

Centenary Celebrated Sharnbasveshwar Vidya Vardhak Sangha, Kalaburagi's



Lingaraj Appa Engineering College, Bidar Invitation

You are cordially invited for

2nd National conference on RECENT TRENDS IN ENGINEERING AND MANAGEMENT STUDIES (RTEMS-2026)



On 23rd May 2026 at 11:00 am

Venue: Seminar Hall-1



With the Benign Blessings of

Vidya Bhandari Lingaikya Poojya Dr. Sharnbaswappa Appa

8th Mahadasoha Peethadhipati, Sharnbasveshwar Samsthan, Kalaburagi

Former President, Sharnbasveshwar Vidya Vardhak Sangha, Kalaburagi, Founder Chancellor, Sharnbasva University, Kalaburagi

Poojya Matoshree Dr. Dakshayini S. Appa

President, Sharnbasveshwar Vidya Vardhak Sangha, Kalaburagi

Hon'ble Chancellor, Sharnbasva University, Kalaburagi

Poojya Doddappa S. Appa

9th Mahadasoha Peethadhipati, Sharnbasveshwar Samsthan, Kalaburagi

Presided By

Shri Basavaraj S. Deshmukh

Secretary, Sharnbasveshwar Vidya Vardhak Sangha, Kalaburagi

Member, BOG, Sharnbasva University, Kalaburagi

Shri Sharanbasappa S. Deshmukh

Director, Lingaraj Appa Engineering College, Bidar

Dr. Umatai B. Deshmukh

HOD of OBG, BRIMS, Director, Lingaraj Appa Engineering College, Bidar,

Member, BOG, Sharnbasva University, Kalaburagi

Chief Guests

Dr. V.D. Mytri

Director,
Sharnbasva University, Kalaburagi

Dr. S.H. Honnalli

Registrar (Evaluation),
Sharnbasva University, Kalaburagi

Key Note Speakers

Dr. Shatrughna Prasad Yadav

Dean, Academics,
GNIT

Dr. Jasmineet Kaur

Associate Professor,
Department of Artificial Intelligence &
Machine Learning,
Guru Nanak Dev Engineering College,
Bidar, Karnataka

Guest Of Honour

Dr. Satish Pratapur

Principal,
Channabasamma BCA & B.COM College, Bidar

Convenor

Dr. Vinita Patil

Principal,
Lingaraj Appa Engineering College, Bidar

All Are Cordially Invited

Secretary, Director, HOD's, Principal, Staff & Students

With the Blessings of

Lingaikya Poojya Dr. Sharnbasappa Appa
8th Maha Dasoha Peethadhipati, Sharnbasveshwar Samsthan
Kalaburagi. Former President, Sharnbasveshwar Vidya
Vardhak Sangha, Kalaburagi. Founder Chancellor, SUK

Chief Patrons

Matoshree Dr. Dakshayini S. Appa

Chancellor, Sharnbasva University, Kalaburagi.
President, Sharnbasveshwar Vidya Vardhak Sangha,
Kalaburagi.

Poojya Chiranjeevi Doddappa Appa

9th Maha Dasoha Peethadhipati, Sharnbasveshwar Samsthan
Kalaburagi.

Patrons

Shri. Basavaraj S Deshmukh

Secretary, SVV Sangha, Kalaburagi.

Shri. Sharnbasappa Deshmukh

Director, Lingaraj Appa Engineering College, Bidar.

Dr. Umatai B Deshmukh

Director, Lingaraj Appa Engineering College,
Bidar. HOD (OBG), BRIMS, Bidar.

Advisory Committee

Dr. Shubhangi D.C

Governing Council Member, IETE, New Delhi &
Regional Director Head, VTU, Kalaburagi

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Vice Chancellor, Sharnbasva University, Kalaburagi.

Dr. Shivkumar S. Jawalgi

Dean, Sharnbasva University, Kalaburagi

Dr. Satish B Pratapur

Principal, Channabasanna BCA & B.Com College, Bidar

Dr. Sharnbasappa Sali

Principal, Veerappa Nisty Engg. College, Shorapur.

Dr. S. R. Patil

Principal, PDAEC, Kalaburagi.

Dr. Udaykumar Kalyane

Principal, BKIT, Bhalki.

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Principal, GNDEC, Bidar.

Dr. Ashok kumar M Vangeri

Principal, BKEC, Basavakalyan.

Prof. Devendra Hanche

Government Engineering College, Bidar

Dr. S. A. Quadri

Principal, KCTEC, Kalaburagi.

Dr. Subhash Kamal

Dean, FET, KBN University, Kalaburagi

Dr. P G Rakaraddi

Principal Shetty Institute of Technology

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Registrar Sharnbasva University

Chairperson, IETE Kalaburagi Center

Dr. Savita Sonoli

Vice Chairperson, IETE Kalaburagi Center

Prof. Sujata Mallapur

Secretary, IETE Kalaburagi Center

Dr. Shatrughna Prasad Yadav

Professor & Dean Academics, Department of Electronics and
Communication Engineering Guru Nanak Institutions, Hyderabad

Dr. Jasminet Kaur

Associate Professor,
Department of Artificial Intelligence & Machine Learning,
Guru Nanak Dev Engineering College, Bidar, Karnataka

Convener

Dr. Vinita Patil

Principal, LAEC, Bidar.

Organizing Committee

Dr. Sharnbasappa Shetkar

Head, Dept. of E&CE, LAEC, Bidar.

Dr. Vivek Jaladi

Head, Dept. of CSE, LAEC, Bidar.

Dr. Bhadrappa Haralayya

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Head, Dept. of EEE, LAEC, Bidar.

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Prof. Shruti Modi

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Prof. Anilkumar Dharne

Head, Dept. of H&S, LAEC, Bidar.

Dr. Basavalinga Swamy

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Dr. P Sripathy Reddy

PG coordinator, Dept. of CSE, LAEC, Bidar.

Prof. Sandeep Mashetty

PG coordinator, Dept. of Machine Design, LAEC, Bidar.

Co-ordinators:

Prof. Chaya, Asst. Prof., E&CE Dept. Mobile: 9481429203

Prof. Basavaraj Sedam, Asst. Prof. CSE Dept. Mobile: 8453888137

Prof. Vishwanath Reddy, Asst. Prof. AI&ML Dept. Mobile: 9480746890

Prof. Sampathkumar, Asst. Prof., Mech Dept. Mobile: 9986668508

Prof. Kalyan Rao, Asst. Prof., CV Dept. Mobile: 8088838131

Prof. Basavaraj B, Asst. Prof., EEE Dept. Mobile: 809501418

Prof. Sangamesh, Asst. Prof., MBA Dept. Mobile: 9738415343

Centenary Celebrated Sharnbasveshwar Vidya Vardhak Sangha



LINGARAJ APPA ENGINEERING COLLEGE

Gornalli, Bidar, Karnataka – 585403

Organised Under IETE Students Forum



2nd National Conference
on

**RECENT TRENDS IN ENGINEERING AND
MANAGEMENT STUDIES (RTEMS-2026)**
23rd May 2026

Organized by

LINGARAJ APPA ENGINEERING COLLEGE
Gornalli, Bidar, Karnataka – 585403



Please Visit The Website For Further Information

Website: www.lingaraj-appaec.in

E-mail: lingarajappaengg@gmail.com

ABOUT LAEC

Lingaraj Appa Engineering College (LAEC) was started in the year 2011 by Lingaika Poojya Dr. Shambaswappa Appaji under the aegis of centenary celebrated Sharnbasveshwar Vidya Vardhak Sangha, Kalaburagi. Our college is located in the serene atmosphere of Gornalli, Bidar in Karnataka. The college has obtained approval from AICTE and is affiliated to Visvesvaraya Technological University, Belagavi and offers

UG Programs	PG Programs
Computer Science Engineering	MBA
Artificial Intelligence and Machine Learning	M.Tech
Electrical and Electronics Engineering	CSE
Civil Engineering	VLSI &
Mechanical Engineering	ESD

The institution has received 2(f) recognition from the UGC and is approved by AICTE, with affiliation to VTU, Belagavi.

It hosts active student chapters in professional societies such as IETE, ISTE, and IEEE. The campus is equipped with high-quality infrastructure and well-established laboratories. The institution regularly organizes workshops, Faculty Development Programs (FDPs), and seminars on advanced technical topics to enhance the knowledge and skills of both faculty and students. As a result, the college stands out with a distinct objective of fostering research and promoting innovation and creativity across all its undergraduate and postgraduate programs. The primary aim of the college is to bring together innovative academicians and industrial experts in the field of Engineering Science and Management Studies to a common forum.

ABOUT THE CONFERENCE

The primary goal of the conference is to promote research and developmental activities in the aforesaid fields. Another goal is to promote scientific information interchange between researchers, developers, engineers, students and practitioners working in and around the country.

CONFERENCE TOPICS ECE/IEEE

- 5G & 6G Communication Technologies
- Internet of Things (IoT) & Industrial IoT (IIoT)
- Artificial Intelligence & Machine Learning in Electronics
- Signal & Image Processing using Deep Learning
- VLSI Design, FPGA & Embedded Systems
- Nanoelectronics & Semiconductor Devices
- Optical Communication & Photonics

COMPUTER SCIENCE AND ENGINEERING

- Artificial Intelligence & Machine Learning
- Data Science & Big Data Analytics
- Cyber Security & Ethical Hacking
- Cloud Computing & Edge Computing
- Internet of Things (IoT)
- Blockchain Technology
- Full Stack Development & Web Technologies
- Quantum Computing

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

- Machine Learning Algorithms & Applications
- Deep Learning & Neural Networks
- Computer Vision & Image Processing
- Natural Language Processing (NLP)
- Reinforcement Learning & Decision Systems
- Explainable AI (XAI) & Model Interpretability
- Generative AI & Large Language Models (LLMs)
- AI in Healthcare & Bioinformatics
- AI in Robotics & Autonomous Systems

MECHANICAL ENGINEERING

- Renewable Energy & Green Technologies
- Electric Vehicles & Hybrid Systems
- Advanced Manufacturing & Industry 4.0
- Robotics & Automation
- Thermal Engineering & Heat Transfer
- Smart Materials & Composites
- Additive Manufacturing (3D Printing)
- Mechatronics Systems

• Fluid Mechanics & CFD

• Sustainable Engineering Design

CIVIL ENGINEERING

- Smart Cities & Urban Planning
- Sustainable Construction Materials
- Structural Health Monitoring
- Earthquake Engineering
- Environmental Engineering & Waste Management
- Transportation & Highway Engineering
- **MANAGEMENT**
- Geotechnical Engineering
- Business Analytics & Data-Driven Decision Making
- Financial Technology (FinTech)
- Digital Marketing & E-Commerce
- Entrepreneurship & Startups
- Human Resource Management
- Corporate Governance & Ethics

HUMANITIES & SCIENCE

- Applied Mathematics & Optimization Techniques
- Environmental Science & Sustainability
- Nanotechnology & Advanced Materials
- Physics in Emerging Technologies
- Chemistry for Energy & Environment

GUIDELINES FOR PAPER SUBMISSION

Papers must be submitted in the manuscript format provided on the website. Both full papers and abstracts should be submitted to the email ID laecrtms2026@gmail.com within the specified deadline. All accepted papers will be included in the conference proceedings. Selected high-quality papers will be considered for publication in **Scopus-indexed conferences** and **IEEE Xplore**. Publication charges, if applicable, will be determined based

To download the paper template and submissions visit www.lingaraj-appaec.in

Registration Fees

Faculty Members	₹ 500/-	Industry Persons	₹ 600/-
UG/PG Students	₹ 400/-	Research Scholars	₹ 600/-

Who Can Attend:

UG/PG students, Faculty Members, Research Scholars and Persons from Industry can explore this opportunity.

Note:

Participants are requested to mention their NEFT Transaction ID during registration.

Paper Submission Last Date	15-05-2026
Paper Acceptance Notification	18-05-2026



ಶರಣಬಸವೇಶ್ವರ ವಿದ್ಯಾವರ್ಧಕ ಸಂಘದ ಎಲ್ಲಾ ಶಿಕ್ಷಣ ಸಂಸ್ಥೆಗಳ ಪ್ರಾರ್ಥನಾ ದೀಪೆ

ಹರನೇ ಸತ್ಯವು
ಸತ್ಯವೇ ಹರನು
ಹರನೇ ಸುಂದರನು
ಸತ್ಯವೇ ಹರನು
ಹರನೇ ಸುಂದರನು

ಸಚ್ಚಿದಾನಂದವು ಸಚ್ಚಿದಾನಂದವು |
ನೇಗಿಲ ಯೋಗಿಯು ಮಾಡುವ
ಕೆಲಸವೇ ಕಾಯಕವು ತಾನಿಲ್ಲದೇ ಆರಂಭ ಮಾಡುವುದೇ ಕಾಯಕವು |
ಪರಹಿತವೇ ದಾಸೋಹಂ |
ಸಚ್ಚಿದಾನಂದವು ಸಚ್ಚಿದಾನಂದವು |
ಸತ್ಯದ ನುಡಿಯ ನಡೆನಾಡು
ವಿಜಯ ಕಲ್ಯಾಣ ನಾಡು ಕನ್ನಡ ನಾಡು
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ಸತ್ಯ ಶಿವನ ಸಾಮರ್ಥ್ಯದಾಗರ
ಸದಾಚಾರ ಸದ್ಭಕ್ತಿ ಜನ್ಮಭೂಮಿ ಜನ್ಮಭೂಮಿ

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ಹರನೇ ಸುಂದರನು
ಸತ್ಯವೇ ಹರನು
ಹರನೇ ಸುಂದರನು
ಅರಿತವರಿಗೆ ಸತ್ಯ ಶಿವಾನುಭಾವಿಗಳ ಅನುಭವ ಮಂಟಪದಲ್ಲಿ
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ಸತ್ಯವೇ ಹರನು
ಹರನೇ ಸುಂದರನು

-ವಿದ್ಯಾಭಂಡಾರಿ ಲಿಂಗೈಕ್ಯ ಪರಮ ಪೂಜ್ಯ ಡಾ. ಅಪ್ಪಾಜಿ

Institutions Run Under the Aegis of Sharnbasveshwar Vidya Vardhak Sangha, Kalaburagi

01. Sharnbasva University, Kalaburagi
02. Veerappa Nisty Engineering College, Shorapur
03. Lingraj Appa Engineering College, Bidar
04. Sharnbasva college of Science, Kalaburagi
05. Sharnbasva college of Arts, Kalaburagi
06. Sharnbasva college of Commerce, Kalaburagi
07. Sharnbasveshwar Residential (SBR) Public School, Klb
08. Appa Public School (CBSC Syllabus), Kalaburagi
09. Sharnbasva Public School Residential Independent Junior Science College, Shorapur.
10. Sharnbasva Public School's Residential Independent Junior Science College, Bidar
11. Antharwani CRS 90.8 Community radio centre, Klb.
12. Mahadevi Girls Higher Primary School, Kalaburagi
13. Mahadevi Girls High School, Kalaburagi
14. Sharnbasveshwar Composite P.U. College, Kalaburagi
15. Sharnbasveshwar High School, Temple Section, Kalaburagi
16. Sharnbasveshwar House of Motessori, Kalaburagi
17. Sharnbasveshwar Ind. P.U.College of Science, Kalaburagi
18. SSK Basveshwar College of Arts & Science, Basavakalyan
19. Sharnbasveshwar Printing & Publication, Kalaburagi
20. Godutai Doddappa Appa P.U.College for Women, Kalaburagi
21. Doddappa Appa Residential P.U. Science College, Kalaburagi
22. Muktabika Residential Ind. P.U. Science College For Girls, Kalaburagi
23. Godutai Doddappa Appa degree College for Women, Kalaburagi
24. Sharnbasveshwar BBA College, Basavakalyan
25. Komalatai Resi. P.U. College for Girls, Basavakalyan
26. Sharnbasva Public School, Bidar
27. Doddappa Appa B.Ed. College, Basavakalyan
28. Sharnbasveshwar Higher Primary Residential Public School Hasanapur Tq. Shorapur Dist. Yadgir
29. Sharnbasveshwar Public Library, Kalaburagi
30. Appa Ayurveda and Modern Spa centre, Kalaburagi
31. Akhila Bharat Shivanubhava Mantap, Kalaburagi



Lingaraj Appa Engineering College, Bidar

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ಸರ್ವದಲೇ ದಾಸೋಹ



Mahadasohi Shri Sharnbasveshwar

Service to Humanity is service to God.

