IOT BASED ENERGY OPTIMIZATION IN A CLASSROOM

Project Guide : Prof Reshma Pise

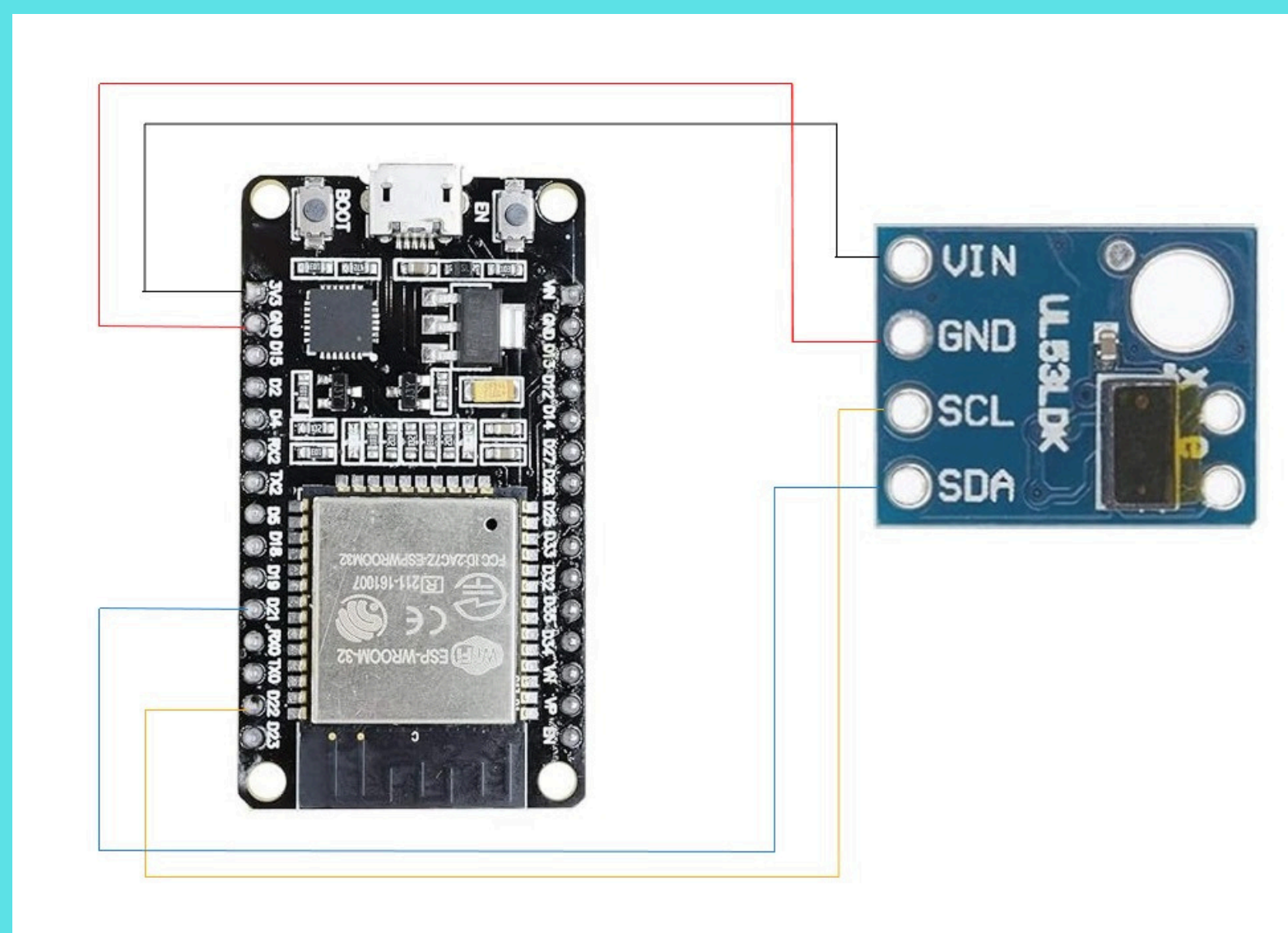Team : Atharva Zanjurne , Mohit Patel , Kamlesh Choudhary , Anagha Patil , Vineet Hadli

