KIET GROUP OF INSTITUTIONS
Connecting Life with Learning
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Delhi-NCR, Ghaziabad
CELEBRATING 25 YEARS OF EXCELLENCE
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CREATE SUSTAIN LIVE KIET SDG HUB

July 2024

Vol No. 19

अनुसंधान

(KIET Research Magazine)

Ms. Veena Sharma
Lead- Scientific Affairs
SARA, AMEA Region
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Gurugram – 122002

Research and Development
KIET Group of Institution
Delhi-NCR, Ghaziabad, Uttar Pradesh, India-201206

KIET – A GLANCE

Overview

KIET Group of Institutions (KIET) was established in 1998 at Ghaziabad (Delhi-NCR) with an annual intake of 180 students. It is an AICTE-approved Institution affiliated to Dr. A.P.J Abdul Kalam Technical University (AKTU), Lucknow (formerly UPTU). KIET offers UG & PG courses in four disciplines i.e., Engineering, MBA, MCA & Pharmacy. With the glorious legacy of 25 years, the Institute now has 7500+ students and is empowered with 350+ highly qualified full-time faculty to nurture our students. Institute credentials and Centers of Excellence can be viewed @ our website www.kiet.edu.

The Institute has NAAC accreditation status with an 'A+' Grade and all its eligible programs are NBA accredited. The effort of the institute in imparting technical education has been recognized in terms of achieving 88th rank in the Pharmacy discipline, Rank Band (151-200) for Engineering and Innovation (51-100) Rank band in the National Institutional Ranking Framework (NIRF) - India Ranking 2023 released by Ministry of Education, GOI. The Institute has to its credit QS-I GAUGE 'Diamond' rating and Scientific and Industrial Research Organization (SIRO) recognition by the Department of Scientific and Industrial Research (DSIR) etc. The Institute also has a Technology Business Incubator (TBI) set up in association with NSTEDB, DST, Govt. of India to promote Innovation and Entrepreneurship in the Institute and the adjoining areas. Since its inception 125 incubate companies have established their venture in KIET-TBI. Presently 36 nos. incubate are operational.

With a rich alumni base of 19000+ students spread in all the nooks and corners of the world, the KIET Group of Institutions is moving efficiently towards its vision of shaping young minds with skill-oriented & value-based education as these alumni serve the dual purpose of mentoring the present students, as well as opening new doors for them.

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Message from the Face of Cover Page

Dear KIET Institutions Team,

I want to express my deep gratitude and sincere appreciation for the exceptional contributions of KIET Institutions. Your ongoing commitment to fostering academic and personal growth over the past 25+ years is truly commendable.

The recent launch of the MOU with L&T Edu Tech and the establishment of the first EV Centre of Excellence in North India are prime examples of your dedication to providing state-of-the-art resources that enhance practical learning. These initiatives are sure to inspire students to engage in more hands-on experimentation, effectively bridging the gap between theory and practice.

Practical experience in applying theoretical concepts is what truly enriches our journey. As Marshall Sylver wisely said, "Enjoy the journey as much as the destination." KIET's outstanding FDP program is a testament to their dedication to ongoing learning, whether it's in the evolving field of pharmaceutical sciences or the emerging areas of Generative AI and Large Language Models.

My own path in Food & Consumer Healthcare has been equally fulfilling—filled with joy, a sense of contribution, and valuable insights. From food supplements and nutraceuticals to specialized products for metabolic health and the simple pleasure of savoring snacks, food has always been a cornerstone of our ancient philosophy of 'Anna & Aushadhi.'

Pharmaceutical and food sciences are deeply connected, each meeting essential needs for human health. A truly meaningful journey unfolds when preventive and curative healthcare work together to enhance 'Self Care.' The SDG goals of Zero Hunger and Good Health & Wellbeing are critical to realizing the vision of a 'Developed India.' The food and pharmaceutical industries are pivotal in addressing the needs of consumers and patients.

By joining forces in these complementary fields and with the continued excellence from institutions like KIET, India is well on its way to achieving its goals. I look forward to seeing the ongoing achievements and innovations that KIET will continue to bring.

Best wishes for your journey ahead—may you enjoy every step along the way!

Warm regards,

Ms. Veena Sharma

Message from Chief Patron

Dear Readers,

It is with immense pride and enthusiasm that I address you through this edition of the KIET Research Magazine. Our journey towards academic excellence and innovation has been both inspiring and rewarding, and it is your dedication and contributions that fuel this remarkable progress.

At KIET Institute, we believe in pushing the boundaries of knowledge and fostering an environment where innovative ideas can flourish. The content of this magazine is a testament to the groundbreaking research and scholarly pursuits KIETians. Each article represents not just the culmination of hard work but also the potential to drive future advancements in our fields.

As we continue to advance in a world that is ever-changing and increasingly complex, your voice and insights become more crucial than ever. I encourage each of you to embrace the opportunity to share your innovative research and perspectives. Your submissions have the power to influence the discourse, inspire your peers, and contribute to the broader academic and scientific community.

Let us remain committed to exploring new frontiers and challenging the status quo. The more we engage in sharing our research, the more we contribute to a vibrant culture of discovery and innovation. I urge you to submit your most innovative and impactful research articles, and to continue pushing the envelope of what is possible.

Finally, I would like to extend my warmest wishes to all our researchers and partners. Their hard work and dedication make our institute a leading force in the research community, and we are honoured to have you on board. Together, let us build on our collective knowledge and make a lasting impact on the society.

Warm Regards

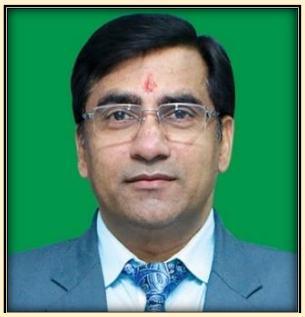
Prof. (Dr) Preeti Bajaj

Ph.D (Electronics), M.B.A

Director General-KIET Group of Institutions

Delhi-NCR, Meerut Road (NH-58) 201206

Message from Patron



Dear Esteemed Readers,

KIET Group of Institutions has always strived to be a beacon of knowledge, innovation, and progress in our ever-evolving world. Our commitment to excellence and dedication to fostering a culture of learning, discovery, and growth has remained unwavering. This magazine serves as a testament to our mission, and it is a privilege to share our stories, insights, and achievements with you.

In recent years, India has witnessed remarkable strides in various fields of research. Our nation's scientific and academic communities are working tirelessly to address some of the most pressing global challenges, from healthcare and environmental sustainability to cutting-edge technology and space exploration. These endeavors have not only propelled India onto the international research stage but also brought our scientists, scholars, and innovators well-deserved recognition.

The objective of this research magazine is to curate a collection of articles that encapsulate the diversity and dynamism of India's research landscape. Readers will have the opportunity to delve into the latest breakthroughs in fields such as artificial intelligence, renewable energy, biotechnology, space research, and many more. It is our commitment to bring you the most up-to-date, well-researched, and thought-provoking content that captures the spirit of innovation that defines research in India today.

In closing, I invite you to engage with us, to share your thoughts, feedback, and suggestions. This magazine is not just ours; it belongs to the community of knowledge seekers, innovators, and change-makers. I encourage you to share your thoughts and continue supporting the pursuit of knowledge and innovation. It is your enthusiasm and curiosity that propel our mission forward.

I also want to extend my heartfelt gratitude to all our contributors, editors, and the diligent team that works tirelessly behind the scenes to bring this magazine to life. Their dedication ensures that our message of progress and learning reaches you, our cherished readers.

Dr. Anil Ahlawat

Director Academics

KIET Group of Institutions

Delhi-NCR, Ghaziabad

Message from Patron

Dear All,

It gives me great pleasure, in my capacity as Joint Director at the KIET Group of Institutions, to introduce this research magazine that focuses on the work that is being done at our institute and its future perspectives on knowledge and innovation. Our goal is to expand the horizons of both knowledge and innovation, and we have confidence that our researchers will unfold every stone and reach new heights.

By encouraging teamwork and open communication, we will be able to make progress in these areas. Our researchers will collaborate with industrial partners, government organizations, and other academic institutions to develop innovative technologies and solutions, share their findings, and disseminate their findings.

Our studies will result in scientific discoveries and technological advancements that are beneficial to society, and we intend to share these with anybody who could make use of them.

In closing, please accept my warmest regards for our researchers and partners. We are grateful for all the hard work and dedication you have shown in making our Institute a pioneer in research. Together, we can accomplish incredible things.

Dr. Manoj Goel

Joint Director KIET

KIET Group of Institutions

Delhi-NCR, Ghaziabad

Message from Editor-In-Chief

Dear Colleagues and Friends,

As Dean of Research and Development KIET, I am honoured to share the latest research and development activities with you. Our dedicated team of researchers, students, and faculties continue to progress significantly in various fields, from basic science to applied technology.

One of our major achievements this year has been the development of a new treatment for a rare genetic disorder. Our team discovered a novel therapeutic approach that has shown promising results in preclinical trials. We are now working to bring this treatment to the clinic and help patients suffering from this debilitating condition. It is a true example of how our research is not just limited to the lab but also can potentially make a real-world impact.

Another area where we have made significant progress is in the field of renewable energy. Our researchers have developed a new type of solar cell that has the potential to increase the efficiency and cost-effectiveness of solar energy significantly. This technology has already attracted the attention of several major companies, and we are currently transferring it to the industry for further development. It not only helps in protecting the environment but also in creating new job opportunities and economic growth. In addition to these specific achievements, KIET has progressed in several other areas. Our researchers have published numerous articles in top-tier journals, presented their work at international conferences, and received numerous grants and awards. It can showcase the quality of our research and our team's dedication and hard work. In addition to our ongoing research activities, we have also launched several new initiatives to support and promote research at our institute. We have also created a new seed funding program to support innovative and high-risk research projects that have the potential to make a significant impact. These initiatives help our researchers not just conduct research but also in developing their skills and knowledge.

I would also like to take this opportunity to express my gratitude to our researchers, scientists, engineers, and staff, who have worked tirelessly to make our institute a leader in research and development. Their dedication, passion, and hard work have been instrumental in our achievements, progress, and initiatives. I also want to thank our funding partners, collaborators, and supporters for their ongoing support and contribution.

Lastly, I would like to extend my best wishes and blessings to all of you, your families, and your friends. May the upcoming year be prosperous, happy, and in good health. With our collective efforts, we will be able to continue making a positive impact on the world through our research and development activities.

Dr. Vibhav Kumar Sachan

Dean (Research and Development)

KIET Group of Institutions

Delhi-NCR, Ghaziabad

Foreword

Academic research and development related to the scientific investigation and experimentation undertaken by colleges, universities, and other higher education institutions aim to further enhance knowledge in a subject. Natural sciences, social sciences, and humanities are subjects in which academic academics can engage in research. Academic research and development aim to add to the corpus of knowledge and educate the next generation of scholars. Today, academic research collaboration may bring scholars from many institutions, fields, and nations to collaborate towards a single aim. Collaboration can take numerous forms, including co-authoring research articles, submitting joint funding applications, and conducting interdisciplinary research initiatives. Collaboration may give researchers access to new resources, such as specialized equipment or data sets, and the opportunity to share knowledge and get fresh views on a research subject. Collaboration also boosts the impact and exposure of research by enabling academics to reach new audiences and get acknowledgement for their work. In this sequence, research magazines play a significant role in academic research and development by providing a forum for scholars to disseminate their results to a larger audience. These periodicals focus on specialized disciplines of study, such as fundamental engineering, computer science, mathematics, and physics, and publish articles authored by subject matter experts. Technical journals may be an essential source of knowledge for researchers, presenting them with the most recent advancements and trends in their area. These publications can also act as a method for researchers to gain feedback from their peers. These periodicals are also excellent resources for students and scholars interested in recent advancements in their respective fields of study.

According to the above-mentioned factors, the publication "KIET Research Magazine" is being produced. It is envisaged that after reading this Magazine, a student or researcher will be aware of current research in his/her relevant subject and be able to identify a suitable partner if necessary. Most of the Magazine's material is drawn from KIET's research and development efforts.

The publication has endeavoured to provide as many study results as feasible while prioritizing reporting clarity. This publication is to report on KIET's research and endeavours, therefore increasing the global exposure of KIET's work. We are grateful to our colleagues for allowing us to present the mentioned research activity and their results in this publication. As appropriate, the names of each of these fellows are included in various sections of the Magazine.

We are deeply grateful to the Institute's Management, Director, Joint Director, Dean R&D, Heads, and all the associates for their support, blessings, and cooperation in publishing this multidisciplinary research magazine “अनुसंधान” .

Dr. Brijesh Singh

Editor
KIET Group of Institutions
Delhi-NCR, Ghaziabad

Foreword

"Sharing knowledge is a charity of knowledge that constitutes the ways of a beautiful life" — Ehsan Sehgal

To enhance the beauty of the research domain, the KIET research magazine plays a vital role through the knowledge sharing of different domains, which may enhance the quality of research at inter and intra-departmental scales in the KIET Group of institutions. The awareness and acknowledgment of the outer niche may enhance the collaborative research among the various disciplines like environment, sustainability, energy, chemistry, modelling, mechanical, management, pharmacy, etc. This initiation is also likely to give positive outcomes in collaborative research publications, joint project submissions, joint work on patents, technical bulletins, etc. The holistic growth in the social, economic, and ecological pillars of society may be achieved through sharing of the scientific research and incorporation of the same through research institutes. It gives me immense pleasure to introduce this supplement dedicated to research upgrowth. As filling such gaps may lead to a paradigm shift in research networking and upliftment in the research domain.

