- This paper deals with the mathematical analysis of Tuberculosis by using fractal fractional operator. Mycobacterium TB is the bacteria that cause tuberculosis. This airborne illness mostly impacts the lungs but may extend to other body organs. When the infected individual coughs, sneezes or speaks, the bacterium gets released into the air and travels from one person to another. To study dynamics of this disease, five classes have been formulated in terms of S: Susceptible class, I_S: Infected of DS, I_r: Infected of MDR, Q: isolated class and R: recovered class. To study the suggested fractal fractional model's wellposedness associated with existence results, and boundedness of solutions. Further, the invariant region of the considered model, positive solutions, equilibrium point, and reproduction number R_0 . To obtain numerical solutions for the fractional order Tuberculosis model using the Adams-Bashforth-Moulton method, one would typically employ a fractional calculus approach. The fractional order derivatives in the model can be approximated using appropriate numerical schemes designed for fractional order differential equations (FODEs), such as the Caputo or Riemann-Liouville fractional derivatives.

Paper code: ICRDET- T3-3020

A numerical analysis of the nabla discrete operator: To investigate the prey-predator model

Abstract: In this article, we propose a fractional-order nabla difference nonlinear system involving bounded disturbances and utilizing the numerical analysis to investigate the prey-predator model in the sense of the nabla difference operator. This system class has a broader range of nonlinearities in comparison to the Lipschitz class. We establish adequate criteria for the observer design based on the one-sided Lipschitz and quadratically inner-bounded ones. And, we prove the practical Mittag-Leffler stability of the closed-loop system. Furthermore, we provided a separation principle for a class of nonlinear systems with bounded uncertain parts. We provide a numerical example to show the efficacy and application of our new findings.

Paper code: ICRDET- T3-3021

Study on Saigo type Fractional q-integral Inequalities

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Abstract: Various fractional q-integral inequalities involving hypergeometric functions have been introduced and investigated by many researchers due to their important applications in diverse fields. In this review article, we discuss some important Saigo type fractional q-integral inequalities and their applications.

Paper code: ICRDET- T3-3022

Development of an Innovative Surface Plasmon Resonance (SPR) sensor for malaria disease detection

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Malaria is a disease that spread to the human through the bites of infected mosquitoes, which leads to the severe health related problems such as organ failure, breathing problem, brain damage etc. This article proposes a novel surface Plasmon resonance (SPR)-based sensor to precisely detect various stages of malaria by analyzing normal and infected red blood cells (RBCs). The proposed structure is based on Kretschmann configuration, which consists of alternating layers of prism /TiO₂ /Au/BaTiO₃/graphene/sensing layer. The design parameters of the sensor like thickness of the Au layer, thickness of BaTiO₃ layer, and number of graphene layer are suitably optimized to improve the sensor's performance. Reflectance of the sensor is thoroughly studied by employing finite element method (FEM) embedded in COMSOL Multiphysics software environment. The research main focus lies on analysis the change in the angle of resonance with respect to different RBCs. Additionally, the electric field distribution along the structure is investigated. It is perceived that the designed sensor achieved a maximum sensitivity of 166.667 deg./RIU, quality factor of 22 RIU⁻¹ and detection accuracy of 0.26 deg⁻¹. The sensor's performance parameters are compared with the recently published similar

sensors, where it is confirmed that our proposed structure outperforms in terms of sensitivity, quality factor and detection accuracy. So, we are confident the presented sensor can be a suitable candidate for applications in biomedical industries.

Paper code: ICRDET- T3-3023

Multiplicative (generalized)-derivation on quotient ring R/P

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Abstract: Let R be a ring and P be a semi prime ideal of R . A mapping $F : R \rightarrow R$ is said to be a multiplicative (generalized)-derivation if there exists a map g on R such that $F(xy) = F(x)y + xg(y)$ for all $x, y \in R$, where g is any mapping on R not necessarily additive. In the present paper, we study certain differential identities involving multiplicative (generalized)- derivation on some appropriate subset of R .

Paper code: ICRDET- T4-4001

Quantifying Polymerization Shrinkage: A Mathematical Analysis and Its Impact on Dental Restorative Materials

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Abstract. To derive an analytical solution of shrinkage stresses in a simplified Class-I composite restoration using a visco-elastic material model. Methods. Simplified, multi-layer, circular plane models were used to represent different sections of a tooth with a Class-I restoration: one section is close to the top occlusal surface, and the other is at a deeper location of the restoration. The sections are, therefore, subjected to different stress states, i.e., plane-stress and plane-strain, respectively. The analytical solution obtained was compared with the numerical results from finite element analysis. A sensitivity study was then carried out to examine the relative influence of geometric and material parameters on the shrinkage stress development. A visco-elastic solution for the shrinkage stresses developed in a simplified Class-I restoration during polymerization has been derived. The solution allows the influence of several geometric and material parameters on shrinkage stress development to be examined readily. It also provides a benchmark test for more elaborate numerical schemes before they are used to analyze more complicated cases.