He, who helps others alone, gets his desires fulfilled.

Mahadasohi Sharnbasveshwar- a mystic saint, a seer with a vision, a savior of mankind and a divine universal teacher. He was one of the greatest humanitarians rarely found in the spiritual history of mankind. He attained divinity by living the way of life called Dasoha. His Dasoha philosophy is based on the precept- "No religion is greater than service; service to humanity is service to God".

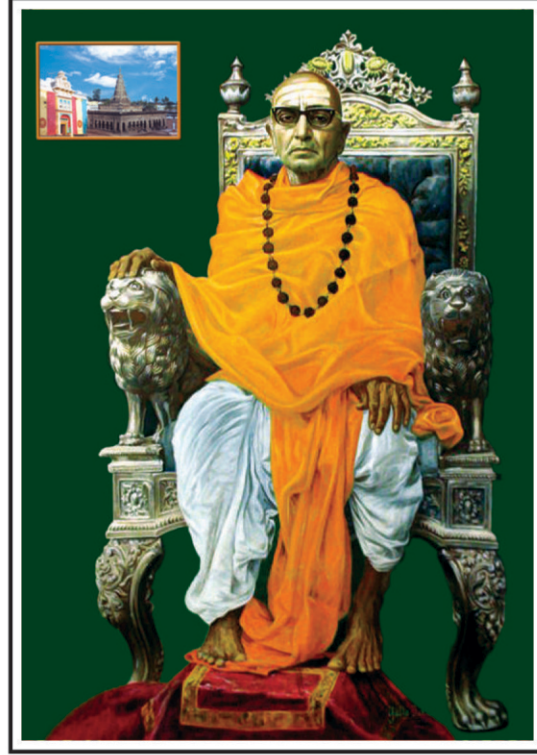
Dedicating his life to the service of humanity, Sri Sharnbasveshwar followed Dasoha in all aspects - in healing the moral and spiritual wounds of the toiling and moiling masses, in feeding the poor, wiping the orphan's tears, soothing and guiding the sinner, serving the sick and curing the diseased by his extraordinary blissful spiritual blessings. Sri Sharnbasveshwar demonstrated to the world, both by precept and practice the eternal values and virtues of life, its essential goodness and oneness.



Lingaraj Appa Engineering College, Bidar

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Poojya Doddappa Appa

7th Mahadasoha Peethadhipati,
Sharnbasveshwar Samsthan

Poojya Doddappa Appa has started first Public library in 1918 at Kalaburagi initiating the era of mass education. In 1934 the first girls school in Kannada medium was started i.e. Mahadevi Girls School in Kalaburagi, empowering the women with the power of the knowledge.

In 1951, Poojya Doddappa Appaji, completed the formal registration of the Sharnbasveshwar Vidya Vardhaka Sangha in the then State of Hyderabad. Higher education (UG) started in the areas of Arts, Science and Commerce, in the year 1957.

Dedicated



VIDYA BHANDARI

LINGAIKYA PARAMA POOJYA DR. SHARNBASWAPPA APPAJI

8th Mahadasoha Peetadhipati, Sharanbasaveshwar Samsthan,
Kalaburagi Former President, Sharanbasaveshwar Vidya Vardhak
Sangha, Kalaburagi Founder Chancellor, Sharanbasva University,
Kalaburagi Sharanbasaveshwar Samsthan, Kalaburagi



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ಮಾಜ್ಯ ಮಾತೋತ್ತೀ ದಾಕ್ಷಾಯಣಿ ಶ. ಅಪ್ಪ



From the Desk of the President

Poojya Matoshree Dr. Dakshayani .S Appa

President, Sharnbasveshwar Vidya Vardhak Sangha, Kalaburgi
Chancellor, Sharnbasva University, Kalaburgi

I am delighted to know that Lingaraj Appa Engineering College Bidar, Under IETE Students Forum is hosting a 2nd National Conference on Recent Trends in Engineering and Management Studies-2026 (RTEMS-2026) in the college campus on May 23rd 2026. The Conference, which has attracted the presence of several delegates from reputed institutions around the region, would go long way in furthering the knowledge of the participating students and helping the academics on the recent advances made in the field of Science and Technology, Engineering, Humanities, Business Studies.

On behalf of the Sharnbasveshwar Vidya Vardhaka Sangha welcome all the delegates and assure that the delegates would spend their time fruitfully in the conference, I extend my warm appreciation for the efforts to make the conference a success by the organizers

Centenary Celebrated Sharnbasveshwar Vidya Vardhak Sangha, Kalaburagi's



Lingaraj Appa Engineering College, Bidar

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ಸಾಫ್ತ್ಯ ಚರಂಜಲವಿ ಢಾಡ್ಡಪ್ಪಾಜಲ



Poojya Doddappa Appa

9th Mahadasoha

Peetadhipatigalu, Sharnbasweshwar Samsthan, Kalaburgi,

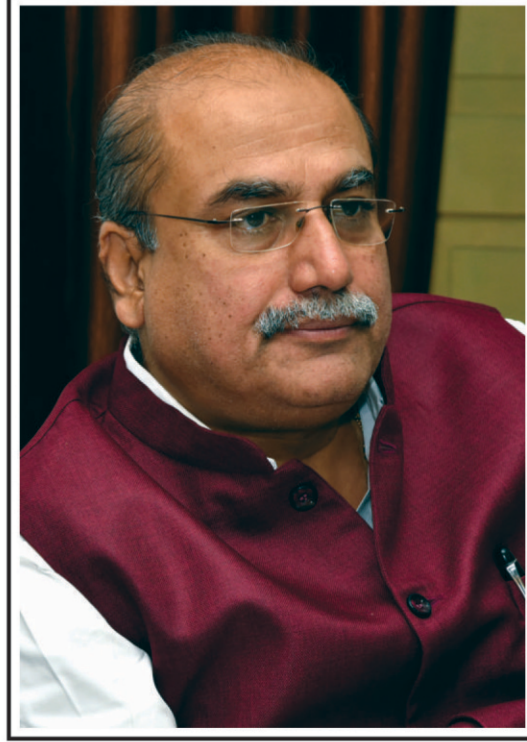
2nd National Conference on Recent Trends in Engineering and Management Studies-2026 (RTEMS- 2026) By LAEC Bidar



Lingaraj Appa Engineering College, Bidar

Approved by AICTE and Affiliated to VTU Belagavi.

ಶ್ರೀ ಬಸವರಾಜ ದೇಶಮುಖ



Sri Basavaraj Deshmukh

Secretary, Sharnbasveshwar Vidya Vardhak Sangha, Member BOG, Sharnbasva University, Kalaburagi
Secretary, Lingaraj Appa Engineering College, Gornalli Bidar.

It gives me immense pleasure to note that under the spiritual guidance of his Holiness Lingaikya Poojya Dr Sharnbaswappa Appaji, the Lingaraj Appa Engineering College Bidar, Under IETE Students Forum is organizing 2nd National Conference on Recent Trends in Engineering and Management Studies-2026 (RTEMS- 2026) in the college campus on May 23rd 2026. The fledgling Lingaraj Appa Engineering College Bidar has already made its mark in the academic circle as one of the fastest emerging centers of excellence in the higher education and this Conference would be another milestone for the Lingaraj Appa Engineering College Bidar, I take this opportunity to welcome all the delegates from reputed Institutions around the region and earnestly hope that their visit to historic Bidar city would be memorable and wishing all of you a pleasant and purposeful stay in Bidar city.



Lingaraj Appa Engineering College, Bidar

Approved by AICTE and Affiliated to VTU Belagavi.

ಡಾ. ವಿನಿತಾ ಪಾಟೀಲ್



Dr. Vinita Patil

Principal

Lingaraj Appa Engineering College, Bidar

It is a proud privilege for me to organize the 2nd National Conference on Recent Trends in Engineering and Management Studies-2026 (RTEMS- 2026) under the spiritual blessings and guidance of Lingayakya Vidyabhandari Param Poojya Dr. Sharnbaswappa Appaji, Poojya Mathoshree Dr. Dakshayini Avvaji, Chi. Doddappa Appaji, and with the constant support of our Secretary Shri Basavaraj Deshmukh. As the Conference Chair, it gives me great pleasure to present this second edition of the conference, building upon the success of the previous one. The conference has evolved into a prominent platform for academicians, researchers, and industry professionals from across the region to share their knowledge and research contributions. Our dedicated team of faculty members has worked tirelessly to bring together eminent speakers and resource persons from diverse domains. The conference will feature parallel technical sessions conducted in both offline and online modes, enabling wider participation and effective dissemination of knowledge.

I am confident that the delegates will gain valuable insights from the expert speakers and enhance their academic and professional excellence. I also take this opportunity to express my sincere gratitude to all my colleagues and organizing committee members for their relentless efforts in making this conference a grand success.

MESSAGE FROM KEY NOTE SPEAKERS



Lingaraj Appa Engineering College, Bidar

Approved by AICTE and Affiliated to VTU Belagavi.



Dr. Shatrughna Prasad Yadav

It gives me immense pleasure and honour to be associated with the 2nd National Conference on Recent Trends in Engineering and Management Studies (RTEMS–2026), organized by Lingaraj Appa Engineering College, Bidar. I extend my sincere congratulations to the management, organizing committee, faculty members, and student coordinators for their dedicated efforts in organizing this prestigious academic event. RTEMS–2026 provides an excellent platform for academicians, researchers, industry experts, and students to exchange ideas, discuss emerging technologies, and explore innovative solutions to contemporary challenges in engineering and management. Such conferences play a vital role in promoting interdisciplinary research, knowledge sharing, and industry-academia collaboration. I am confident that the technical sessions and deliberations during the conference will inspire innovative thinking, foster meaningful collaborations, and contribute significantly to research and societal development. I convey my best wishes to all the delegates, authors, presenters, and participants for a highly successful and enriching conference experience.

With Best Wishes,
Dr. Shatrughna Prasad Yadav
Professor & Dean Academics
Department of Electronics and Communication Engineering
Guru Nanak Institutions, Hyderabad
Senior Member IEEE, Fellow IE(I), FIETE, LFBES



Lingaraj Appa Engineering College, Bidar

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Dr. Jasmineet Kaur

It is a matter of great pride and privilege to be a part of the 2nd National Conference on Recent Trends in Engineering and Management Studies (RTEMS–2026) organized by Lingaraj Appa Engineering College, Bidar. I extend my sincere appreciation to the management, organizing committee, faculty members, and student coordinators for creating a vibrant academic platform that encourages knowledge exchange, innovation, and interdisciplinary collaboration. Conferences such as RTEMS play a vital role in bringing together researchers, educators, industry experts, and young innovators to discuss emerging technologies that are shaping the future of engineering and society.

The theme of my keynote address, "AI, IoT, and Smart Systems: The Future of Engineering Innovation," reflects the transformative shift taking place across industries and institutions worldwide. The convergence of Artificial Intelligence, Internet of Things, and intelligent cyber-physical systems is redefining how we design, operate, and optimize modern engineering solutions. From smart manufacturing and precision agriculture to intelligent healthcare, sustainable energy systems, and smart cities, these technologies are enabling systems that can sense, analyze, learn, and act autonomously. This technological evolution is not only enhancing efficiency and productivity but also creating opportunities for sustainable and human-centric innovation.

As educators and engineers, we carry the responsibility of preparing future generations to lead this transformation with technical excellence, ethical awareness, and social responsibility. India stands at a remarkable point of opportunity with its strong talent ecosystem, growing digital infrastructure, and innovation-driven initiatives. I hope this conference inspires meaningful discussions, collaborative research, and practical solutions that contribute to national development and global technological advancement. I convey my best wishes for the grand success of RTEMS–2026 and congratulate the organizers for their dedicated efforts in promoting academic and research excellence.

With Best Wishes,
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2nd National Conference On “Recent Trends In Engineering And Management Studies” (RTEMS–2026)

**On
23rd May 2026**

ABOUT THE LINGARAJ APPA ENGINEERING COLLEGE, BIDAR, KARNATAKA, INDIA



Lingaraj Appa Engineering College Runs Under the Sharanabasaveshwar Vidya Vardhak Sangha, Kalburgi. The Sharanabasaveshwar Vidya Vardhak Sangha, Gulbarga, which was founded in the year 1903, is named after the great mystic Saint of Deccan India, Lona Sharanabasaveshwar. It is the cardinal principle of Sharanabasaveshwar that "No mlgien is greater than Service" and "Service to Humanity is Service to God". This Kayaka and Devita Philosophy is his legacy, which is continued even today by the Perthadhipan of Sharanabasaveshwar Samsthan. The Sharanabasaveshwar Samsthan, which is also called an Sharanabasaveshwar Mahadasohapeetha has a long spiritual, cultural, social and educational history that represents the glorious heritage of the nation. The Philosophy of Dusoha has been the touchstone principle on which the 7th Mahadasoha Peethadhipathi of Sharanahasavenwar Samsthan, Gulbarga, founded the Sharanabasaveshwar Vidya Vardhak Sangha. Lingaraj Agga Engineering College Bidar is established in the year 2011 affiliated Vivemanya Technological University Belagavi, Undergraduate Programs are Civil Engineering Computer Science Engineering Electronics & Communication Engineering Electrical & Electronics Engineering Mechanical Engineering Post Graduate Programs are Master of Business Administration M. Tech-Computer Science & Engineering M. Tech-VLS Design & ES M. TechMachine Design.



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Abstracts of Computer Science & Engineering

Paper ID: RTEMS_101

AI-Based Virtual Try-On Fashion System: A Literature Review

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Abstract— The rapid growth of e-commerce and digital fashion retail has created an unprecedented demand for immersive and accurate online shopping experiences. One of the most transformative innovations in this domain is the AI-based Virtual Try-On (VTON) Fashion System, which enables users to visualize garments on their bodies without physically wearing them. This literature review comprehensively examines the evolution of virtual try-on technology, spanning early geometric warping approaches, Generative Adversarial Network (GAN)-based frameworks, attention-driven architectures, 3D body modeling techniques, and the most recent diffusion model-based methods. The review critically analyses fifteen foundational and contemporary research works, evaluating their contributions to garment representation, human pose estimation, body shape fitting, texture preservation, and real-time rendering. Key challenges such as handling complex poses, multi-garment scenarios, occluded body regions, and domain generalization are discussed in depth. Furthermore, this paper identifies critical research gaps, including the lack of real-time 3D virtual try-on systems, insufficient handling of diverse body types, and limited explainability in deep learning models applied to fashion. The proposed AI-based system aims to bridge these gaps by integrating hybrid deep learning architectures, multimodal data fusion, and physics-informed 3D garment simulation for a seamless, realistic, and inclusive virtual fashion experience.

