



Patient Motion Monitoring System

- A patient-activated IoT home rehabilitation monitoring system that safely tracks recovery without intrusive surveillance, using a **leg-worn IMU** and **room radar** to measure activity and detect safety risks.
- **Patient** : the system operates on patient-activated sessions to measure steps, stair climbing, and basic movement states
- **Caregiver** : Simultaneously monitoring for falls and prolonged immobility, when a risk is detected it alerts a caregiver, and the patient can confirm they are okay to cancel the alert.
- **Doctor** : uniquely providing doctors with both a real-time view of the current session and detailed historical summaries that translate raw sensor data into actionable clinical metrics.

Wiring diagram

The wiring diagram illustrates the hardware setup. An ESP32 development board is connected to an MPU9250 IMU module and an RD-03D RADAR module. The IMU and RADAR are connected to the ESP32 via I2C buses and power lines. The connections are color-coded: red for power, black for ground, and green for the I2C data lines.

Flutter app

The Flutter app interface includes a 'SESSION START' button in grey and a 'SESSION STOP' button in red. Below these are two large buttons: one red labeled 'I'M OK' and one green labeled 'Session Started'. To the right, there are four cards showing session statistics: 5.0 steps/min, 4.3 stairs/min, 20 total steps, and 17 total stairs. At the bottom are two red-bordered boxes showing 1 event for falls and 1 event for all alerts.

Caregiver Alerts (p1)

The Caregiver Alerts screen lists two fall events. The first event is a red warning for a fall at 21:41 (29/1) with a 'MARK AS HANDLED' button. The second event is a green confirmation for a fall at 21:25 (29/1) with a 'HANDLED BY CAREGIVER' button.

Raneen Haj Yahya , Mariam Assdi ,Gharam Kharabna
Itai Darban + Tom Sofer

A Project in Internet of Things (IoT)