Paper code: ICRDET- T4-4002

Use of Artificial Neural Network for Prediction of Tensile Strengths In Particle Reinforced Aluminum Matrix Composites

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Abstract. This study explores the efficacy of artificial neural networks (ANN) in forecasting the tensile strengths of particle-reinforced aluminum matrix composites.

The research delves into the application of ANN as a predictive tool, aiming to enhance the comprehension and anticipation of mechanical properties in these specific composites. Through extensive experimentation and analysis, this abstract highlights the potential and reliability of ANN models in estimating the tensile strengths, contributing significantly to the advancement of materials science and engineering

Paper code: ICRDET- T4-4003

Preparation of Aluminium Matrix Composite by Using Stir Casting Method

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Abstract. Aluminum matrix composites (AMCs) have garnered significant attention due to their exceptional mechanical and physical properties, offering a wide array of applications in various industries. This study focuses on the fabrication of AMCs through the stir casting method, a widely employed technique known for its simplicity and cost-effectiveness in producing metal matrix composites. The research investigates the influence of various reinforcing agents, such as ceramic particles or fibers, on enhancing the mechanical properties of the aluminum matrix. The experimental procedure involves the selection of suitable reinforcing materials, their pre-treatment to ensure proper bonding with the aluminum matrix, and the optimization of process parameters during the stir casting method. The fabricated composites are then subjected to a comprehensive analysis to evaluate their microstructure, mechanical properties (including hardness, tensile strength, and wear resistance), and thermal behavior. The results obtained from this study demonstrate the significant improvement in the mechanical properties of the developed composites compared to the base aluminum alloy. The microstructural analysis reveals a homogeneous distribution of reinforcing agents within the aluminum matrix, indicating a strong interfacial bonding between the phases. Moreover, the thermal behavior analysis provides insights into the thermal stability and potential applications of these composites in elevated temperature environments. This research contributes valuable insights into the fabrication of AMCs using the stir casting method, offering a pathway for the development of high-performance materials with tailored properties for diverse industrial applications.

Paper code: ICRDET- T4-4004

DESIGN AND ANALYSIS OF HEAT EXCHANGER WITH DOUBLE HELICAL INNER TUBE

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Abstract. Heat exchangers have been widely used in power plants and industries for heating or cooling applications. Heat is transferred from one medium to another medium by using heat exchangers. This paper aims to study the fluid flow and heat transfer through a double helix inner tube heat exchanger. Designing of heat exchangers is done with parallel flow arrangement by using SOLIDWORKS 2022. The performance is analysed by using Fluid flow (Fluent) in ANSYS WORKBENCH 2020 R1 for CFD

simulations. Further the helical tube materials Copper and Aluminium which are widely used in heat exchangers are also analysed in shell and heat transfer rates are also compared using CFD (Fluent) analysis.

Paper code: ICRDET- T4-4005

Investigations of Mechanical Behavior of the Basalt Fiber Reinforced Polypropylene Composites

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Abstract. This research work presents the investigation of the basalt fiber reinforced polypropylene composites. The polypropylene material is used as a matrix material with the reinforcement basalt fiber with the varying 10 wt.%. The samples were designed according to their compositions of the fiber and matrix material. The samples were fabrication using the twin screw extruder and injection molding machine with the control process parameters. The samples were dried in to hot air oven before testing. The physical properties (experimental density and voids content), mechanical properties (Tensile strength, compressive strength and hardness) were analyzed according to the ASTMs. The results were showed that the physical and mechanical performance were improved by using the basalt fiber at the certain wt.%.

Paper code: ICRDET- T4-4006

Fractional Anomalous Diffusion Equations and Special Function Approaches in Caputo - Fabrizio Sense

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Abstract. Fractional calculus is a novel idea that is becoming more and more well-known in a variety of scientific fields. It is receiving more attention in contemporary science. In order to investigate the deep significance of fractional calculus in modern science, the Caputo-Fabrizio and Grunwald-Letnikov methods are applied to perform a systematic comparison between solutions obtained from fractional equations ($0 < \alpha \leq 1$) and their non-fractional counterparts ($\alpha = 1$). Interestingly, divergences appear for different values of α , but a convergence with classical calculus is seen when α approaches 1. This study investigates in detail the behavior of curves for various α values in two and three dimensions. It investigates fractional diffusion equations using the natural decomposition method and shows how this strategy offers computing benefits for handling both linear and non-linear problems. Furthermore, the investigation includes a thorough analysis of several numerical techniques, including the application of flexible L1 and L1-2 schemes that use Lagrange interpolation. This thorough investigation advances our understanding of fractional calculus's intricacies and demonstrates how it might revolutionize scientific computing methods.