We heartily thank our management, the Director, the Joint Director, the Dean of R&D, and the entire KIET family for their unconditional guidance and support.

Dr. Minakshi Karwal
Associate Editor
KIET Group of Institutions
Delhi-NCR, Ghaziabad

"Research is something that everyone can do, and everyone ought to do. It is simply collecting information and thinking systematically about it" - Raewyn Connell

The KIET research magazine contributes significantly to inspiring young researchers to augment knowledge and innovation. The magazine also disseminates awareness about technical innovation in the field of science, technology, and management to faculty and students.

The highlights of the notable research activities conducted by our institute over the past month are included in this magazine issue. This would help the research activities to get a better reach and new dimensions in terms of collaborative publications, research articles, project proposal submissions, patent filing, etc.

To achieve the goal of the KIET Institute to observe the year 2023 as an innovation and start-up year, we are confident that KIET Research Magazine will continue to contribute significantly to the inner and outer specialization for greater scientific research and innovation.

We would like to extend our deepest gratitude to the Research and Development Team of the KIET Group of Institutions for their tireless work in ensuring the success of all research initiatives.

We are extremely grateful to the leadership of the KIET Group of Institutions, the Director, the Joint Director, the Dean of R&D, and the entire KIET family for their generous support and leadership over the years.

Dr. Himanshu Chaudhary
Associate Editor
KIET Group of Institutions
Delhi-NCR, Ghaziabad

Overview of the Research and Development

Rapid growth in scientific knowledge is an indication of the quest for discovery and has a substantial impact on economic and societal development. Science, technology, and innovation are often initiated in an Institution's research environment. Research and developmental activities create and disseminate new knowledge in different fields, promote innovation, and motivate better learning and teaching among faculty members and students at our Institute, as these are often incorporated into the courses. Research is the foundation of knowledge that brings new energy builds state-of-the-art facilities, promotes research publications, develops collaborations, and becomes part of an active community that shares common objectives. Moreover, there is good evidence that research supports and improves teaching and helps to build excellence in this dimension as well. Research can have salutary effects on faculty members, on the nature of their teaching, and the undergraduate and postgraduate students.

Evidence is accumulating that students do benefit in significant ways from having researchers as instructors if, the institution balances resources spent, and rewards assigned between research and teaching. This positive view, which has been consistently detected in recent studies, sees the benefits of 'research-led teaching.' In this approach, the experience of the researcher is integrated into teaching.

Vision

To achieve excellence in research and create an outstanding climate of support for researchers, broadly enabling research advances to meet National and International needs.

Mission

- To motivate faculty members to concentrate on research-related activities, in addition to teaching, to publish research articles in reputed journals.
- To pursue efforts to write books and monographs for publication by – International and National publishers of repute.
- To evince interest among the faculty members so that they make efforts to establish collaborative research projects with their counterparts in reputed National and International Universities.
- To encourage faculty members to submit proposals and secure funded research projects from various funding agencies in India and Abroad.
- To undertake consultancy projects sponsored by the Government as well as Private, Industrial, and other organizations.

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Glimpses of Month

'Industry, Academia, and Professional Societies - Partnering to Deliver Excellence', organized by the IEEE India

Director General of KIET Group of Institutions, Dr. Preeti Bajaj was invited as a 'Moderator' for a panel discussion on 'Industry, Academia, and Professional Societies - Partnering to Deliver Excellence', organized by the IEEE India Head Office for Vice Chancellors and Directors.

The event featured Hon'ble Chairman AICTE as the Chief Guest, with Prof. Vinay Pathak, President of AIU, as the Guest of Honour. The keynote address was delivered by IEEE Global President Dr. Thomas Coughlin. Other distinguished dignitaries included IEEE President-Elect Kathleen A. Kramer, IEEE Region 10 Director Dr. Lance Fung, IEEE MGA Vice President Deepak Mathur, and others.

The panel discussion focused on how collaboration among industry, academia, and professional societies can enhance engineering education.

ECE Department Conducted 5-Day Online Faculty Development Program

On July 22, 2024, the Department of Electronics and Communication Engineering at KIET Group of Institutions inaugurated its five-day Faculty Development Program (July 22nd to 26th, 2024) on "Design & Development of Biomedical Antennas."
This prestigious event, sponsored by Dr. A.P.J. Abdul Kalam Technical University, Lucknow, has brought together 322 participants from across India.

We were honoured by the presence of Prof. (Dr.) S. S. Patnaik, Vice Chancellor of Odisha State Open University, as the Chief Guest, and Dr. Preeti Bajaj, Director General of KIET, as the Guest of Honor. The inaugural ceremony also saw the participation of Dr. Manoj Goel, Dr. Anil Ahlawat, and other distinguished dignitaries.

KIET School of Pharmacy Inaugurates 5-Day Online Faculty Development Program

We are excited to announce the inauguration of a 5-day Online Faculty Development Program (FDP) on "**Paradigm Shift in Pharmaceutical Sciences**: **From Bench to Bedside and Beyond**" on July 22, 2024. This FDP, running from July 22 to July 26, 2024, is sponsored by AKTU, Lucknow. It aims to explore the transformative journey of pharmaceutical sciences from laboratory research to clinical application, fostering interdisciplinary collaboration and advancing faculty capabilities in teaching and research methodologies.

The inaugural session was graced by dignitaries including Dr. Preeti Bajaj (Director General - KIET), Dr. Manoj Goel (Joint Director - KIET), Dr. Anil K. Ahlawat (Director Academics), the chief guest Prof. (Dr.) B. N. Sinha (Dean Academic Affairs, Amity University, Ranchi & Kolkata), and Dr. Rakesh Sharma (Founder President, CBRN Warriors, India, Director (Rtd.) DRDO-DFRL, Mysore). The event was convened by Dr. K. Nagarajan, Principal of KIET School of Pharmacy.

KIET Signed MOU with Xebia (Leading Software Engg and IT Consultancy Company)

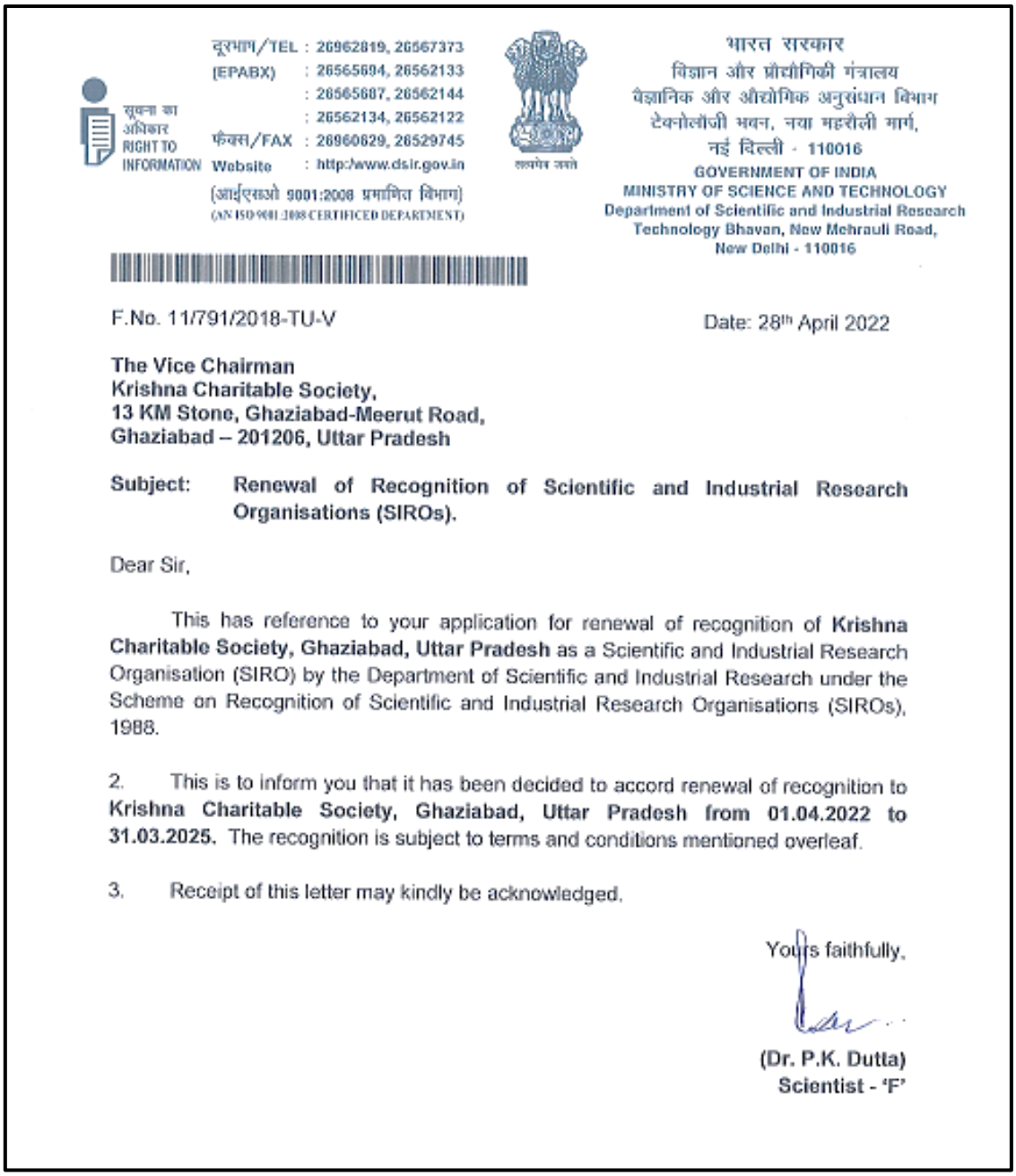
On July 17, 2024, KIET Group of Institutions signed an MOU with Xebia to offer specialized courses aligned with industry needs. This partnership aims to enhance students' skill sets by providing tailored educational programs that meet current market demands.

Through this collaboration, KIET Group of Institutions and Xebia will work together to ensure that the courses offered are relevant and beneficial, equipping students with the knowledge and expertise required to excel in their professional careers.

Statistics of KIET Research and Development Activities

Rankings & Accreditations

- **NAAC - Grade 'A+' (Cycle 2 Assessment) - Accredited for 5 years till 03 Jan 2027.**
- **NIRF 2023 (Pharmacy – Rank 88 & Engineering - Rank Band (151-200).**
- **NIRF 2023 Innovation Rank Band (51-100).**
- **QS-IGAUGE - 'Diamond' College Rating (till Feb 2024) & 'Institution of Happiness' Award.**
- **Innovation Hub, AKTU – Hon'ble VC AKTU Appointed KIET as Nodal Regional Centre**
- **NBA Accreditation - All eligible programs are NBA accredited.**
- **KIET Group of Institutions, Delhi-NCR, Ghaziabad (UP) recognized by the Scientific and Industrial Research Organization (SIROs) under Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, Government of India. (Till 31 Mar 2025)**



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Department of Scientific and Industrial Research
Technology Bhavan, New Mehrauli Road,
New Delhi - 110016

F.No. 11/791/2018-TU-V

Date: 28th April 2022

The Vice Chairman
Krishna Charitable Society,
13 KM Stone, Ghaziabad-Meerut Road,
Ghaziabad – 201206, Uttar Pradesh

Subject: **Renewal of Recognition of Scientific and Industrial Research Organisations (SIROs).**

Dear Sir,

This has reference to your application for renewal of recognition of **Krishna Charitable Society, Ghaziabad, Uttar Pradesh** as a Scientific and Industrial Research Organisation (SIRO) by the Department of Scientific and Industrial Research under the Scheme on Recognition of Scientific and Industrial Research Organisations (SIROs), 1988.

2. This is to inform you that it has been decided to accord renewal of recognition to **Krishna Charitable Society, Ghaziabad, Uttar Pradesh from 01.04.2022 to 31.03.2025.** The recognition is subject to terms and conditions mentioned overleaf.