Keywords— Virtual Try-On, Generative Adversarial Networks, Garment Warping, Human Pose Estimation, 3D Body Modeling, Fashion AI, Image Synthesis, Diffusion Models, Texture Preservation, Augmented Reality in Fashion, Deep Learning, E-commerce Personalization

Paper ID: RTEMS_102

COMFORTPING: AI & ML BASED DISCOMFORT PATTERN ANALYSIS AND SMART STUDENT RESHUFFLING SYSTEM

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Abstract: Shared living spaces such as college hostels and paying guest accommodations often experience conflicts caused by behavioral differences, noise, personal habits, and lifestyle mismatches among students. Many students hesitate to report discomfort directly due to fear of arguments or social pressure, causing dissatisfaction to grow silently. Existing room allocation systems mainly depend on static questionnaires and manual administration, making them ineffective in handling real-time behavioral changes. This paper presents ComfortPing, an AI and Machine Learning-based discomfort pattern analysis and smart student reshuffling system designed to improve student wellbeing and reduce roommate conflicts. The proposed system collects anonymous comfort feedback through a mobile application and analyzes recurring discomfort patterns using machine learning techniques. Based on the analyzed data, the system identifies high-risk rooms and generates intelligent roommate reshuffling recommendations. An administrative dashboard provides visualization through heat maps, risk scores, and weekly recommendations. The proposed approach enables proactive conflict management and improves overall student comfort in shared accommodations.

Keywords: Artificial Intelligence, Machine Learning, Comfort Analysis, Student Accommodation, Roommate Reshuffling, Behavioral Analytics, Smart Hostel Management, active hostel management

Paper ID: RTEMS_103

PEST DETECTION AND ANIMAL TRESSPASSING CONTROL USING MACHINE LEARNING

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Abstract: Pest and animal intrusion is a major problem in agricultural fields, causing crop damage and economic loss. This project presents an intelligent pest and animal detection system using machine learning integrated with embedded hardware for real-time response. The proposed system employs a machine learning-based detection model running on a laptop to identify pests or animals through visual data. Once a pest or animal is detected, the software transmits corresponding serial data to an Arduino microcontroller. The Arduino processes this data and activates a relay module connected to an electrical shock unit, which is used as a controlled deterrent mechanism to prevent further intrusion. Simultaneously, the system displays alert messages on an LCD, providing clear information about the detected threat. This combination of software intelligence and hardware automation enables fast, accurate, and efficient intrusion management without continuous human supervision. The system is cost-effective, scalable, and suitable for small to medium agricultural applications. By integrating machine learning with Arduino-based control, the proposed solution enhances crop protection while reducing manual monitoring efforts. This project demonstrates how smart agriculture solutions can improve productivity and security using modern technologies.

Paper ID: RTEMS_104

SALES INSIGHTS FOR CONSUMER GOODS COMPANY

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Abstract : Sales analytics and business intelligence are important technologies used by organizations to improve business performance and decision-making. Consumer goods companies generate large amounts of sales data through transactions, products, and customer interactions.

Paper ID: RTEMS_105

LITERATURE REVIEW ON MACHINE LEARNING-BASED EMOTIONAL HEALTH MONITORING SYSTEMS FOR STUDENTS

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Abstract—Student mental health has emerged as a critical concern in educational institutions worldwide, with rising rates of anxiety, depression, and academic burnout particularly evident among undergraduate and postgraduate populations. Traditional mental health support systems are hindered by stigma, under-reporting, delayed intervention, and inadequate real-time monitoring. This literature review synthesizes research on the application of machine Learning (ML) technologies to develop intelligent emotional health monitoring systems for students. Two foundational studies are examined in detail: a multimodal ML-based student stress detection system using physiological and behavioral signals, and an integrated deep learning model for continuous emotional state classification using wearable sensors and social media data. The review explores each technology domain, identifies limitations of existing systems, and discusses how converged ML architectures address critical gaps. A comparative analysis of reviewed works is presented, followed by identification of research gaps and future directions. The findings confirm that end-to-end automated emotional health monitoring through ML convergence is both feasible and clinically beneficial.

Keywords—Student mental health; Machine learning; Emotional monitoring; Stress detection; Deep learning; Wearable sensors; Sentiment analysis; APPEctive computing.

Paper ID: RTEMS_106

THE UNIFIED CAMPUS OPERATIONS HUB AND ACADEMICS MANAGER

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Abstract—The modern campus ecosystem encompasses a wide spectrum of operations — from academic scheduling and examination management to fee collection, hostel administration, library services, placement coordination, and student grievance resolution. Historically, these functions have been managed through siloed, disconnected systems, leading to administrative redundancy, data inconsistency, and a fragmented experience for students, faculty, and administrators alike. EduSync — The Unified Campus Operations Hub and Academics Manager — addresses this systemic fragmentation by providing a single integrated platform that consolidates all critical campus functions. It enables student registration and profile management, timetable generation, attendance tracking, examination and result management, fee processing, hostel and library management. This literature review surveys prior research on campus information systems, academic management platforms, attendance automation, examination systems, and campus ERP solutions, identifying key contributions, limitations, and research gaps that EduSync is designed to address.

Paper ID: RTEMS_107

AGROVISION -IQ: REAL -TIME MULTI -CLASS FRUIT QUALITY DETECTION VIA YOLOV11 - BASED LOCALIZATION AND DEEP FEATURE CLASSIFICATION

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Abstract — Fruit quality assessment is a critical factor influencing consumer health, market value, and operational efficiency across agricultural and food supply chains. Inspectors due to differences in experience, lighting conditions, and time pressure, resulting in unreliable grading outcomes. These limitations become more pronounced when Traditional inspection techniques rely heavily on manual evaluation, resulting in subjective judgments, inconsistent grading, and limited scalability under real-time conditions. This study presents AgroVision -IQ, a deep learning-based framework for real-time multi-class fruit quality detection and classification. The system employs YOLOv11 for high-speed fruit localization, enabling precise instance-level detection under varying backgrounds and lighting conditions, followed by InceptionResNetV2 for deep feature extraction and quality classification. Multiple fruit types, including apples, bananas, guavas, lemons, limes, oranges, and pomegranates, are categorized into Good, Bad, and Mixed quality classes. Robust image preprocessing, data augmentation, and stratified dataset partitioning are applied to improve generalization and stability. Experimental evaluation demonstrates high classification accuracy with low latency inference, validating suitability for real-time deployment. A deployment-ready web interface supports live image uploads, instant predictions, probability-based interpretation, and automated logging. The proposed framework demonstrates a scalable and reliable solution for automated fruit quality monitoring in agricultural, retail, and warehouse environments.

Index Terms — Fruit quality assessment, YOLOv11, InceptionResNetV2, real-time detection, deep learning, computer vision, smart agriculture.

Paper ID: RTEMS_108

ROPEVISION -AI: REAL -TIME WIRE ROPE DEFECT DETECTION USING DEEP LEARNING

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Abstract — Wire ropes are critical load-bearing components widely used in elevators, cranes, suspension bridges, mining hoists, and industrial lifting systems. The safety and reliability of these systems depend heavily on the structural integrity of wire ropes. Over time, due to mechanical stress, environmental exposure, fatigue, and corrosion, wire ropes develop defects such as broken strands, surface wear, internal cracks, and rust formation. Failure to detect these defects at an early stage may result in catastrophic accidents, economic losses, and potential threats to human life. This paper proposes a Real-Time Wire Rope Defect Detection System using Deep Learning based on Convolutional Neural Networks (CNN). The system captures wire rope images using a camera module and processes them using a trained deep learning model to automatically detect and classify defects. The proposed model achieves high accuracy while maintaining real-time processing capability. Experimental results demonstrate that the system significantly improves inspection efficiency, accuracy, and industrial safety compared to traditional methods.

INTELLIGENT CYBER THREAT DETECTION USING AI AGENTS

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Abstract –Cybersecurity has emerged as a critical challenge in the digital era, where organizations face an ever-growing number of sophisticated cyber threats including malware, network intrusions, phishing attacks, and Distributed Denial-of-Service (DDoS) attacks. Traditional rule-based security systems struggle to keep pace with the rapidly evolving threat landscape, resulting in delayed detection and significant financial damage. To address this problem, this paper proposes an Intelligent Cyber Threat Detection System using AI Agents, which leverages machine learning and deep learning techniques to autonomously identify, classify, and respond to cybersecurity threats in real-time. The proposed system employs a multi-agent architecture where specialized AI agents are deployed for network traffic analysis, malware classification, phishing URL detection, and anomaly-based intrusion detection. A hybrid model combining Random Forest, Long Short-Term Memory (LSTM), and Natural Language Processing (NLP) techniques is used as the core detection engine. The system is implemented as a web-based application using the Django framework, providing a user-friendly dashboard for real-time monitoring, alert management, and threat reporting.

AI-BASED DOCTOR ASSIST SYSTEM FOR EARLY MISDIAGNOSIS DETECTION

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Abstract —The rapid advancement of artificial intelligence (AI) in healthcare has created new opportunities to enhance diagnostic accuracy and reduce clinical errors. Among these challenges, early misdiagnosis remains a critical issue, often leading to delayed treatment, increased healthcare costs, and adverse patient outcomes. This research paper presents an AI-Based Doctor Assist System for Early Misdiagnosis Detection, designed to support healthcare professionals in identifying potential diagnostic inaccuracies at an early stage.

Keywords —Artificial Intelligence in Healthcare, Early Misdiagnosis Detection, Clinical Decision Support System,

SECURE SENTINEL: AN ENHANCED PROVABLE DATA POSSESSION FOR INTEGRITY-AWARE CLOUD STORAGE

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Abstract—Cloud computing has become one of the most important technologies for modern data storage and processing. Organizations and individuals store huge amounts of data on third-party Cloud Service Providers (CSPs) because of scalability, flexibility, and low infrastructure cost. However, once data is outsourced to the cloud, users lose direct control over their data, which creates major security and integrity concerns. Traditional data verification methods require downloading the entire file for integrity checking, which is expensive and time-consuming for large-scale cloud storage systems. To overcome this problem, this paper presents Secure Sentinel, an AI-enhanced integrity-aware cloud storage framework based on Provable Data Possession (PDP). The proposed system combines lightweight cryptographic verification with Machine Learning-based anomaly detection to ensure efficient and reliable data integrity verification without downloading the complete file. Secure Sentinel uses homomorphicifiable tags and challenge-response auditing to verify stored data, while the AI auditor continuously monitors server behavior and computes a trust score. The system improves cloud storage reliability, reduces bandwidth consumption, and predicts suspicious cloud behavior before major data loss occurs.

Keywords: Cloud Computing, Provable Data Possession, Data Integrity, Machine Learning Auditor, Cloud Security, Anomaly Detection

LITERATURE REVIEW ON MACHINE LEARNING-BASED EMOTIONAL HEALTH MONITORING SYSTEMS FOR STUDENTS

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Abstract—Student mental health has emerged as a critical concern in educational institutions worldwide, with rising rates of anxiety, depression, and academic burnout particularly evident among undergraduate and postgraduate populations. Traditional mental health support systems are hindered by stigma, underreporting, delayed intervention, and inadequate real-time monitoring. This literature review synthesizes research on the application of Machine Learning (ML) technologies to develop intelligent emotional health monitoring systems for students. Two foundational studies are examined in detail: a multimodal ML-based student stress detection system using physiological and behavioral signals, and an integrated deep learning model for continuous emotional state classification using wearable sensors and social media data. The review explores each technology domain, identifies limitations of existing systems, and discusses how converged ML architectures address critical gaps. A comparative analysis of reviewed works is presented, followed by identification of research and future directions. The findings confirm that end-end automated emotional health monitoring through ML convergence is both feasible and clinically beneficial.

Paper ID: RTEMS_113

AI-BASED AUTOMATIC QUESTION PAPER DIFFICULTY ANALYZER USING NATURAL LANGUAGE PROCESSING AND BLOOM'S TAXONOMY CLASSIFICATION

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Abstract—The manual preparation of examination question papers is a subjective, time-consuming process that often leads to inconsistencies in difficulty levels. This paper presents an AI- Based Automatic Question Paper Difficulty Analyzer designed to classify academic questions into Easy, Medium, and Hard categories. By leveraging Natural Language Processing (NLP) and Machine Learning algorithms, the system evaluates textual complexity, keyword frequency, and cognitive levels based on Bloom's Taxonomy. The proposed framework utilizes TF-IDF vectorization and classification models to ensure balanced assessments. Experimental results demonstrate that the system minimizes human bias and maintains high consistency in standardized to improve assessment quality.

Index Terms—Artificial Intelligence, Natural Language Processing, Educational Technology, Difficulty Analysis.

Paper ID: RTEMS_114

NEXTGEN TALENT — AI-POWERED CAREER, SKILL & OPPORTUNITY ECOSYSTEM

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Abstract: NextGen Talent is an AI-powered platform designed to connect students, companies, and mentors in a single ecosystem.

The project aims to solve major problems such as lack of career guidance, difficulty in skill verification, and absence of a unified platform for opportunities. With the integration of modern technologies like Artificial Intelligence, Blockchain, and WebApplications, the system provides features such as resume building, career planning, hiring, skill verification, and startup idea showcase. The motivation behind this project is to bridge the gap between skills and opportunities and to create a smart and secure platform for career development.

Paper ID: RTEMS_115

DEEPPFAKE VIDEO AND IMAGE DETECTION SYSTEM

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Abstract: Deepfake technology is an advanced artificial intelligence technique used to generate manipulated images and videos that appear realistic. It mainly uses deep learning 4 models such as Convolutional Neural Networks (CNNs), Generative Adversarial Networks (GANs), Autoencoders, and Diffusion models. These technologies can create fake multimedia content that is difficult to detect using human observation. Due to the misuse of deepfake technology in cybercrime, misinformation, identity theft, and social media manipulation, it becomes necessary to develop an efficient system to detect fake multimedia content. This literature survey reviews existing research work carried out in deepfake detection systems and identifies research gaps for developing an improved detection model.

LITERATURE REVIEW ON AI -BASED SMART FOOD QUALITY MONITORING SYSTEM FOR
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Abstract - The AI -Based Smart Food Quality Monitoring System for Hostels and Canteens is an intelligent system developed to ensure food safety, hygiene, and quality through real -time monitoring and automated analysis. In many hostels and canteens, maintaining food freshness and hygienic conditions is a major challenge due to improper storage, manual inspection, and lack of continuous monitoring. This may lead to food spoilage, contamination, and health problems among students and customers. The proposed system uses Artificial Intelligence, IoT sensors, and computer vision technologies to monitor important food parameters such as temperature, humidity, smell, color, and gas levels. The collected data is analyzed using AI algorithms to identify spoiled or unsafe food conditions automatically. Whenever abnormal conditions are detected, the system generates instant alerts to hostel or canteen authorities for quick action. The system helps improve food quality management, reduce food wastage, and maintain hygiene standards effectively. It also minimizes manual effort and supports smart monitoring in food service environments. This project provides a reliable , cost -effective, and efficient solution for ensuring safe food consumption in hostels, canteens, and other public food facilities.

