



KALINGA UNIVERSITY



NAAC
GRADE B+
Accredited University

nirf
RANKING
2023

Ranked in
Top 101-150
Universities



MINDROID

Exploring Excellence

Volume 2, Issue 1 (January 2023 - June 2023)



THE CONTENTS

Message From Volunteers

05

About IEEE

07

About IEEE KU Student Branch

07

Let's Hear from Them

08

IEEE Activities

10

Achievements

19

Articles

20



INAUGURATION

of Kalinga University

IEEE Student Branch

MESSAGE FROM PRESIDENT-ELECT, IEEE COMPUTER SOCIETY



Nita Patel

P.E., PMP Sr. Director,
Engineering @ Otis President-Elect
@ IEEE Computer Society
Director, IEEE Foundation
nita.patel@ieee.org

I am extremely honoured to congratulate the Kalinga University, Naya Raipur, for launching this Digital Magazine initiative. I am pleased to see the incredible recognitions the university has already received, including accreditation by NAAC, being in the NIRF Ranking 2023 in the 101-150 band and being the ninth private university to receive the prestigious UGC 12(B) designation for research and development. Congratulations!

Additionally, I know of your volunteer work to advance women in engineering and wish you the best in continuing the work at Kalinga University. This reminds me of the power of augmenting technical learning with volunteering to improve critical business and leadership skills, such as problem solving, coaching/mentoring, and communicating effectively. In a study, How Volunteerism Shapes Professional Success, conducted by Power Skills, professionals stated they gained many leadership skills through their volunteer activities. These skills include:

Leadership
Communications
Fundraising/Resource Development
Patience
Political Astuteness
Problem-Solving

Organization/Multitasking
Finance/Budgeting/Accounting
Coaching/Mentoring
Meeting Planning
Interviewing/Hiring
Research

I know students at Kalinga University will have the opportunity for incredible technical learning augmented with opportunities for developing additional skills through volunteering. I wish you, the faculty and, most particularly, the students, the absolute best as you embark on this new endeavour. May it be a wonderful and auspicious learning journey.

Sincerely,

Nita Patel, P.E.



MESSAGE FROM IEEE R10 SECRETARY



Prof. Takako Hashimoto

IEEE R10 Secretary,
Former IEEE WIE CHAIR

IEEE WIE is here to help you succeed!

Congratulations on the establishment of the IEEE Student Branch at Kalinga University and on the successful petition for WIE AG. Today, WIE has established a stronger network, encouraged WIE affinity groups and volunteerism, and has grown to over 30,000 members and over 1,000 affinity groups. These accomplishments have been made possible by a dedicated and vibrant community of volunteers led by WIE chairs and leaders.

WIE has managed to establish its existence and goodwill worldwide, and it has also successfully grown over the years. The number of WIE members has dramatically increased, and we've globally extended our activities through conferences, workshops, forums, fund support, training, publishing, and communication to spread our mission and message to larger communities. We, WIE, are an extremely valuable science, technology, engineering, and math resource for women and girls, and we can expand our network globally.

We need to plan and extend our activities further to realise our dream of building a zero-gender-gap society, where men and women will work together hand in hand in every corner of life with equal responsibility. We need everyone's ideas and opinions for planning such activities. I would like to request that all of you participate actively to express your opinions, your ideas, and your plans for improvement and the realisation of WIE's basic mission of empowerment of women. This year will provide many opportunities as well as challenges to each of us in our volunteer, professional, and personal lives. As you take advantage of the opportunities, challenges will also come invariably with them.

Let's work together to change the world!

Sincerely,

Prof. Takako Hashimoto



ABOUT IEEE

IEEE is the world's largest technical professional organisation dedicated to advancing technology for the benefit of humanity. IEEE and its members inspire a global community through its highly cited publications, conferences, technology standards, and professional and educational activities.



ABOUT IEEE Kalinga University Student Branch (IEEE KU SB)

IEEE Student Branch of Kalinga University was established on 04th April 2022. The IEEE Student Branch of Kalinga university is a part of the IEEE Madhya Pradesh Section. The Objective of IEEE KU SB is to enhance the learning experience of the student community and develop a research environment among Faculty members. The Student Branch focuses on conducting social and technical activities for students and also encourages the students to take full advantage of the benefits of IEEE membership, including scholarships, competitions, and conference grants. The Student Branch also intends to provide opportunities for students to network with peers in other institutes, academicians, professionals, engineers, and scientists through the on-campus IEEE Student Branch and the Local IEEE Section, thereby encouraging students to be a part of the global IEEE community.