Paper code: ICRDET- T4-4007

Dispersive Effects on General Two-Phase Mass Flow Model and Landslide Generated Tsunami

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Abstract: - Magneto-Rheological (MR) clutch is a device that uses MR fluid (MRF) for the torque transmission between input shaft and output shaft by the action of shearing. Improvising the transmission capability of MR clutches without compromising upon the restrictions of minimal space and power requirements has always been a great motivation for research exploration. In this paper, an attempt has been made to investigate different configurations for the transmission surface of the clutch to improve torque transmission capability. A comparative analysis using COMSOL Multiphysics software is carried out between the plane, extended corrugated and hybrid plane-corrugated type transmission surfaces of the MR clutch keeping the space and power constraints the same. From the results obtained, it is observed that hybrid disc design ensures the best torque transmission in comparison to the plane and extended corrugated disc configurations.

Paper code: ICRDET- T4-4008

A comparative analysis of the transmission capability for plane, extended corrugated and hybrid corrugated-plane type transmission surfaces for Magneto-Rheological fluid-based Clutch

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Abstract. Magneto-Rheological (MR) clutch is a device that uses MR fluid (MRF) for the torque transmission between input shaft and output shaft by the action of shearing. Improvising the transmission capability of MR clutches without compromising upon the restrictions of minimal space and power requirements has always been a great motivation for research exploration. In this paper, an attempt has been made to investigate different configurations for the transmission surface of the clutch to improve torque transmission capability. A comparative analysis using COMSOL Multiphysics software is carried out between the plane, extended corrugated and hybrid plane-corrugated type transmission surfaces of the MR clutch keeping the space and power constraints the same. From the results obtained, it is observed that hybrid disc design ensures the best torque transmission in comparison to the plane and extended corrugated disc configurations.

Paper code: ICRDET- T4-4009

Enhancement of torque transmission capability in Magneto-Rheological fluid-based Clutch using novel hybrid corrugated plane transmission surface strategy

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Abstract. In an increasingly automated world, miniaturization is the key to widespread deployment of advanced technologies. Enhancing the torque transmissibility by abiding to the spatial constraints imposed by radial space availability has consistently remained a hurdle in the implementation of Magneto-Rheological (MR) clutches that use shear mode of MR fluid (MRF). This proves the necessity of a novel design capable of providing required transmission capability with a reduced transmission surface area. The present study analyzes a corrugated transmissible surface design which improves torque transmissibility with the help of increased transmission area and proper alignment of field lines passing through the MRF gap. In this paper, the impact of various dimensional parameters of a hybrid corrugated plane type MR clutch (MRC) design was studied with the aid of magnetic analysis performed on COMSOL Multiphysics software. The results obtained shows that various parameters in the design of MR clutches, such as annular and radial MR gaps, disc width, individual corrugation heights, corrugation width, bobbin thickness and radii of plane surface influences the torque transmission capability of MR clutches. Also, an optimization of the hybrid corrugated plane MR Clutch of the chosen geometry has been conducted with the transmission capability increasing by 39.37% compared with the non-optimized geometrical configuration.

Paper code: ICRDET- T4-4010

A comparative analysis of the effect of bobbin topography in the transmission performance capability of Hybrid corrugated-plane type transmission surface for Magneto-Rheological fluid-based Clutch

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Abstract. Magneto-Rheological (MR) fluid-based devices work on the principle of changing the rheological properties of MR fluid (MRF) using magnetic field excitation generated from an electromagnet. The electromagnet is usually created with the aid of copper coils wound on a low magnetic permeable spindle structure referred to as bobbin. In this paper, an attempt has been made to investigate the different bobbin configurations and its effect on the torque transmissibility of a MR clutch (MRC). A hybrid corrugated- plane type transmission surface MRC is chosen for the study, due to the advantage of enhanced transmission capability due to the simultaneous existence of plane and corrugated extensions on the disc surface. This enhanced transmission capability, resulting from the hybrid corrugated plane type transmission surface

facilitates measurement of the influence of bobbin configuration on the torque transmission capability in an MRC. A comparative analysis using COMSOL Multiphysics software is carried out between five different innovative bobbin configurations such as rectangular, semi-circular, conical, I-sectioned, and H-sectioned. This study aims to simulate and reason the variations in the magnetic field line characteristics upon variations in bobbin topography. The results obtained testify for the need of a bobbin design considering the transmission surface geometry. For the specific design analyzed, it was found that the H-sectioned bobbin provided the maximum torque transmission capability when compared with other topographies, whereas the conical shaped bobbin topography proved to be least facilitating for torque transmission.

