

Project Synopsis: Smart Monitoring for Trauma Outpatients

Objective:

To develop a low-cost, real-time monitoring system for trauma outpatients that detects critical events like falls, pulse irregularities, sudden loud sounds, and abnormal body temperature changes — providing immediate alerts and logging data for medical follow-up.

Description:

This is built on the ESP32 microcontroller and integrates sensors including an MPU6050 (for fall and temperature detection) and simulated analog inputs for pulse and sound sensing. The system sounds a buzzer when an abnormal event occurs and records key data — including acceleration, temperature, pulse, and sound levels — to an SD card for later review. Real-time sensor values and alerts are also displayed via Serial Monitor.

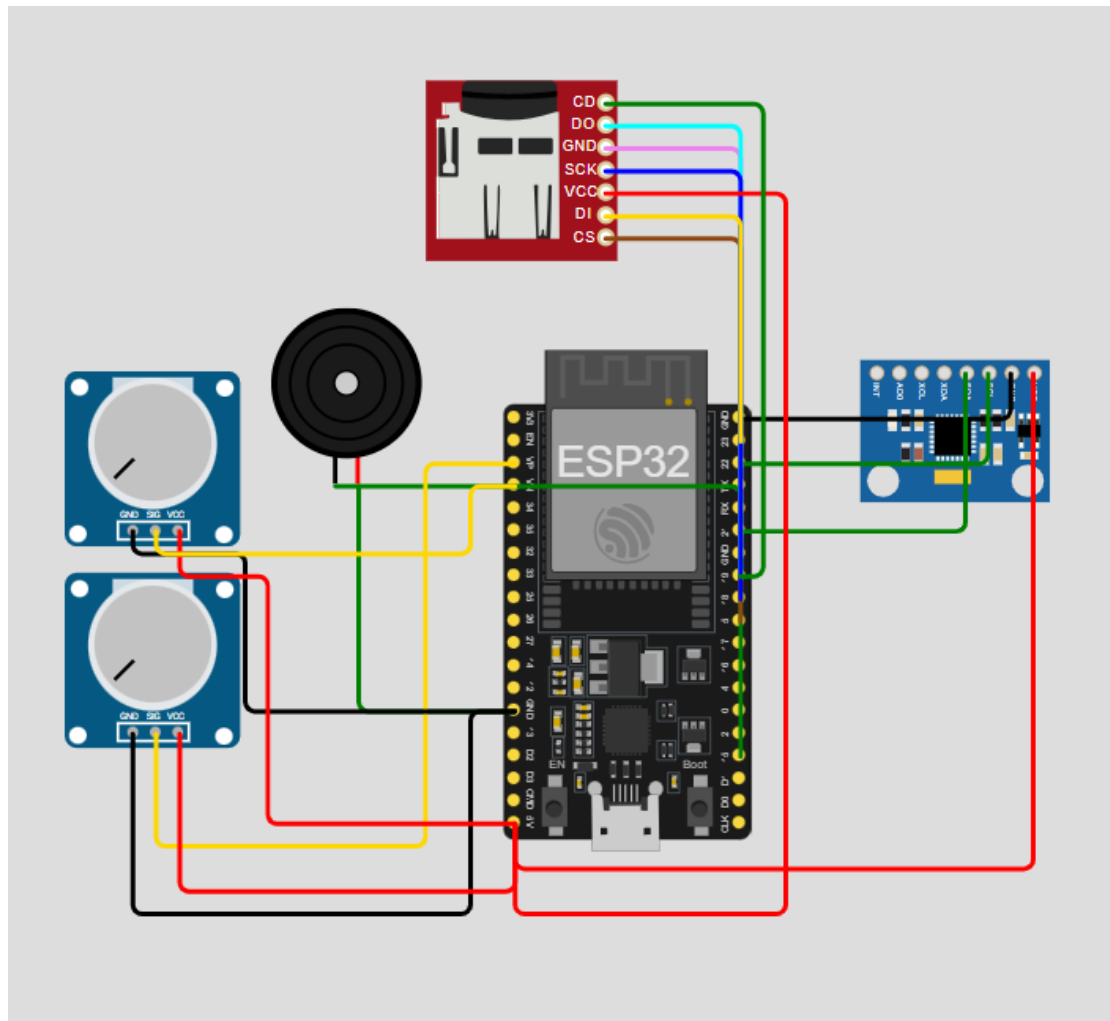
Use Case:

Designed for outpatients recovering from trauma who may be unsupervised at home. The system acts as an early warning device to assist in post-discharge care, helping reduce complications by detecting and responding to physical distress events.

System Overview:

- **Controller:** ESP32
- **Sensors:**
 - MPU6050: Fall detection via acceleration
 - Pulse Sensor (simulated): Heart rate spike detection
 - Sound Sensor (simulated): Detects loud impact or distress
 - Temperature (MPU6050): Tracks body temp change
- **Outputs:**
 - Buzzer: Immediate audible alert
 - Serial Output: Real-time display of abnormality
 - SD Card: Logs events to events.csv with timestamp and sensor data

Wiring & Components:



Demo Instructions:

- Use potentiometers to simulate pulse and sound
- Move MPU6050 in GUI to simulate a fall
- Watch serial monitor for alerts
- Check SD card contents after events

Conclusion

The prototype offers a low-cost, modular solution for critical patient monitoring. It can be extended with GPS, GSM modules, or real-world biometric sensors for hospital or ambulance use.