MEDI -ASSIST AI: AN INTELLIGENT NLP -BASED DIGITAL HEALTHCARE ASSISTANT FOR
SYMPTOM ANALYSIS AND PRELIMINARY DIAGNOSIS

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Abstract - This paper presents *Medi -Assist AI* , an intelligent digital healthcare assistant designed to provide preliminary medical guidance using Natural Language Processing (NLP) and machine learning techniques. The system enables users to input symptoms in natural language, which are processed through text preprocessing, feature extraction, and classification to identify possible medical conditions and generate relevant recommendations. Unlike traditional symptom checkers, the proposed approach integrates a hybrid model combining rule -based logic with machine learning to improve interpretability and response accuracy. The architecture includes a user interface module, NLP engine, symptom analyzer, and recommendation system, ensuring efficient and user -friendly interaction. Experimental evaluation indicates improved usability and faster response time compared to conventional systems, making it suitable for initial health assessment, particularly in resource -constrained environments. However, the system is intended to assist rather than replace professional medical diagnosis, and challenges such as data quality, bias, and privacy remain areas for future improvement.

Keywords - Artificial Intelligence, Healthcare Systems, Natural Language Processing, Symptom Checker,
Machine Learning, Digital Health .

LITERATURE REVIEW ON AI -BASED CROWD DENSITY MONITORING & ALERT SYSTEM FOR TEMPLE & FESTIVAL SAFETY

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Abstract - Large gatherings during temple festivals, pilgrimages, and cultural events often lead to overcrowding, congestion, and stampede risks, posing serious threats to public safety. Traditional crowd monitoring methods based on manual surveillance and conventional CCTV systems are limited in accuracy, scalability, and real-time response capability. To address these challenges, this study reviews AI-based crowd density monitoring and alert systems designed for temple and festival safety. The review focuses on the application of Artificial Intelligence, Computer Vision, Deep Learning, Internet of Things (IoT), and smart surveillance technologies for real-time crowd analysis and emergency management. The literature indicates that techniques such as Convolutional Neural Networks (CNNs), YOLO-based object detection, density map estimation, and anomaly detection models significantly improve the accuracy of crowd counting and congestion prediction. Integration with IoT devices, edge computing, and drone surveillance further enhances real-time monitoring and automated alert generation. These systems can detect overcrowded zones, monitor crowd movement.

LITERATURE REVIEW ON AI GARBAGE SEGREGATION AND RECYCLING

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Abstract - The AI Garbage Segregation and Recycling Assistant is an intelligent waste management system designed to automate the process of identifying, classifying, and sorting different types of waste materials. Improper waste disposal is a major environmental concern that leads to pollution, health hazards, and inefficient recycling. This project aims to address these challenges by using Artificial Intelligence (AI) and Machine Learning (ML) techniques to accurately detect and categorize waste into classes such as biodegradable, recyclable, hazardous, and non-recyclable materials. The system uses image recognition and deep learning models, particularly Convolutional Neural Networks (CNNs), to analyze images of waste items captured through a camera or uploaded by users. Once the waste is identified, the assistant provides instructions on the correct disposal method and suggests possible recycling options. The system can be integrated into a mobile application, smart dustbin, or web platform to assist households, schools, industries, and municipal waste management systems. In addition to waste classification, the assistant can educate users about recycling practices, environmental impact, and methods to reduce waste generation. By improving segregation accuracy and increasing public awareness, the AI Garbage Segregation and Recycling Assistant promotes sustainable waste management and supports the development of cleaner and greener communities. This project demonstrates how AI can be applied to solve real-world environmental problems and contribute to efficient resource utilization and environmental conservation.

CHILDREN SAFETY DEVICE WITH GPS TRACKER AND ALERT SYSTEM

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Abstract: Child safety has become one of the major concerns in modern society due to increasing incidents of child kidnapping, getting lost, and emergency situations. Parents often face difficulties in continuously monitoring the location and safety of their children, especially during school travel and outdoor activities. The proposed system, provides a smart and reliable solution for real-time child monitoring and emergency alert management. The system uses technologies such as GPS, GSM, microcontroller, and alert mechanisms to track the child's live location and send emergency notifications to parents or guardians. In case of danger, the child can press an emergency button which immediately sends an alert message along with the current GPS location. The proposed model improves child safety, enables quick response during emergencies, and provides peace of mind to parents. The system is designed to be portable, user-friendly, and cost-effective for real-world implementation.

SEASON BASED CROP RECOMMENDATION SYSTEM USING MACHINE LEARNING

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Abstract: Agriculture plays a vital role in the economic development of many countries, especially India, where crop productivity is highly dependent on soil conditions, climatic factors, and seasonal variations. Farmers often face challenges in selecting suitable crops due to lack of technical knowledge and unpredictable environmental conditions, which may result in low yield and financial loss. To address this problem, this project proposes a Season Based Crop Recommendation System using machine learning techniques. The proposed system recommends suitable crops based on soil nutrients such as Nitrogen (N), Phosphorus (P), Potassium (K), soil pH, and climatic parameters including temperature, humidity, and rainfall along with the selected farming season. A Random Forest classifier is used as the core machine learning model due to its high accuracy and robustness. The system is implemented as a web-based application using the Flask framework, allowing users to input required parameters and receive real-time crop recommendations.

Paper ID: RTEMS_122

SMARTHIRE:AI-BASED RESUME SCREENING AND RANKING SYSTEM

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Abstract-The SmartHire:AI-Based Resume Screening and Ranking System is developed to automate the recruitment process using Natural Language Processing (NLP) and Machine Learning (ML). The system allows candidates to upload resumes and enables HR users to post job descriptions through a user-friendly interface. Resume text is extracted, preprocessed, and converted into numerical vectors using TF-IDF vectorization. Cosine similarity and Logistic Regression are used to calculate match percentages between resumes and job descriptions. Based on the similarity score, candidates are ranked and displayed on the HR dashboard. The system reduces manual effort, improves recruitment efficiency, and provides accurate and unbiased candidate selection.

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Paper ID: RTEMS_123

SCHOLARSHIP TRACKER SYSTEM

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Abstract- Scholarship management and discovery are critical challenges faced by students at every level of education. With hundreds of government and private scholarships available across different states and categories, identifying eligible opportunities is time-consuming and error-prone. The Scholarship Tracker System addresses this challenge by providing a centralized platform that registers student profiles, matches them with eligible scholarships based on income, category, education level, and state, and displays curated results with application support features. This literature review examines prior research on scholarship management systems, eligibility verification.

SMART BUS TRACKING SYSTEM

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Abstract—Transportation is one of the most important services in modern society. Public transport systems, especially buses, are widely used because of their affordability and accessibility. However, passengers often face problems such as uncertain waiting times, delays, lack of real-time information, and poor communication regarding bus schedules. Traditional bus systems do not provide accurate live tracking facilities, which creates inconvenience for passengers and difficulty for transport authorities in monitoring buses effectively. The Smart Bus Tracking System is designed to solve these problems using modern technologies such as GPS, GSM, IoT, cloud computing, and mobile applications. The system enables real-time tracking of buses, Estimated Time of Arrival (ETA) prediction, route monitoring, and better communication between passengers and transport authorities. This literature survey reviews existing research work carried out in smart transportation and bus tracking systems and identifies research gaps for developing an efficient and user -friendly transportation solution.

SMART HELMET: A COMPREHENSIVE SOLUTION FOR RIDER SAFETY

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Abstract—Smart helmets: The merging of the conventional head- gears for the protection of one's head, with modern technology, may be said to be one of the breakthroughs in the motorcycling, cycling, construction, and emergency services industries. This paper deals with the history, components, applications, and advantages of smart helmets, showing how these impact user safety and connectivity in a wide context. This paper involves a feasibility study and problem statement for a project using smart helmet technology to integrate solutions with the prevalent social problems. The research focuses on three systems, including helmet recognition and reminders, emergency message sending, drowsiness detection. The article argues that each of these systems contributes in bringing about road safety, providing emergency help, and safe distance in drowsy riding. Smart helmets integrate cutting edge technology with the inclusion of sensors and communication systems thus giving the wearers much situational awareness with proactive safety measures. Through this research, it brings out the importance of smart helmets in preventing losses while outlining the construction of a safer connected future.

Keywords— Smart helmets, safety equipment, technology integration, connectivity, drowsiness detection, real-time notifications, road safety.

AI BASED WOMEN SAFETY SMART ROUTE PREDICTOR**1st Sadhana Metre***Student,**Department of Computer Science
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Abstract: Women's safety during travel in urban environments is a pressing societal challenge. As per the National Commission for Women (NCW), over 25,743 cases of crimes against women were reported in India in 2024. Despite advancements in navigation technology, tools like Google Maps focus solely on distance and time, completely ignoring the safety aspect of a route. AI Based Women Safety Smart Route Predictor is an intelligent system that recommends the safest travel route for women using real-time crime data, street lighting conditions, crowd density, and proximity to police stations and emergency services. The motivation behind this project is to empower women with a proactive, AI-driven tool that helps them avoid unsafe routes before travel, rather than responding to threats after they occur. This literature survey reviews 10 relevant and recent research papers covering women safety systems, crime prediction using AI/ML, safe route recommendation algorithms, and real-time data integration to identify existing techniques and open research gaps.

UDAAN VENTURES: A PRAGMATIC, DISTRIBUTED STARTUP LIFECYCLE OPERATING SYSTEM AND INTER-DISTRICT INCUBATION NETWORK**1st Vinaya Sakpal***Assistant Professor, Department of
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Abstract—Traditional startup incubation ecosystems suffer from fragmented toolsets, manual milestone tracking, and severe geographical isolation, leading to high venture failure rates. This systemic fragmentation diverts vital focus away from core product innovation and market validation. Traditional startup incubators and academic accelerators attempt to mitigate these structural risks through human-led mentorship cohorts and periodic, milestone-based review sessions. However, these conventional frameworks rely almost entirely on manual reporting methods and static evaluations. Consequently, incubator managers and institutional investors frequently diagnose catastrophic startup health indicators such as rapid capital exhaustion, critical co-founder friction, or paucity of growth statistics and operational health scores. The platform integrates automated workflow tracking, live metric dashboards, and verified data pipelines. Grounded in a pragmatic research paradigm, the system enables an interconnected “Interstate Incubation Exchange” where registered angel investors, venture capital networks, and adjacent regional hubs can evaluate a startup’s real-time performance on manual reporting methods and static evaluations. By replacing stalled technical progression long after the vulnerabilities have static, manual self-reporting with continuous, system-verified analytics, the proposed architecture offers a scalable, legally compliant infrastructure for modern digital venture acceleration.

Index Terms—Startup Ecosystem, Lifecycle Operating System, Digital Incubator, Milestone Analytics, Institutional Network

VYAPAR HUB EMPOWERING LOCAL VENDORS WITH ULTRA-FAST DIGITAL MARKETPLACE

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Abstract—The rapid advancement of digital technology has collaboration, transformed the way businesses operate and interact with customers, yet many traditional and small-scale businesses still face challenges such as limited digital presence, inefficient customer engagement, poor accessibility, and lack of intelligent management systems. Research on traditional market customer behavior highlights that customer convenience, organized infrastructure, smooth navigation, and environmental conditions significantly influence while studies on digital innovation hubs emphasize the role of technology-driven ecosystems in promoting entrepreneurship, innovation, and socio-economic development.

Keywords: Digital Marketplace, Business Automation, Vendor Management, Inventory Tracking, Platform, Secure Customer Payments, E-Commerce Management, Sales Analytics, Online Trading, Retail Management.

REAL-TIME MERN BASED RIDE BOOKING WITH INTEGRATED MEDICAL EMERGENCY SUPPORT AND DIGITAL FUND RAISING SYSTEM

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Abstract: The rapid advancement of web and mobile technologies has transformed real-time service platforms, especially in transportation. Ridebooking systems have become essential in urban mobility. However, most existing platforms focus mainly on ride efficiency and lack integrated emergency response features.

IOT-ENABLED WEARABLE SAFETY SYSTEMS FOR WOMEN

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Abstract—Women's safety has emerged as one of the most critical socio-technological challenges of the twenty-first century, particularly in densely populated nations such as India. According to the National Crime Records Bureau, India recorded over 42.8 million crimes against women in 2021 alone, underscoring an urgent need for proactive, technology-driven protective mechanisms. Conventional safety solutions suffer from fundamental limitations: dependence on active network connectivity, requirement for manual triggering under duress, absence of real-time evidence capture, and inability to function in resource-constrained environments. This paper presents a comprehensive literature review underpinning the development of "Radium Wear"—a next-generation intelligent wearable that integrates real-time biometric monitoring, AI-powered distress detection, GPS/GSM emergency communication, and sustainable power management into a single, unobtrusive form factor.

SCALABLE INDOOR NAVIGATION SYSTEM USING HYBRID GRIDGRAPH BASED ROUTING

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Abstract—Indoor navigation has become an increasingly critical research domain driven by the growing scale and complexity of modern infrastructure such as shopping malls, hospitals, university campuses, airports, and corporate buildings. Unlike outdoor environments where GPS provides reliable and accurate positioning, indoor spaces present unique challenges due to signal attenuation, multi-path interference, and structural barriers that render GPS ineffective.

Existing indoor navigation solutions predominantly rely on hardware-based positioning infrastructures including BLE beacons, Wi-Fi access points, RFID sensors, and ultrasonic emitters.

While these systems provide real-time localization, they impose high deployment costs, significant maintenance overhead, and scalability limitations — making them impractical for widespread adoption, particularly in institutions with limited resources.

CAMPUS NEXUS: A SCALABLE DIGITAL STUDENT COLLABORATION AND EVENT PARTICIPATION PLATFORM

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Abstract—Traditional campus event systems rely heavily on manual communication channels, resulting in delayed team formation, reduced participation efficiency, and limited student awareness. Students often spend excessive time identifying suitable teammates and discovering relevant opportunities through fragmented platforms. This paper presents Campus Nexus, a scalable AI-integrated digital student collaboration and event participation platform designed to streamline campus engagement through intelligent teammate recommendation, skill-based matching, and centralized event management. The proposed system integrates real-time notifications, personalized event suggestions, participation analytics, and cloud-based collaboration infrastructure into a unified ecosystem. The architecture utilizes Next.js, React, TypeScript, Firebase, and Cloud Firestore to provide scalability, reliability, and real-time synchronization. By automating collaboration workflows and integrating AI-assisted recommendation mechanisms, Campus Nexus improves coordination efficiency and enhances student participation across technical, cultural, and sports events.

Index Terms—Student Collaboration, Event Participation, Artificial Intelligence, Team Formation, Recommendation System, Cloud Computing, Smart Campus

Keywords—Network intrusion detection, machine learning, Random Forest, NSL-KDD, real-time monitoring, FastAPI, full-stack architecture, lightweight features.

MERN STACK JOB BOARD APPLICATION

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Abstract The increasing use of online payment systems and digital transactions has significantly increased the risk of credit card fraud. Fraudulent transactions cause major financial losses to banks, businesses, and customers. Traditional fraud detection systems often fail to identify fraudulent activities efficiently due to the large volume of transaction data and constantly changing fraud patterns. This paper presents the design and implementation of a Credit Card Fraud Detection System using Machine Learning techniques. The proposed system uses machine learning algorithms to analyze transaction patterns and identify suspicious activities with high accuracy. Python libraries such as Pandas, NumPy, and Scikit-learn are used for preprocessing, feature extraction, and model development. The system integrates data preprocessing, fraud analysis, classification techniques, and prediction models to improve fraud detection efficiency.

Keywords – Data Analytics, E-Commerce Dashboard, Power BI, Python, Business Intelligence, KPI Analysis, Data Visualization, Sales Forecasting.