Paper code: ICRDET- T4-4011

Modeling of Meandering Flow with Enhanced Two Phase Mass Flow Model

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Abstract. Natural debris flow/floods may pass through straight or meandering channels. Classical studies on the mathematical models of gravity driven debris flows/floods down in natural and generic topography are primarily concentrated on single-phase, and mixture, two layers and two-phase of solid and viscous fluid. The flow behaviour is greatly influenced by the concentration of solid, fluid, and their interactions along with the channel geometry. In particular, these flows in meandering conduits, the dynamics and evolution of the phases are controlled by the centrifugal force-induced stratification and pressure gradient created by the force acting on the fluid. Here, we present an enhanced two-phase numerical model for the simulation of the flow dynamics and mass transport in the meandering channels with different sinuosities and amplitudes as in the natural meandering rivers. The model is based on depth-averaged continuity and momentum conservation equations that includes the essential physical aspects such as buoyancy, drag, virtual mass, Newtonian and Non-Newtonian viscous effects. So, this contribution presents a foundation for the numerical experiments to better understand the dynamics of debris flows/floods down meandering channels as seen in the natural paths of the rivers as well as already existing channels like episodic rivers in hilly regions. The results can be extended to propose some appropriate mitigation strategies.

Paper code: ICRDET- T4-4012

Greener marvel for electromagnetic interference shielding applications with Mustard Oil-Carbon Soot PMMA Nanocomposites

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Abstract. In this research paper, we explore the electromagnetic interference (EMI) shielding effectiveness (SE) of Mustard Oil Carbon-soot-PMMA composite. The S-parameters, specifically S₁₁ and S₂₁, were assessed using a vector network analyzer (Agilent E82B) and the EMI SE of the 100 μm thin laminate of 6.0wt % PMMA-carbon soot composite was found to reach an impressive value of 32.4 dB at 11.7GHz MW frequency within the X band frequency range (8-12 GHz). Analysing the characteristic EMI SE graphs and the shielding mechanism in these composites we find that the SE in this frequency range is primarily influenced by absorption. This study suggests that these composites hold great potential as promising materials for lightweight low-cost EMI shielding applications.

Paper code: ICRDET- T4-4013

Polymeric Nanocomposites Marvels: Revolutionizing Industry for a Greener Tomorrow

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Abstract. Polymeric nanocomposites (PNCs) boast remarkable potential across diverse applications, capitalizing on the synergistic properties derived from their integrated structure. Unlike their individual components, PNCs exhibit unique attributes, making them highly desirable for a range of uses. The versatility of PNC fabrication allows for the customization of shapes and sizes, providing control over essential properties like surface area, magnetic behavior, optical and electrical characteristics etc. Notably, the cost-effectiveness and lightweight nature of PNCs enhance their appeal for various environmental applications. Within the realm of PNCs, stimuli-responsive nanocomposites emerge as a distinct subgroup, featuring chemical and physical properties that respond to specific stimuli. This adaptability expands the potential applications of these nanocomposites. This review explores diverse preparation methods for PNCs, including in situ synthesis, solution mixing, melt blending, and electrospinning. Furthermore, it outlines the myriad environmental and industrial applications of PNCs, spanning water treatment, electromagnetic shielding in aerospace, sensor devices, innovations in food packaging etc.

Paper code: ICRDET- T4-4014

Synthesis of Gold nanostars for cancer chemo-photo thermal therapy

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Abstract. The strong and tunable optical response of gold nanostars has made them a promising candidate for various biomedical applications such as photothermal treatments and bio sensing. We have developed a method for the instantaneous synthesis of star-shaped gold nanoparticles (AuNPs) through a modified seed-mediated method involving different concentrations of seed, gold chloride, ascorbic acid and silver nitrate. These nanostars show strong absorption in near infrared region as observed in UV-Vis measurements. The morphological feature of gold nanostars was characterized by FE-SEM and HR-TEM. The size distribution and surface charge was examined by dynamic light scattering (DLS) and zeta-potential studies. These nanostars show effective encapsulation of an anticancer drug, doxorubicin (DOX) and delivery into melanoma cells (B16F0). The MTT based cell viability assay reveals significant reduction in cell viability counts in comparison to free drug. The plasmonic photothermal and drug delivery applications of gold nanostars make them excellent candidates for chemo-photothermal therapy.