LET'S HEAR FROM THEM

It's a pleasure for me to know that the IEEE KALINGA UNIVERSITY STUDENT BRANCH has progressed to publish the third edition of their magazine "MINDROID". This magazine is a valuable resource for students to enhance their technical knowledge and develop their ancillary skills. I extend my best wishes to the magazine team for all their future endeavours and hope that they continue to achieve great success. I appreciate the teamwork and coordination that went into producing this magazine and wish them all the best.



Dr. Rajeev Kumar
Chairman
Kalinga University



Dr. Sandeep Arora
Chancellor
Kalinga University

I am thrilled to be informed that the IEEE Student Branch at Kalinga University is launching the third issue of "MINDROID" magazine. This publication is a valuable resource and skill-building tool for students. I extend my best wishes to the "IEEE KU SB" for success in all their future endeavours. I also commend the team's dedication and collaboration in creating this magazine. I wish them all the best.

I firmly believe that innovation and technology have the potential to create a positive social impact, and as an Engineer/Scientist or Technologist, I find it gratifying to learn that the IEEE STUDENT BRANCH KALINGA UNIVERSITY is launching the third edition of the IEEE magazine 'MINDROID'. I am confident that this magazine will continue to contribute to shaping young minds. I offer my warmest congratulations to the IEEE KU SB for this achievement.



Dr. R. Shridhar
Vice-Chancellor
Kalinga University



LET'S HEAR FROM THEM

This momentous occasion signifies a significant achievement for our organisation and highlights our commitment to delivering valuable content to our esteemed readership. The hard work, dedication, and creativity poured into the development of this magazine have truly paid off, and I am immensely proud of each and every one of you for your contributions. I wish the team at IEEE KU SB all the best for their third edition of the "MINDROID" magazine.



Dr. Sandeep Gandhi
Registrar
Kalinga University



Dr. Vijaylaxmi Biradar
Director, IQAC
IEEE KU SB Mentor
Kalinga University

We have specific plans to take IEEE SB KU to greater heights, including increasing student activities, organising workshops, developing membership, promoting women in Engineering, and enhancing member benefits. Launching the third edition of this magazine is no small feat, and it is a testament to our collective vision, innovation, and perseverance. Through the pages of "MINDROID", we will be able to connect with our audience on a deeper level, providing them with enriching, entertaining, and informative content that aligns with their diverse interests and passions.

I would like to express my gratitude to the entire team for their unwavering commitment and tireless efforts in bringing this magazine to life. From the talented designers who have created visually stunning layouts to all the contributors who have shared their expertise and insights by sharing articles, your collective collaboration has made this magazine a true masterpiece. I hope the third edition of "MINDROID" will have a positive impact on all the readers.



Mr. Anup Kumar Jana
IEEE KU SB Counsellor
Kalinga University

IEEE ACTIVITIES

1. Aeromodelling Workshop

Date: 16th - 17th March 2023

A two-day workshop on “AEROMODELLING for Girl Students from Government School” was conducted from 16th March 2023 to 17th March 2023. This was organised by the IEEE WIE AG Kalinga University Student Branch. Government school students of adopted villages like Kotni, Kuhera, Palaud, Kotarabhanta, Tandul and Parsada were participated in the workshop. Resource persons of this workshop were Dr. Vijayalaxmi (Director, IQAC, Kalinga University) Mr. Anup Kumar Jana (IQAC Coordinator) and Mr. Sarat Chandra Mohanty (IQAC Coordinator). A total of 49 students from different schools participated in the event.



Received Grant from
IEEE WIE AG Region 10.
USD: 200



2. Hands-on Training in Robotics

Date: 20th - 25th March 2023

A one-week hands-on training on ROBOTICS was conducted from 20th March 2023 to 25th March 2023. This was organised by the IEEE Kalinga University Student Branch. Resource persons of this training were Dr. Vijayalaxmi (Director, IQAC, Kalinga University) Mr. Anup Kumar Jana (IQAC Coordinator) and Mr. Sarat Chandra Mohanty (IQAC Coordinator). A total of 47 students took active participation in this training. They were taught to make different robots practically. On 29th March, a robotics competition was also held to understand the outcome of the workshop.