3. Receipt of this letter may kindly be acknowledged.

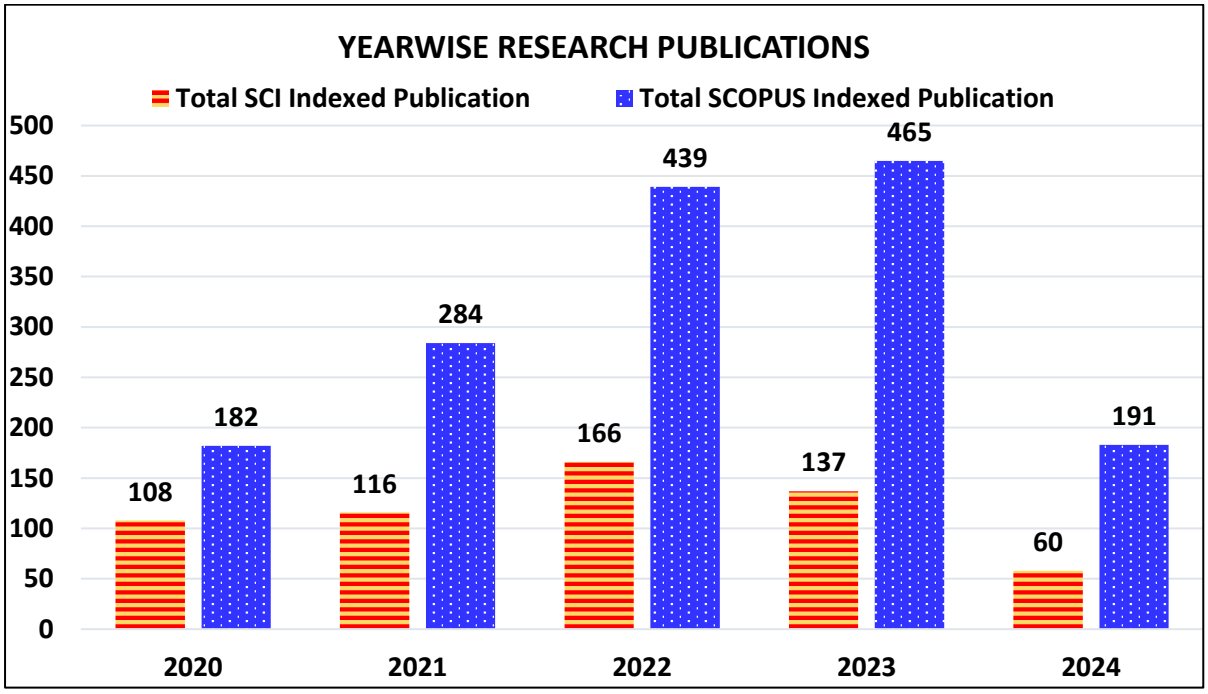
Yours faithfully,

(Dr. P.K. Dutta)
Scientist - 'F'

KIET Research Credentials

A total of SCI Research Publications and Scopus Indexed Research Publications with an affiliation of KIET Group of Institutions, Delhi-NCR, Ghaziabad are listed in Web of Science and Scopus Database till July 2024.

Year	Total Number of SCI Indexed Publications	Total Number of SCOPUS Indexed Publications	Total Number of Research Publications
2020	108	182	290
2021	116	284	400
2022	166	439	605
2023	137	465	602
2024*	60*	191*	251*
Total	587*	1561*	2148*



CATEGORY	Number of Publication (2023-24)						
	Jan-24	Feb-24	March-24	April-24	May-24	June-24	July 24
SCOPUS Publications	*9*	*8*	*34*	*23*	*29*	*80*	*8*
Web of Science Publication	*4*	*6*	*9*	*15*	*18*	*6*	*2*

Details of Patents Published/Granted

Title of the Invention: Design a mathematical based modal for currency escrow transactions

Application Number: 202411050977 A (Indian Patent Office)

Applicant(S): KSOM, KIET Group of institution

Date of Filing: 03-07-2024

Date of Publishing: 12-07-2024

Field of the Invention: The present invention relates to design a mathematical based modal for currency escrow transactions.

Objects of the Invention: The principal object of the present invention is to overcome the disadvantages of the prior art.

Another object of the present invention is to focuses on systems and methods for performing transactions involving a purchase of a titled item with MBC held in escrow.

Another object of the present invention is to design a mathematical based modal for currency escrow transactions.

The present invention relates to a simplified summary of the invention in order to provide a basic understanding of some aspects of the invention. Its sole purpose is to present some concept of the invention in a simplified form as a prelude to a more detailed description of the invention.

In an aspect, the present invention relates to method of facilitating the transfer of an asset from a seller to a buyer through a transfer of a digital title via a math - based currency transaction. The method includes receiving, by a financial institution computing system associated with a financial institution, an amount of funds from the buyer. The method further includes receiving, by the financial institution computing system, an identifier of the math-based currency transaction from a seller computing device associated with the seller.

n another aspect, the present invention provides the math-based currency transaction for a transfer of a first amount of a math-based currency from the seller to the buyer. The method includes locating, by the financial institution computing system, a record of the first math-based currency transaction in a distributed ledger associated with the math-based currency. The method further includes verifying, by the financial institution computing system, that the record of the first math-based currency transaction includes an indication the digital title was passed from the seller to the buyer. The method includes sending, by the financial institution computing system, the amount of funds to the seller.

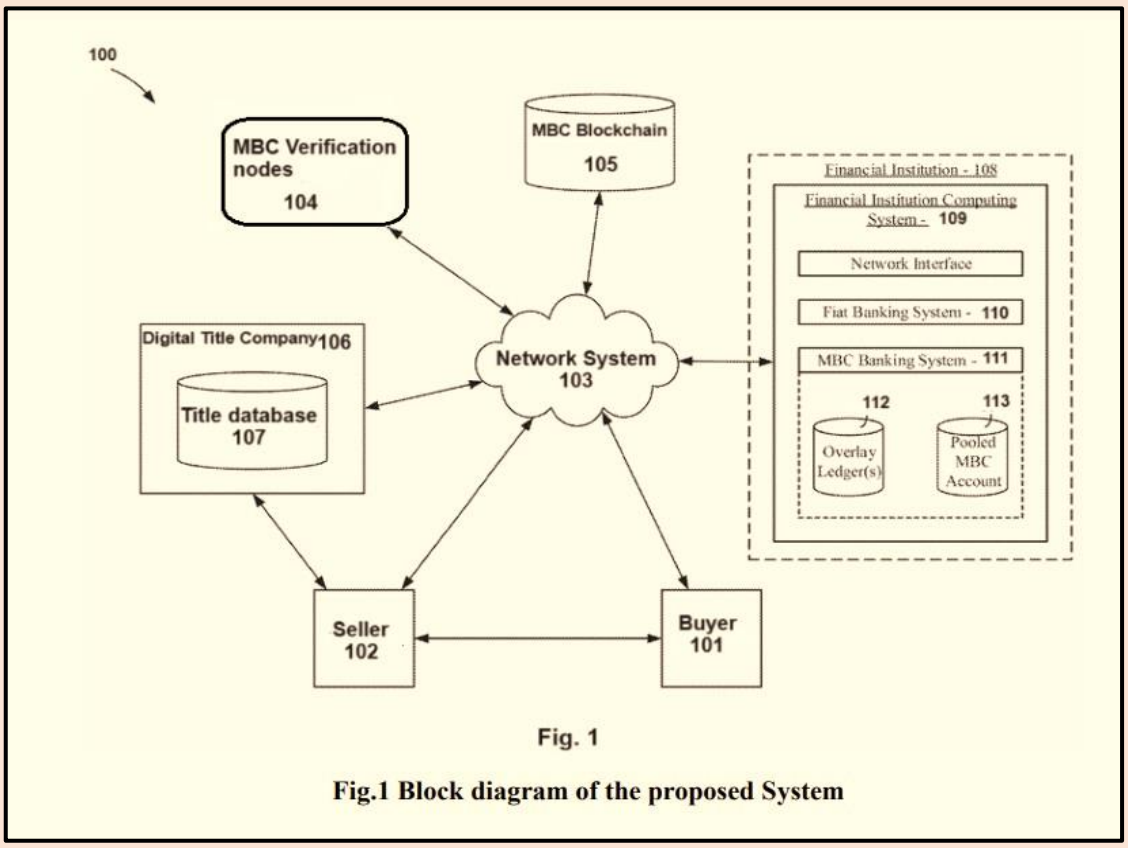


Figure 1: Illustrates an exemplary block diagram of computing system and method of creating and maintaining digital title for a physical asset.

Title Of the Invention: A system to allow multiple passengers on one card

Application Number: 202311003637 A (Indian Patent Office)

Applicant(S): KIET Group of Institutions (CS)

Date of Filing: 18-01-2023

Date of Publishing: 19-07-2024

Field of the Invention: This invention relates to a system to allow multiple passengers on one card. In particular, this invention relates to a metro card system to allow more than one person to travel in the metro using a single metro card, saving the time of metro travellers who don't need to buy a token or metro card explicitly if someone along with them has a metro card OBJECTIVE: An object of the present invention is to provide a system to allow multiple passengers on one card which obviates the disadvantages associated with the prior art.

Another object of the present invention is to provide a system to allow multiple passengers on one card capable to allow a single metro card to be used for multiple passengers to travel at a time. Yet another object of the present invention is to provide a single-card multiple-passenger / user metro system capable to allow multiple passengers to travel with a single metro card.

Still another object of the present invention is to obviate time loss to buy a token or metro card to travel even if someone along with a passenger has a metro card. A further object of the present invention is to decrease the effort at token and card distributors.

Summary: According to this invention, there is provided a system to allow multiple passengers on one card comprising at least one entry card scanner (1) with an input interface (2) adapted to be installed at an entrance gate of a metro station such that to scan a card of a passenger and allow to feed number of passengers and destination station, a central processing unit (3) connected with the entry card scanner (1) and the input interface (2) being provided to process the scanned data and feed value and allow the entry of the passenger accordingly, at least one exit card scanner (4) installed at an exit gate of a metro station such that to scan the card of the passenger and allow exit same number of passengers entered at the point of the entry gate, an alarm system being provided with the central processing unit (3) to alert authorities when the passenger count increases and amount of money not sufficient to allow such number of passengers.

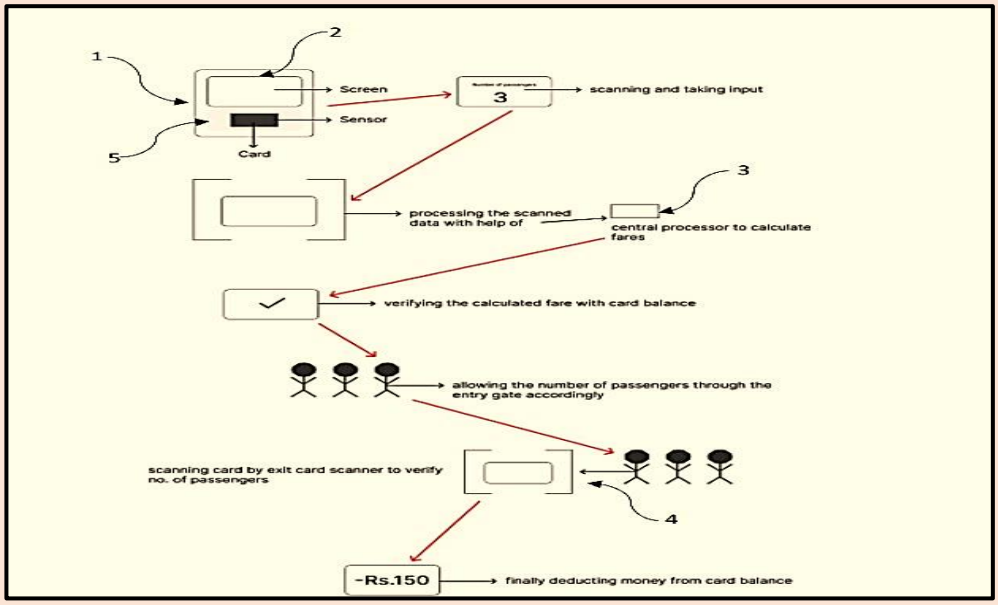


Figure 1: Illustrates a block diagram of a system to allow multiple passengers on one card

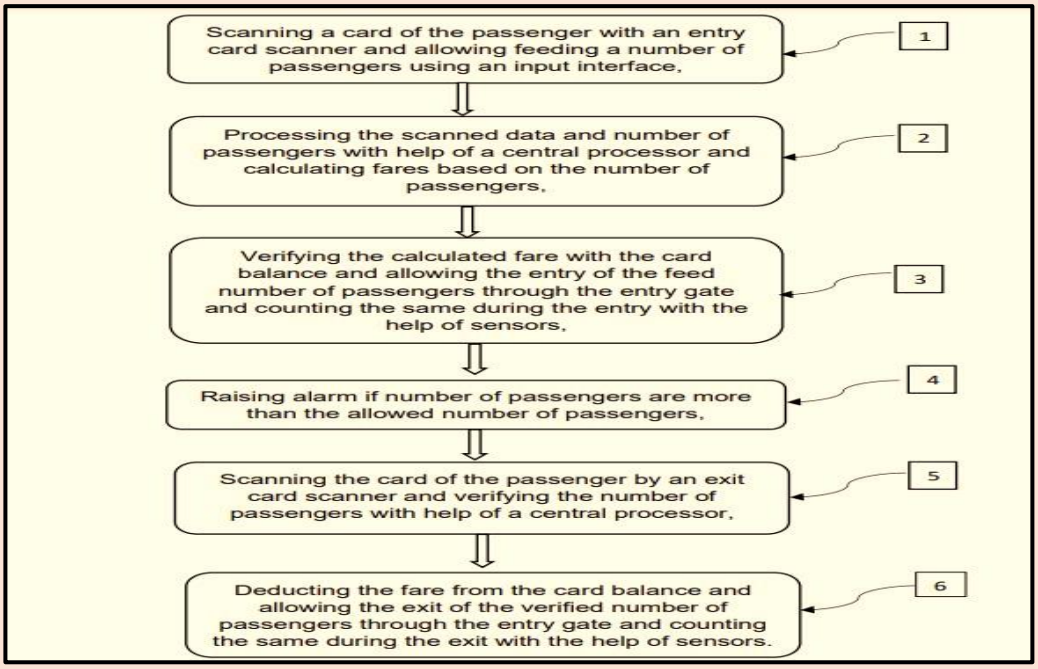


Figure 2: Illustrates a process flow diagram of a system to allow multiple 10 passengers on one card.

