Check My Chair Project

Objective:
To develop an IoT-based system that detects whether a chair is occupied or unoccupied using a Force Sensitive Resistor (FSR) and transmits this status along with GPS location to an online database (or optionally to a mobile app). This helps in locating free chairs in public or institutional settings.

Key IoT Components Used:

1. ESP32 Dev Module
- Microcontroller with WiFi & Bluetooth support
- Acts as the brain of the system, reads FSR sensor and GPS data, and sends them over WiFi.

2. FSR (Force Sensitive Resistor)
- Used to detect pressure/weight (presence of a person).
- Changes its resistance based on the applied force.

3. NEO-6M GPS Module
- Provides real-time GPS coordinates of the chair.
- Communicates with ESP32 via serial communication.

4. Power Source
- A USB power bank (or direct USB from laptop) powers the ESP32.

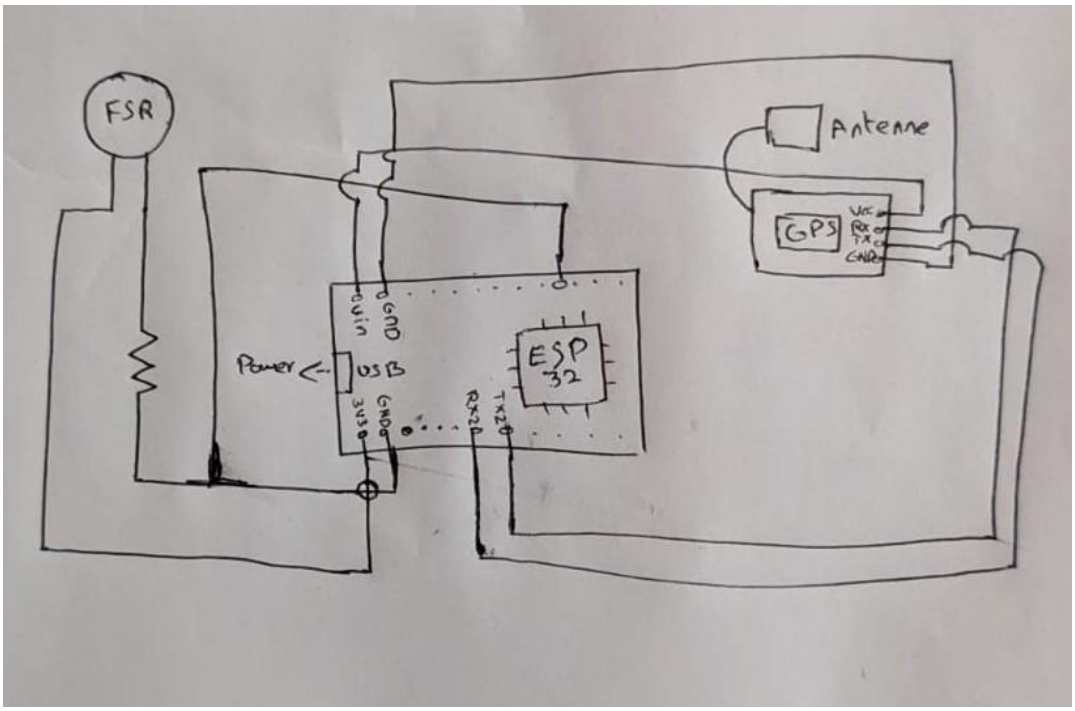
Working Principle:

1. Chair Monitoring Logic:
- When someone sits on the chair, the FSR detects pressure.
- The ESP32 reads the analog value from the FSR and compares it with a threshold to determine if the chair is occupied.

2. GPS Tracking:
- NEO-6M GPS module provides real-time latitude and longitude data.
- This helps in uniquely identifying and locating each chair.

3. Data Handling:
- Based on FSR and GPS input, ESP32 prepares a data packet (e.g., chair ID, status, coordinates).
- This data can optionally be sent over WiFi to cloud platforms like Firebase, Ubidots, or displayed via Serial Monitor for local testing.

Circuit Diagram:



Conclusion and Future Scope:

This project demonstrates a successful proof-of-concept for a smart seating solution using IoT technology. It effectively combines sensor data acquisition, data processing, and communication protocols into a cohesive and practical system.

Potential Future Enhancements:

- Cloud Integration and Mobile App: Fully develop the backend on a cloud platform like Firebase and create a user-friendly mobile application that visualizes the data on a map.
- Power Optimization: Implement the ESP32's deep-sleep modes to significantly reduce power consumption, allowing for long-term battery-powered operation.
- Miniaturization: Design a custom PCB to create a more compact and aesthetically pleasing enclosure that can be unobtrusively integrated into chair designs.
- Reservation System: Add functionality to the app allowing users to reserve a vacant chair for a short period.