ONE-WEEK HANDS ON TRAINING ON

ROBOTICS

organized by
IEEE KU SB

20th MARCH TO 25th MARCH 2023 | 10:00 AM TO 12:30 PM DAILY
@ Seminar Hall, (MBSE-01), Kalinga University

RESOURCE PERSONS:

Dr. Vijayalaxmi Brahma Director IQAC	Mr. Anup Kumar Jana Assistant Professor (Mech Deptt), IQAC Coordinator	Mr. Sarat Chandra Mohanty Assistant Professor (Mech Deptt), IQAC Coordinator
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Participation Eligibility: All Diploma, UG and PG Students (Irrespective of the Branch)

REGISTRATION DETAILS

1. Registration fee is Rs. 300/- per participant for non-IEEE members, and Rs. 200/- per Participant for IEEE members.
2. If any group wishes to keep the Robotic Kits with them after the workshop, they have to pay an additional amount of Rs. 1500/-

Note : Registration is limited to 75 Participants.

Last Date of registration is: 04-03-2023.

Exciting Prizes will be given to the "Best Groups" at the end of the workshop.

Note: Certificates will be provided to all the participants.

IEEE KU SB, Room No. OBCF-02, Kalinga University, Naya Raipur - 492101, Chhattisgarh, India
www.kalingauniversity.ac.in/ieee/

Scan the QR code for Registration

Contact : 91 798184430



Atal Nagar-Naya Raipur, Chhattisgarh, India
SRSC-808, Kalinga University, Atal Nagar-Naya Raipur,
Chhattisgarh 492101, India
Lat 21.568087°
Long 81.821222°
23/03/23 11:36 AM GMT +05:30



Atal Nagar-Naya Raipur, Chhattisgarh, India
SRSC-808, Kalinga University, Atal Nagar-Naya Raipur,
Chhattisgarh 492101, India
Lat 21.568087°
Long 81.821222°
23/03/23 11:36 AM GMT +05:30

3.IEEE Student Branch (SB) Inauguration,SSIPMT

Date: 05th April 2023

In order to nurture the students of Shri Shankaracharya Institute of Professional Management and Technology (SSIPMT), Raipur, India, at a global level, Kalinga University has started the student branch of IEEE at SSIPMT on the date of 05th April 2023. IEEE Student Branch provides members a networking opportunity to meet and learn from fellow students, as well as faculty members and professionals in the field, to share their interests, future professions, and ideas. In addition to improving their soft and hard skills. The resource person for this event was Dr. Vijayalaxmi (Director, IQAC, Kalinga University).



4.IEEE Student Branch Inauguration at Guru Ghasidas Vishwavidyalaya, Bilaspur

Date: 06th April 2023

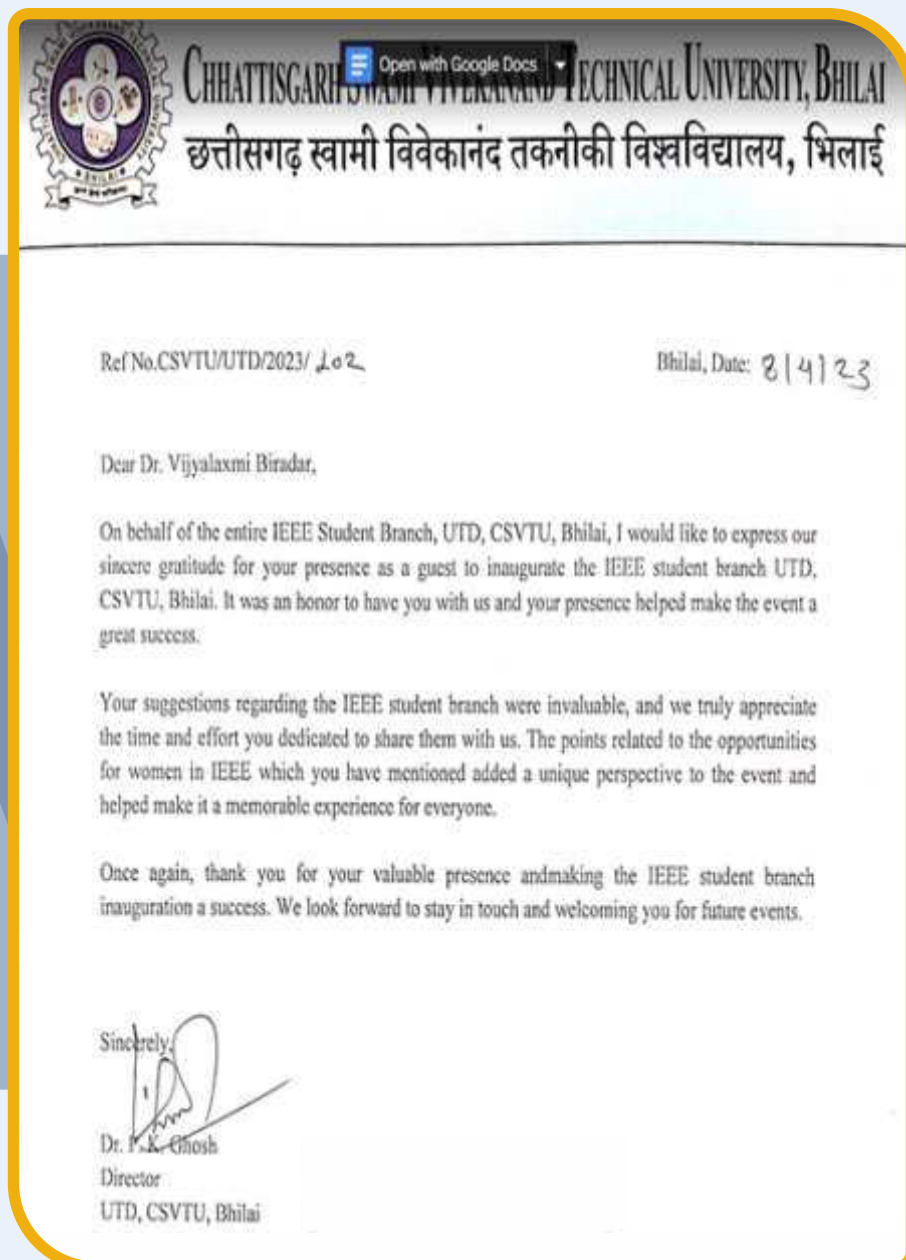
To nurture the students of Guru Ghasidas Vishwavidyalaya (GGU), Bilaspur, India, at the global level, Kalinga University has started the student branch of IEEE at GGU on the date of 06th April 2023. IEEE Student Branch provides its members a networking opportunity to meet and learn from fellow students, as well as faculty members and professionals in the field, to share their interests, future professions and ideas. In addition to improving their soft and hard skills. The resource person for this event was Dr. Vijayalaxmi (Director, IQAC, Kalinga University).