Title of the Invention: An IOT-based, AI-Powered, and machine learning-based schoo security system

Application Number: 202421046676 A (Indian Patent Office)

Applicant(S): Dr. Meeta Chaudhry, Mr. Ruchin Gupta, Ms. Garima Singh (CSIT, IT)

Date of Filing: 18-06-2024

Date of Publishing: 20-07-2024

Field of the Invention: The present embodiment is about a system that can help improve school security by using GSM technology and the principles of the Internet of Things.

The "School Girls and Women Safety Empowerment using IoT and Machine Learning Framework" was submitted as an application for an Indian patent under the number 202211005092 by the authors of the invention. A group of innovators came up with the idea of using AI and the Internet of Things to create a system that would notify women of potential danger, making them feel more secure. When it comes to women's safety, the Internet of Things (IoT) and machine learning are crucial because they link billions of devices and make user data exchange possible. The latest update to the women's security alert system, which is compatible with Micro Chip and Arduino, is referred to as Support. The victims' loved ones can receive an SMS alert thanks to this new feature, so women can go about their day without fear.

Objective of the Invention: The system's input-output architecture will be useful for the school's administration as well as the individual responsible for safety. The system will provide assistance to these two categories. The development of this Implementation was guided by the recognition of the most prevalent difficulties encountered by students, educators, and parents. Our aim is to establish a real-time, two-way communication channel between the school administration and the security staff that is both easy to use and affordable. More specifically, we want to make it easy for users to accomplish this.

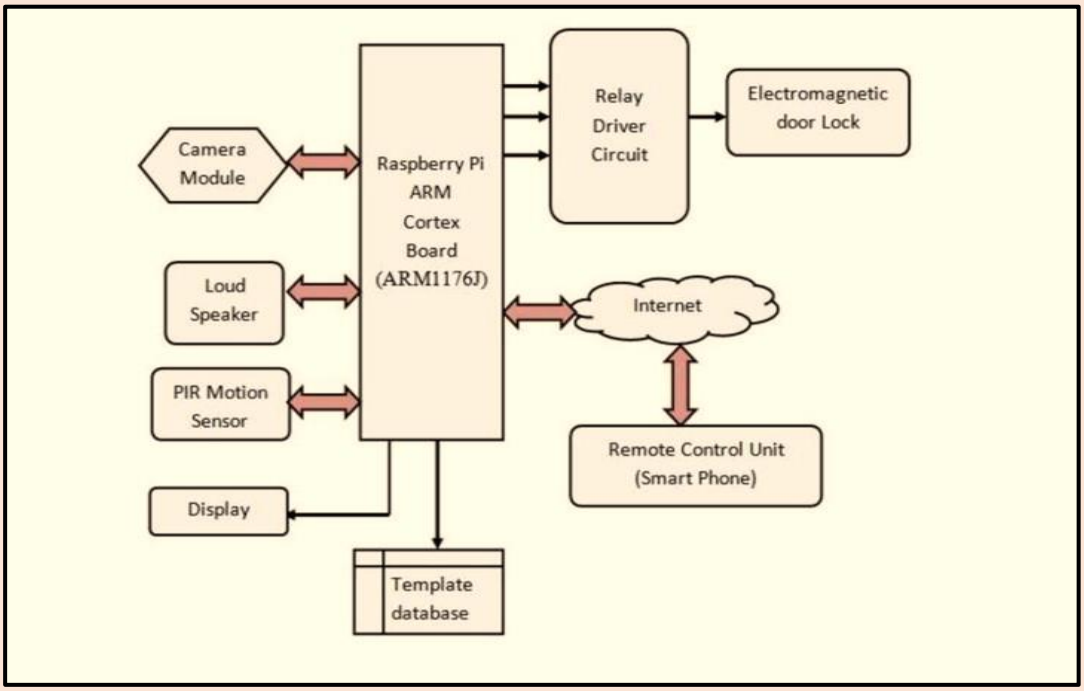


Figure 1: The system will activate and then use the camera to snap a photo of whoever is at the door.

Title of the Invention: Last-mile connectivity enhancement in urban transport through integrated transit solutions

Application Number: 202411048471 A (Indian Patent Office)

Applicant(S): Mr. Saurabh Sharma, Dr. Gaurav Dubey (CS)

Date of Filing: 24-06-2024

Date of Publishing: 12-07-2024

Field of the Invention: The present invention relates to urban transportation systems, specifically focusing on enhancing last-mile connectivity through integrated transit solutions.

Abstract of the Invention: India's urban population is experiencing rapid growth, leading to increased pressure on existing public transportation systems. In response to this challenge, the government has initiated plans for significant upgrades to the urban transit infrastructure, including the implementation of Mass Rapid Transit Systems (MRTS), Bus Rapid Transit Systems (BRTS), and Light Rail Transit Systems (LRTS) across major cities. These initiatives are expected to enhance the overall capacity and efficiency of urban transit networks. However, a critical gap remains in the integration of these upgraded systems with the "first-last mile" connectivity, which is essential for ensuring seamless transitions between residential areas, commercial destinations, and major transit hubs.

First-last mile connectivity refers to the initial and final segments of a commuter's journey, typically between their home or destination and the nearest transit hub. Intermediate para-transits (IPT), such as autorickshaws, cycle-rickshaws, and the recently introduced e-rickshaws (battery-operated three-wheeled vehicles), play a vital role in addressing this connectivity need. Despite their importance, these IPT options are often unregulated and operate informally, leading to inefficiencies and safety concerns. The effective linkage of these final segments, particularly the last-mile connectivity from major transportation hubs to end destinations, remains one of the most significant challenges in urban mobility.

Addressing this issue is crucial for creating a more efficient, accessible, and user-friendly public transportation system. Without proper last-mile connectivity, the benefits of large-scale transit infrastructure projects like MRTS, BRTS, and LRTS are undermined, as commuters face difficulties in reaching their final destinations comfortably and conveniently

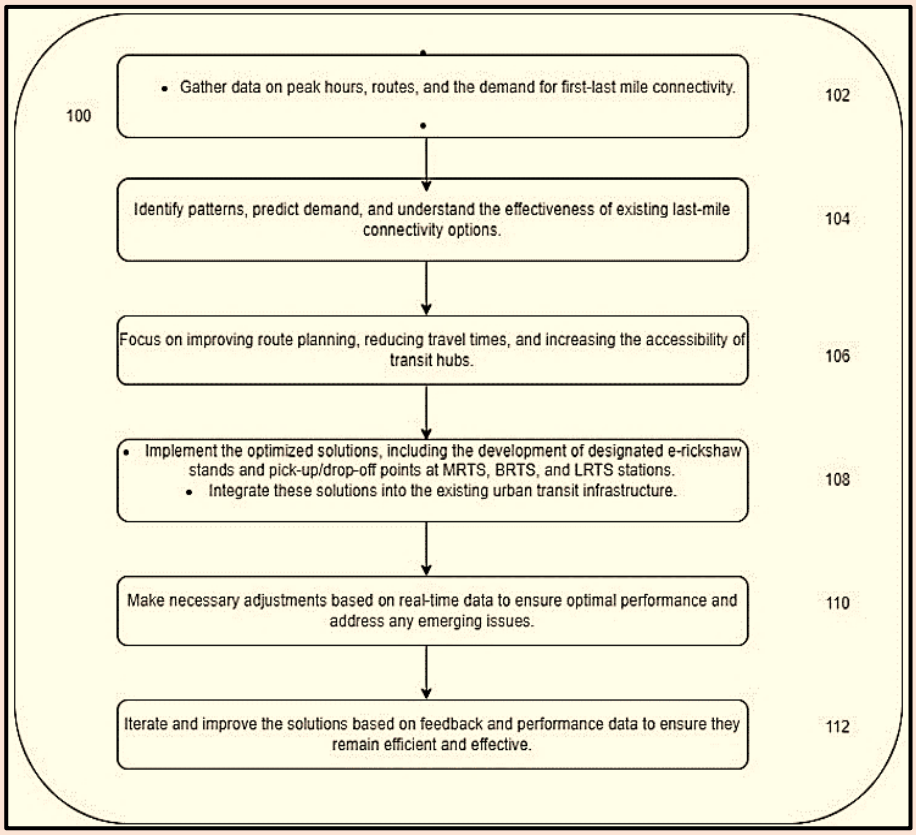


Fig. - Represents a real time data on urban mobility patterns, data analysis using deep learning algorithms, optimization and implementation

Title of the Invention: Sensor-driven adaptive lighting system for commercial spaces

Application Number: 202411049469 A (Indian Patent Office)

Applicant(S): Dr. Ajeet Pratap Singh, Dr. Jyoti Srivastava, Dr. Gaurav Dubey (CS)

Date Of Filing: 27-06-2024

Date of Publishing: 12-07-2024

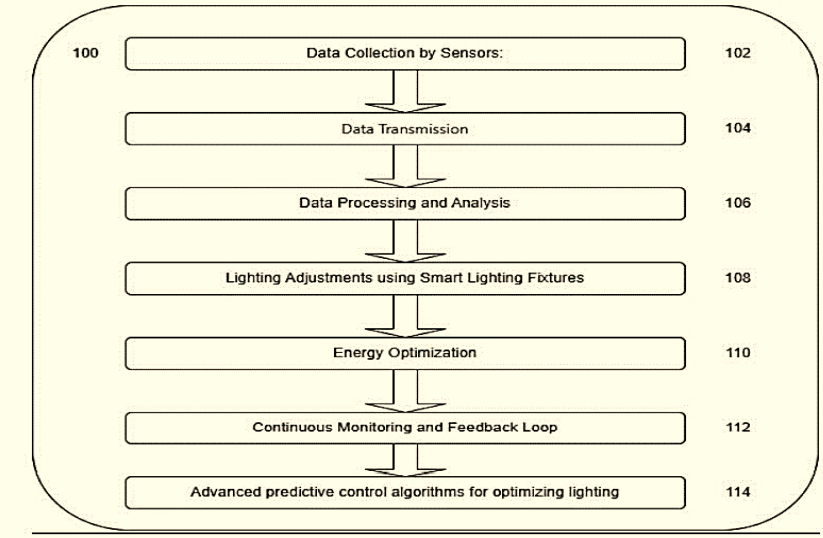
Field of the Invention: The present invention relates to smart building technologies and, more specifically, to adaptive lighting systems for commercial spaces using integrated sensors to enhance energy efficiency and occupant comfort.

Objects of the Invention: The primary object of the invention is to reduce energy consumption in commercial buildings by optimizing the use of artificial lighting through real-time sensor data.

Furthermore, Another object of the invention is to enhance occupant comfort and productivity by maintaining optimal lighting conditions tailored to current occupancy and natural light levels. he Sensor-Driven Adaptive Lighting System is designed to significantly improve the comfort and productivity of occupants in commercial spaces through the following mechanisms: The system employs advanced occupancy sensors (such as passive infrared (PIR), ultrasonic, or microwave sensors) strategically placed throughout the commercial space to detect the presence and movement of individuals. When occupants enter or move within a space, the sensors immediately detect this activity and send data to the central control unit. This unit processes the information and adjusts the lighting

fixtures in real-time to ensure that the space is well-lit, enhancing visibility and comfort for the occupants.

Summary of the Invention: The Sensor-Driven Adaptive Lighting System for Commercial Spaces is designed to provide intelligent lighting control by using a network of sensors that monitor various parameters such as occupancy, natural light levels, and room usage patterns. This system adjusts the artificial lighting in real time to maintain optimal lighting conditions and energy efficiency.



The primary components of the system include occupancy sensors, ambient light sensors, a central control unit, and smart lighting fixtures. The occupancy sensors detect the presence and movement of individuals within a space, while the ambient light sensors measure the level of natural light. The central control unit processes the sensor data and dynamically adjusts the lighting fixtures to provide the appropriate level of illumination.

