THE NATIONAL INSTITUTE OF ENGINEERING

DEPARTMENT OF ELECTRONICS AND COMMUNICATION

NavaNIEti Hackathon – Report

1. Hackathon Overview

The NavaNIEti 24-Hour National Level Hardware Hackathon 2026, the flagship event of the Department of Electronics and Communication Engineering at The National Institute of Engineering, Mysuru, was conducted from 11:00 AM on March 4th to 11:00 AM on March 5th, 2026.

The objective of the hackathon was to encourage students to develop practical hardware-based solutions for real-world challenges using embedded systems, IoT technologies, sensors, and intelligent processing techniques. The event aimed to foster innovation, problem-solving skills, and interdisciplinary collaboration among engineering students.

The hackathon received an overwhelming response from students across institutions, with 189 teams registering and submitting project proposals addressing various industry-relevant problem statements. After a rigorous internal screening and evaluation process, 25 teams were shortlisted for the final round of the hackathon.

The shortlisted teams participated in the 24-hour continuous development challenge, during which they designed, built, and demonstrated working hardware prototypes to validate their proposed solutions. The event provided participants with a platform to transform their conceptual ideas into functional engineering solutions.

The hackathon focused on addressing real-world challenges aligned with the United Nations Sustainable Development Goals (SDGs) across multiple domains including:

1. Disaster Management
2. Healthcare
3. Agriculture
4. Defence and Security

Participants worked intensively throughout the 24-hour duration to develop innovative prototypes, while receiving guidance and mentorship from faculty mentors and industry experts.

The final prototypes were evaluated by a panel of distinguished judges from academia and industry, who assessed the projects based on innovation, technical implementation, societal impact, feasibility, and prototype performance.

The NavaNIEti Hackathon successfully provided a dynamic innovation ecosystem, enabling students to apply their engineering knowledge to develop technology-driven

solutions for real societal challenges while promoting creativity, collaboration, and hands-on learning

2. Inauguration Ceremony

The NavaNIEti 24-Hour National Level Hackathon 2026 was formally inaugurated on March 4th, 2026 at 11:00 AM at The National Institute of Engineering, Mysuru.

The inauguration ceremony was graced by Chief Guest Dr. Madhan Raj K, Architect, Samsung R & D Bengaluru, IEEE ComsSoc Distinguished Lecturer, who addressed the participants and emphasized the importance of innovation, interdisciplinary thinking, and hardware-based problem solving in addressing real-world challenges. He encouraged students to utilize emerging technologies and industry-oriented approaches while developing their solutions.

The event also had the presence of Guest of Honour Dr. Dharma Prasad, CEO and Chief scientist, prosetta Bio founder Director, WOW presence, who motivated the participants to think creatively and develop impactful technological solutions that could benefit society. He highlighted the role of research, entrepreneurship, and collaboration between academia and industry in nurturing innovation among young engineers.

The ceremony marked the official beginning of the hackathon, following which the shortlisted teams began their 24-hour intensive development phase, working on hardware prototypes addressing real-world problem statements.

3. Problem Statements and Final Round Participation

The hackathon featured problem statements distributed across four thematic tracks.

The Disaster Management track included 13 problem statements, the Healthcare track included 10 problem statements, the Agriculture track included 11 problem statements, and the Defence track included 12 problem statements.

In total, the hackathon included 46 active problem statements across all tracks. From the 189 submitted proposals, 25 teams were shortlisted for the final round. Among these finalists, 7 teams worked on Disaster Management problems, while 6 teams each were shortlisted in the Healthcare, Agriculture, and Defence tracks. These teams were required to present functional hardware prototypes during the final round evaluation.

4. Winning Teams and Solutions

Track: Agriculture & Sustainability

Team: Smart Areca Farming, City College of Engineering, Bengaluru

PS ID: NavaNIEti_AG_05

Problem Statement: Develop a self-sufficient irrigation system for rural farms that operates reliably without dependence on grid electricity. A solar-powered or renewable energy-based irrigation solution with battery backup, capable of automatically watering crops based on soil moisture, ensuring uninterrupted operation even in electricity-deficient rural areas.

Proposed solution:

Arecanut cultivation is a long-term crop that requires consistent irrigation for about 6–7 years. Traditional irrigation methods often lead to water wastage and uneven distribution, while farmers also face challenges such as labor shortages, high operational costs, and the difficulty of monitoring farms that are located far from their homes. Additionally, many existing irrigation systems rely on timer-based controls, which do not measure the actual quantity of water supplied. In rural areas, the lack of stable internet connectivity further limits the use of advanced smart farming technologies.

To address these challenges, a GSM-based smart irrigation system was developed. This system allows farmers to control irrigation remotely through SMS, eliminating the need for internet connectivity. A flow sensor measures the exact quantity of water delivered to each plant, ensuring precise irrigation. The system also uses solenoid valves with an automatic cut-off mechanism to prevent over-watering. Its scalable design supports multi-zone irrigation, making it suitable for farms of different sizes. With battery power and future solar integration, the system is reliable and practical for rural deployment.

Track: **Healthcare**

Team: Hack Omegas, SIT Tumkur

PS ID: NavaNIEti_HC_13

Problem Statement: Develop an assisted mobility solution for physically challenged individuals to reduce the effort of using manual wheelchairs. A smart wheelchair system that provides motorized assistance, intuitive controls, and adaptive navigation to help physically challenged users move independently, safely, and with minimal physical strain.