5. IEEE Student Branch Inauguration at CSVTU, Bhilai

Date: 06th April 2023

For skill exploration with various domains of the students of Chhattisgarh Swami Vivekanand Technical University (CSVTU), Bhilai, India, at a global level, Kalinga University has initiated the student branch of IEEE at CSVTU on the date of 06th April 2023. IEEE Student Branch provides its members a networking opportunity to meet and learn from fellow students, as well as faculty members and professionals in the field, to share their interests, future professions and ideas. In addition to improving their soft and hard skills. The resource person for this event was Dr. Vijayalaxmi (Director, IQAC, Kalinga University).



6. IEEE KU SB Anniversary Celebration

Date: 05th April 2023

Student and Professional members of IEEE KU SB (Kalinga University Student Branch) celebrated one year of completion of IEEE KU SB on 05th April 2023.



7. Branch Counsellors and EXCOM members Meet

Date: 05th April 2023

At Arena Hotel, Raipur, a Meeting was conducted with Branch Counsellors and EXCOM members with Dr. G. S. Tomar, Chair IEEE MP Section, on 05th April 2023. This program was attended by Dr. Vijayalaxmi (Director, IQAC, Kalinga University) and Mr. Anup Kumar Jana (IEEE KU SB Counsellor).

8. IEEE MP Section Chair Visit Kalinga University

Date: 07th April 2023

Dr. G. S. Tomar, IEEE MP Section Chair, visited Kalinga University, Naya Raipur, on 07th April 2023.



9. IEEE 8th I2CT CONFERENCE 2023

Date: 07th - 09th April 2023

At this IEEE 8th I2CT conference 2023, organised from 07th to 09th April 2023 in hybrid mode, Dr. Vijayalaxmi (Director, IQAC, Kalinga University) was invited as a Keynote Speaker.



10. 1st Annual Meet Celebration of IEEE Kalinga University Student Branch

Date: 20th April 2023

This 1st Annual Meet Celebration of the IEEE Kalinga University Student Branch was organised by IEEE KU SB at Kalinga University on 20th April 2023. The Chief Guest of this event was Mr. Pravin Kulkarni, GM, R & D, Godawari E-Vehicles Pvt. Ltd.



11. IEEE Initiative: Student Internship at Godawari

Under the initiative of IEEE KU SB, five students have completed their internship at Godawari Electric Motors Pvt. Ltd (EBLU).

