Department of Electronics and Telecommunication Engineering
K. K. Wagh Institute of Engineering Education and Research
HirabaiHaridasVidyanagari, AmrutDham, Panchavati, Nashik-422003

Innovative Teaching – Learning Activities

MSPA: Design complex engineering problem/ real life problem for two subjects of TY B.Tech and get it solved by students. The evaluation of CEP will be under CCE category.

Class: TY.B.Tech (Div A,B)

Course:

1. Industry 4.0 and IIoT
2. Embedded Processor

Objective:

- Enhance critical thinking and problem-solving skills through hands-on projects.
- Encourage innovation in embedded system design for IoT applications.
- Promote interdisciplinary collaboration between IoT, embedded systems, and electronics engineering.
- Develop expertise in ARM-based embedded processors and their real-world applications.
- Build practical experience with hardware and software tools such as STM32, LPC2148, Keil MicroVision, CubeIDE, and Proteus for simulation**.**
- Equip students with technical and hands-on experience in real-world embedded and IoT applications.
- Encourage team work, responsibility, and professionalism in engineering practices.

Outcome:

- Practical Knowledge of Embedded Processors: Understanding architectures like ARM Cortex-M, and ARM7TDMI.
- Hands-on Implementation: Working with development boards for embedded system design.

- IoT System Development: Building and integrating IoT applications using sensors, actuators, and communication protocols (UART, SPI, I2C, MQTT).
- Programming Proficiency: Writing embedded C and Python code for microcontrollers and IoT applications.
- Simulation and Debugging: Using Proteus software for circuit simulation and debugging embedded systems.
- Project-Based Learning: Implementing real-world applications such as smart home automation, industrial monitoring, and wearable technology**.**
- Technical Documentation & Presentation Skills: Preparing professional project reports and presentations.
- Career Readiness: Equipping students with skills required in the embedded and IoT industry.

Photos of the Activity:


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ROAD ACCIDENTS
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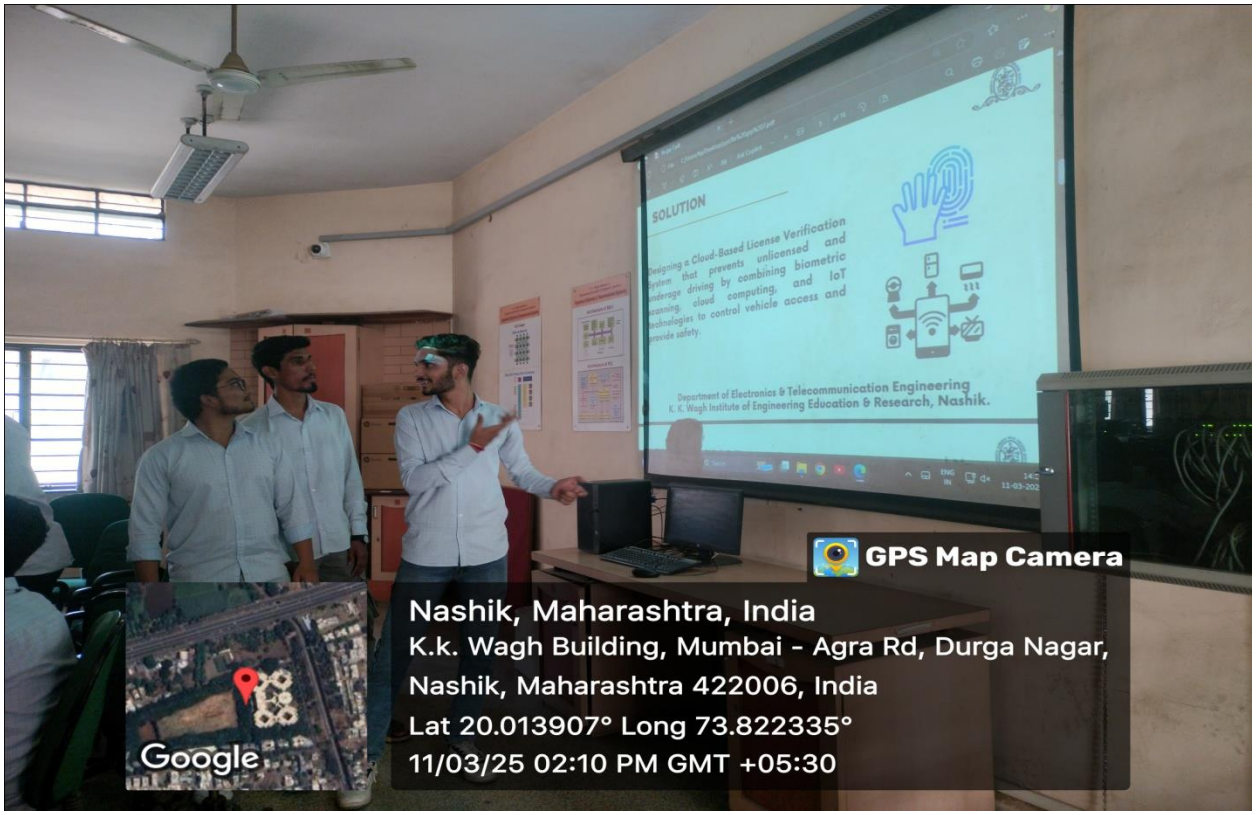
SOLUTION
Designing a Cloud-Based License Verification System that prevents unlicensed and underage driving by combining biometric scanning, cloud computing, and IoT technologies to control vehicle access and provide safety.
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Gesture recognition simulation 2
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Hardware circuit diagram
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Impact of the Activity:

- Project-Based Learning: Encourages students to work on complex engineering problems using real-world embedded applications.
- Hands-on Exposure to ARM Processors: Students get experience with industry-relevant microcontrollers like STM32 and LPC2148 by making complex projects e.g. Robotic arm controlled using gesture recognition, Speech recognition, Face recognition and environmental parameter measuring and control**.**
- Practical Use of Software Tools: Learning Keil MicroVision, STM32CubeIDE, and Proteus for microcontroller programming and simulation.
- Interfacing with Hardware Components: Working with sensors, actuators, and communication interfaces for IoT applications.
- Developing Real-Life IoT Solutions: Implementing smart devices, automation systems, and industrial IoT applications**.**
- Enhancing Technical Skills: Strengthening programming in Embedded C and Python.
- Better Problem-Solving Abilities: Encourages critical thinking and innovative solutions to embedded system challenges.
- Improved Collaboration & Communication: Working in teams enhances teamwork, documentation, and presentation skills**.**
- Bridging Academia and Industry: Preparing students for careers in embedded systems and IoT industries by providing exposure to real-world applications and building strong technical foundations.