Figure 1: It shows the input parameter; which is to be processed by the system 100

REGISTRATION OF DESIGN:

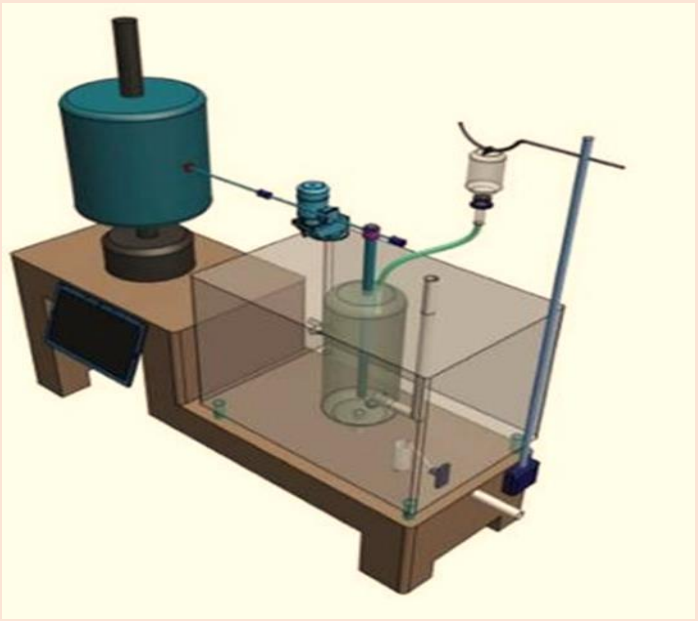
Title of the Invention: Digital student organ bath to study nerve muscle interaction

Application Number: 416376-001 (Indian Design)

Applicant(S): Mr. Balwan Singh (KSOP)

Date of Filing: 09-05-2024

Date of Registration: 05-07-2024



PATENTS Published – July 2024

S. No.	Title Of Patent	Dept.	Name Of Applicant	Date Of Publication	Status
1.	Design a mathematical based modal for currency escrow transactions	KSOM	Dr. Reenu, Dr. Komal Sharma, Dr. Namrata Tripathi	12-07-2024	PUBLISHED
2.	A system to allow multiple passengers on one card	CS	KIET, Mr. Gaurav Tripathi, Mr. Ashish Pandey, Mr. Neelesh Tiwari, Ms. Arti Sharma, Dr. Ajay Kumar Shrivastava, Mr. Saurabh, Dr. Harsh Khatter	19-07-2024	PUBLISHED
3.	An IOT-based, AI-Powered, and machine learning-based school security system	CSIT, IT	Dr. Meeta Chaudhry, Mr. Ruchin Gupta, Ms. Garima Singh	20-07-2024	PUBLISHED
4.	Last-mile connectivity enhancement in urban transport through integrated transit solutions	CS	Mr. Saurabh Sharma, Dr. Gaurav Dubey	12-07-2024	PUBLISHED
5.	Sensor-driven adaptive lighting system for commercial spaces	CS	Dr. Ajeet Pratap Singh, Dr. Jyoti Srivastava, Dr. Gaurav Dubey	12-07-2024	PUBLISHED
6.	A system for mitigating sql injection attacks	CS	Ms. Pallavi Sharma, Ms. Karnika Dwivedi, Ms. Bharti Chugh,	12-07-2024	PUBLISHED
7.	Innovative application of ai techniques in enhancing the efficiency and effectiveness of robotic path planning	CSIT	Ms. Arti Pandey	12-07-2024	PUBLISHED
8.	Digital student organ bath to study nerve muscle interaction	KSOP	Mr. Balwan Singh		REGISTRATION OF DESIGN
9.	Advancing medical diagnostics: utilizing adversarial gans for enhanced imaging and precision medicine	CS	Mr. Anurag Mishra	26-07-2024	PUBLISHED

10.	AMBU-The unified health care and management system	EEE	Dr. Rahat Ullah	26-07-2024	PUBLISHED
11.	System and method for monitoring and controlling oxygen	ECE	KIET, Dr Amik Garg, Dr Sanjay Kumar Sharma, Dr Vibhav Kumar Sachan, Dr Sundeep Rohila, Dr Shubham Shukla, Dr Shubham Shukla , Dr Parvin Kumar, Mr Atul Kumar, Dr Kamal Kishor, Mr Mohit Tyagi, Mr Ankit Singh Rawat Upadhyay,	31-07-2024	GRANTED

Details of Research Incentives for Journals

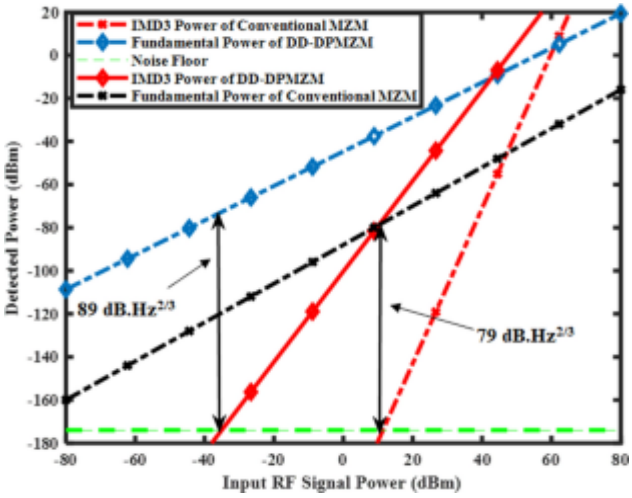
S. No.	Name of Faculty	Designation	Dept.	Title of Paper and Name of Journal	Impact Factor /Cite Score	Benefits/ Incentives	Index in Journal
1.	Balram Tamrakar	Assistant Professor	ECE	Performance analysis of DD-DPMZM based RoF link for emerging wireless networks		11,000	SCIE
2.	Gauri Goyal	Student	M. Pharm.	Herbal Remedies in wound Healing : A comprehensive review of plants and Non-clinical Applications ; Oriental Journal of Chemistry		2,000	Gauri Goyal

Highlights of the Published Journal Articles

1. **Tamrakar, B., Singh, K., Kumar, P. *et al.* Performance analysis of DD-DPMZM based RoF link for emerging wireless networks. *Analog Integr Circ Sig Process* 119, 441–453 (2024). https://doi.org/10.1007/s10470-023-02231-2**

This paper demonstrates the analytical approach of Linearized Radio over Fiber (RoF) link based on Dual-Drive Dual Parallel Mach Zehnder Modulator (DD-DPMZM) by properly adjusting the phase shifters and biasing of the Mach Zehnder Modulator (MZM). Two input RF Source at 7 and 8 GHz applied in the used RoF link. The proposed RoF link consists of Mach Zehnder Modulator (MZM), Parallel combination of Mach Zehnder Modulators, optical fiber, and photodetector (PD). Third Order Intermodulation Distortions (IMD3) factor act as a major issue, which is responsible as performance degradation factor. Major sources of IMD3 spurious components have been investigated and suppressed in theoretical analysis before photodetection. The proposed method is designed with the help of OptSim simulation software, to confirm and validate the analytical analysis and simulation results. Analytical analysis & simulation results show that, 40 dB suppression found in IMD3 spurious components, and 30 dB.$Hz^{2/3}$ enhancement found in Spurious Free Dynamic Range (SFDR), for the proposed linearized RoF link as compared to conventional MZM RoF link.

The Measured SFDR is also founded as 26 dB.Hz$^{2/3}$, 5 dB.Hz$^{2/3}$, & 10 dB.Hz$^{2/3}$ for different optical fiber impairments as 8 km, 10 km & 15 km respectively for used DD-DPMZM based RoF link.



2. Gauri Goyal, Vinay Kumar, Himani Tyagi, Priyanshi Varshney, Shardendu Kumar Mishra and Sanjeev Chauhan, "Herbal Remedies in Wound Healing: A Comprehensive Review of Plants and Non-Clinical Applications", Vol. 40, No. 2, DOI: http://dx.doi.org/10.13005/ojc/400232

The phenomenon of wound healing encompasses a coordinated sequence of cellular and biochemical phases collaborating synergistically to promote the restoration of the injured tissue. Tissue repair is complex, posing challenges in wound management. Healing involves three phases: inflammatory, proliferative, and remodeling. Treatments include antibiotics, antiseptics, and extracts, but synthetic drugs have limitations. There is growing interest in plant-based formulations for effective wound treatment. Medicinal plants are increasingly recognized for their wound healing potential with lower side effects, particularly in diabetic, infected, or open wounds, supported by studies highlighting various identified mechanisms for improved healing. Medicinal plants such as Allium sativum, Boerhavia diffusa, Calendula officinalis, Crocus sativus, Curcuma longa L., Glycyrrhiza glabra L., Melaleuca alternifolia, Woodfordia fruticosa, etc. have demonstrated wound healing properties and have proven effective in treating wounds. This review highlights medicinal plants in wound healing, emphasizing in-vivo models, specifically examining their effectiveness in excision and incision wound healing.

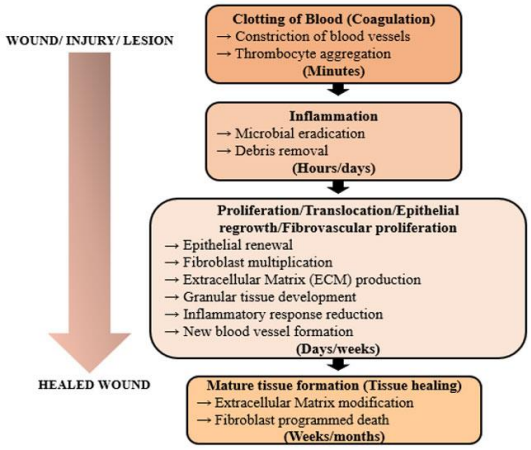


Figure 1: Healing Process of Wounds in the Human Body.

Reimbursement of Conference Registration Fee

S. No	Name of Faculty	Designation	Dept.	Name of Conference	Title of Paper	Incentives	Published By
1.	Urvashi Chugh	Assistant Professor	IT	2024 2nd International Conference on Device Intelligence, Computing and Communicaiton Technologies (DICCT)	Capacity Analysis of EMNC System in an Interference Limited Scenario	6,000	IEEE

2.	Shahid Siddiqui	B.TECH	ECE	Advances in AI for Biomedical Instrumentation, Electronics and Computing (ICABEC-2023)	Path Finding Visualizer	3,500	Springer
3.	Hardik Mitra	B.TECH	ECE	Advances in AI for Biomedical Instrumentation, Electronics and Computing (ICABEC-2023)	Design and Implementation of automatic street light systems.	3,500	Springer
4.	Rohit Verma	B.TECH	ECE	Advances in AI for Biomedical Instrumentation, Electronics and Computing (ICABEC-2023)	Automated Car Parking Indicator System	3,500	Springer
5.	Ayush Kumar	B.TECH	CSE	"Reliability, Infocom technologies and optimization (ICRITO 2024)".	"Mental healthcare chatbot based on custom diagnosis documents using a quantized large language model",	2,950	IEEE
6.	Neha	M.TECH	CSE	2nd International Conference on Desruptive Technologies (ICDT) 2024	Analysis and Evaluation of Crop yield pattern based on various forecasting methodologies.	3,000	IEEE
7.	Neha	M.TECH	CSE	Advances in AI for Biomedical Instrumentation, Electronics and Computing (ICABEC-2023)	A Review on the Anlysis and Prediction Methhodologies of Crop Yield Pattern	3,000	Springer
8.	Devansh Gupta	B.TECH	ECE	"Advances in AI for Biomedical Instrumentation, Electronics and Computing (ICABEC 2023)"	"Smart Helmet for Bike Riders"	3,500	

Highlights of the Published Conference Papers

1. U. Chugh, S. Mishra, R. Jaisawal, A. Kumar, K. Kaur and S. P. Singh, "Capacity Analysis of EMNC System in an Interference Limited Scenario," *2024 2nd International Conference on Device Intelligence, Computing and Communication Technologies (DICCT)*, Dehradun, India, 2024, pp. 7-10, doi: 10.1109/DICCT61038.2024.10533164.

EM based Nano Communication is a new paradigm of communication system which involves Bio-Nano-Machines (BNMs) for information exchange. Numerous BNMs are required to implant inside the body at different locations to monitor different diseases. Desired information from each of the nano-transmitters is routed via nano-routers. This makes the system interference limited scenario. In this manuscript different adaptive capacities are

proposed over interference limited scenarios under dual Selection Combining (SC) diversity. Analytical expressions for capacity under two types of adaptive schemes are presented. One of them is Capacity under Optimal Rate Adaptation (CORA) keeping the power constant whereas, second is Capacity under Channel Inversion with Fixed Rate (CCIFR). It is observed that simulated results show perfect agreement with the theoretical background.

2. Ankit, Anushka, Akash, Shahid, S. Ranjan, Richa Srivastava, "Path Finding Visualizer", in Book Advances in AI for Biomedical Instrumentation, Electronics and Computing, 1st Edition, CRC Press, 2024.

Pathfinding algorithms hold significant importance in navigation systems, robotics, and gaming. This paper introduces an Interactive Pathfinding Visualizer developed using HTML, CSS, and JavaScript, which allows users to explore and compare different pathfinding algorithms. The visualizer empowers users to set source and destination points, observe algorithmic execution, and comprehend the essence of data structures and algorithms. Through this project, the paper showcases the practical application of web technologies in creating educational tools that enhance algorithmic understanding.

3. Mohit Tyagi, Kanishka Chauhan, Hardik Mitra, Raman Pundhir, Naman Gupta, Sachin Tyagi, Satya Prakash Singh , "Design and implementation of automatic street light systems", in Book Advances in AI for Biomedical Instrumentation, Electronics and Computing, 1st Edition, CRC Press, 2024.

Design the Automatic Street light systems to react dynamically to environmental conditions, which requires the study of sensor technologies. The IR and LDRs sensor technology is used in the implementation of automatic street light systems. IR sensors are designed to detect the vehicles and any obstacles. LDR is used the detect the light intensity, based on which switching ON/OFF operation of lights was performed. Therefore, LDR helps the street light system to work automatically. The implementation of this system is to focus on the issue of energy wastage and the cost of maintenance of street lighting systems.

4. Hunny Pahuja, Rohit Verma, Abhishek Pandey, Akash Singh, Satyansh Kumar, "Automated car parking indicator system", in Book Advances in AI for Biomedical Instrumentation, Electronics and Computing, 1st Edition, CRC Press, 2024.

The Automated Car Parking Indicator System is a technologically advanced solution designed to simplify the process of finding available parking spaces in real-time within parking facilities. This system employs a network of sensors and LED indicators to provide drivers with up-to-the-minute information about parking space availability, thus optimizing the overall parking experience. By offering a seamless blend of hardware and software components, this system improves traffic flow, reduces search times, and enhances parking facility management. Efficient parking management can have economic benefits for cities and businesses. It can reduce the need for constructing new parking facilities, save time for drivers, and improve the overall flow of traffic in urban areas.