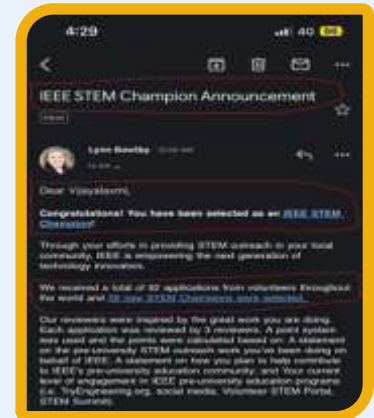


International Achievement

1. IEEE STEM Champion

Date: 02nd May 2023

Dr. Vijayalaxmi (Director – IQAC, Kalinga University) has been selected as an IEEE STEM Champion on 02nd May 2023. This is a significant achievement, as only 26 applications were selected out of 92.



2. IEEE Student Branch (AESS) Achievement

Date: 09th May 2023

IEEE KU SB Achieved 2nd Highest Student members across the Globe on 09th May 2023.



National Achievement

1. Chairperson IEEE WIE AG MP Section

Date: 03rd Feb 2023

Dr. Vijayalaxmi has been selected as Chairperson of IEEE WIE AG Madhya Pradesh Section 2023 on 03rd Feb 2023 at IEEE AGM, Gwalior.



FACULTY ARTICLE

AI AND fMRI AS BRAIN DECODER TO TRANSLATE BRAIN ACTIVITIES

Various brain imaging techniques are being utilised to measure brain activities, such as Electroencephalography (EEG), Positron Emission Tomography (PET), Structured and Functional Magnetic Resonance Imaging (MRI) and Diffusion Tensor Imaging (DTI). Decoding brain neural activity is a significant area of neuroscience study and a crucial component of the Brain-Computer Interface (BCI) technology. BCI is a device that can translate brain impulses into language. Numerous researchers have examined AI-based models for decoding brain activity. To categorise and identify brain processes, machine learning methods and straightforward linear models were initially developed. Deep Neural Networks (DNN) have been used to rebuild visual stimuli from human brain activity using Functional Magnetic Resonance Imaging (fMRI) with Image processing methods such as image recognition and production. Different AI based Brain models currently receiving a lot of attention for decoding brain activity: Triune Brain Model, Graph Convolutional Network (GCN), Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN), Variational Auto-Encoder (VAE), and Generative Confrontation Network (GAN). The gadgets can be developed with the combination of Brain Imaging and AI-based Brain Models may be able to help those who are unable to talk or communicate. However, using the current interfaces requires users to undergo risky brain surgery as well. The adoption of a system that uses non-invasive recordings of brain activity may be substantially greater. Thus, a hybrid model with a combination of brain imaging techniques and AI brain models solutions to many real-life incapacities and problems.

**Mrs. Divya**

Assistant Professor,
Kalinga University, Naya Raipur

FACULTY ARTICLE

TECH INNOVATIONS REVOLUTIONIZING THE FASHION INDUSTRY: A CLOSER LOOK AT SMART FABRICS

The fashion industry is undergoing a significant transformation with the integration of cutting-edge technologies. Among these innovations, smart fabrics have emerged as a game-changer, revolutionising the way we interact with clothing. These intelligent textiles are paving the way for a new era of fashion that seamlessly combines style and functionality. Smart fabrics, also known as e-textiles or electronic textiles, are materials infused with technology to enhance their capabilities. They integrate various sensors, conductive threads, and miniature electronic components into the fabric, creating a range of interactive and responsive features. From monitoring health metrics to adapting to environmental conditions, these fabrics are changing the fashion landscape in remarkable ways.

One of the most prominent applications of smart fabrics is in the field of health and wellness. The integration of biometric sensors into clothing allows for real-time monitoring of vital signs such as heart rate, respiration, and body temperature. This enables individuals to track their health data effortlessly, providing valuable insights for athletes, patients, and fitness enthusiasts alike. Another exciting aspect of smart fabrics lies in their ability to adapt to environmental conditions. With the inclusion of thermochromic dyes and conductive fibres, these textiles can regulate temperature and provide personalised comfort. Imagine a jacket that automatically adjusts its insulation based on the outside temperature or shoes that keep your feet warm in the winter and cool in the summer. Smart fabrics offer endless possibilities for creating functional and comfortable garments that cater to individual needs. While smart fabrics offer tremendous potential, challenges remain. The integration of technology into textiles requires careful consideration of durability, washability, and power sources.

In conclusion, smart fabrics are transforming the fashion industry, merging technology and style to create a new era of interactive clothing. From health monitoring to adaptive comfort and futuristic designs, these intelligent textiles are revolutionising the way we wear and experience fashion. As technology continues to advance, we can expect even more exciting developments in smart fabrics, bringing us closer to a future where our clothing becomes an extension of ourselves.