Proposed solution:

The team proposed Assist Wheel, a power-assist attachment that can be integrated with existing manual wheelchairs. The system detects the push effort applied by the user and provides motor assistance when additional force is required, such as while climbing ramps or travelling long distances. This reduces physical strain while maintaining manual control of the wheelchair and offers an affordable alternative to fully motorized wheelchairs. Physically challenged individuals who rely on wheelchairs often face difficulties while navigating uneven roads, steep slopes, obstacles, and staircases.

Traditional wheelchairs lack intelligent safety features to detect such hazards, which increases the risk of accidents and often forces users to depend on caregivers for movement. They also do not monitor whether the user is properly seated or provide flexible control methods, and most systems do not include any way to monitor the user's health condition during mobility. To address these challenges, we developed a Smart Assisted Mobility Wheelchair System that improves both safety and independence. The system uses sensors to detect slopes, obstacles, and staircases, automatically controlling the wheelchair speed or stopping it to prevent accidents. It also includes user presence detection to ensure safe operation and an integrated health monitoring system to measure heart rate and SpO_2 levels of the user. The wheelchair can be controlled using a joystick for manual navigation as well as a web-based control interface, allowing remote operation and easier accessibility. This solution makes wheelchair mobility safer, smarter, and more independent while also enabling basic health monitoring for the user

Track: Disaster Management

Team: The Change Makers, The National Institute of Engineering, Mysuru

PS ID: NavaNIEti_DM_12

Problem Statement Title: Landslide Warning Chip

Proposed solution:

The team proposed an AI-based IoT system for detecting and locating faults in low-voltage power distribution lines. The system uses voltage and current sensors placed at selected reference nodes instead of every pole, reducing infrastructure cost. An ESP32-based neural network model analyzes variations in electrical parameters to estimate the fault location. Once a fault is detected, the information is transmitted using LoRa communication to a monitoring station and displayed on a cloud dashboard, enabling faster identification and repair of damaged lines. The monitoring system is deployed at network nodes where several poles meet. A lightweight AI/ML model uses electrical parameters and the length of the line to estimate the location of conductor breakage, implemented using a Feed-Forward Neural Network (FFNN) for fault localization

Track: Defence Track

Team: MAVIC, BNMIT

PS ID: NavaNIEti_DF_01

Problem Statement Title: Smart Border Intrusion Detection Chip. Design a digital chip that takes inputs from motion, vibration, and sound sensors and raises an intrusion alert when abnormal activity is detected.

Proposed solution: The team developed a multi-sensor intrusion detection system designed for border and perimeter security. The system integrates motion, vibration, and acoustic sensors connected to an ESP32 microcontroller. A sensor fusion algorithm triggers an alert only when at least two sensors detect abnormal activity within a short time interval, which significantly reduces false alarms. Alerts are generated through LED indicators, buzzers, and wireless communication.

5. Mentorship and Technical Guidance

Throughout the hackathon, the participants received valuable guidance from experienced faculty mentors and track in-charges.

The mentors played a crucial role in helping teams refine their ideas, improve their hardware designs, and troubleshoot technical issues during the prototype development phase.

The mentors and track in-charges included:

- Dr. Sharmila B. S.
- Dr. Kavitha S. S.
- Dr. Yajunath K.
- Dr. Sujeet Kumar Rai

Their continuous mentoring ensured that the teams remained focused on developing feasible, innovative, and impactful solutions within the limited 24-hour timeframe.

6. Evaluation and Judging Process

At the end of the 24-hour development period, each team presented and demonstrated their working hardware prototype before a distinguished panel of judges from academia and industry. The projects were evaluated based on multiple criteria, including:

- Innovation and originality of the idea
- Technical implementation and hardware integration
- Feasibility and practicality of the solution
- Potential societal impact
- Quality of prototype demonstration

The **external judging panel consisted of:**

- Dr. Raghavendra B. S. – Model Aerosports Pvt. Ltd.
- Mr. Kiran Marathe – Deshila Technology Research Institute (DTRI)
- Mr. Sharath Chandra – Omnishield Technologies
- Dr. Narasimha Kaulgud- Professor & HoD- Sheshadripuram institute of Technology, Mysuru

Internal faculty judges also supported the evaluation process:

- Dr. Remya Jayachandran-ECE
- Dr. Sangamesh-Chemistry
- Dr. Harshavardhan B-ME
- Dr. Abhishek Pathak-Civil

The judges appreciated the creativity, technical depth, and commitment shown by the participating teams in developing innovative hardware solutions within the limited time frame.

7. Post-Hackathon Analysis and Lessons Learned

- Participants gained hands-on technical experience in:

- Hardware debugging and troubleshooting
- Sensor calibration and interfacing
- Circuit design and system integration
- Embedded programming and IoT communication

- Many teams applied interdisciplinary knowledge combining:

- Electronics and embedded systems
- Internet of Things (IoT) technologies
- Communication systems
- Data processing and intelligent control.

- The event highlighted the importance of mentorship, where faculty mentors and technical experts helped teams:

- Refine solution approaches
- Select appropriate hardware components
- Overcome technical challenges during prototype development.

- The hackathon also served as a learning platform for student volunteers and coordinators.