Paper code: ICRDET- T4-4015

Dynamic Analysis of a Single-Column Building Using Staad.Pro Software

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Abstract. In general, RCC is used in the construction of all residential and commercial buildings in India. This RCC construction is essentially connected by materials like beams and columns and has a floor layout. All buildings have loads that are carried from the slab to the beams, beams to the columns, and columns to the foundation. A building that rests on a single column is known as a single-column building and a building that has multiple floors lying on a single column is called a single-column multi-story building. The rapid growth of the population requires more pieces of land and an increment in the usage of automobiles (such as bikes, cars, etc) which leads to the augmentation of dynamic loads which include shaking, noise pollution, earth tremors, etc. The purpose of this research is to find node displacement, support reactions, member force lateral load, base shear, and story drift. This paper performs dynamic analysis on a single-column, multi-story building for seismic zone-v using staad.pro software as per IS 1893:2016 part-1. The conclusion is that the base shear value in the X-direction and the Z-direction are identical, as is the drift value in the story in both directions.

Paper code: ICRDET- T4-4016

Polymers and Other Advance Materials: Emerging Technologies and Perspectives

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Abstract. Materials play a critical role in driving the advancements of emerging technologies. As the field of science and engineering progresses, novel materials are being developed and tailored to meet the unique requirements of cutting-edge technologies. Emerging technologies such as flexible electronics, quantum computing, 3D printing, and bio-inspired materials are rapidly evolving and reshaping industries. These technologies require materials with exceptional properties to enable breakthrough performance and functionality. For instance, graphene, a one-atom-thick sheet of carbon atoms arranged in a hexagonal lattice, is a remarkable material that exhibits excellent electrical and thermal conductivity. It is being extensively explored for use in flexible electronics, sensors, and batteries, opening up new possibilities for wearable devices, foldable displays, and advanced energy storage solutions. Advanced composites, made by combining two or more materials, are also driving advancements in emerging technologies. Carbon fibre composites, ceramic matrix composites, and metal matrix composites are examples of advanced composites that offer superior properties such as high strength, lightweight, and improved performance. These materials are used in various applications, including aerospace, transportation, renewable energy, and sports equipment, enabling advancements in performance, efficiency, and sustainability. This study provides an overview of the role of materials in emerging technologies, highlighting some of the key materials that are driving innovation in various fields.

Paper code: ICRDET- T4-4017

Grey wolf optimizer and genetic algorithm for solving no wait permutation flow shop problem in manufacturing

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Abstract. In this work, our subject is to solve a flow shop scheduling problem under the constraint of no wait. The constraint of no wait is highly important in the manufacturing industry. The goal is to minimize the maximum completion time of all jobs, referred to as the makespan. To achieve this, we will employ two efficient metaheuristics: The Grey Wolf Optimizer (GWO) and the Genetic Algorithm (GA). We will consider different sizes of instances and compare the results obtained from these metaheuristics. The numerical tests show that the Genetic Algorithm demonstrates better performance compared to the Grey Wolf Optimizer.

Paper code: ICRDET- T5-5001

A Review of How Retarding Chemical Super plasticizers Affect The Cement Paste Setting Time in India

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Abstract:- Construction tendencies are at their height degree with inside the twenty-first century across the globe. There are numerous skyscrapers, roads, dams, bridges, underground tunnels, and underwater systems all around the world. The days while discussing the deserves of making use of admixtures have been hard to have passed. It is plain that admixtures might also additionally cope with technical problems even as additionally saving cash via way of means of growing concrete electricity and decreasing water use. Many admixtures are used within side the constructing enterprise for diverse functions to enhance diverse cement concrete's favorable characteristics. Generally, admixtures are divided into categories: -Mineral II) Chemical admixtures.

Paper code: ICRDET- T5-5002

Changing Paradigm of Women Entrepreneurs in the Clothing Boutique Industry of Jaipur: Evolving Challenges and Opportunities

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Abstract. With increasing awareness of women's position and economic standing in society, the latent entrepreneurial potentials of women have steadily changed in the globalized arena. Women in India are now on a level with males. They've progressed from being referred to as 'homemakers' to 'career-oriented' women. Modern-day women are determined to defy stereotypes and carve out a space for them. Women entrepreneurs to generate new jobs for themselves and others, as well as of managerial, organisational to society. In this paper we have studied about the women who engaged in the boutique clothing industry in Jaipur city and qualities of women. Various policies have been issued by the government for the women to run their business successfully. Depending upon the complexity, data will be categorised, tabulated, and analysed using a number of statistical methodologies.