Lt. Vibha Chandrakar
Assistant Professor,
Kalinga University,
Naya Raipur

FACULTY ARTICLE

THE FUTURE OF ELECTRICITY: SOLAR CELLS ILLUMINATING THE WAY

In an era characterised by a growing concern for sustainability and the urgent need to combat climate change, the future of electricity lies in the embrace of solar cells. Solar energy, derived from the boundless power of the sun, offers a clean, renewable, and abundant source of electricity. With remarkable advancements in technology, plummeting costs, and a heightened awareness of environmental responsibility, solar cells are poised to revolutionise the way we generate and consume electricity.

I. The Era of Renewable Energy: The global shift towards renewable energy sources is gaining momentum, and solar power stands at the forefront of this revolution. Unlike fossil fuels, solar energy is abundant, inexhaustible, and emits no harmful greenhouse gases. By harnessing this immense power, solar cells pave the way for a cleaner and more sustainable energy future.

II. The Advantages of Solar Cells:

- 1. Environmental Benefits:** Solar cells produce electricity through the photovoltaic effect, converting sunlight directly into usable energy. This process generates no air or water pollution and significantly reduces carbon dioxide emissions. By harnessing the sun's energy, solar cells provide a solution to combat climate change, improve air quality, and preserve natural resources.
- 2. Cost-Effectiveness:** Over the past decade, the cost of solar cells has plummeted, making solar energy increasingly competitive with conventional energy sources. Advances in manufacturing, economies of scale, and technological innovations have drastically reduced the cost per watt of solar power. As a result, solar energy is becoming an economically viable choice for both individuals and businesses.
- 3. Energy Independence:** Solar cells enable individuals, communities, and even nations to become self-reliant in energy generation. By producing electricity locally, reliance on centralised power grids and imported energy sources is reduced. This newfound energy independence enhances energy security, mitigates the risk of power outages, and reduces vulnerability to geopolitical tensions.
- 4. Scalability and Flexibility:** Solar cells offer scalability and flexibility in terms of installation. They can be deployed on rooftops, integrated into buildings, or utilised in large-scale solar farms. This adaptability allows solar energy systems to be tailored to

diverse needs, from residential and commercial applications to utility-scale power generation.

- 5. Job Creation and Economic Growth:** The rapid growth of the solar industry has the potential to generate significant employment opportunities. Installation, maintenance, research and development, manufacturing, and associated services create jobs across various skill levels. The solar sector also stimulates economic growth through investment and local supply chains.

III. Technological Advancements:

- 1. Increased Efficiency:** Research and development efforts continue to drive improvements in solar cell efficiency. From traditional silicon-based cells to emerging technologies like perovskite and multi-junction cells, breakthroughs are pushing the boundaries of efficiency, enabling more energy to be captured from sunlight.
- 2. Energy Storage Solutions:** One of the challenges associated with solar energy has been intermittency—the fact that sunlight is not available 24/7. However, advancements in energy storage technologies, such as batteries and grid-scale solutions, are complementing solar cells. Energy storage enables excess solar power to be stored for use during periods of low sunlight, ensuring a consistent and reliable electricity supply.

IV. Overcoming Challenges and Shaping the Future: While solar cells offer immense promise, there are challenges to address:

- 1. Grid Integration:** Integrating large-scale solar energy into existing power grids requires robust infrastructure upgrades and grid modernisation to ensure seamless integration and distribution of electricity.
- 2. Policy Support:** Governments and policymakers play a crucial role in supporting the adoption of solar energy through favourable policies, incentives, and regulatory frameworks. Stable and long-term policies can spur investment, create market certainty, and accelerate the transition to solar power.
- 3. Public Awareness and Education:** Raising awareness about the benefits and potential of solar energy is essential. Public education campaigns can dispel myths, address misconceptions, and encourage the widespread adoption of solar cells as a clean and sustainable energy solution.

Solar cells are poised to transform the future of electricity generation, ushering in an era of clean, renewable, and accessible energy for all. With their environmental benefits, cost-effectiveness, scalability, and technological advancements, solar cells provide a sustainable pathway towards a decarbonised energy system. By embracing solar power, we can create a brighter future powered by the boundless energy of the sun. Let us embrace this transformative technology and shape a world powered by clean and sustainable electricity.