- Volunteers developed managerial and organizational skills, including:
- Event coordination and logistics management
- Team support and participant assistance
- Time management during a 24-hour continuous event
- Communication and coordination with mentors, judges, and organizers.
- Through the buddy mentoring system, volunteers were assigned to assist teams and gained exposure to: Hardware design workflows, Prototype development stages, Debugging strategies used by teams.

Overall, the hackathon strengthened technical skills, teamwork, leadership, and innovation culture among both participants and volunteers.

8. Scope for Improvement in the Next Edition of NavaNIEti

- Increasing the hackathon duration or providing a pre-hackathon preparation phase could help teams develop more refined and reliable hardware prototypes.

- Providing brief sessions on hardware component specifications, selection, and applications would help participants efficiently choose appropriate sensors, microcontrollers, and modules.
- More direct interaction with industry experts during the hackathon could help teams better understand real-world applications and practical constraints.
- Encouraging interdisciplinary collaboration between students from different engineering branches can enhance innovation and solution quality.
- The successful organization of the NavaNIEti 24-Hour National Level Hardware Hackathon 2026 was made possible through the generous support of several industry partners and sponsors who encouraged innovation and student-driven technological development.

9. Sponsors and Supporters

- We extend our sincere gratitude to Massivetronics for being the Title Sponsor of the hackathon and for supporting this initiative that promotes hardware innovation among engineering students.

- We also thank our Co-Sponsors, AT&S Pvt Ltd and MathWorks, for their valuable support and encouragement in making the event a success.

- A special note of appreciation is extended to Dr. Kachigere Krishnappa for sponsoring the ₹80,000 prize money under the "Smt. Meenakumari and Siddegowda Krishnappa Puttachi Scientific, Innovative and Impactful Research Award." This generous contribution greatly motivated the participating teams to develop impactful solutions.

- The organizers greatly appreciate the support of all sponsors and partners who contributed to the success of the event and encouraged students to pursue innovation, creativity, and technology-driven solutions for real-world challenges.

10. Conclusion

The NavaNIEti Hackathon successfully promoted innovation, teamwork, and practical engineering problem-solving among students. The winning projects demonstrated creative and feasible solutions addressing real-world challenges in disaster management, healthcare, agriculture, and defence. The event served as an effective platform for experiential learning and encouraged students to apply embedded systems and IoT technologies to develop impactful engineering solutions.

Photographs:

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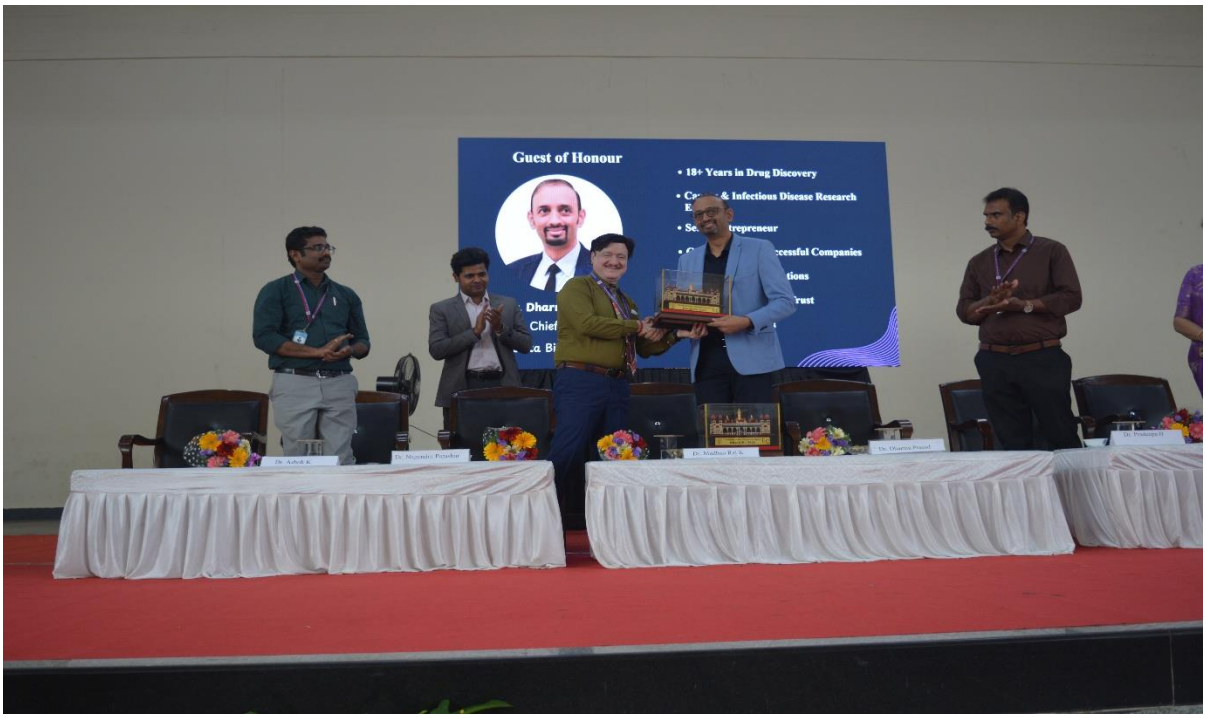