CREDIT CARD FRAUD DETECTION USING MACHINE LEARNING

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Abstract- The increasing use of online payment systems and digital transactions has significantly increased the risk of credit card fraud. Fraudulent transactions cause major financial losses to banks, businesses, and customers. Traditional fraud detection systems often fail to identify fraudulent activities efficiently due to the large volume of transaction data and constantly changing fraud patterns. This paper presents the design and implementation of a Credit Card Fraud Detection System using Machine Learning techniques. The proposed system uses machine learning algorithms to analyze transaction patterns and identify suspicious activities with high accuracy. Python libraries such as Pandas, NumPy, and Scikit-learn are used for preprocessing, feature extraction, and model development. The system integrates data preprocessing, fraud analysis, classification techniques, and prediction models to improve fraud detection efficiency.

NEWS RESEARCH TOOL USING LANGCHAIN AND OPENAI LLM

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Abstract: The rapid growth of digital news sources has created a need for efficient tools that can analyze, summarize, and extract insights from vast amounts of information. This project, News Research Tool Using LangChain and OpenAI LLM, aims to simplify news analysis by leveraging state-of-the-art natural language processing techniques. The system integrates LangChain for orchestration and retrieval-augmented generation (RAG), OpenAI's large language model for intelligent text processing, and vector databases for semantic search. The tool enables users to ingest news articles from multiple sources, generate concise summaries, perform sentiment and topic analysis, and retrieve relevant information using embeddings-based similarity search. A user-friendly interface built with Streamlit ensures seamless interaction and real-time results. This project demonstrates how modern AI and NLP technologies can support research, decisionmaking, and trend identification, making it highly valuable for students, analysts, and journalists.

MACHINE LEARNING-BASED ANALYSIS OF DIGITAL ADDICTION AND MENTAL HEALTH

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Abstract—Digital addiction has emerged as a critical public health challenge, affecting over 210 million individuals worldwide and disproportionately impacting adolescents and young adults. This paper presents a comprehensive machine learning (ML)-based framework to analyse the relationship between digital addiction patterns and mental health outcomes, using a dataset of 3,200 anonymised self-reports encompassing screen time, social media engagement, sleep duration, depression (PHQ-9), anxiety (GAD-7), and perceived stress (PSS-10). Seven ML algorithms—Logistic Regression, Decision Tree, Support Vector Machine (SVM), k-Nearest Neighbor (kNN), Random Forest, XGBoost, and Long Short-Term Memory (LSTM)—are evaluated alongside CatBoost, which achieves the highest classification accuracy of 91.2% with an AUC-ROC of 0.95. Feature importance analysis identifies daily screen time, depression severity, and anxiety level as the strongest predictors of addiction risk. Results reveal statistically significant correlations between excessive digital engagement and

deteriorating mental health, particularly among users aged 13–24. This study demonstrates that ML techniques can serve as effective, scalable tools for early detection of at-risk individuals, enabling targeted mental health interventions.

Keywords—digital addiction; machine learning; mental health; CatBoost; screen time; depression; anxiety; random forest; LSTM.

AI-Based Voice Lie Detection System

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ABSTRACT: This project presents an intelligent automated solution for lie detection using Artificial Intelligence and Machine Learning techniques. Traditional methods like polygraphs are often expensive, time-consuming, and require physical sensors. To solve this, we built a non-invasive system that analyses voice signals to detect deception based on vocal stress and speech patterns. Our system extracts critical features such as pitch, tone, and frequency variations from audio recordings. Using trained ML models like SVM and Random Forest, the speech is classified as Truthful or Deceptive with a confidence score. This low-cost web-based application can be effectively used in security, interviews, and criminal investigations.

Keywords— AI-based lie detection, Voice stress analysis, Machine Learning (ML), Speech processing, Librosa, Feature extraction, Classification models.

Smart Kisan Assistant: A Multi-Modal AI Ecosystem for Disease Diagnostics, Yield Forecasting, and Regional Commerce Integration for Karnataka's Marginal Farmers

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Abstract—Small-scale agriculture in the Indian subcontinent is currently facing a double-edged crisis: increasing pathological threats due to climate variability and a profound information asymmetry regarding technological interventions. This paper presents the “Smart Kisan Assistant,” a comprehensive research into an AI-powered ecosystem tailored for the Kannada-speaking farmers of Karnataka. Our contribution is three-fold: First, we develop a quantized MobileNetV2 CNN model capable of highprecision leaf disease detection on low-resource edge devices. Second, we implement a native Kannada Natural Language Processing (NLP) pipeline that allows for a voice-first interaction model, effectively removing the literacy barrier. Third, we integrate a hyper-local commercial engine that bridges diagnostic outputs with real-time pricing and availability of agro-chemical treatments in the Bidar and Raichur districts. The proposed system demonstrates a 91.2% diagnostic accuracy and provides a scalable framework for precision agriculture in the Deccan plateau.

Index Terms—CNN, MobileNetV2, Kannada NLP, Precision Agriculture, Random Forest Regression, Agro-Commerce, Edge Computing.

ATTENDANCE-MANAGEMENT-SYSTEM-USING-FACE-RECOGNITION

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Abstract: If attendance is taken manually, it may become a heavy workload for the teachers. To overcome management system this problem smart and auto attendance has been in use. Using this framework, it becomes very simple to solve the issue marked present even of proxies and students if they're not physically there. This product captures the live the attendance from camera is. The frames obtained from video by OpenCV. Face detection and recognition of the detected face are the primary implementation steps in this type of system, which make use of dlib. After these, it should be possible to connect recognized faces by comparing them to the database of student faces. Students' attendance will be effectively managed using this model. The overall complexity and accuracy are determined after extensive testing. When it came to taking attendance in a classroom without spending any time or doing any manual work, the proposed system proved to be a reliable and effective tool. The developed system is cost-effective and requires less installation. Python-based live webcam-based face attendance system project.

Key Words: open CV-python, face recognition, NumPy, pandas

Paper ID: RTEMS_201

AI RESUME ANALYZER AND ATS JOB MATCH SYSTEM USING PYTHON

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Abstract- Recruitment processes have become increasingly data-driven, yet traditional resume screening remains manual, time-consuming, and prone to inconsistency. This paper presents the design and implementation of an AI-powered Resume Analyzer and Application Tracking System (ATS) Job Description (JD) Match System developed using Python and Natural Language Processing (NLP) techniques. The system enables users to upload a resume in PDF format, paste a target job description, and receive an automated comparative analysis. It employs TF-IDF (Term Frequency-Inverse Document Frequency) vectorization and cosine similarity to compute a quantitative match score. The application further identifies matched skills, missing skills, critical keywords absent from the resume, and generates actionable improvement suggestions. User authentication is implemented using credentials stored in a SQLite database, and the application is deployed on a cloud platform for remote access. Experimental evaluation demonstrates significant reduction in resume screening effort, improved keyword coverage awareness, and faster actionable feedback for job applicants. The system is designed for both individual candidates and institutional recruitment development programs.

Keywords— AI Resume Analyzer, ATS, TF-IDF, Cosine Similarity, NLP, Flask, Job Description Matching, Skill Gap Analysis.

Paper ID: RTEMS_202

CUSTOMER CHURN PREDICTION USING MACHINE LEARNING

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Abstract— Customer churn prediction is a critical challenge in the telecommunication subscription-based industries. This paper proposes a machine learning-based framework to identify customers likely to discontinue services, enabling proactive retention strategies. Classification algorithms— Logistic Regression, Decision Tree, Random Forest, XGBoost— are evaluated on a real-world telecom dataset of 7,043 customer records with 21 features. Data preprocessing techniques including missing value imputation, one-hot encoding, and SMOTE-based oversampling are applied to handle class imbalance. The XGBoost model achieved the highest accuracy of 92.1%, precision of 91.4%, recall of 90.1%, and F1 score of 91.2%.

E-COMMERCE DATA ANALYSIS DASHBOARD USING POWER BI AND PYTHON

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Abstract-- The rapid growth of e-commerce platforms has generated massive volumes of transactional, customer, and product-related data. Organizations require efficient analytical systems capable of transforming raw data into actionable business intelligence. This paper presents the design and implementation of an E-commerce Data Analysis Dashboard developed using Power BI, Python, SQL, and visualization techniques. The system enables organizations to monitor sales performance, customer behavior, product trends, and profitability through an interactive dashboard interface. Python libraries such as Pandas and NumPy are used for preprocessing and analysis, while Power BI is used for visualization and reporting. The project integrates data preprocessing, exploratory data analysis, KPI generation, and interactive dashboard modules to provide meaningful business insights. Experimental evaluation demonstrates that the proposed system significantly improves reporting efficiency, reduces manual effort, and supports strategic decision-making.

Keywords – Data Analytics, ECommerce Dashboard, Power BI, Python, Business Intelligence, KPI Analysis, Data Visualization, Sales Forecasting.

EXPENSE TRACKER SYSTEM USING PYTHON

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Abstract-- The Expense Tracker System is a console-based application developed using Python with the primary objective of helping users efficiently manage and monitor their financial transactions. In today's fast-paced lifestyle, keeping track of expenses has become essential for maintaining financial discipline and planning future budgets. This project aims to provide a simple, user-friendly, and effective solution for recording, organizing, and analysing personal expenses without relying on complex tools or external software.

The system is designed by utilizing fundamental Python concepts such as data structures, functions, file handling, and exception handling. All expense data is stored persistently using a database.

AI DRONE SOLAR INSPECTION USING DEEP LEARNING

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Abstract— Solar energy systems are increasingly important for renewable energy generation; however, maintaining large-scale photovoltaic (PV) installations present significant challenges in fault detection and timely maintenance. Traditional manual inspection methods are time-consuming, costly, and error-prone. This paper presents an intelligent AI-powered drone inspection system that integrates Convolutional Neural Network (CNN)-based deep learning with unmanned aerial vehicles (UAVs) to automatically detect faults in solar panels. The proposed system captures aerial images of solar installations and processes them through a trained deep learning model capable of identifying defects such as cracks, hotspots, dust accumulation, shading anomalies, and damaged cells with high accuracy. Experimental evaluation demonstrates that the CNN model achieves 95% detection confidence, substantially outperforming manual inspection approaches. The system reduces inspection time, minimizes labor costs, and supports proactive maintenance management of solar power plants.

Keywords—solar panel inspection, deep learning, convolutional neural network, drone technology, fault detection, photovoltaic systems, UAV, computer vision.

SMART HOME AUTOMATION PROJECT USING BLYNK APPLICATION

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Abstract — This paper presents a research study conducted during an IoT internship at Glowlogics Solutions, focusing on the development of a Smart Home Automation system using IoT technology and the Blynk application. Modern homes require intelligent systems that improve convenience, energy efficiency, and remote accessibility for controlling household appliances. This study implements an IoT-based automation system using NodeMCU ESP8266, relay modules, sensors, and Wi-Fi communication to remotely monitor and control electrical appliances such as lights and fans through a smartphone application. The complete IoT development process was followed, including hardware setup, circuit

INTEGRATING SIEM DASHBOARDS WITH INTRUSION DETECTION SYSTEMS: A PRACTICAL FRAMEWORK FOR REAL -TIME THREAT MONITORING IN ENTERPRISE NETWORKS

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Abstract-- Cybersecurity threats are growing faster than most organizations can keep up with. Traditional approaches — siloed logs, manual reviews, and reactive patching — are no longer adequate for protecting modern enterprise networks. This paper presents a practical, hands-on framework for integrating a Security Information and Event Management (SIEM) dashboard with a Network Intrusion Detection System (IDS), specifically Snort, to achieve real-time, centralized threat monitoring. Built and validated during a cybersecurity internship at SuprMentr Technologies Pvt Ltd, Bengaluru, the system combines open -source tools including Snort, the Elastic Stack (Elasticsearch, Logstash, Kibana), Filebeat, and Splunk to create a layered security monitoring pipeline. The framework was tested against simulated attack scenarios — port scans, SSH brute force, SQL injection, and ICMP flood attacks — all of which were successfully detected and visualized on the dashboard. Results show that SIEM-IDS integration reduces alert investigation time by providing correlated, context -rich event data in place of raw, unstructured log output. The paper contributes a reproducible deployment architecture, Snort rule templates, Logstash grok configurations, and SPL correlation queries that practitioners and researchers can adapt for their own environments.

Keywords: SIEM, Intrusion Detection System, Snort, Elastic Stack, Kibana, Splunk, Network Security, Threat Detection, Security Operations Center, Log Analysis, Cybersecurity, Real -Time Monitoring

**WALMART SALES FORECASTING AND BUSINESS INTELLIGENCE SYSTEM
USING MACHINE LEARNING AND DATA ANALYTICS**

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Abstract-- Retail industries generate massive amounts of transactional data, making accurate sales forecasting essential for strategic business planning and decision-making. This paper presents the development of a Walmart Sales Forecasting and Business Intelligence System using Python, Machine Learning, SQL, and Power BI. The system analyzes more than 11,000 Walmart retail sales records across multiple stores and departments to generate predictive insights and business analytics dashboards. The proposed system incorporates data preprocessing, feature engineering, Exploratory Data Analysis (EDA), machine learning model training, and dashboard visualization. Linear Regression and Random Forest Regressor models were implemented and evaluated using RZ Score and Mean Absolute Error (MAE). Experimental analysis demonstrated that Random Forest achieved an RZ Score of approximately 0.97 with MAE around 612, significantly outperforming Linear Regression. Interactive Power BI dashboards were developed to visualize store performance, monthly sales trends, department analytics, and the impact of external factors such as fuel price, CPI, unemployment, and temperature. The developed system improves forecasting accuracy, reduces manual analytical effort, and supports intelligent retail decision-making.

Keywords – Walmart Sales Forecasting, Machine Learning, Random Forest, Power BI, Data Analytics, Retail Analytics, Predictive Analytics, Business Intelligence.

IOT BASED AIR QUALITY AND WEATHER MONITORING SYSTEM

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Abstract—The weather and air quality monitoring plays vital role in environmental safety, public health, and agriculture. Conventional monitoring systems are often expensive, bulky, and limited to fixed locations, which makes them unsuitable for real-time localized monitoring. The incorporation of IoT ensures scalability, remote approachability, and energy competitive monitoring. This work presents an IoT-based weather monitoring and air quality system using Arduino Uno, DHT11 sensor, MQ135 gas sensor, and ESP8266 Wi-Fi module. The DHT11 sensor is used to measure temperature and humidity, while the MQ135 gas sensor is used to measure air quality levels, the MQ135 sensor detects harmful gases such as CO, NH₃, and smoke whereas ESP8266 Wi-Fi module is used for wireless data communication. Alerts can be generated when air quality exceeds safe limits. This arrangement enables accurate, real-time weather information accessible through cloud platforms or mobile devices. By eradicating manual data gathering, it ensures appropriate weather forecasting and enhances decision-making in agriculture, disaster managing, and smart city applications. The collected sensor data is processed by the Arduino Uno and displayed locally on an I2C LCD for real-time observation. Using the ESP8266 Wi-Fi module, the measured parameters are transmitted to a cloud platform for remote monitoring through a mobile or web application. The proposed system is low-cost, compact, and energy-efficient, making it suitable for smart cities, environmental monitoring, and weather-based decision-making applications.

Keywords—Arduino-Uno, DHT11 Sensor, MQ135 Sensor, ESP8266 Wi-Fi Module and I2C LCD.