Paper code: ICRDET- T5-5003

Securing Critical Energy Infrastructure: The Strategic Role of MITRE ATT&CK Framework in Enhancing Cyber Resilience of the Power Sector

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Abstract. In the evolving landscape of cyber security threats, the power sector stands as a critical infrastructure, highly vulnerable to sophisticated cyber-attacks. This research paper delves into the strategic importance of the MITRE ATT&CK framework, a comprehensive matrix of tactics and techniques used by cyber adversaries, in fortifying the cyber defenses of the power sector. We examine how this framework, initially designed for general cyber security applications, can be specifically tailored to meet the unique challenges faced by power utilities and grid operators. Through a thorough analysis of case studies and expert interviews, the paper demonstrates the framework's effectiveness in identifying, mitigating, and responding to diverse cyber threats. Additionally, it explores the framework's role in shaping cyber security policies and training programs within the power sector. The findings highlight the MITRE ATT&CK framework not just as a tool for technical defense, but as a catalyst for organizational and strategic cyber resilience, emphasizing its necessity in the continuous battle against cyber threats in the power sector. This research aims to provide valuable insights for cyber security professionals, policymakers, and stakeholders in the power industry, underlining the framework's pivotal role in safeguarding our critical energy infrastructure.

Paper code: ICRDET- T5-5004

Plastic Waste, Current Scenario and Waste Management

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Abstract. Plastic, which has many benefits and drawbacks, is becoming a necessary component of everyday life for humans, contributing significantly to many facets of existence. This review article compiles the scientific study findings from earlier investigations and advancements on plastics, including their diversity, the state of plastic trash now, new breakthroughs, and the usage of plastic fiber in concrete mix for building purposes as well as prospective uses. It also briefly discusses the harmful effects that plastic pollution, including micro plastics, has on marine life at various tropical levels. In order to use plastic wisely and avoid overusing this miraculous resource created by humans, it is imperative that an objective research of the material be conducted.

Paper code: ICRDET- T5-5005

Jaipur's battle for clean skies - a legal framework for tackling air pollution

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Abstract. Jaipur, often hailed as the Pink City, is currently grappling with a pressing issue that threatens not only its aesthetic charm but also the health and well-being of its residents – air pollution. The city's rapid urbanization and industrial growth have contributed to a surge in air pollution levels, necessitating urgent and strategic interventions. This work specifically focuses on assessing three crucial parameters—NO₂, SO₂, and PM₁₀—in the ambient air across five different locations within Jaipur city. The collected data underwent thorough analysis to determine the monthly averages of these pollutants, subsequently comparing them against the standards set by the Central Pollution Control Board (CPCB). The findings reveal that while the levels of SO₂ and NO₂ fall within the permissible limits according to CPCB standards, PM₁₀ concentrations exceed the prescribed thresholds across all investigated locations. This underscores a concerning deviation from the established guidelines and emphasizes the urgent need for targeted interventions to address and mitigate the elevated PM₁₀ levels, contributing to a more comprehensive understanding of the specific air quality challenges faced by Jaipur city. In response to this environmental challenge, a comprehensive legal framework is being required to be forged to spearhead Jaipur's battle for clean skies. Recognizing the severity of the issue, this present article presses the dire need for the authorities in Jaipur to get actively engaged in formulating a robust legal framework specifically tailored to address the nuances of air pollution. This legal initiative encompasses a spectrum of measures, including stringent regulations on industrial emissions, vehicular pollution controls, and the promotion of cleaner energy alternatives. Additionally, it emphasizes public awareness campaigns to educate citizens about sustainable practices and the collective responsibility in preserving the city's air quality. Jaipur's battle for clean skies signifies a commitment to fostering a healthier and more sustainable urban environment. As the legal framework takes shape, it stands as a beacon of hope, guiding the city towards a future where the air is not only visually pristine but also safe for all residents to breathe freely.

