GYM OCCUPANCY MONITORING SYSTEM WITH AI AND IOT

Group G

PROJECT SCOPE

This project aims to build an AI-powered gym occupancy monitoring system that tracks the number of people in various gym zones in real-time using HC-SR501 PIR sensors, edge devices, and AI models. The system will use object detection to count people, recognize activities, and display this data on a web dashboard. Alerts for overcrowding and zone usage insights will help optimize gym operations and improve member experience.

GOALS

- **Real-time Occupancy Tracking:** Accurately monitor the number of people in different gym zones using AI-powered object detection.
- **Activity Recognition:** Identify and classify gym activities to provide insights into equipment usage and workout trends.
- **Web Dashboard Integration:** Display occupancy data, activity trends, and alerts on a user-friendly web interface.
- **Operational Optimization:** Use data-driven insights to improve gym layout, equipment allocation, and overall management.

HARDWARE COMPONENTS

- HC-SR501 PIR Sensors - for motion detection
- Rasberry Pi/ ESP32 - for preocssing sensor data
- WiFi Module - for data transmission

SOFTWARE COMPONENTS

- Frontend - React.js, TailwindCSS/Material UI for UI design
- Backend- Node.Js, Express.js for API
- Database –Influx DB
- IoT Communication: MQTT / WebSockets for real-time updates.

TIME LINE

Week 1

Research technologies (sensor APIs, database frameworks, etc.).

Week 2-3

Design UI/UX wireframes for the customer extranet and company intranet.

Week 4-5

Develop backend functionality (Monitoring system, sensor data processing).

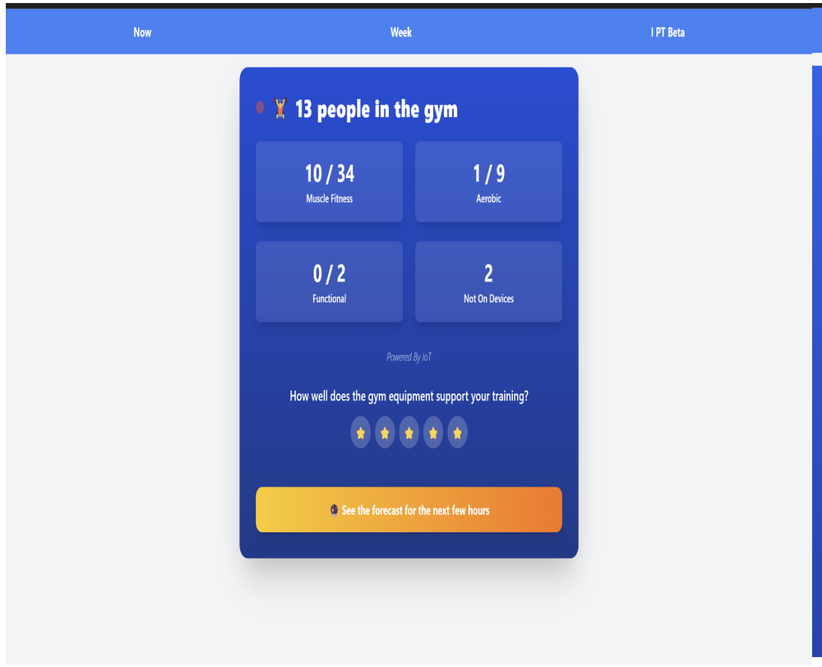
Week 6-7

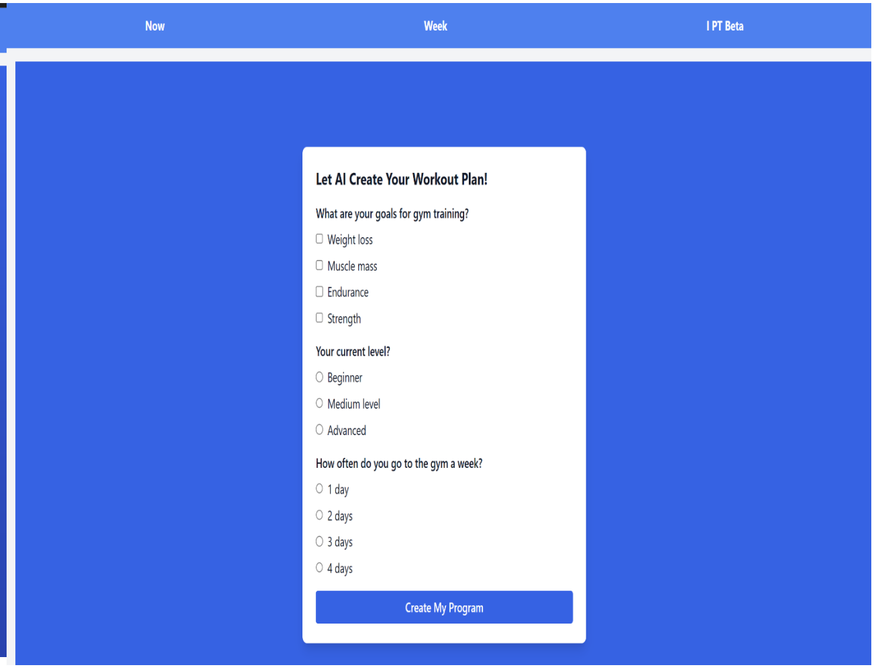
Integrate frontend and backend.

Week 8-9

Perform testing and deploy the system.

User Interface





CONCLUSION

This AI-powered gym occupancy monitoring system holds great promise for improving gym operations and member experience. By tracking occupancy, detecting overcrowding, and analyzing data insights, the system can enhance efficiency, safety, and overall satisfaction.

THANK YOU