Dr. Alope Verma

HoD & Assistant Professor,
Department of Physics,
Kalinga University, Naya Raipur

FACULTY ARTICLE

APPLICATION OF ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS IN THE CONSTRUCTION SECTOR

The development of Neural Networks and Artificial Intelligence (AI) is revolutionising the building sector. They are revolutionising many facets of building with their capacity to analyse massive amounts of data, spot trends, and reach wise judgements. Predictive analytics, made possible by Artificial Intelligence and Neural Networks, aids construction organisations in predicting project outcomes, such as cost overruns and delays. AI can analyse past data and detect prospective dangers in construction projects, allowing for proactive risk management. Safety events and accident reports can be analysed by Neural Networks to detect patterns and improve safety procedures. AI aids Virtual Design and Construction (VDC) by automating collision detection, optimising designs, and increasing efficiency. AI-powered cameras and sensors that detect risks and track worker actions improve construction site monitoring. By optimising building systems and minimising energy use, AI can help with energy efficiency. Drones driven by AI and robotics perform repetitive jobs such as site inspections, surveying, and material transportation. By analysing environmental aspects and optimising energy usage, AI can assist in the design of sustainable buildings. Geospatial data can be analysed by Neural Networks to locate suitable development sites and assess environmental effects. AI-powered chatbots and virtual assistants give construction professionals immediate assistance, answering questions and providing advice. AI can analyse weather data to optimise construction scheduling, taking into account variables such as rain, temperature, and wind. By analysing historical data, material costs, and labour rates, Neural Networks can help with cost estimation. AI can mine social media and consumer comments for information about customer happiness and to optimise project delivery. Building layouts can be optimised using AI-powered algorithms for best space utilisation and efficiency. To predict foundation requirements and analyse ground stability, Neural Networks can automate the examination of soil data. AI can help with real-time project monitoring, progress tracking, and spotting potential bottlenecks. Image recognition systems driven by AI may analyse building site photographs to detect safety infractions and potential hazards. AI-powered Virtual Reality (VR) and Augmented Reality (AR) technologies provide immersive visualisation and project simulations. AI can analyse past data to detect patterns and optimise construction asset upkeep and longevity. Neural Networks can detect infrastructure deterioration early, allowing for proactive

maintenance and lowering repair costs. Artificial intelligence systems can analyse traffic data to optimise construction logistics and reduce transit delays. AI can help smart cities develop by combining data from diverse sources and optimising infrastructure systems. Neural Networks contribute to the optimisation of prefabrication and modular construction processes, resulting in reduced construction time and costs. Artificial Intelligence-powered algorithms may analyse project performance data and find areas for improvement, hence improving overall project management. To summarise, the use of Artificial Intelligence and Neural Networks in the construction sector is revolutionising old practices and resulting in increased efficiency, safety, and sustainability. As technology advances, we may expect more developments in AI applications, which will contribute to the construction industry's ongoing transformation.

References:

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**Dr. N. K. Dhapekar**

Head - Department of Civil Engineering,
Kaling University, Naya Raipur

STUDENT ARTICLE

PROPULSION THROUGH PLASMA: THE NEW AGE OF GREEN AVIATION

The development of propulsion systems for space exploration and aerospace applications has been a critical area of research for decades. Traditional chemical propulsion systems have been the primary means of propelling spacecraft and satellites, but they have fuel efficiency and overall performance limitations. Alternative propulsion technologies have been explored to overcome these limitations, including plasma-based propulsion systems. Plasma-based propulsion systems operate by ionising the gas and generating a plasma that is accelerated to produce thrust. Compared to traditional chemical propulsion systems, plasma-based systems offer several advantages, including higher fuel efficiency, scalability, and the potential for higher levels of thrust. The plasma-based propulsion system consists of a plasma generator and a nozzle that accelerates the plasma to produce thrust.

Propulsion through plasma includes a wide range of technological products and apparatuses that span a wide range of dimensions, powers, thrusts, particular impulses, and efficiency. While some thrusters are now prototypes being developed and tested in labs, others have a lengthy history of flying and are commercially accessible.

**Honey Kumar**

B.Tech. Mechanical, 8th Sem.,
Kalinga University, Naya Raipur

STUDENT ARTICLE

CONFIDENTIAL AI COLLABORATIONS: REVOLUTIONISING HEALTHCARE WITH FEDERATED LEARNING

Federated learning is revolutionising healthcare by enabling secure and privacy-preserving AI collaborations. This groundbreaking approach allows healthcare institutions to collectively train AI models without sharing patient data centrally, preserving confidentiality and unlocking unprecedented advancements in diagnosis, treatment, and patient care.