Paper code: ICRDET- T5-5006

Repurposing Agricultural Waste in Textiles

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Abstract. The textile sector is at a crossroads, with rising demand to embrace environmentally friendly techniques. This research looks into the feasibility of using agricultural waste as a sustainable resource in textile manufacture. The project investigates extraction approaches for transforming agricultural waste such as cotton stalks and pineapple leaves into usable fibres. It investigates these fibres qualities and appropriateness for various textile applications, assessing their strength, fineness, and adaptability. The study describes how agricultural waste-derived materials can be spun,

woven, or knitted to generate fabrics, from fibre extraction methods to production and integration into textile processes. It emphasizes innovative ideas and technology that are aiding this shift, emphasizing their significance in minimizing environmental impact and resource depletion. The environmental consequences of incorporating agricultural waste into textiles are examined, highlighting the possibility for lower carbon footprints, waste reduction, and resource conservation. However, problems and limitations in adoption are addressed, including technological, economic, and market restrictions. The study finishes by describing future directions and recommendations based on existing research, case studies, and developing trends. It emphasizes the importance of ongoing research, innovation, and industry collaboration in order to fully realize agricultural waste's potential for sustainable textile production. Finally, the purpose of this investigation is to advocate for a paradigm shift towards a more ecologically conscious and resource-efficient textile sector.

Paper code: ICRDET- T5-5007

A Study on Potential source for sustainable environment source ingredient as Biochar derived from sewage sludge and wastewater treatment

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Abstract. The present study evaluated how the initial sewage sludge properties affect the characteristics and composition of sewage sludge-based biochars. Sewage sludges of varying organic matter content were pyrolyzed at temperatures of 500, 600 and 700 ° C. The obtained materials were characterized in terms of their composition and physico-chemical as well as their surface and thermal properties. The properties of biochar, especially sludge-derived biochar, are greatly affected by various factors such as residence time, moisture content, pyrolysis temperature, heating rate, etc. This paper reviews recent emerging fields of application for SSDB, including water and wastewater treatment, soil amelioration, air pollution control, and carbon sequestration. The barriers of sludge derived biochar application and possible strategies to overcome them have also been presented. This review article will promote further research, facilitate the advancement required for the sustainable management of SS and promote the circular economy. The current review provides an up-to-date review regarding important aspects of sewage sludge pyrolysis, highlighting the process that results major solid fraction (biochar), as high-value product. Further, the physiochemical characteristics of sewage-sludge derived biochar such as the elemental composition, specific surface area, pore size and volume, the functional groups, surface morphology and heavy metal content are discussed. Recent progress on adsorption of metals, emerging pollutants, dyes, nutrients and oil are discussed and the results are examined.

Paper code: ICRDET- T5-5008

Assessing the Impact of Sand Gradation on Relative Density: A Comprehensive Technical Investigation

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Abstract. The utilization of relative density in characterizing the compaction level of granular cohesionless soil surpasses the efficacy of relative compaction, particularly in coarser soil. Sands, given their reduced susceptibility to pore moisture content compared to cohesive soils, are favored for foundation/base material. This preference stems from their larger void size, containing more air than water. Achieving homogeneity in sands during cut and fill operations proves challenging, leading to the procurement of sand from diverse sources and resulting in heterogeneous sample properties.

Existing literature lacks substantial efforts to establish a correlation between relative density, bearing capacity, and sand gradation—specifically, and the proportions of coarse, medium, and fine sand. Consequently, this study seeks to bridge this gap through experimental investigations. The empirical relation between relative density and sand gradation is explored, utilizing vibratory table tests on various samples. Initial assessments involve sieve analysis and specific gravity tests on samples from four sources to determine natural proportions.

Upon establishing the empirical relation between relative density and sand gradation, the study progresses to correlate the bearing capacity of the sample with relative density for practical field application. The direct shear test is employed to determine the internal angle of friction, subsequently calculating the bearing capacity in accordance with IS 6403:2002. The relation between relative density and internal angle of friction is established using Meyerhof's relation, with an allowable error of $\pm 5\%$ from the ideal values.

Paper code: ICRDET- T5-5009

Comparison of Seismic Performance in Indian Seismic Zones: Moment Resisting Frames, Centrally Braced Frames, and Eccentrically Braced Frames

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Abstract. Moment resisting frames, centrally Braced frames & eccentrically braced frames are three generally used seismic force resisting systems in framed structure. These frames are relatively efficient as lateral force resisting method which is developed to oppose seismic measures in a conventional way. Suitably detailed and considered seismic lateral force resisting frame act in a ductile manner by the means of shear or flexural. This ductile yielding gives large, excellent energy dissipation, balanced hysteresis loops, which is necessary for major lateral forces.

This report shows the assessment of the structural parameters of Moment resisting frames, concentrically braced frames & eccentrically braced frames and also describes their seismic requirement which is used in design. For this, three types of frames of 3, 6 & 9 storey are assumed for the analysis. To compare these three heights frames according to the Indian codes, four seismic zones are considered.