**SMART AMBULANCE BOOKING AND EMERGENCY RESPONSE SYSTEM
USING REAL-TIME GPS AND INTELLIGENT**

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Abstract--Rapid emergency response is essential for reducing mortality during medical emergencies and road accidents. Traditional ambulance booking systems rely heavily on manual phone communication and fragmented coordination, leading to delayed ambulance dispatch and inefficient resource allocation. This paper presents a Smart Ambulance Booking and Emergency Response System that integrates real-time GPS tracking, intelligent ambulance allocation, hospital coordination, and automated emergency notifications through a centralized web-based platform. The proposed system is developed using the Django framework with MySQL database support and responsive frontend technologies including HTML, CSS, and JavaScript. The system incorporates shortest-path-based ambulance allocation and real-time availability monitoring to minimize response time and improve operational efficiency. Experimental analysis demonstrates that the proposed system significantly reduces booking delay and improves ambulance utilization compared with traditional manual systems. The developed platform enhances communication among patients, ambulance drivers, hospitals, and administrators while ensuring scalability, reliability, and faster emergency response.

Keywords: Ambulance Booking System, Emergency Healthcare, GPS Tracking, Intelligent Dispatch, Django, MySQL, Smart Healthcare

SOFTWARE TESTING WITH AUTOMATION USING AI

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Abstract-- The work covered Software Development Life Cycle (SDLC), Software Testing Life Cycle (STLC), manual testing techniques, test case design, defect tracking, and automation testing using FireFlink – an AI-based scriptless automation tool. The practical project involved testing "ShoppersStack," an e-commerce web application, across three modules: Admin, Merchant, and Shopper. Core Java programming and MongoDB database concepts were also covered. The internship significantly enhanced technical and professional skills, bridging the gap between academic learning and practical implementation in the software industry.

PIXEL BASED IMAGE PROCESSING USING VERILOG

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Abstract—This paper titled “Pixel Based Image Processing Using Verilog” presents the design, simulation, and validation of a hardware -based image processing system implemented using Verilog Hardware Description Language (HDL). The primary objective of this work is to perform basic image processing operations at pixel level using FPGA architecture and to evaluate the efficiency of hardware implementation compared to conventional software processing.

The system performs three fundamental image processing operations: **Brightness Adjustment, Image Inversion, and Thresholding**. Each pixel of the image is processed individually using combinational and sequential logic modules written in Verilog. The design and simulation are carried out using Xilinx Vivado, which provides RTL synthesis, behavioral simulation, and waveform verification.

For data preparation and visualization, MATLAB is used to convert input images into HEX format suitable for FPGA memory initialization. After processing in Vivado simulation, the generated HEX output file is reconverted into image format using MATLAB for result analysis and comparison.

The hardware -based pixel processing approach ensures parallel execution, reduced latency, and improved computational speed. Simulation results confirm that the brightness operation increases pixel intensity with saturation control, inversion produces negative images, and thresholding converts grayscale images into binary images effectively.

This project demonstrates the feasibility and efficiency of FPGA -based image processing systems and provides a foundation for implementing advanced real -time image processing applications such as edge detection, filtering, and object recognition in embedded vision systems.

Keywords—Verilog HDL, FPGA, Image Processing, MATLAB, Vivado, Thresholding, Image Enhancement.

DESIGN AND SIMULATION

NOF TEA COFFEE & WATER
VENDING MACHINE
USING VERILOG

DESIGN AND SIMULATION

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Abstract—This project focuses on the Design and Simulation of an Automated Tea and Coffee Vending Machine using Verilog HDL. The system is modeled as a Finite State Machine (FSM) that processes user selections and coin inputs to dispense the desired beverage. The design supports multiple drink options (Tea, Coffee, Ginger Tea, Latte) and handles various coin denominations. The core logic is verified through a testbench using simulation tools like Xilinx Vivado or ModelSim to ensure the system transitions correctly between idle, selection, payment, and dispensing states.

In this design, a Verilog HDL -based controller is developed to automate a tea and coffee vending machine. The system is modeled using a Finite State Machine (FSM) —specifically a Mealy machine—to handle asynchronous user inputs, credit accumulation, and output triggers. The design is validated through functional simulation to ensure that the machine correctly processes different coin denominations, validates sufficient balance for the selected beverage, and accurately calculates the remaining change.

AUTOMATIC SEAT BELT WARNING SYSTEM USING VERILOG

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Abstract—Automatic seat belt warning systems play an important role in improving road safety and reducing accident -related injuries. Failure to wear a seat belt is one of the major causes of severe injuries during road accidents. Conventional reminder systems are often limited in functionality and may not provide continuous monitoring. This project presents the design and implementation of an Automatic Seat Belt Warning System using Verilog Hardware Description Language (HDL). The system continuously monitors key inputs such as vehicle ignition status, seat occupancy sensor, and seat belt latch sensor to ensure proper seat belt usage. When the ignition is turned ON and the seat is occupied without fastening the seat belt, the system generates both visual and audible warning signals to alert the driver or passenger. The design is implemented using digital logic modules such as comparators, logic gates, and finite state machines coded in Verilog. The proposed model is simulated and verified using FPGA development tools to ensure accurate and reliable performance. The system is designed to be compact, low -power, and easily integrable into modern automotive electronic control units. By automating the monitoring process, the system eliminates manual checking and ensures timely reminders, thereby increasing compliance with safety regulations. The proposed design enhances vehicle safety standards and can be further extended to include speed -based alerts, centralized monitoring systems, and integration with advanced driver assistance systems. Overall, the Automatic Seat Belt Warning System using Verilog provides a cost -effective, reliable, and efficient solution for improving passenger safety in automobiles.

Paper ID:RTEMS_215

HEART DISEASE PREDICTION SYSTEM USING MACHINE LEARNING

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Abstract-- Cardiovascular disease remains one of the leading causes of mortality worldwide, making early and accurate prediction of heart disease a critical challenge in modern healthcare. This paper presents the design and implementation of a Heart Disease Prediction System using Machine Learning (ML) techniques developed using Python and Scikit -learn. The system enables clinicians and patients to input clinical parameters and receive an automated risk assessment for heart disease. The system employs multiple ML algorithms including Logistic Regression, Random Forest, K -Nearest Neighbors (KNN), and Support Vector Machine (SVM) to classify patients as at -risk or not at-risk. Feature selection and hyperparameter tuning are applied to maximize predictive accuracy. The application is deployed as a web -based interface built using Python Flask, providing accessible real -time predictions. Experimental evaluation on the Cleveland Heart Disease Dataset demonstrates accuracy exceeding 87 %, with strong precision and recall across risk categories. The system is designed for both individual health monitoring and institutional clinical decision support.

Keywords— Heart Disease Prediction, Machine Learning, Random Forest, SVM, Logistic Regression, Clinical Decision Support, Flask, Feature Selection, Healthcare AI.

Paper ID:RTEMS_216

AI-BASED SKILL GAP DETECTION AND LEARNING RECOMMENDATION PLATFORM

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Abstract--Recruitment processes have become increasingly data -driven, yet traditional resume screening remains manual, time consuming, and prone to inconsistency. This paper presents the design and implementation of an AIpowered Resume Analyzer and Applicant Tracking System (ATS) Job Description (JD) Match System developed using Python Flask and Natural Language Processing (NLP) techniques. The system enables users to upload a resume in PDF format, paste a target job description, and receive an automated compatibility analysis. It employs TF -IDF (Term Frequency–Inverse Document Frequency) vectorization and cosine similarity to compute a quantitative match score. The application further identifies matched skills, missing skills, critical keywords absent from the resume, and generates actionable improvement suggestions. User authentication is implemented using hashed credentials stored in a SQLite database, and the application is deployed on a cloud platform for remote access. Experimental evaluation demonstrates significant reduction in manual screening effort, improved keyword coverage awareness, and faster actionable feedback for job applicants. The system is designed for both individual candidates and institutional career development programs.

Keywords— AI Resume Analyzer, ATS, TF -IDF, Cosine Similarity, NLP, Flask, Job Description Matching, Skill Gap Analysis.

Paper ID:RTEMS_217

SOLAR ENERGY BASED ON AUTOMATIC STREET LIGHT CONTROLLER

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Abstract—The demand of energy has increased in the world now. So, to fulfil the demands of energy more fossil fuels are used, as a result fossil fuels will extinguish in future if they are used at such a rate. To replace the loss of fossil fuels we can use renewable energy as they are freely available and adequate. Today, LED (light emitting diode) lamps have replaced the HID (high intensity discharge) lamps that were used in urban street lights. Solar street lights work on the principle of photovoltaic cell or solar cell. In short, this paper is based on the idea of maintaining the maximum utilization and minimum loss of available energy.

Keywords—Demand Energy, Fossil Fuels, LED

AI-DRIVEN CHANNEL ESTIMATION IN 5G MIMO -OFDM SYSTEMS USING DEEP LEARNING TECHNIQUES

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Abstract— Fifth Generation (5G) wireless communication systems require reliable and high speed data transmission under varying channel conditions. Technologies such as Multiple Input Multiple Output (MIMO) and Orthogonal Frequency Division Multiplexing (OFDM) improve spectral efficiency and communication performance, but accurate channel estimation remains a major challenge. Conventional estimation techniques such as Least Squares (LS) and Minimum Mean Square Error (MMSE) estimators suffer from reduced performance in noisy wireless environments. This work presents a Deep Learning assisted channel estimation approach for a 2×2 MIMO -OFDM system. The proposed model evaluates the performance of LS, MMSE, and AI-based estimation techniques using MATLAB simulation. Binary Phase Shift Keying (BPSK) modulation and Additive White Gaussian Noise (AWGN) channel conditions are considered for performance analysis. The system performance is evaluated using Bit Error Rate (BER) versus Signal-to-Noise Ratio (SNR) characteristics. Simulation results show that the Deep Learning based method achieves lower BER compared to conventional LS and MMSE estimators, thereby improving channel estimation accuracy and communication reliability. The proposed framework demonstrates the potential application of Artificial Intelligence techniques in future wireless communication systems

Keywords— 5G Communication, Deep Learning, Channel Estimation, Bit Error Rate , Least Squares , Minimum Mean Square Error, , Signal-to-Noise Ratio

DEEP LEARNING –BASED EARLY DISEASE DETECTION AND GENERALIZED ADVISORY MANAGEMENT FRAMEWORK FOR BLACK PEPPER -A REVIEW

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Abstract—The economically valuable spice crop black pepper (*Piper nigrum* L.) is extremely vulnerable to a variety of foliar and systemic diseases, which can result in large losses in yield and quality. Due to mild symptom manifestation and substantial variability in real-field settings, early and reliable illness identification continues to be a significant problem. For black pepper and similar crops, this study suggests a generalized advising management system and early disease identification using ensemble deep learning. The suggested method combines an improvised ensemble learning strategy to improve multi-disease classification accuracy and generalization with attention-enabled deep learning models for reliable feature extraction and early symptom recognition. Transfer learning is used to adapt the created framework to related crops, such as bell pepper, using less training data in order to enhance scalability. Furthermore, crop-specific disease detection and management advice are provided via an intelligent advice management module. By supporting dependable early disease detection, cross-crop adaptability, and useful decision assistance, the suggested framework seeks to advance precision-oriented and sustainable spice crop management systems.

Keywords—Precision agriculture, crop disease classification, ensemble deep learning, early disease diagnosis, attention mechanisms, transfer learning, black pepper disease detection, and intelligent advisory systems.

LIFE SAVING JACKET FOR WORKPLACE ENVIRONMENT

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ABSTRACT

This project focuses on the design and development of a rider's safety jacket aimed at enhancing the safety of motorbike riders, horse riders, and workers in high-risk environments such as construction sites. The system operates on principles similar to vehicle-mounted airbags, deploying automatically to minimize injuries during accidents. The jacket integrates a pressure cylinder connected via a pneumatic valve, conduits, and connectors. Upon impact, the pneumatic valve triggers the release of pressurized air, inflating the jacket within milliseconds to provide cushioning. Additionally, the system incorporates a GPS module to capture the rider's live location, which is then transmitted to the nearest ambulance or designated contacts via a GSM module.

Keywords: Arduino UNO, GSM Module, Vibration Sensor, GPS Module.

Abstracts of Artificial Intelligence & Machine Learning Engineering

PAPER ID _RTEMS_301

FINSIGHT AI- GEN AI BASED QUERY-DRIVEN EXPENSE MANAGEMENT AND BUDGET MONITORING SYSTEM

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Abstract - Personal expense management has become increasingly complex due to the growth of digital transactions and diverse spending patterns. Conventional expense tracking systems depend on manual data entry and static interfaces, which often leads to incomplete records, low user engagement, and weak financial insight. This paper presents Opti-Budget Engine, an AI query-driven expense management and budget monitoring system designed to simplify and automate personal finance tracking. The system enables users to manage expenses through natural language interaction, allowing them to add, query, update, and delete financial records conversationally instead of filling traditional forms. An integrated AI agent interprets user intent, extracts key entities such as amount, category and date, and executes verified operations directly on the backend SQLite database, ensuring real-time synchronization between data storage and visual analytics. The platform also offers dynamic dashboards, category-wise and trend-based insights, and professional PDF report generation to support informed financial decision-making. Overall, Opti-Budget Engine transforms conventional expense tracking into an intelligent financial assistance process by reducing user effort, improving record accuracy, and enhancing usability, providing a modern and user-centric solution for personal finance management. Key Words: Personal finance, Expense management, Budget monitoring, Conversational AI, Large language model, Flask, SQLite, Dashboard.

AI Based Intelligent Traffic Signal Control System

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ABSTRACT: AI-based intelligent traffic signal control refers to the use of Artificial Intelligence techniques such as Machine Learning, Deep Learning, Computer Vision, Neural Networks, and IoT sensors to automatically monitor, analyze, and control traffic flow at road intersections. These systems can make real-time decisions by studying traffic density, vehicle movement, pedestrian activity, and emergency vehicle requirements. The main objective of the system is to reduce traffic congestion, improve road safety, and provide smooth transportation. In a conventional traffic signal system, the signal timing remains fixed regardless of the number of vehicles on the road. Cameras, sensors, and GPS devices collect traffic data, which is then processed using AI algorithms to determine the optimal signal timing.

PAPER ID_RTEMS_303

IOT BASED LPG LEAKAGE & AI FLAME DETECTION WITH AUTO CUTOFF & AIR PURIFIER

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Abstract— Safety has become a major concern all over the world, especially when it comes to LPG leakage and fire accidents which can happen in any residential, commercial or industrial location. Most of the gas detection systems that are available in the market today are able to provide alerts or other types of notifications, but they need to be manually intervened in order to stop the gas leak, which can take a long time to fix the problem before it's too late. In this paper an IoT based system has been designed for LPG leakage detection and an AI system for flame detection. This system is able to detect any kinds of leakage or flame and automatically switches off the gas supply by a solenoid valve and starts the exhaust and air purification system in order to reduce the bad gas in the air as quickly as possible and alerts the user in real time through the IoT platforms so that he or she is able to monitor the system from anywhere in the world at any time without depending on other people. In addition, the proposed system has the ability to detect flame more accurately and also to reduce false alarm, which is not the case with traditional flame detectors. Overall, the system is cost effective, reliable, and automated, thus can play a significant role in saving human lives and property and in reducing the level of human intervention.