Problem Statement

Smart IoT-Based Human Detection and Energy Optimization System for Classrooms
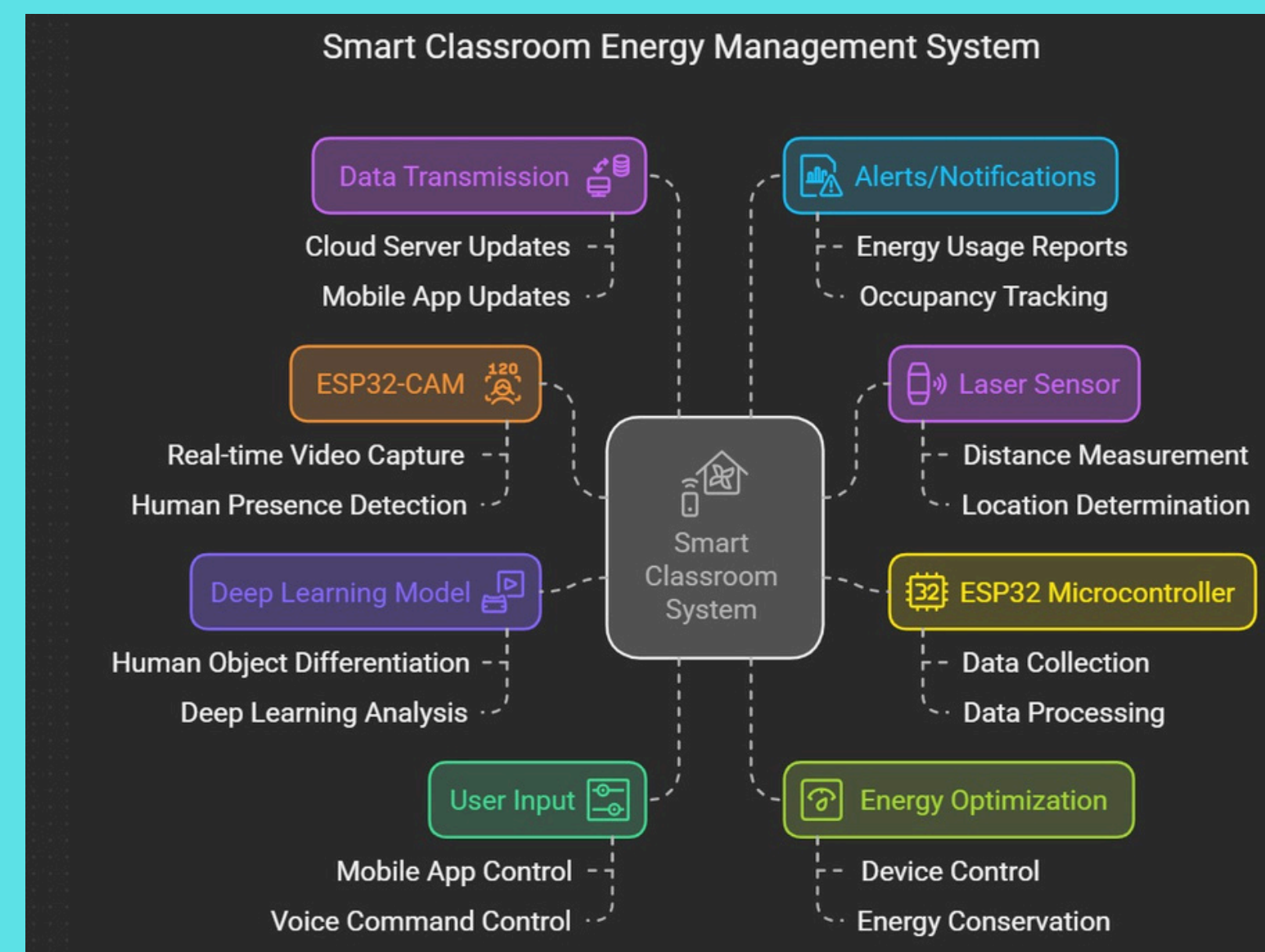
Project Goal

The Goal is to design an IOT based system that detects occupancy ,adjusts lighting and climate control and reduces energy consumption

Hardware Representation

Process

Future Goals

• Integrate Al for predictive energy optimization .
• Improve security and data privacy
• Expand system to large-scale buildings
• Enable real-time energy usage analytics
• Incorporate renewable energy sources for power .
• Develop a mobile app for remote system control
• Introduce voice assistant integration for hands-free operation

Functionalites

1. Human Presence Detection Detects the presence of people in the classroom using an ESP32-CAM and an Ai model.
2. Zone-Based Device Control - Activates only the lights and fans in the areas where people are present, ensuring targeted energy usage.
3. Automatic Power Saving Turns off all electrical devices (lights, fans, projectors, etc.) when the classroom is unoccupied.
4. Real-Time Monitoring & Control Provides real-time updates on classroom occupancy and device status via a cloud-based dashboard or mobile app.
5. Manual Override - Allows users (teachers, administrators) to manually control devices through an app, web interface, or voice command.
6. Energy Usage Optimization Reduces electricity consumption by automating device control based on occupancy, contributing to cost savings and sustainability.
7. Scalability & Multi-Room Support Can be extended to multiple classrooms with centralized control.

References

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[3]https://rjwave.org/ijedr/papers/IJEDR2302001.pdf