5. A. Kumar, S. Sharma, S. Gupta and D. Kumar, "Mental Healthcare Chatbot Based on Custom Diagnosis Documents Using a Quantized Large Language Model," *2024 11th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO)*, Noida, India, 2024, pp. 1-6, doi: 10.1109/ICRITO61523.2024.10522371.

This research presents a novel retrieval-based question-answering (QA) framework utilizing LangChain's (version 0.1.6) modular architecture and Chainlit's (version 0.7.700) conversational interface. Our system efficiently handles PDF and directory documents, generates sentence embeddings with HuggingFace's pre-trained model, stores vectors in FAISS for fast search, employs the powerful CTransformers (version 0.2.27) with Llama-2-7B-Chat-GGUF model, and guides it with a custom prompt template for accurate and factual responses. The integrated Chainlit interface facilitates user interaction, demonstrating the framework's potential for knowledge-intensive domains like medical chatbots.

6. Neha, A. Ahlawat and H. Chaudhary, "Analysis and Evaluation of Crop Yield Pattern Based on Various Forecasting Methodologies," *2024 2nd International Conference on Disruptive Technologies (ICDT)*, Greater Noida, India, 2024, pp. 1008-1013, DOI: 10.1109/ICDT61202.2024.10489323.

Agriculture is the backbone to the Indian financial state. It makes up about 17% of overall GDP (Gross domestic product) and offers employment to nearly 58% among the populace. But there are many challenges in achieving the precision in the agricultural activity related with estimation and production of crops, which includes crop and weed detection, uncertain water and atmospheric conditions, biomass evaluation and yield prediction. In the proposed study, the emphasis has been laid down on predicting the crop yield pattern based on some prominent features such as: ratio of nitrogen, phosphorous and potassium in the soil, humidity, rainfall, temperature, and pH of soil, which directly affects the pattern of crop yielding. In retrospect, there are numerous machine learning methodologies that have been proposed to evaluate their performance with respect to estimated and targeted production of several crops. In this proposed work, a comprehensive comparative analysis of the most significant machine learning classifiers has been done for recommending the crop name (which crop to grow). The prominent classifiers analyzed in this work are Logistic Regression, Naïve Bayes, Decision Tree, Random Forest, SVM and KNN.

7. Neha, Anil Ahlawat, Himanshu Chaudhary, "A review on analysis and prediction methodologies of crop yield pattern", in Book Advances in AI for Biomedical Instrumentation, Electronics and Computing, 1st Edition, CRC Press, 2024.

Making supportive decisions for crop production, such as crop name recommendations and forecasts for crop production, requires machine learning implementation. Numerous machine learning classifiers and algorithms are employed in this. Climatic factors (temperature, rainfall, precipitation, sun radiation, and humidity), edaphic factors (pH, kind, and proportions of nitrogen, phosphorus, and potassium in the soil), and physiographic factors (altitude, steepness of slope, exposure to light, and wind) are some of the variables or factors that influence crop production. However, the most common variables are temperature, soil pH, precipitation, and humidity, and the most common algorithms are Examples of artificial neural networks and deep learning algorithms include Random Forest, Support Vector Machine, Linear Regression, Long Short-Term Memory, Convolution Neural Network, and Deep Neural Network. As part of this study, we reviewed the literature to ascertain the techniques and influencing factors that have been used in agricultural output prediction.

Innovation Spotlights of the Month

What is Solar Paraboloid Technology

As the world moves towards using more renewable energy, solar paraboloid technology is becoming more popular because it could make solar power more efficient. This technology might play a big role in reducing carbon emissions and helping countries meet their net-zero goals.

Solar Paraboloid Technology

Solar paraboloids use a Parabolic Trough Collector (PTC) system. This system has long, curved mirrors that focus sunlight onto a tube. The energy collected heats a fluid inside the tube, which can then be used to generate electricity or provide heat for industries. Unlike traditional solar panels, solar paraboloids can work at much higher temperatures, up to 300°C, making them more efficient by reducing heat loss.

Economic Impact and Market Potential

Although solar paraboloids can produce more electricity from the same amount of sunlight compared to regular methods, they are expensive to set up and require complicated infrastructure. However, with better efficiency, they could help lower electricity costs, making solar energy more competitive with fossil fuels. Investment in research, development, and government support is crucial to overcome the challenges.

Industry Response and Future Prospects

The industry has shown cautious interest in solar parabolic technology, with successful projects like the Godavari solar project and the Dadri ISCC plant. However, high costs and technical challenges remain obstacles. Despite this, the future looks promising. As the demand for renewable energy increases, solar paraboloids could play a vital role in meeting global renewable energy targets, possibly becoming cost-competitive by 2050.

Could this be a Game Changer in Renewable Energy?

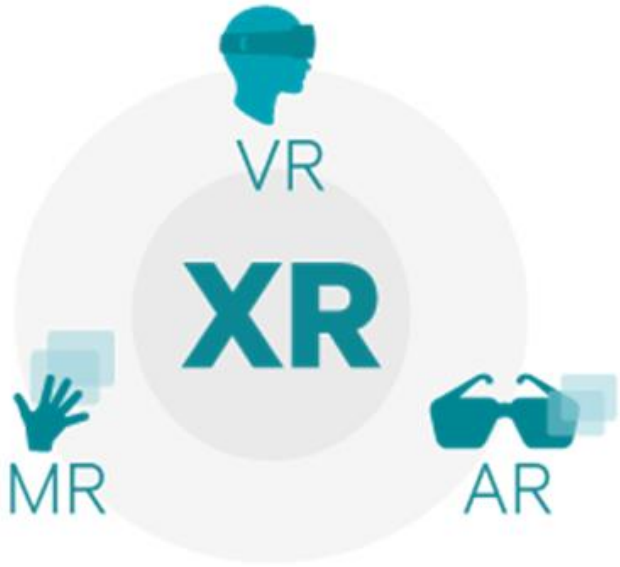
Solar paraboloid technology is still in its early stages but has the potential to revolutionize renewable energy. With continued research, innovation, and supportive policies, it could become a major player in the energy market, offering an effective solution to meet the world's growing energy needs and significantly contributing to sustainable energy goals.

Source: https://www.gktoday.in/what-is-solar-paraboloid-technology/

Extended Reality Technology (XR)

Extended reality (XR) is transforming medicine and patient care like never before.
Mixed reality (MR), virtual reality (VR), and augmented reality (AR) technologies are being investigated by pharmaceutical entrepreneurs in the areas of research and manufacturing.
Extended reality (XR) has multiple use cases in the healthcare sector. The primary among these include:

- Developing surgery simulator for training medical providers
- Facilitating collaborations among multiple surgeons using an XR-based immersive interactive app solution
- Accelerating product development, testing, and delivery



Extended Reality Technology (XR)

Source: https://www.linkedin.com/pulse/discover-top-10-pharma-industry-trends-innovations-2022-mh2u/

Efficient Indoor Solar Cells With Mirror Like Black Surface

Thinner electrodes and increased layer thickness enable significant technological advancements.

Panasonic's hydrogenated amorphous silicon (a-Si:H) solar cells, known as Amorton, have long powered various indoor and outdoor applications, including IoT devices, watches, sensor nodes, asset trackers, and remote controls. These cells efficiently harvests energy even in low-light and artificial-light conditions. The company introduced series: AMG-1401C and AMG-1701C. These new models feature a black-reflective surface and significantly enhanced efficiency, achieving a 20% boost. This improvement stems from an optimized production process that expands the active area compared to previous models. As a result, the AMG-series is among the most efficient indoor amorphous solar cells available.

The key specifications include:

- Both models are built on glass substrates
- Thickness: 1.1mm
- Energy generation: approximately 8uW/cm² at 200 lux per active area

- External dimensions are slightly larger than the active area for space and material optimization
- Dimensions: 41.4mm x 26.1mm
- Maximum energy generation: 77.8uW at 200 lux
- Cell voltage: 2.2V

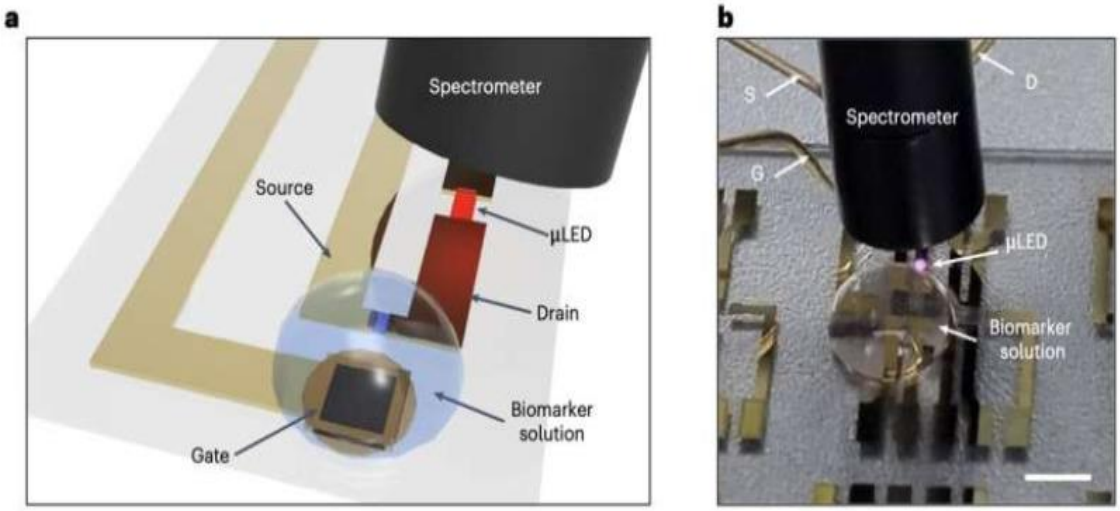
The external dimensions are slightly larger than the active area to optimize space and material usage. These solar cells are designed for a variety of energy harvesting applications, ensuring efficient performance. Additionally, they are compatible with a wide range of power management ICs available on the market, making them versatile and adaptable for different systems.

"We are thrilled to launch the new indoor Amorton solar cell series, marking a significant advancement in amorphous silicon solar cell technology," says Robert Spiegler, Lead Product Manager Solution Business at Panasonic Industry. "Our extensive R&D and production expertise has enabled us to develop solar cells that excel in both appearance and performance. Additionally, we can customize solar cells for small electronic devices according to customer requirements, including transparent surfaces for applications involving displays."

For more information visit: https://industry.panasonic.eu/products/energy-building/amorphous-solar-cells/amorton-indoor-environment

Ultrathin Device Tracks Health Markers

Researchers at the Korea Institute of Science and Technology have developed a wireless device that monitors glucose, lactate, and pH levels.



A) Schematic illustration of electrical and optical characterization set-up. B) Photograph of electrical and optical characterization set-up. Scale bar, 3 mm. Credit: Nature Electronics (2024). DOI: 10.1038/s41928-024-01237-6

Electronics engineers have recently developed wearable and implantable devices using organic electrochemical transistors (OECTs) to detect and amplify biological signals. These flexible devices track physiological processes like heart rate and sleep patterns, which are valuable in sports and healthcare. They also monitor health indicators such as glucose and cortisol levels, which are crucial for medical diagnostics. However, integrating wireless communication circuits to transmit data often requires inorganic materials, which can compromise the device's flexibility and size.

Researchers at the Korea Institute of Science and Technology (KIST) have recently developed an innovative wireless device capable of monitoring multiple biomarkers, such as glucose, lactate, and pH levels. The device combines components made from both organic and inorganic materials, offering high performance and exceptional mechanical stability, with an overall thickness of just 4 μm.

The device features organic electrochemical transistor (OECT) biochemical sensors paired with inorganic micro-light-emitting diodes (μLEDs). To create the OECT sensors, the team patterned gold electrodes and a polymer blend of two ionomers onto an ultrathin parylene substrate.

These sensors are connected to μLEDs constructed from inorganic materials. The OECTs can detect specific biomarkers because the current flowing through them varies with the concentration of these biomarkers in their environment. This variation in the OECT channel current subsequently controls the light output from the μLEDs, enabling the wearable device to monitor the biomarkers effectively.

In preliminary tests, the biomarker monitoring device, which is only 4 μm thick, showed promising results. It demonstrated a high transconductance (gm) of 15 mS and outstanding mechanical stability. The researchers also discovered that the device could analyze near-infrared images and predict glucose, lactate, and pH concentrations based on these images.

Looking ahead, there is potential for further testing and enhancements of the device, which could contribute significantly to advances in medical technology. Additionally, adaptations could be made to power the device using soft batteries or solar cells, leading to a fully chipless sensing system.

Reference: Kyung Yeun Kim et al, An ultrathin organic–inorganic integrated device for optical biomarker monitoring, *Nature Electronics* (2024). DOI: 10.1038/s41928-024-01237-6

Newspaper: Monthly Technical Spotlights

AI casts huge uncertainty on jobs

India Inc Should Plan To Augment Labour Rather Than Displace Workers

TEAM TOI

The advent of Artificial Intelligence (AI) casts a "huge pall of uncertainty" when it comes to jobs, considering its impact on workers across all skill levels —low, semi and high, said the Economic Survey. "The biggest disruption for the future of work is the accelerated growth in AI, which is poised to revolutionise the global economy. India would not remain immune to this transformation."