Keywords— Internet of Things, LPG Leakage Detection, AI Flame Detection, ESP32, Gas Sensor, Automatic Gas Cut Off, Air Purifier, Smart Safety System, IoT Monitoring, Embedded Systems, Fire Detection, Real Time Alerts

IoT-Integrated Deep Learning Framework for Automated Tur Dal Leaf Disease Detection and Smart Agricultural Control

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Abstract—Leaf diseases are one of the major factors responsible for reduced crop productivity and economic losses in agriculture, particularly in pulse crops such as Tur dal (*Cajanus cajan*). Diseases such as *Cercospora* Leaf Spot and pest infestations such as Leaf Webber can significantly affect plant health, decrease photosynthetic efficiency, and lower final yield if not detected and controlled at an early stage. Traditional disease identification methods rely on visual inspection by farmers or agricultural experts, which are time-consuming, labor-intensive, and often inaccurate under field conditions. This study presents an intelligent smart agriculture system that combines deep learning, embedded control, and IoT technologies for automated detection and management of Tur dal leaf diseases. Images of Tur dal leaves belonging to three classes, Healthy, *Cercospora* Leaf Spot, and Leaf Webber, are obtained from the Mendeley Data dataset and used to train a Convolutional Neural Network (CNN) model for multiclass classification. During operation, a leaf image is captured or uploaded to the system, and the trained model predicts the corresponding class. The prediction result is transmitted to an Arduino Uno through serial or IoT communication. Based on the identified condition, appropriate actions are automatically performed. For healthy leaves, only soil moisture is monitored and irrigation is controlled according to soil dryness. When *Cercospora* Leaf Spot is detected, a water pump or pesticide sprayer is activated. When Leaf Webber is identified, a UV or LED lamp is switched on for pest control. The detected disease type, soil moisture level, and control actions are displayed on an LCD and transmitted to a mobile or web application through Wi-Fi for real-time monitoring. The proposed system provides an efficient, low-cost, and automated solution for early disease detection and intelligent crop management in precision agriculture. **Index Terms**—Tur Dal, Leaf Disease Detection, *Cercospora* Leaf Spot, Leaf Webber, Convolutional Neural Network (CNN), Arduino Uno, Internet of Things (IoT), Soil Moisture Monitoring, Smart Irrigation, Precision Agriculture.

LITERATURE REVIEW ON BLOCKCHAIN, ARTIFICIAL INTELLIGENCE, AND IOT-BASED CROP INSURANCE SYSTEMS

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Abstract—Crop insurance is a cornerstone of agricultural risk management, particularly for smallholder farmers in developing economies exposed to climate-related vulnerabilities. Traditional insurance systems are hindered by inefficiencies including manual verification, delayed claim settlements, fraud, and low transparency. This literature review synthesizes research on the application of Blockchain, Artificial Intelligence (AI), and Internet of Things (IoT) technologies to modernize crop insurance systems. Two foundational studies are examined in detail: a private blockchain-based crop index insurance solution utilizing Ethereum smart contracts, and an integrated AI-IoT-Blockchain model for real-time claim automation. The review explores each technology domain, identifies limitations of existing systems, and discusses how converged architectures address critical gaps. A comparative analysis of reviewed works is presented, followed by identification of research gaps and future directions. The findings confirm that end-to-end automation of crop insurance through technology convergence is both feasible and beneficial.

Keywords—Crop insurance; Blockchain; Smart contracts; Artificial intelligence; Internet of Things; Agricultural risk management; Claim automation; Precision agriculture.

HYBRID APPROACH OF COTTON DISEASE DETECTION FOR ENHANCED CROP HEALTH AND YEILD

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Abstract- Cotton, a vital cash crop cultivated extensively across the globe, plays a significant role in the agricultural economy. However, its productivity is often compromised due to various leaf diseases such as bacterial blight, cotton leaf curl virus, and fusarium wilt. Accurate and early detection of these diseases is essential to minimize yield loss and enhance crop health. Traditional ensemble methods such as the combination of Random Forest and Decision Tree classifiers have previously been employed for cotton leaf disease detection. While these methods provide acceptable accuracy, their performance often depends heavily on handcrafted features and fails to generalize effectively across diverse datasets and varying environmental conditions. To address these limitations, a Convolutional Neural Network (CNN)-based approach is proposed for automated and high-precision detection of cotton leaf diseases. CNN models possess the ability to learn hierarchical spatial features directly from raw image data, eliminating the need for manual feature extraction. The proposed system incorporates preprocessing techniques including image resizing, normalization, and augmentation to improve the quality and variability of input data. A deep CNN architecture is designed and trained using a labeled dataset comprising healthy and diseased cotton leaf images. The model classifies the input images into predefined disease categories with high accuracy. The performance of the CNN model is evaluated using metrics such as accuracy, precision, recall, F1-score, and confusion matrix analysis. Comparative analysis indicates a significant improvement in detection accuracy and generalization capability over traditional ensemble methods. The proposed system also demonstrates robustness against.

Abstracts of Civil Engineering

PAPER ID
RTEMS_401

COMPARATIVE STUDY ON CONCRETE BEAM WITH AND WITHOUT FIBER UNDER FLEXURE

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Abstract: The development of advancements in concrete technology might lessen the amount of natural resources destroyed, thereby reducing the pollutants released into the environment. Currently, industries produce large amounts of fly ash, which adversely affects the environment and human health. Recent studies have shown that additional cementitious materials can improve various concrete qualities. These materials include fly ash, slag, silica fume, metakaolin, rice husk, and hypo sludge. These materials not only enhance the properties of fresh and hardened concrete but also help constructors save money. The aim of this study is to determine whether thermal industrial waste can partially replace cement in concrete manufacturing. Specifically, fly ash was tested as an additional cementitious ingredient to replace conventional concrete. It was added to the cement in different amounts: 0% (fly ash-free), 5%, 10%, and 15% by weight of cement to produce the M35- mix. Concrete mixtures were created, tested, and their compressive strengths were compared to those of conventional concrete. Results were collected up to 28 days after curing to assess the strength attributes. The use of 5% fly ash results in a decrease in strength, but it is not significant. For 15% replacement of cement, the strength was found to beN/mm², which is satisfactory.

PAPER ID
RTEMS_402

LABORATORY EVALUATION OF WMA WITH ZYCOTHERM WARM MIX ADDITIVE

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Abstract: Good network is a key for rapid growth of economy of a country. It provides connectivity to remote areas for various transportation activities. In this study the samples of RAP materials were collected and analysed for suitability of their usage in flexible pavements. From this study it was found that the RAP materials can be effectively used in the soil subgrade, sub base and base of the flexible pavements resulting in reduction of construction cost.

PAPER ID
RTEMS_403

LABORATORY STUDY ON MIXING RAP MATERIALS ON BITUMINOUS COURSE LAYER OF FLEXIBLE PAVEMENT

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Abstract: Warm mix asphalt (WMA) is a technology is allows significantly lowering the bituminous production and paving temperature of conventional Hot mix asphalt. The WMA is prepared by mixing chemical additives to conventional mix to improve the pavement performance and reduce the temperature up to 100° C and even lowering without compromise of quality. In this study an attempt is made to compare the Marshall properties and water sensitivity of WMA produced with the chemical additives Zycotherm.

PAPER ID
RTEMS_404

UTILIZATION OF RECYCLED AGGREGATE AS COARSE AGGREGATE IN CONCRETE

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Abstract: This experimental investigation explores the feasibility and performance Of using recycled demolished concrete (RDC) as coarse aggregate in the production of concrete grades M30 and M4(h) The study focuses on the impact of replacing natural coarse aggregates with varymg proportions of RDC on the mechanical properties of concrete. Concrete mixes were prepared with 0%, 25%, 50%, 75%, and 100% replacement of natural aggregates with RDC, and the compressive strength, workability, and durability characteristics were evaluated, The results indicated that while the use Of ROC reduces compressive strength compared to conventional concrete, acceptable strength levels can still be achieved at lower replacement levels, especially for M30-grade concrete. The workability of the mixes was found to decrease with the increase in ROC content, but this could be mitigated by adjusting the watercement ratio. Durability tests, including water absorption and chloride ion penetration, showed that recycled aggregate concrete performed similarly to conventional concrete, with minor differences in some properties. The study concludes that RDC can be used effectively as an alternative aggregate for the production Of M30 and M40 concrete, promoting sustainable construction practices by reducing the environmental impact Of natural resource extraction and disposal of demolished concrete.

Study of tribological and mechanical properties Aluminium-7079 reinforced with Tungsten carbide and Graphite

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Abstract—Aluminium Metal Matrix Composites (AMMCs) have attracted significant attention in aerospace, automobile, marine, and defense industries because of their superior mechanical strength, low density, excellent wear resistance, and improved thermal properties. In the present investigation, Aluminium alloy Al-7079 was selected as the matrix material, while Tungsten Carbide (WC) and Graphite (Gr) were used as reinforcement materials. The composites were fabricated through the stir casting technique with varying weight percentages of WC (3%, 6%, and 9%) and constant Graphite content of 2 wt.%.

The fabricated composites were subjected to hardness, tensile, compressive, and microstructural investigations according to ASTM standards. Optical microscopy was employed to study the distribution of reinforcement particles in the matrix. Experimental results revealed that the addition of WC and Graphite significantly improved the mechanical properties of Al-7079 alloy. Maximum hardness, tensile strength, and compressive strength were observed for the composite containing 6 wt.% WC and 2 wt.% Graphite. Beyond this reinforcement percentage, a reduction in properties occurred due to particle agglomeration and poor wettability. The developed hybrid composites exhibited improved tribological and structural characteristics suitable for aerospace and automotive applications.

Keywords—AMMCs, Al-7079, Tungsten Carbide (WC) and Graphite (Gr), mechanical properties.

Experimental Investigation and Characterization of Hybrid ABS Composites Reinforced with Glass Fiber and Granite Powder

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Abstract—The present work focuses on the fabrication and evaluation of hybrid Acrylonitrile Butadiene Styrene (ABS) composites reinforced with glass fiber and granite powder. Four different composite combinations were prepared through the injection moulding technique, including pure ABS, ABS reinforced with 10 wt.% glass fiber, ABS reinforced with 10 wt.% granite powder, and a hybrid composition containing both reinforcements. The developed composites were investigated for their physical, mechanical, thermo-mechanical, and morphological characteristics using density analysis, melt flow index, shrinkage, warpage, tensile, compressive, flexural, impact, and hardness tests along with scanning electron microscopy (SEM). The experimental investigation indicated that the incorporation of reinforcements significantly influenced the behavior of the ABS matrix. Among all the fabricated samples, the hybrid composite exhibited improved compressive strength, reduced shrinkage and warpage, and superior thermal stability compared with virgin ABS. Glass fiber reinforcement contributed mainly toward enhanced stiffness and strength, while granite powder improved hardness and dimensional stability. SEM observations also confirmed comparatively better reinforcement distribution and improved interaction between the matrix and fillers in the hybrid composite system. The overall results demonstrate that hybrid reinforcement using glass fiber and granite powder can effectively improve the engineering performance of ABS composites for structural and thermal applications.

Keywords—Hybrid ABS composites, Glass fiber, Granite powder, Mechanical properties, Thermo-mechanical analysis, Injection moulding, Morphological characterization.

Fabrication and Characterization of Al6061–AlO Metal Matrix Composites by Stir Casting and Extrusion

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Abstract—Aluminium Metal Matrix Composites (AMMCs) are extensively used in aerospace, automotive, and structural applications because of their superior strength-to-weight ratio, improved wear resistance, and enhanced mechanical properties. In the present work, Al6061 alloy reinforced with Alumina (AlO) particles was fabricated using the stir casting technique with varying reinforcement percentages of 5 wt.%, 7 wt.%, and 9 wt.%. The fabricated composites were further subjected to extrusion processing to evaluate the influence of extrusion on microstructural and mechanical properties. Scanning Electron Microscopy (SEM), hardness testing, tensile testing, wear analysis, and fractography studies were carried out. Results revealed uniform dispersion of AlO particles within the matrix with minimal porosity. The composite containing 7 wt.%AlO exhibited the best overall performance. Before extrusion, the hardness increased from 70.7 VHN for base alloy to 79.2 VHN, while tensile strength improved from 105.2 MPa to 142.5 MPa. After extrusion, hardness further improved to 88.7 VHN and tensile strength reached 261.25 MPa. Wear resistance also improved significantly after reinforcement and extrusion. ANOVA analysis indicated that applied load had the highest influence on wear rate. The study concludes that extrusion combined with optimal AlO reinforcement enhances the mechanical and tribological properties of Al6061 composites.

Keywords—Al6061, Alumina, Metal Matrix Composite, Stir Casting, Extrusion, Wear Analysis, SEM, Tensile Strength.

Paper ID: RTEMS_504

Synthesis and Characterization of Aluminium Based Hybrid Composites Reinforced with Carbon Nanotubes and Graphene

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Abstract—Aluminium matrix composites (AMCs) have gained significant attention in aerospace, automotive, and structural engineering applications due to their superior strength-to-weight ratio, wear resistance, and corrosion resistance. In the present work, hybrid aluminium metal matrix composites reinforced with Multi-Walled Carbon Nanotubes (MWCNTs) and graphene were fabricated using the powder metallurgy route. Various compositions of aluminium reinforced with constant 2 wt.% MWCNT and varying graphene content (1–5 wt.%) were prepared and characterized. Microstructural studies were carried out using optical microscopy and scanning electron microscopy to investigate particle distribution and interfacial bonding. Mechanical properties such as density, hardness, and compression strength were evaluated according to ASTM standards, along with tribological behavior using wear testing. Experimental results revealed uniform distribution of reinforcement particles in the aluminium matrix, leading to enhanced hardness and wear resistance. The composite containing Al + 2 wt.% MWCNT + 3 wt.% Graphene exhibited maximum hardness and superior wear resistance. However, compression strength decreased with increasing reinforcement due to increased porosity and agglomeration effects. The addition of graphene and CNTs significantly improved tribological performance compared to pure aluminium. The study demonstrates the potential of graphene and CNT reinforced aluminium hybrid composites for lightweight and wear-resistant engineering applications.

Keywords Aluminium Matrix Composite, Graphene, Carbon Nanotubes, Powder Metallurgy, Hardness, Wear Resistance.

Abstracts of Electrical & Electronics Engineering

Pape ID_RTEMS_601.

IoT-Enabled Precision Agriculture: An AI-Powered Autonomous Robot for Real-Time Leaf Disease Detection and Targeted Pesticide Spraying

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Abstract—Agriculture forms the economic backbone of India, with over 60% of the rural population depending directly on it for their livelihood. Despite its significance, the sector faces mounting challenges such as undetected plant diseases, excessive use of chemical pesticides, and reliance on inefficient manual labor. This paper presents the design, development, and experimental evaluation of an IoT-enabled autonomous agricultural robot that integrates Artificial Intelligence (AI)-based leaf disease detection with a precision pesticide spraying mechanism. The proposed system employs a Raspberry Pi 3 module coupled with a Convolutional Neural Network (CNN) model to identify plant diseases in real time from USB camera feeds. Upon disease identification, a relay-controlled pump dispenses pesticides precisely onto the affected region, eliminating unnecessary chemical exposure. The mobility and field operations of the robot—including plowing, seed sowing, and grass cutting—are controlled by an ESP32 microcontroller interfaced with the BlynkIoT cloud platform. The robot supports both manual and fully autonomous navigation modes, with an ultrasonic sensor enabling obstacle avoidance. A solar panel powers the system, making it energy-independent and suitable for rural deployments lacking stable power infrastructure. Experimental results demonstrate that the CNN model achieves 92.4% classification accuracy, while the integrated spraying mechanism reduces chemical usage by approximately 31% compared to conventional uniform spraying, substantially lowering costs and minimizing environmental contamination.