Seismic requirements for the design and analysis of structural steel frames with the downward gravity loads and lateral loads are applied as according to IS 800:2007 & IS 1893(part I):2002. Seismic Analysis is performed using STAAD PRO V8i software. The results of the analysis of this parametric study are discussed in detail and conclusion and recommendation are also suggested in the report.

Paper code: ICRDET- T5-5010

Exploring the Performance of Circular Footings under Different Confinement Heights and Diameters

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Abstract. For sustainable development the world has forced the civil engineers to utilize unsuitable sites or weak soil. In recent year geotechnical professionals have adopted the practice of ground improvement of such soils by grouting, vibro compaction, mixing of fibres, reinforcement, and confinement etc. The soil confinement is one such method of improving load carrying capacity and reducing the settlement of the footing resting on sand. Confinement of soil in shallow depths might have a significant effect in enhancing soil bearing capacity. In this research, load tests were performed on the circular footing of 150mm diameter, resting over cylindrical confinement of varying diameter ratio $d/D = 0.73, 1.06$ and 1.33 and height ratio $h/D = 0.25, 0.5, 1, 1.25$ and 1.5 . Soil confined by using this method has a significant effect on improving the behavior of circular footing on sands. The ultimate load carrying capacity was found to increase by 2.95 times as compared to the unconfined case. These confinements could be easily manufactured and placed around the individual footings.

Paper code: ICRDET- T5-5011

A Comprehensive Exploration into the Working Capital Management Strategies of Udaipur Cement Works Ltd

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Abstract. Working capital is often deemed the "lifblood of business," encompassing the funds necessary for both long-term and short-term needs. Long-term funds are essential for establishing production facilities, involving the acquisition of fixed assets like plant machinery, land, and buildings. On the other hand, short-term funds cater to immediate requirements such as raw material procurement, wage payments, and day-to-day expenses. Referred to as working capital, circulating capital, or short-term

capital, these funds are crucial for the smooth operation of businesses. Typically, working capital needs are fulfilled through external sources. The primary focus of this study is to meticulously examine the various components of the company's working capital and gauge its impact on profitability. The study aims to achieve this by analyzing and evaluating the liquidity position of the company, scrutinizing the individual elements of its working capital, and ultimately determining how working capital influences overall profitability.

Paper code: ICRDET- T5-5012

Exploring Sustainable Concrete: Advancements in Technology and Ecology for Environmentally Friendly Solutions

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Abstract. It's very common about the importance and necessity of concrete in construction industries. However, a known fact, a lot of energy is utilized for the preparation of concrete which in turn imbalances the environment by creating various health hazards. The concept of Green concrete is gaining popularity compared to normal concrete. Nowadays it plays a very good role in the construction of structures. It is subjected to very low energy consumption and low resource consumption. This paper mainly deals with the study of importance of Environmental friendly concrete and its applications and advantages and disadvantages as well.

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An Assessment, Audit and Cost Analysis of Road Accident for Road Safety on Selected Area of NH- 52.

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Abstract. Road traffic accident in India is taken as an event, not an evil event, it has a huge loss to country's human, health and economic crises. Road traffic accident have great impact on individuals, communities and nation. This is leading cause for massive cost to frequent overburden healthcare system, productivity and prosperity with deep social and economic loss. the natural causes are due to the act of god and cannot be prevented but on the other hand road accidents are caused by the manmade environment and can be controlled WHO reports says that 1.24 million people suffered from road traffic accident i.e. 3400 person daily worldwide, and it is 1st leading cause for death in 15 -29 years age person. More than 90% of accident occurs in low-middle income countries, without any action it will leads to 1.9 million in 2030.

In India, according to the MORTH report, road accidents on National Highways, State Highways and Other Roads are 30.4%, 25.0% and 44.6% respectively of the total road accidents. Reports also prevails that the number of accidents is more in rural area than urban develop area.

This study also comprises of finding cost of accident with respect to social and economic loss of nation so that I could give recommendations to minimize the risk and severity of accidents in study area, by analyzing the road safety programs, and accident analysis using data and various research for achieving “BARSIALS ZERO ROAD ACCIDENT VISION 2020”.

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Reporting of Green Auditing of the Educational Institutions.

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Abstract:- Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of various establishments. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience. Green audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus, If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

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To Identify the Success and Failure Criteria of a Construction Project

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Abstract- The performances of a construction projects, in general, are not up to the mark and thus it is imperative to understand the factors for ensuring success in a project and moreover the reason for a project failure is also equally important. Case studies have been explored based on the project performance depending upon the material, manpower, machinery, management and money to study the various performance indicators related to the success or failure of the project.



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