Taking a note of the growing concerns around impact of AI on employment, the survey said technological leap has potential to disrupt growth and thus it requires a concerted effort among Centre, states and even corporates to minimise disruptions.

MAY REDUCE PRODUCTIVITY

Short term challenge | Generative AI could slow BPO sector growth, affecting customer service

Productivity impact | However, AI's emergence might reduce annual productivity growth by approximately 0.3 percentage points in coming years

Long term potential | Broader AI adoption could lead to significant improvements in healthcare and education, enhancing human capital

"These will create barriers and hurdles to sustained high growth rates for India in the coming years and decades."

To protect jobs, there is a need to quickly adapt to advancements. "With AI taking roots in several spheres of economic activity, job market must adapt, while steering the technological choices towards collective welfare is key."

It said while AI has a considerable potential for boosting productivity, it can also "disrupt employment" in certain sectors. "As AI systems continue to get smarter and adoption increases, the future of work will be reshaped... Routine tasks, including customer service, will likely witness a high degree of automation, creative sectors will see extensive usage of AI tools for image and video creation, personalised AI tutors can reshape education and sectors like healthcare can witness accelerated drug discovery."

The survey also said India's services exports, primarily the BPO sector, could be badly hit due to the advent of AI, and thus companies should devise strategies to tackle the reversal. "Next wave of technological evolution might bring the curtains down on boom in telecom and rise of internet facilitated BPOs. In this milieu, the corporate sector has a responsibility, as much to itself as it is to society, to think harder about ways AI will augment labour rather than displace workers." On impact of AI in the services sector, the survey said studies suggest it is likely to "restrain the growth opportunities for business services progressively" and, therefore, poses a challenge to long-term sustainability and job creation.

The survey, however, noted that even while posing challenges to jobs, AI will emerge as an opportunity to create employment. "... India is an attractive destination for AI investment due to its relatively low operating costs and world's second-largest pool of highly skilled AI, machine learning, and big data workers." India — with its vast demographic dividend and a very young population — is "uniquely situated" as AI poses both risks and opportunity.

THE ECONOMIC TIMES | NEW DELHI / GURGAON | WEDNESDAY | 11 SEPTEMBER 2024 | WWW.ECONOMICTIMES.COM

ROUNDTABLE WITH CEOs OF SEMICONDUCTOR COMPANIES

PM Assures Predictable Policy Regime for Semiconductor Biz

Our Political Bureau

New Delhi: Prime Minister Narendra Modi assured CEOs of semiconductor industry that his government will follow a "predictable and stable" policy regime even as he emphasised that India has the wherewithal to become a reliable partner in the diversified semiconductor supply chain.

Ahead of the Semicon India conclave, the prime minister chaired on Tuesday a Semiconductor Executives Roundtable in which he underlined that democracy and technology together can ensure the wellbeing of humanity. He gave assurances to the CEOs that India will provide a conducive environment for growth in the semiconductor sector.

"The Indian government will follow a predictable and stable policy regime. With the focus of Make In India and Make for the World, the government will continue to support the industry at every step," Modi said, according to officials.

PM Modi and Union ministers Ashwini Vaishnaw and Jitin Prasada with semiconductor industry titans in New Delhi, on Tuesday

The PM said the ideas of the innovators in this field have an impact on India's future and semiconductors will be the basis of the coming Digital Age which will be technology-driven. "The day is not far when the semiconductor industry will be the bedrock for even our basic necessities," he said.

Underlining the pillars of development, the prime minister enlisted developing social, digital and physical infrastructure, giving boost to inclusive development, reducing compliance burden and attracting investment in manufacturing and innovations. He underscored that India has the capability to become a trusted partner in a diversified semiconductor supply chain.

Modi said India has an admirable talent pool and his government has put immense focus on skilling to ensure that trained workforce is available for the industry. India is making all efforts to develop products which are globally competitive, he underlined. He maintained that India is a great market for investing in hi-tech infrastructure and the excitement shared by the leaders of the semiconductor sector today will motivate the government to work harder for this sector.

The CEOs appreciated India's commitment to the growth of the semiconductor sector and said that what has transpired today is unprecedented wherein leaders of the entire semiconductor sector have been brought under one roof. They talked about the immense growth and future scope of the semiconductor industry.

They said the centre of gravity of the semiconductor industry is starting to shift towards India, adding that the country now has a suitable environment for the industry which has put India on the global map in the semiconductor sector. Expressing their belief that what is good for India will be good for the world, they said India has amazing potential to become a global power house in raw materials in the semiconductor sector. India has a business friendly environment.

Semicon 2.0 Soon to Build Out Full Chip Ecosystem: Vaishnaw

Says second phase to focus on component firms and raw materials apart from chip fabs

Our Bureau

New Delhi: The government is working towards rolling out the second phase of the India Semiconductor Mission (ISM), which will focus on getting component and raw material suppliers to set shop in the country apart from chip fabrication and packaging units, union electronics and information technology minister Ashwini Vaishnaw said.

"We are formulating Semicon 2.0, which will be a much-expanded form of the first phase. We will work towards getting the entire ecosystem," Vaishnaw said.

The government will need three to four months to complete the process of forming ISM 2.0. The electronics and IT ministry will soon take some of the new proposals as well as a modernisation plan for the Semiconductor Laboratory in Mohali to the Union Cabinet, he said. Vaishnaw was speaking to the media at the Semicon India industry conference in Greater Noida. In the new phase of the ISM, the government will work to increase the availability of raw materials, the minister said.

The focus is on developing the entire ecosystem, across equipment, specialised materials, specialised gases and chemicals, he said, while noting that 250 chemicals and gases go as inputs into semiconductors. The industry has also formed partnerships with academia, Vaishnaw said.

Uttar Pradesh will be involved in the new proposals, he said.

UP chief minister Yogi Adityanath, also addressing the media, said land and capital subsidies, which come to about 25% of total costs, are being made available to such units. About 1,000 acres of the Yamuna Expressway Industrial Development Authority have been reserved for this.

Speaking at the inauguration of the conference, Tata Electronics chief executive Randhir Thakur said a chip packaging unit that the company is setting up will create 50,000 jobs. It will also create world-class social infrastructure in Gujarat and Assam, the two states where the company is setting up chip fabrication and chip assembly facilities, he said.

"The semiconductor industry has a multiplier effect on job creation, and every semiconductor job will create 10 additional jobs in the ecosystem," Thakur said.

Kurt Sievers, CEO of Dutch chip manufacturing and design company NXP Semiconductors, said the company will invest more than $1 billion in India over the next few years, doubling its research and development efforts here.

ASHWINI VAISHNAW
Union IT Minister

We are formulating the Semicon 2.0, which will be a much-expanded form of the first phase. We will work towards getting the entire ecosystem

Chip Infra Co Jacobs Sees Role in 4 Plans with Govt Approval

Global CEO gung-ho about data centre biz with hyperscalers expanding rapidly

Dia Rekhi & Surabhi Agarwal

New Delhi: Facilities management firm Jacobs is seeing huge opportunities in India which includes sharpening its focus on the semiconductor sector as more downstream industries of the supply chain are beginning to set up shop in India along with emergence of large chip fabrication units and chip assembly facilities in the country. It is also gung-ho on its data centre business as hyperscalers are rapidly expanding in the country.

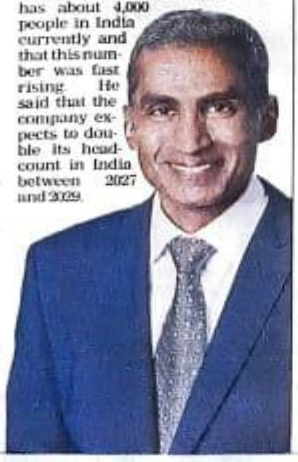
Bob Pragada, Jacobs Global CEO, told ET in an interview that the company was in active consultation with four of the five chip projects that had received approval from the government. With CG Power and the Tata group, however, he said Jacobs was "in a full engagement role".

Jacobs in itself is partnering with CG Power for its OSAT facility in Sanand. Pragada said the facility is a critical packaging test and assembly partner to Renesas and said the pilot plant is in the field in construction and that the company was "still in design for the main facility" while adding that the project was progressing "very fast". In August, ET was the first to report that the Murugappa Group firm had onboarded the leading global facilities management firm to build its upcoming chip assembly plant in Sanand, Gujarat. Getting Jacobs, as a turnkey contractor, which is dubbed as the world's best in building fabs since all leading fabs globally by top chipmakers such as Intel and TSMC are done by them meant that CG Power may be "the fastest chip assembly plant to start production", an official had told ET at the time. Pragada said that the company is now also working with Kaynes Semicon, which recently received approval for an OSAT facility in Gujarat. Mysuru-based Kaynes Semicon is investing in an OSAT facility in Sanand, Gujarat too.

Pragada said that the company has about 4,000 people in India currently and that this number was fast rising. He said that the company expects to double its headcount in India between 2027 and 2029.

BOB PRAGADA
Global CEO, Jacobs

The company was in active consultation with four of the five chip projects that had received approval from the government



NXP to Double its India Workforce to 6,000+ in 5 Years

Firm to invest $1b to expand R&D ops in India in hardware and software segments

Aashish Aryan

New Delhi: NXP Semiconductors plans to double its workforce in India to more than 6,000 over the next five years, the Dutch chip manufacturing and design company's chief executive, Kurt Sievers, told ET.

The company will also invest $1 billion in the next five years to expand its research and development capabilities in India, both in the hardware and software segments, to work on leading devices and products such as a 5-nanometer chip it recently launched for the automotive segment, Sievers said. A majority of its expanded workforce will be design engineers who still constitute more than 80% of the company employees in India, the executive said during an interaction with ET on the sidelines of the Semicon India conference in Greater Noida.

"The most innovative products we design worldwide are co-designed in India at our Noida and Bangalore offices. So, it is not like India is doing legacy work for us. It is already at the forefront of the technology," he said.

India, Sievers said, has made progress when it comes to the availability of raw talent by ensuring semiconductor training in colleges. This helps companies like NXP Semiconductors collaborate with these institutes.

"My big relief is that if we get college graduates straight away, that's the best we can do because then we embrace them early in the career and can raise them. We are committed to doing this," he said, adding that the company would also look to hire more women in time to come. Going ahead, India will be one of the countries where the company will aim to expand its offerings to include complete system solutions instead of one particular product or service, and work directly with original equipment manufacturers (OEMs), he said.

"In the western part of the world, we often work with a tier-one company which is between us and the OEM customer. In India, they are more modern, and the OEMs directly work with us through vertical integration," he said.

KURT SIEVERS
CEO, NXP Semiconductors

The most innovative products we design worldwide are co-designed in India at our Noida and Bengaluru offices

KIET (R&D) Policies

Promotion of research culture with the formulation of policies by the R&D Committee is as follows:

- KIET Research Policy
- KIET Ethics Policy for Students and Faculty Members
- CV Raman Award Policy
- Policy for KIET Research Faculty Members
- Guidelines for Organizing International Conferences in Institute
- Departmental Research Committee
- KIET Policy for Research Proposals/Grants
- KIET Policy for Research Guidance/Ph.D. Guidance for Improving Research Culture

For details, kindly refer -
https://www.kiet.edu/Research%20and%20Development%20Policy

RESEARCH POLICY FOR STUDENTS

Research and developmental activities create and disseminate new knowledge in a range of fields, promote innovation, and will motivate better learning and teaching among faculty members and students at our institute as they are often incorporated into the courses. Research is the foundation of knowledge that brings new energy, builds state-of-the- art facilities, promotes research publications, develops collaborations, and becomes a part of an active community that shares the mission objectives. Researching is a process that not only improves your skills but also teaches you a lot and broadens your knowledge, even though we could get to conclusions we already know. A deeper comprehension of the subject matter, a greater understanding of your issue, and the ability to ensure that your writing is well-informed and supported can all be attained through conducting research.

1. Objectives of Research-

- **Enhancing Knowledge-** New avenues for knowledge discovery can be reached through conducting research and producing research papers. Research will have a chance to develop your writing abilities when writing a research paper, and in the future, you will be able to produce a better piece of writing that will impress others. These skills would certainly be useful for getting high package placements.

- **Adds Value to Your Resume-** A research paper helps you to find more knowledge about the field you are researching, so you can learn something new and fascinating about the discipline that you can use for work later. Besides expanding your knowledge in each field, Research will enhance your CV and make you stand out as a candidate. Therefore, research is essential since it enhances the value of your CV and demonstrates the talents you currently possess—skills that they may be seeking for.

- **Raising Awareness-** Conducting research enhances your knowledge and helps you boost your analytical and critical thinking skills. As you choose your topic and do the research, you may reach new conclusions that spark discussions in academic work. Developing critical thinking is important not only for the writing of research papers, but also for many other duties. To become a successful person and a specialist in your field, becoming a better thinker is something that is certainly important.
- **Important for Higher Studies-** When students pursue postgraduate studies such as an M.Tech or MS degree in India or overseas, having strong research experience at the undergraduate level is crucial.
- **Enhancement of Practical knowledge-** Research is crucial for students to improve their practical knowledge. High package employment in R&D agencies such as DRDO/ISRO, etc., are available to students if they are having good research background.

2. The Vision of the Institute for Research

To achieve excellence in research and create an outstanding climate of support for researchers,broadly enabling research advances to meet national and international needs.