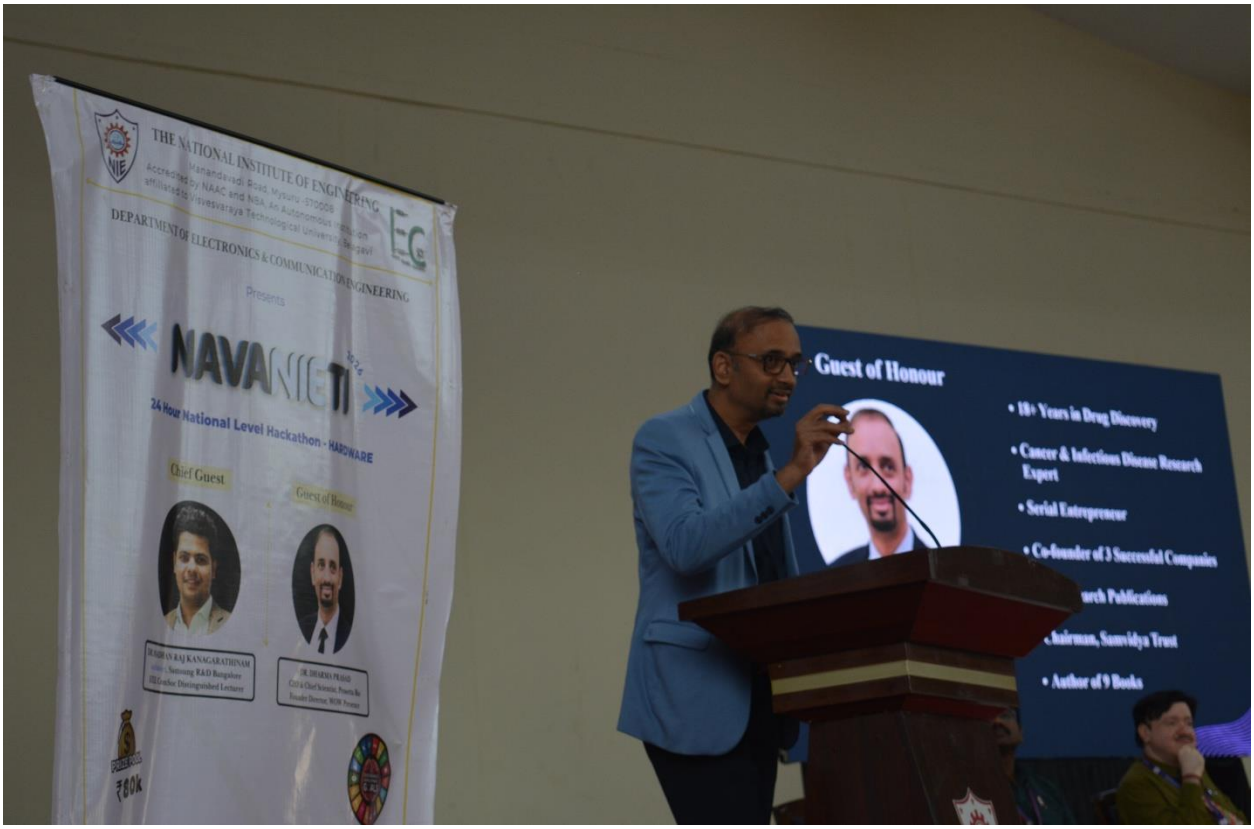
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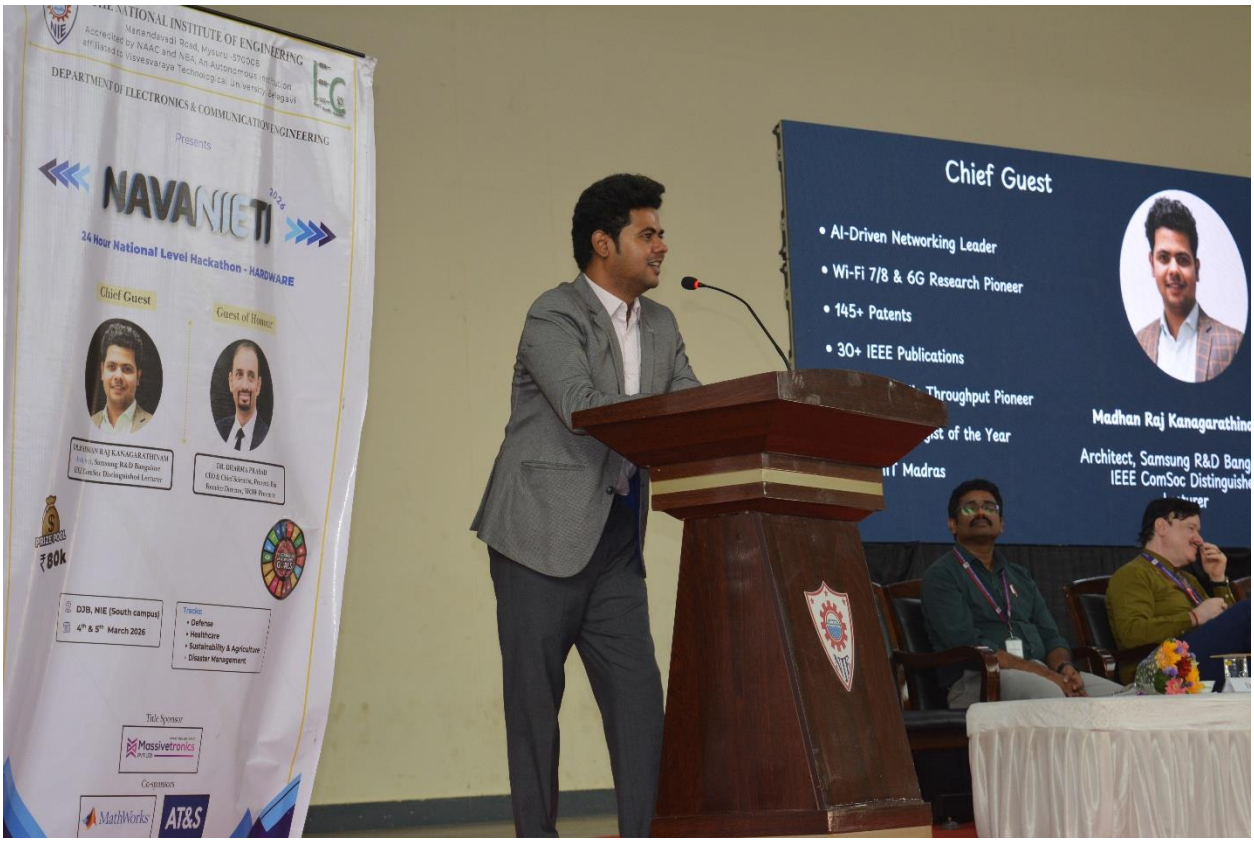