Pape ID_RTEMS_602.

Smart Road Safety and Vehicle Accident Prevention System for Mountain Roads.

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Abstract—

This project introduces an intelligent accident prevention system designed specifically for hilly terrains and sharp blind curves. In mountainous regions, accidents frequently occur due to limited visibility of

oncoming vehicles around curves. Traditional safety measures such as convex mirrors are often ineffective during nighttime and adverse weather conditions. To address this issue, a smart safety solution has been developed using the ESP32-CAM module and Internet of Things (IoT) technology. The system continuously captures and streams live video footage from the opposite side of the curve, enabling drivers to monitor approaching traffic in real time. Additionally, Infrared (IR) sensors are employed to detect the presence of vehicles near the curve. Once a vehicle is detected, warning signals including red LEDs and a buzzer are activated instantly to alert drivers on the other side. This cost-effective and reliable system improves driver awareness, enhances road safety, and significantly reduces the risk of head-on collisions on dangerous hilly roads.

Keywords— Intelligent road safety, ESP32-CAM, Internet

of Things (IoT), accident detection and prevention, blind curve monitoring, live video surveillance, IR sensor technology, embedded systems.

Pape ID_RTEMS_603.

IoT-Based Smart Energy Meter for Efficient Energy Monitoring and Management

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Abstract- The rapid increase in energy demand and inefficient consumption patterns have led to the need for advanced monitoring systems. The Internet of Things (IoT) plays a significant role in transforming conventional energy meters into smart systems. This paper presents the design and implementation of an IoT-based smart energy meter that enables real-time monitoring, data analysis, and remote access. The proposed system measures voltage, current, power, and energy consumption and transmits data to a cloud server using wireless communication. The system improves energy efficiency, reduces wastage, and supports smart grid applications. Experimental results show high accuracy with minimal error, making it suitable for residential and industrial applications.

Keywords: IoT, Smart Meter, Energy Monitoring, Smart Grid, Cloud Computing, Wireless Communication

Density-Based Traffic Light Control with Overriding Detection Using IoT

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Abstract— Intelligent traffic management is essential to reduce congestion, improve emergency response time, and enhance overall transportation efficiency in urban environments. This work presents a microcontroller-based traffic density monitoring and emergency vehicle priority control system implemented using an Arduino Mega and NodeMCU. Traffic density is detected through distributed sensors at each lane, and the signal duration is dynamically allocated based on real-time congestion levels. A NodeMCU-based local web interface provides live traffic visualization, operating mode selection, and real-time monitoring charts. The system incorporates three operating modes: automatic density-based control, operator-controlled priority mode, and emergency mode for fast clearance of ambulances or rescue vehicles. Mode selection and emergency activation are entirely software-controlled without requiring additional hardware switches. An I²C LCD display provides on-site status feedback, and buzzer alerts indicate emergency operation. The NodeMCU communicates serially with the Arduino Mega to exchange control commands and traffic statistics. The proposed system improves traffic throughput by reducing idle green time and ensuring quick passage for emergency services. EEPROM storage also preserves the last operating state during power resets, enhancing system reliability. Experimental testing demonstrates stable real-time operation, responsive control switching, and clear visualization through the web interface. This solution is cost-effective, scalable, and suitable for smart-city transportation applications.

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Abstracts of Master of Business Administration

PAPER ID RTEMS_701

A STUDY ON CUSTOMER RELATIONSHIP MANAGEMENT AT LKP SECURITIES LTD., BANGALORE

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Abstract: Customer Relationship Management (CRM) has become an essential strategic tool for financial service organizations to improve customer satisfaction, loyalty, and profitability. In the highly competitive securities and brokerage industry, maintaining long-term relationships with clients is critical for business sustainability. This study focuses on the CRM practices adopted by LKP Securities Ltd., Bangalore, and evaluates their effectiveness in enhancing customer satisfaction and retention. The study analyzes customer perceptions regarding service quality, responsiveness, technological support, communication, and grievance handling mechanisms. The research is based on both primary and secondary data. Primary data were collected through a structured questionnaire administered to customers of LKP Securities Ltd., Bangalore. Secondary data were gathered from journals, company reports, websites, and previous studies related to CRM in financial services. Statistical tools such as percentage analysis and simple interpretation techniques were used to analyze the collected data. The findings reveal that CRM practices significantly influence customer satisfaction and loyalty. The company demonstrates strength in customer support, trading technology, and personalized communication. However, improvements are required in complaint resolution speed and awareness regarding value-added services. The study concludes with suggestions to enhance CRM efficiency and strengthen customer engagement strategies.

PAPER ID RTEMS_702

STUDY ON CUSTOMER SATISFACTION TOWARDS PERSONAL AT HDFC BANK, KALABURAGI

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Abstract: The banking sector in India has undergone remarkable transformation due to technological advancement, financial inclusion initiatives, and increasing competition among public and private sector banks. Personal loans have emerged as one of the most preferred retail banking products because of their flexibility, quick processing, and minimal documentation requirements. This study focuses on customer satisfaction towards personal loan services provided by HDFC Bank in Kalaburagi. The primary objective of the study is to evaluate customer satisfaction levels and identify the factors influencing customer perceptions regarding personal loan services. The research is based on primary data collected from 120 respondents through a structured questionnaire and secondary data obtained from journals, reports, websites, and banking publications. Statistical tools such as percentage analysis, mean score analysis, and chi-square tests were used for interpretation. The findings reveal that customers are generally satisfied with HDFC Bank's personal loan services due to faster processing, employee behaviour, digital banking facilities, and transparency in loan procedures. However, customers expressed concerns regarding interest rates, hidden charges, and repayment flexibility. The study concludes with suggestions to improve customer satisfaction through better communication, customized repayment plans, and enhanced customer relationship management. Banking, Kalaburagi.

**PAPER ID
RTEMS_703****A STUDY ON ENHANCING EMPLOYEE ENGAGEMENT AND
RETENTION IN ORGANIZATIONS****Kotmad Vaijayanti1**

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Abstract: Employee engagement and retention have become critical challenges for organizations in today's competitive business environment. Engaged employees contribute positively to organizational productivity, innovation, and customer satisfaction, while higher retention reduces recruitment and training costs. This review paper examines various factors influencing employee engagement and retention, including leadership, organizational culture, rewards, communication, career development, and work-life balance. The study reviews existing literature to understand effective strategies adopted by organizations for improving employee satisfaction and loyalty. The paper concludes that organizations focusing on employee well-being, recognition, and growth opportunities achieve better engagement and long-term retention.

**PAPER ID
RTEMS_704****A STUDY ON FINANCIAL RATIO ANALYSIS OF
CHANDRA LIFE SCIENCE PVT. LTD., KOLAR****Ashwini1**

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Abstract: Financial ratio analysis is an important tool used to evaluate the financial performance, operational efficiency, liquidity position, profitability, and solvency of a company. It helps management, investors, creditors, and other stakeholders in understanding the financial health and growth potential of an organization. The pharmaceutical and life sciences industry plays a significant role in economic growth and healthcare development. In recent years, pharmaceutical companies have increasingly focused on financial sustainability and operational efficiency to remain competitive in the market. The present study aims to analyze the financial performance of Chandra Life Science Pvt. Ltd. using financial ratio analysis based on secondary data. The study evaluates liquidity ratios, profitability ratios, leverage ratios, and activity ratios using publicly available company reports and financial information. The study is descriptive and analytical in nature. Secondary data were collected from company financial reports, business databases, journals, and online sources. Ratio analysis was conducted to assess the company's financial strengths and weaknesses. The findings indicate that the company has maintained a satisfactory financial position with improvements in profitability, revenue growth, and operational efficiency. However, the study also reveals certain challenges related to working capital management and market competition.

**PAPER ID
RTEMS_705****Evolution of Delivery Modes in Higher Education****Sandeep**

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Abstract: The evolution of delivery modes in higher education reflects a dynamic interplay between pedagogical innovation, technological advancement, and societal transformation. Historically, universities relied on traditional face-to-face instruction, emphasizing lectures, seminars, and tutorials as the dominant modes of knowledge transmission. This model, rooted in the industrial era's emphasis on standardization and discipline, gradually expanded with the rise of distance education and correspondence courses, which sought to democratize access for learners beyond the physical campus. The late twentieth century ushered in digital technologies that redefined delivery modes, introducing online learning platforms, blended learning environments, and flipped classrooms. These innovations were accelerated by global crises such as the COVID-19 pandemic, which compelled institutions to adopt hybrid and fully online modalities at unprecedented scale. Today, delivery modes are no longer confined to a binary of in-person versus remote; instead, they encompass a spectrum of flexible, technology-enabled approaches that prioritize learner agency, inclusivity, and adaptability. Examining this evolution provides critical insights into how higher education continues to transform in response to industrial, technological, and cultural shifts, positioning delivery modes as both a reflection of broader societal change and a driver of educational innovation.

**PAPER ID
RTEMS_706****STARTUP STUDY ON STOREFERRY ONLINE SERVICES PRIVATE LIMITED, BENGALURU****Ambika Sainure**

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Abstract: Start-ups play a significant role in economic development by promoting innovation, generating employment opportunities, and enhancing technological advancement. In recent years, Bengaluru has emerged as one of India's leading start-up ecosystems due to its strong technological infrastructure, entrepreneurial culture, and investment opportunities. Storeferry Online Services Private Limited is an emerging startup operating in the property maintenance and facility management sector. The company focuses on providing online procurement and maintenance solutions for residential apartments, commercial properties, and facility management companies. This study aims to analyze the business model, operational strategies, growth opportunities, challenges, and future prospects of Storeferry Online Services Private Limited, Bengaluru. The study is descriptive in nature and is based on secondary data collected from company websites, start-up databases, journals, and online sources. The findings reveal that Storeferry has adopted a technology-driven approach to simplify procurement and maintenance activities. The company's customer-centric services, digital procurement platform, and facility management support contribute to its competitive advantage. However, challenges related to market competition, brand awareness, and operational scalability remain significant. The study concludes that Storeferry possesses strong growth potential in India's expanding property management and maintenance industry.

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Abstract: The literature review demonstrates that AI is revolutionizing the ICT sector by automating processes, enhancing communication, analyzing data, and strengthening cyber security. The comparative analysis highlights the shift from static, limited systems to dynamic, adaptive ecosystems, while the discussion of challenges underscores the complexity of integration. The future outlook suggests that AI-ICT convergence will drive innovation across industries, but success depends on balancing technological advancement with ethical governance. In this context, AI emerges not only as a technological imperative but also as a strategic enabler of global digital transformation, positioning ICT as the backbone of intelligent, secure, and inclusive infrastructures.

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Abstract: The Unified Payments Interface (UPI), launched by the National Payments Corporation of India (NPCI) in April 2016, ranks among India's most transformative financial innovations. Built on the Immediate Payment Service (IMPS) as an interoperable, real-time system, UPI reshaped digital transactions, especially in rural and semi urban areas. This article analyzes UPI's impact on rural financial inclusion from 2016-2024—a phase fueled by demonetisation (2016), COVID-19, and Digital India. Employing mixed methods—secondary data, government reports, NPCI stats, RBI inclusion indices, and World Bank data—the study evaluates UPI's role in integrating marginalized rural groups into formal finance. Transactions surged from 0.93 crore (2016-17) to 1,172.7 crore (Rs. 182.26 lakh crore by March 2024), with growth from Tier-3 cities, rural districts, and village-level enterprises. Challenges included digital illiteracy, connectivity gaps, smartphone limits, and language barriers, hindering equitable access despite rapid last-mile gains. The paper outlines policy recommendations and a roadmap for regulators, fintech firms, and policymakers to foster inclusivity.

Navigating Data Privacy in Digital Finance: A Regulatory Comparison of the EU GDPR and India's DPDP Act in the FinTech Ecosystem

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Abstract: The exponential expansion of financial technology (FinTech) has fundamentally transformed the delivery of financial services globally, simultaneously intensifying concerns around personal data security, regulatory compliance, and consumer trust. This article undertakes a systematic regulatory comparison of the European Union's General Data Protection Regulation (GDPR) and India's Digital Personal Data Protection (DPDP) Act, 2023, with specific reference to their implications for FinTech operations. Drawing upon primary legislative texts, regulatory enforcement data, judicial precedents, and peer-reviewed literature spanning 2016–2024, the study critically evaluates key regulatory dimensions including consent architecture, legal bases for data processing, data subject and data principal rights, cross-border data transfer mechanisms, enforcement structures, and sector-specific compliance obligations. The analysis reveals that while both frameworks are grounded in the recognition of data privacy as a fundamental right, they differ materially in regulatory philosophy: the GDPR adopts a comprehensive rights-centric model with robust enforcement, whereas the DPDP Act reflects a more enabling, sovereignty-oriented approach that prioritises operational flexibility. The article further examines the compounded compliance burden on FinTech entities operating across both jurisdictions, particularly in areas such as algorithmic credit scoring, KYC processes, open banking, and data breach notification. Additional dimensions including the emerging role of regulatory sandboxes, the interplay between data privacy and financial inclusion, and the implications of India's Account Aggregator framework are also explored. The study concludes with a set of targeted policy recommendations aimed at narrowing the regulatory gap and advancing a convergent, interoperable data protection standard conducive to responsible FinTech innovation.

Digital Marketing Approaches to Improve Sales Conversion in E-commerce Platforms

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Abstract: In this digital era, technological developments have vital changed the business example, especially in the e-commerce industry. E-commerce platforms have become one of the main media for several companies to sell their products and services online. However, the increasing number of competitors on e-commerce platforms requires companies to have an effective marketing strategy to increase sales conversion and boost a competitive advantage. The purpose of this research is to analyses and categorize effective digital marketing strategies in increasing sales conversion on e-commerce platforms. The current research type is qualitative. Data collection techniques include listening and recording important information to conduct data analysis through data reduction, data display, and conclusion drawing. The study results show that in an effort to increase sales conversions on e-commerce platforms, digital marketing strategies play a vital function. By combining various techniques and tactics, you can achieve successful results in increasing traffic, engagement, and ultimately, sales conversions on your e-commerce platform. Here are the core digital marketing strategies including SEO, content marketing, social media, paid promotion, customer experience optimization, customer review and testimonials, content personalization, video usage, incentives, and car optimization.

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Abstract: Green Human Resource Management (Green HRM) and sustainable workforce management have emerged as important concepts in modern organizational practices due to increasing environmental concerns and the need for sustainable development. Green HRM focuses on integrating eco-friendly policies and environmental management into various human resource functions such as recruitment, training, performance appraisal, employee engagement, and performance management. The purpose of this study is to examine the role of Green HRM practices in promoting sustainable workforce management and enhancing organizational performance. The study highlights the importance of green initiatives in creating environmental awareness among employees and encouraging sustainable workplace behavior. It also analyzes various Green HRM practices adopted by organizations, including paperless communication, energy conservation, recycling activities, and green training programs. The research is descriptive in nature and is based on both primary and secondary data collected from journals, books, websites, and employee responses. The findings of the study reveal that Green HRM practices positively influence employee motivation, job satisfaction, organizational image, and environmental sustainability. Employee participation and management support are identified as key factors for successful implementation of green initiatives. However, challenges such as lack of awareness, resistance to change, and financial limitations affect effective adoption of Green HRM practices. The study concludes that organizations should integrate sustainable HR strategies into their management systems to achieve long-term environmental and organizational goals. Effective implementation of Green HRM can contribute significantly to sustainable workforce development, improved productivity, and corporate social responsibility.

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