3. The Mission of the Institute for Research

a. To motivate faculty members and students to concentrate on research-related activities to publish research articles in reputed journals and Scopus indexed conferences

b. To pursue efforts to write books and monographs for publication by international andnational publishers of repute.

c. To spark faculty members' interest in joint research projects with colleagues at prestigiousnational and international universities.

d. To encourage faculty members and students to submit proposals and secure funded research projectsfrom various funding agencies in India and abroad.

e. To undertake consultancy projects sponsored by the government as well as private, industrial, and other organizations.

f. To encourage creativity in the minds of the faculty members and students so that they make originalcontributions by way of products, concepts, etc., and obtain patents.

g. To reach out to national and international professional societies.

4. Policy of Research Incentives Scheme

4.1 Scope of the Scheme

Undergraduate and postgraduate students of KIET Group of Institutions can publish their original research work.

4.2 Incentives for Research Publications in Journals

To further promote the intensive research culture among the students of KIET, it is intended to adopt the incentive policies under the vision of the research institution. KIET has already adopted the incentive policies for SCI, SCIE, SSCI, AHCI, SCOPUS, eSCI and CCR Expanded indexed international journals, but to make the research more adaptive, it is required to give more freedom in the regulation of SCI publications. In view of the above, **students may claim a maximum of 5 Research Publications incentives for Journals in an academic year as**

mentioned in different categories of Table-1. The primary objective of this incentive scheme is to motivate the students of our Institution to undertake quality research and other related activities.

Requirements to be fulfilled by students for claiming the Incentives

- The current/present impact factor, indexing (SCI/SCIE/SSCI) and other information will be taken from Clarivate analytics for evaluation of the papers. For indexing in Scopus, Cite Score and other information will be taken from scopus.com.
- The student requesting the incentive must be the first author in the research paper and other author may be his/her supervisor(s) only.
- Published papers must have "**KIET Group of Institutions, Delhi-NCR, Ghaziabad**" as the affiliation.
- Students needs to claim the incentive only after the volume number, issue number, and page number have been assigned to the research paper by the journal.
- To raise the number of citations for improvement of KIET NIRF Ranking, it is advised for the perspective authors to include at least two references of already published Research Papers by KIET faculty/students in their Research papers.
- Authors must also be aware of the KIET Ethics Policy for Students on academic dishonesty and plagiarism
- Students shall take the responsibility of screening the paper for plagiarism, ethics approval, and background checks on the potential, possible, or probable predatory scholarly open access journals before communicating the research publication to Beall's list of predatory publishers.
- A publication claim under the Research Incentive Schemes (RIS) of KIET must be made within amonth of publication in the prescribed form to the Head of Department (**Annexure I)**.
- Students after publication of the research paper with volume, issue and page no. must submit the application along with the following documents to Head of the Department within one month of publication-

1. Annexure I
2. Copy of College ID card
3. Proof of Volume/ Issue/ Page Number allotted by the respective journal.
4. PDF of the research manuscript.
5. Indexing of the journal

1. Scopus Valid proof (if journal is Scopus indexed)
2. SCI Valid proof (if journal is SCI indexed)

- The Head of the Department will send the file with recommendations to the Office of Dean R&D for further processing within one week of receiving the application from the students.
- Dean R&D will take the approval from Director, KIET Group of Institutions and will submit the approval note to the account's office for final disbursement of registration fees

within a week.

Presentation of Research Papers in Conferences in India

- **Reimbursement of Conference Registration Fees-**

Case-I: For the Research paper Publication by students in Scopus Indexed Conference based upon B.Tech. Final Year Project, the institute will reimburse 50% of the registration fee to each project group.

Case-II: For the Research paper Publication in Scopus Indexed Conferences by students of B.Tech. (I, II, III), B. Pharma (I, II, III, IV), MBA & MCA (I, II), M.Tech. & M.Pharma (I, II), the institute will reimburse 50% of the registration fee with a capping of maximum Rs 3000/-.

- The International/National conference must be of repute (viz. IEEE, Springer/Wiley/IPC etc.) and the hosting institutions must be of repute as well (IITs/IISc/NITs/IIITs/Universities/Deemed Universities etc.).
- Authors must also be aware of the KIET Ethics Policy for Students and Faculty Members onacademic dishonesty and plagiarism.
- Published paper must have '**KIET Group of Institutions, Delhi-NCR, Ghaziabad**' as the affiliation.
- Only oral presentation of research papers is acceptable.
- To raise the number of citations for improvement of KIET NIRF Ranking, it is advised for the perspective authors to include at least two references of already published Research Papers by KIET faculty/students in their Research papers.
- Only one student may use the facility in the case of joint authorship.
- A publication claim must be made within a month of the publication of a research paper (available online) in the prescribed form to the Head of the Department (**Annexure II**).
- Students after publication of research paper online must submit the application along with the following documents to Head of the Department within one month of publication-

1. Annexure II
2. Copy of College ID card
3. Valid proof of published paper in conference
4. Valid proof of presentation certificate
5. Valid proof of Scopus Indexing
6. PDF of the research manuscript
7. Page number of the research paper if published as book chapter
8. ISSN/ ISBN number
9. Valid proof of registration/fee receipt

- The Head of the Department will send the file with recommendations to the Office of Dean R&D for further processing within one week of receiving the application from the students.

- Dean R&D will take the approval from Director, KIET Group of Institutions and will submit the approval note to the account's office for final disbursement of registration fees within a week.

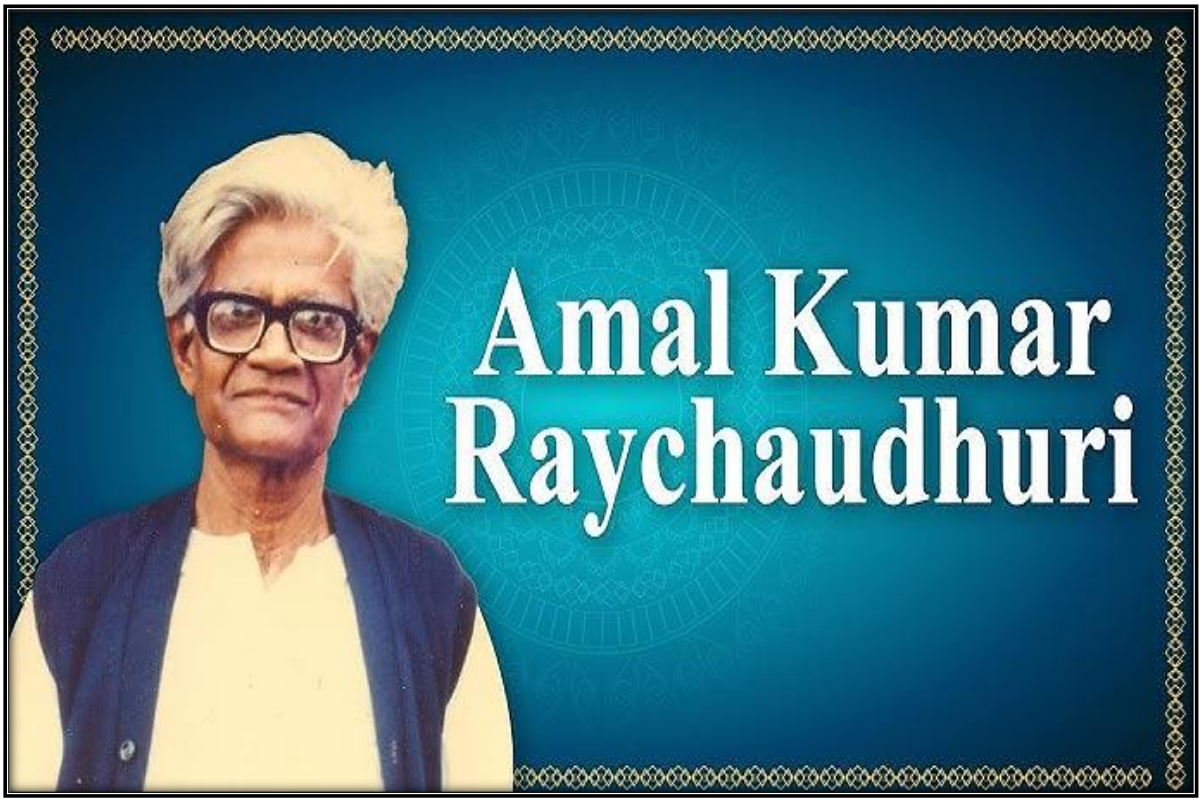
Table-1			
S. No.	**Categories**	**Conditions**	**Incentive**
<u>Incentive for publication in SCI/SCIE/SSCI/AHCI</u>			
1	**Outstanding Research Publication Incentive**	Publication in Nature (British Multidisciplinary Scientific Journal) Science Academic Journal of the American Association Harvard Business Review (Management magazine published by Harvard Business Publishing, a wholly owned subsidiary of Harvard University)	25,000 /-
2	**Premier Research Publication Incentive**	Paper must be published in SCI/SCIE/SSCI American Mathematical Society American Physical Society American Society for Civil Engineers (ASCE) American Society for Mechanical Engineers(ASME) American Society of Testing Materials (ASTM) Association for Computing Machinery (ACM) Transactions IEEE Transactions /Journals/ Letters/Reviews IET Transactions/ Journals/ Letters/ Reviews Institute of Civil Engineering Publishing, London Institute of Mechanical Engineering, London **In addition to the above list the SCI/SCIE/SSCI journals with impact factor>= 7 will be considered**	21,000 /-
3	**Commendable Research Publication Incentive**	Paper must be published in journal with an impact factor between 5 to 6.99 and indexed inSCI/ SCIE/ SSCI	15,000 /-
4	**Admirable Research Publication Incentive for SCI**	Paper must be published in journal with animpact factor between 0.750 to 4.99 and indexed in SCI/ SCIE/ SSCI	11,000/-
5	**Valuable Research Publication Incentive for SCI**	Paper must be published in journal with animpact factor between 0.500 to 0.749 and indexed in SCI/ SCIE/ SSCI	8,000/-
6	**Gratifying Research Incentive for SCI**	Paper must be published in journal with an impact factor between 0.250 to 0.499 and indexed in SCI/ SCIE/ SSCI	5000/-

Incentive for publication in Scopus			
7	**Admirable Research Publication Incentive for SCOPUS**	Quality research published in SCOPUS having Cite Score 3 and above	5000/-
8	**Valuable Research Publication Incentive for SCOPUS**	Quality research published in SCOPUS havingCite score **2 to 2.999**	4000/-
9	**Gratifying Research Incentive for SCOPUS**	Quality research published in SCOPUS having Cite score **1.000 to 1.999**	3000/-
Incentive for publication in eSCI and CCR Expanded			
10	**eSCI indexed Journal**	Quality research published in eSCI Journals is applicable for publications in any ESCI/CCR-Expanded journal, and a maximum of one ESCI/CCR-Expanded indexed research paper in an academic year shall be considered.	2000 /-

Various Research Labs in KIET

S. No.	Research Lab/Centre of Excellence	Department
1.	Centre of supercomputing equipped with NVIDIA DGX A100	CS (AI ML)
2.	Centre of Robotics and Mechatronics	ECE
3.	KIET NI LABVIEW Academy	ECE
4.	Bio-Medical Instrumentation MBS	ECE
5.	Space Technologies	ECE
6.	D-Link Global Center of Excellence	IT, CS, MCA
7.	Centre for Automotive Mechatronics in association Mercedes Benz	ME
8.	CAD/CAM Lab	ME
9.	Material Science & Testing Lab	ME
10.	IC Engine and Automobile Lab	ME
11.	Maker's Space Innovation Lab	All Branches
12.	Central Instrumentation Lab	Pharmacy
13.	Pharmacology research Lab	Pharmacy
14.	Center of Excellence for Renewable Energy based Power System for Electrical Power Supply and Transportation	EN
15.	Centre of Excellence in latest art of structural analysis and design facilities viz. STAAD PRO, E-TABS, SAP, ANSYS, PLAXIS, Primavera etc.	CE
16.	Centre of Excellence in Process Control and Industrial Automation	EN
17.	Finance Lab	MBA


Centres of Excellence
KIET-MBS Research & Development Centre for Bio-Medical Instruments
Centre for Advanced Woodworking
Automotive Mechatronics Centre
in Collaboration With Mercedes-Benz India Pvt. Ltd.



Amal Kumar Raychaudhuri (14 September 1923 – 18 June 2005) was an Indian physicist, known for his research in **general relativity and cosmology**.

His most significant contribution is the eponymous **Raychaudhuri equation**, which demonstrates that singularities arise inevitably in general relativity and is a key ingredient in the proofs of the **Penrose–Hawking singularity theorems**.

He earned B.Sc. from the Presidency College in 1942 and M.Sc. in 1944 from Science College campus of Calcutta University and he joined Indian Association for the Cultivation of Science (IACS) in 1945 as a research scholar.

He was honoured with number of awards and recognition:

- He was elected member of the International Committee on General Relativity and Gravitation for the period 1974–83.
- President of the Indian Association of General Relativity, Gravitation (1980-82)
- Honorary Fellow of the Astrophysical Society of India
- Awarded Professor A.C. Banerji Memorial Lecture Award (1989) by National Academy of Sciences
- Indian National Science Academy Senior Scientist (1988–91)
- Conferred Vainu Bappu Memorial Award (1991) by Indian National Science Academy.

KIET Group of Institutions

Delhi-NCR, Ghaziabad, Uttar Pradesh, India - 201206