• Serial Entrepreneur
• Co-founder of 3 Successful Companies
• Author of 9 Books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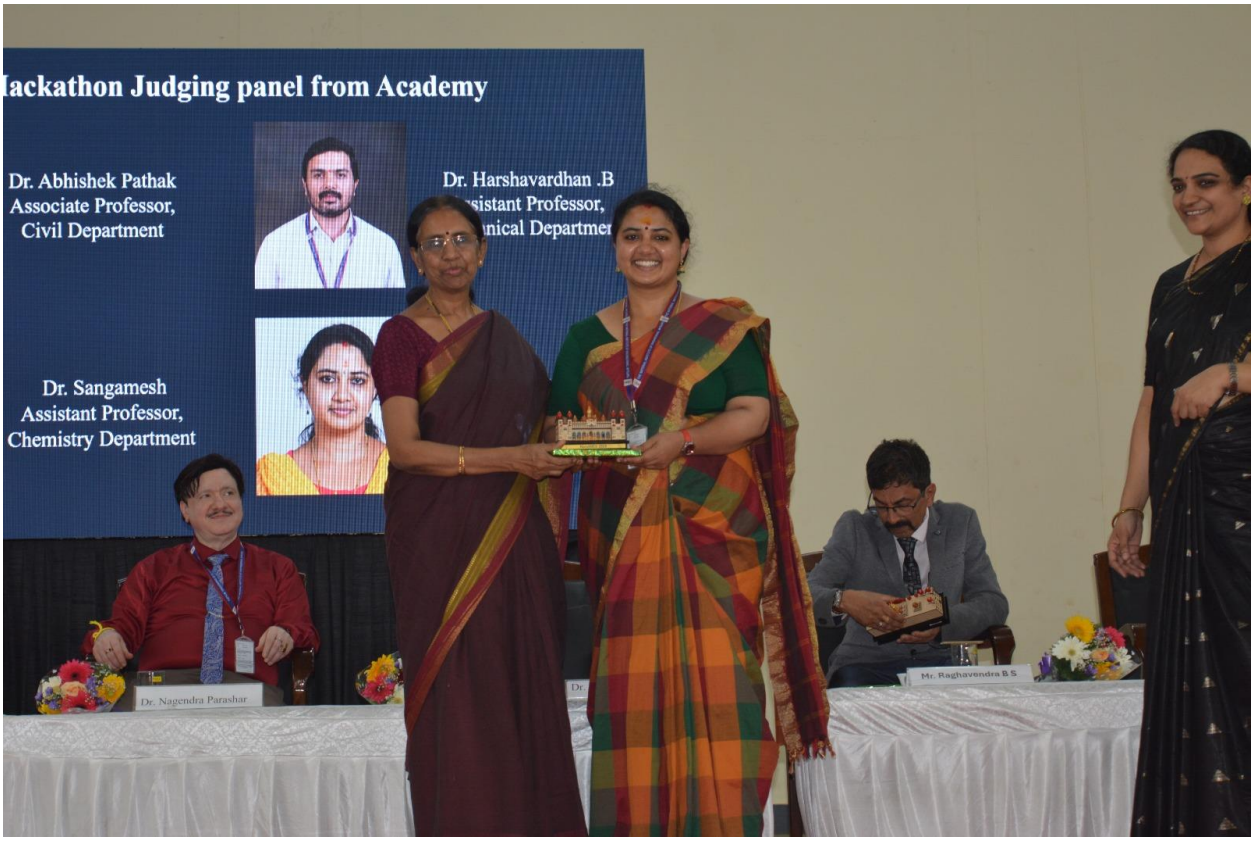
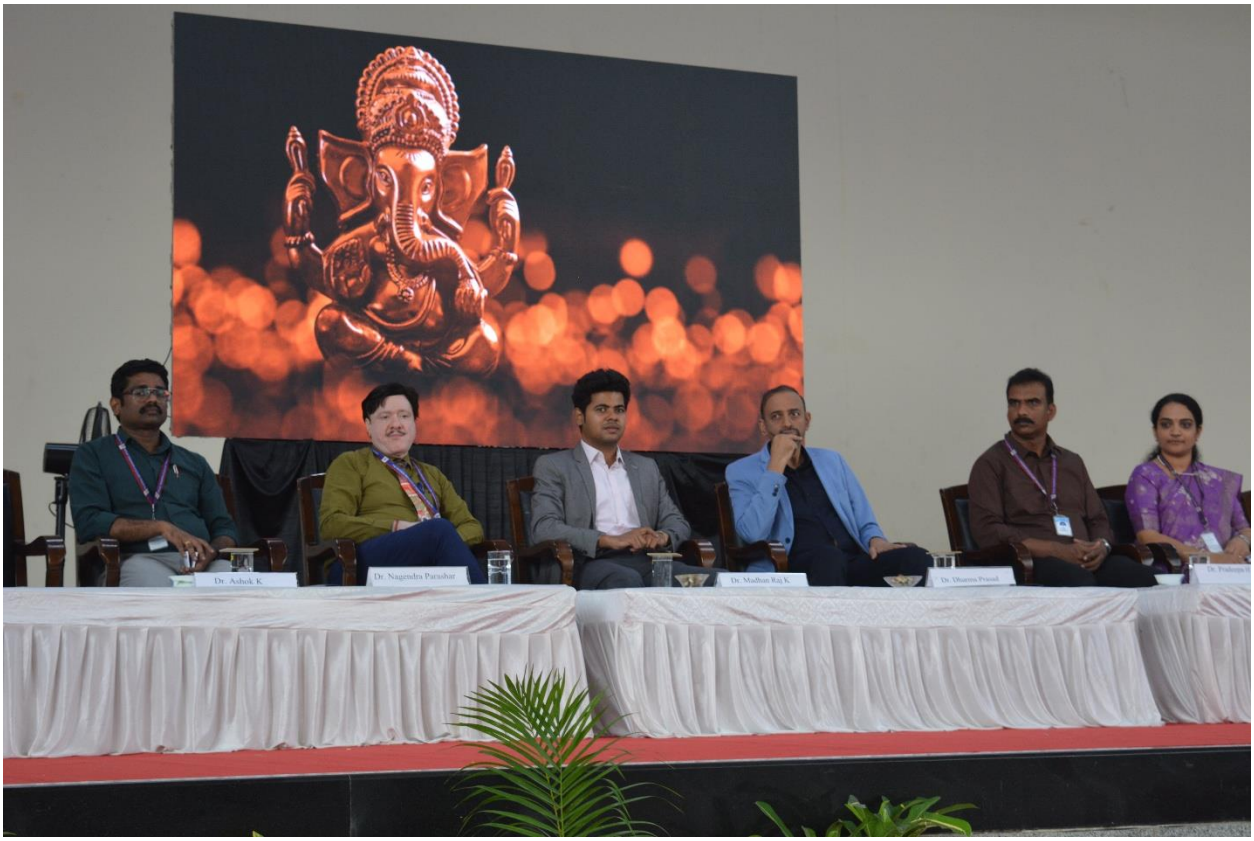
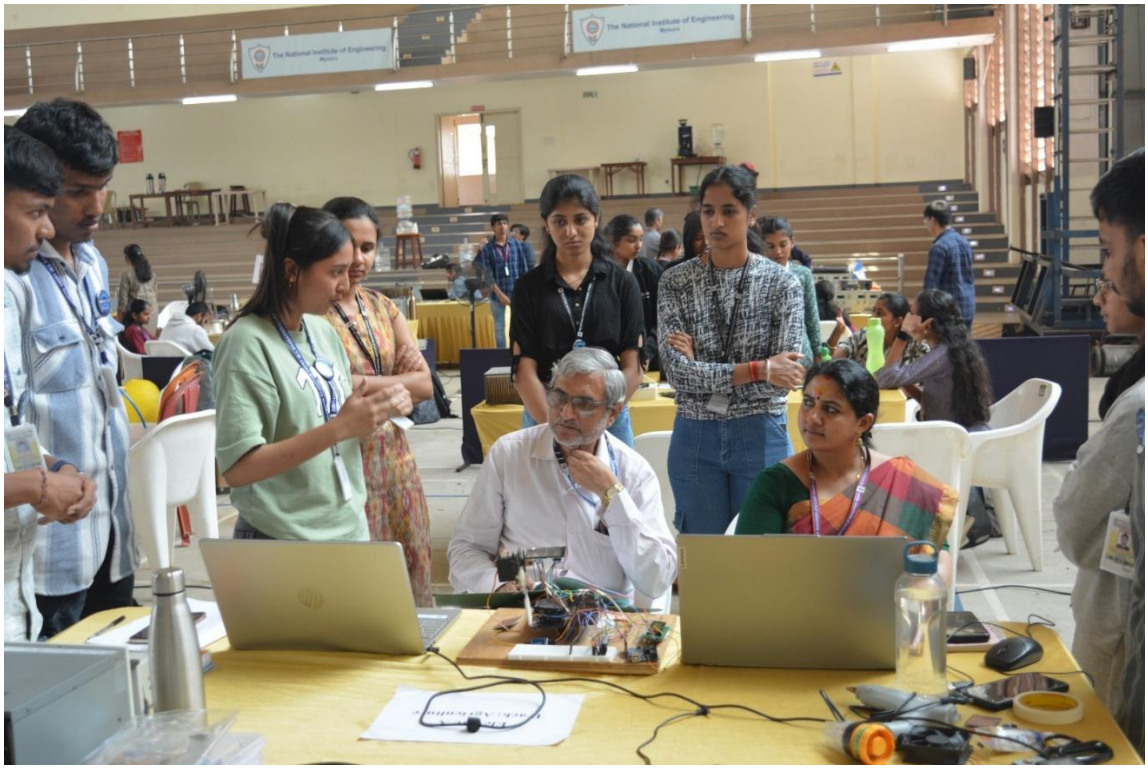