Preserving Patient Privacy: Federated learning ensures patient data security and confidentiality, enabling collaborative model training across institutions without centralised data collection.

Collaborative Data Analysis: Through distributed data analysis, federated learning enables insights and advancements in disease prediction, early detection, and personalised treatment recommendations while maintaining privacy.

Enhanced Diagnosis and Treatment: Leveraging deep learning algorithms, federated learning enables accurate diagnosis and the development of customised treatment plans based on individual patient characteristics.

Regulatory and Ethical Considerations: Compliance with data protection regulations and transparency are crucial when implementing federated learning in healthcare. Responsible deployment addresses ethical concerns and fosters trust.

Confidential AI collaborations revolutionise the healthcare landscape, empowering providers to leverage the collective knowledge of distributed data without compromising patient privacy. With the promise of improved diagnosis, treatment, and personalised care, federated learning shapes the future of healthcare.



Kushal Jain

MCA, 2nd Sem.,

Kalinga University, Naya Raipur

STUDENT ARTICLE

POSSIBILITIES TO USE COAL AS HYDROGEN BATTERY

Hydrogen has been hailed as a potential solution to the climate crisis due to its high energy density, making it suitable for powering heavy-duty vehicles and various transportation modes, as well as applications in heavy industries. However, the challenge lies in its storage, which could find an unlikely answer in coal.

According to Shimin Liu, an associate professor of energy and mineral engineering at Penn State, "We have discovered that coal can serve as a geological hydrogen battery. It offers the ability to inject and store hydrogen energy, making it readily available for future use."

Geological formations have the potential to store significant amounts of hydrogen, contributing to grid-balancing efforts. Liu states, "Coal is a well-studied resource, and we have been commercially extracting gas from coal for nearly half a century. We possess a comprehensive understanding of its properties and have established infrastructure. Therefore, coal appears to be the most logical choice for geological hydrogen storage."

Liu and a team of researchers conducted an analysis of eight different types of coal found across the United States to assess their sorption properties, which indicate their capacity for hydrogen retention. The scientists reported that all eight coal types exhibited substantial sorption properties, with low-volatile bituminous coal from eastern Virginia and anthracite coal from eastern Pennsylvania performing exceptionally well in tests, as documented in the journal *Applied Energy*.

Liu believes that from a scientific perspective, "It is highly likely that coal could be the most suitable option for geological storage. Coal outperforms other formations due to its higher capacity for hydrogen retention, existing infrastructure, and widespread availability in proximity to populated areas."

Promising sites for hydrogen storage include former methane reservoirs that have been depleted. These sites previously exhibited adsorption, where methane adhered to the coal's surface. The same process could be employed for injecting hydrogen, with a layer of shale or mudstone acting as a seal. Liu explains, "Although many define coal as a rock, it can be viewed as a polymer with high carbon content and numerous small pores capable of storing a substantial amount of gas. Coal functions like a sponge, capable of retaining a higher number of hydrogen molecules compared to other non-carbon materials."

This innovative approach also presents an opportunity to revitalise former coal mining communities. Liu emphasises, "Coal communities have been significantly affected economically during the energy transition. This represents an opportunity to repurpose these regions. They possess the expertise of energy engineers and the necessary skills. By establishing the required infrastructure, we can transform their economic prospects, which is a possibility worth considering."



Aditya Kumar

B.Tech. ME 7th Sem.,
Kalinga University, Naya Raipur

STUDENT ARTICLE

THE BALLAD OF STRUGGLE & OPPORTUNITY - CONDITION OF AN INDIAN CIVIL ENGINEER

As technology continues to advance, so does the field of civil engineering, with constant innovations revolutionising the way projects are planned, designed, and executed. In the context of India, it is essential to shed light on the current condition of Indian civil engineers.

The state of Indian civil engineers today is one of both challenges and opportunities. On one hand, there is a growing demand for skilled professionals due to the extensive infrastructure projects taking place across the country. However, there are certain issues that need attention, such as skill gaps, inadequate training, and the need for continuous professional development. Several noteworthy advancements have emerged in civil engineering. One notable area is the integration of building information modelling, and the utilisation of green & sustainable practices in construction. Indian civil engineers are embracing techniques like green building design, the use of eco-friendly materials, and the implementation of renewable energy sources.

Conclusion: In summary, the condition of Indian civil engineers today reflects a mix of challenges and opportunities. By addressing skill gaps and promoting continuous professional development, Indian civil engineers can contribute to the nation's infrastructure development and create sustainable, efficient, and resilient built environments.



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