lackathon Judging panel from Academy
Dr. Abhishek Pathak
Associate Professor,
Civil Department
Dr. Harshavardhan .B
Dr. Sangamesh
Assistant Professor,
Chemistry Department
Dr. Nagendra Parashar
Mr. Raghavendra B S


Dr. Ashok K
Dr. Nagendra Parashar
Dr. Madhan Raj K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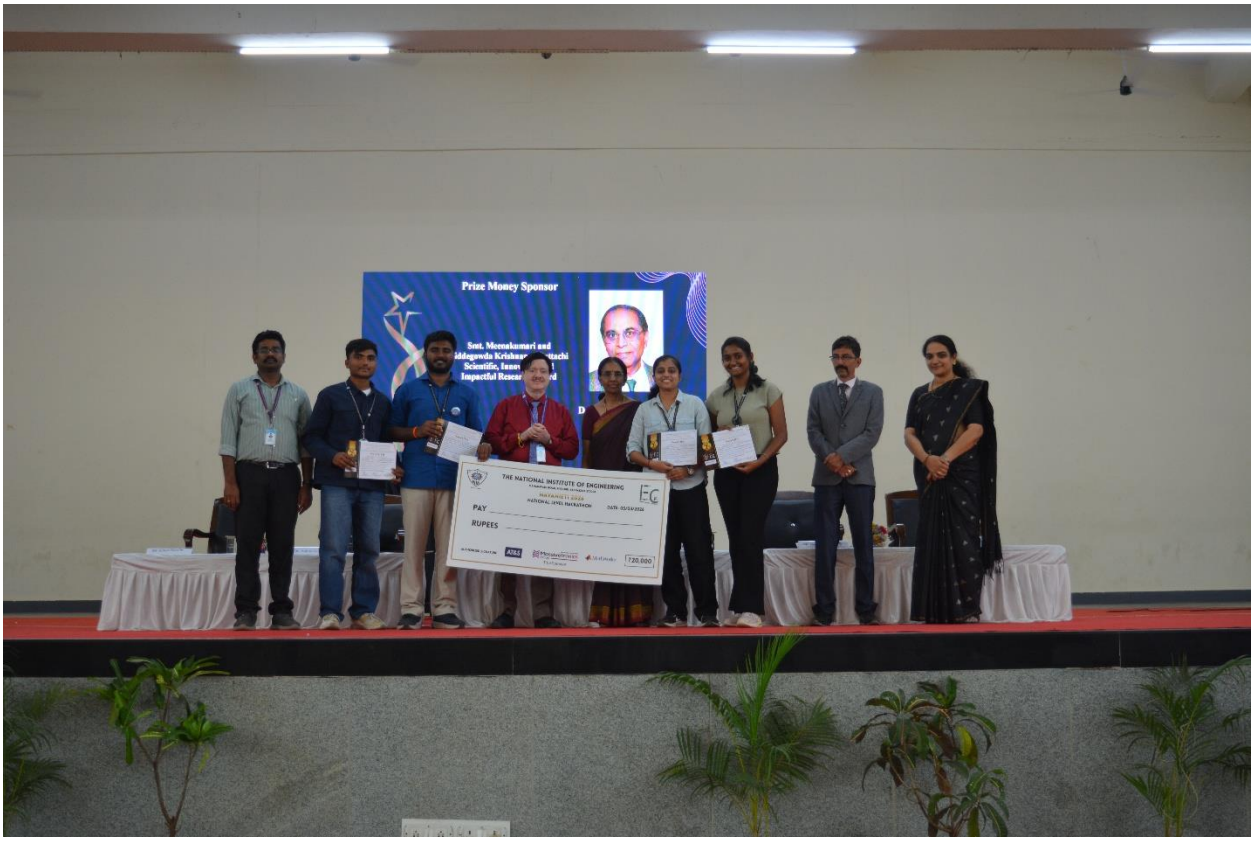
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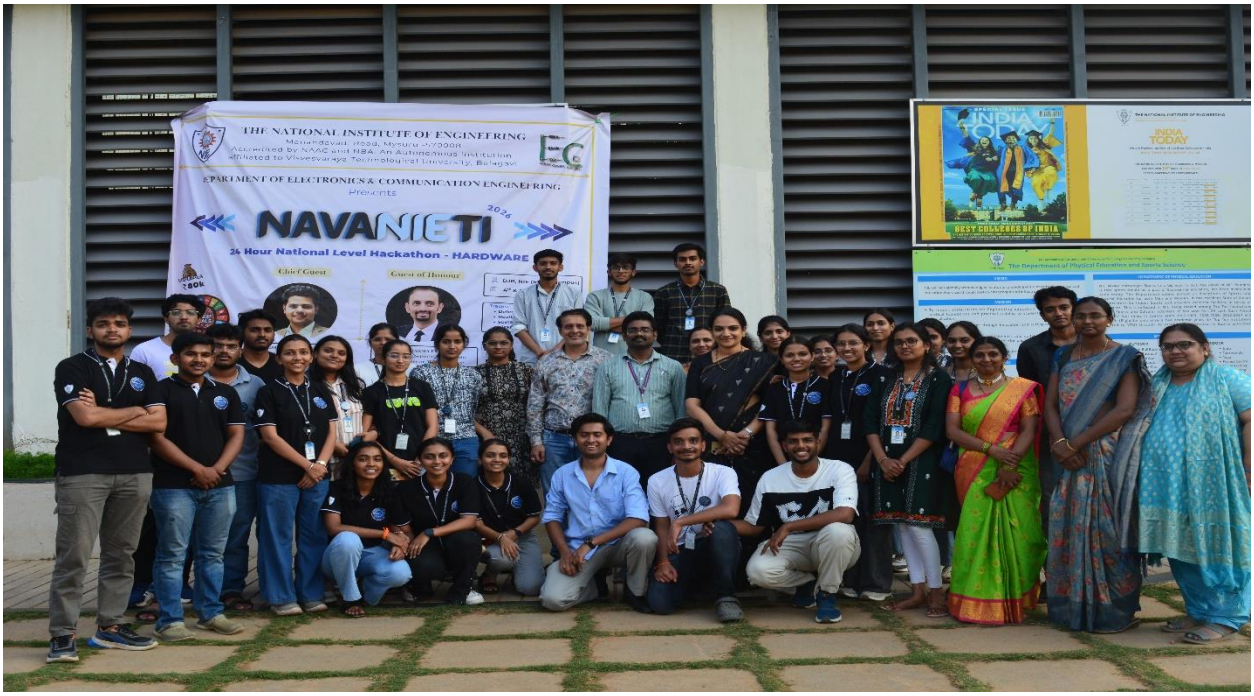

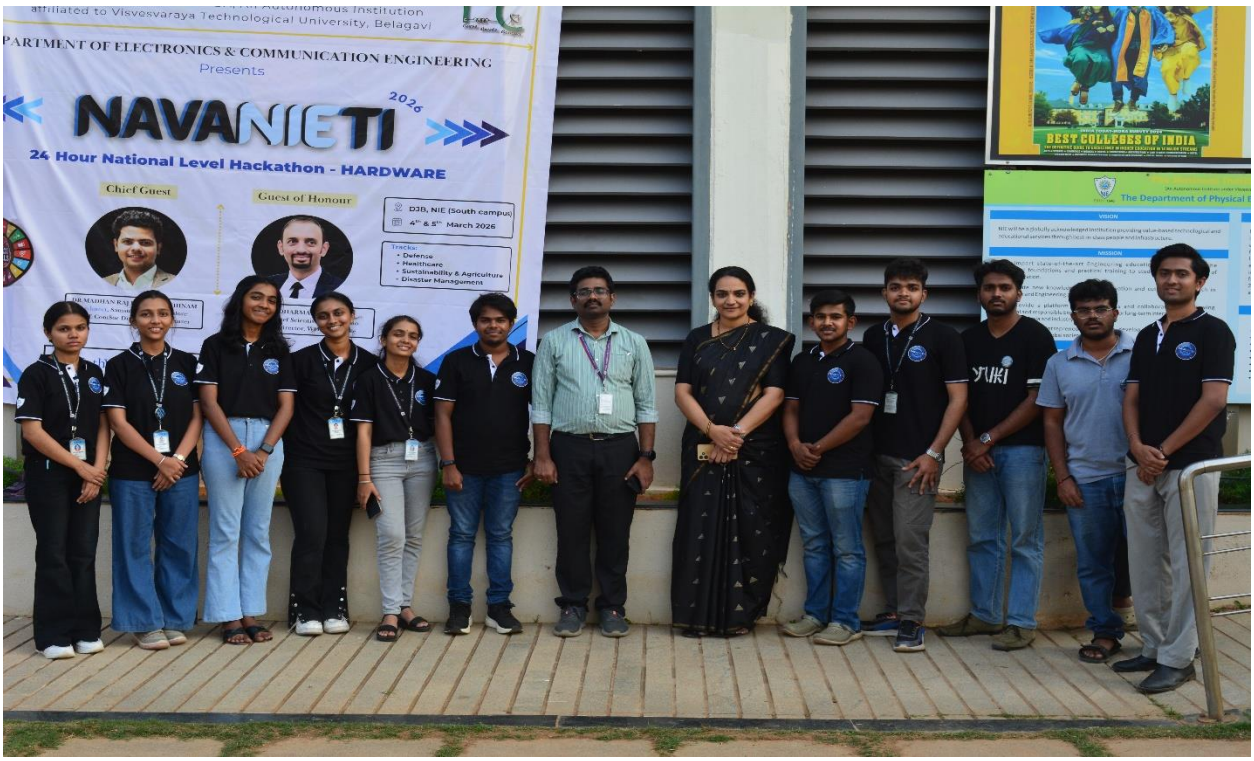

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