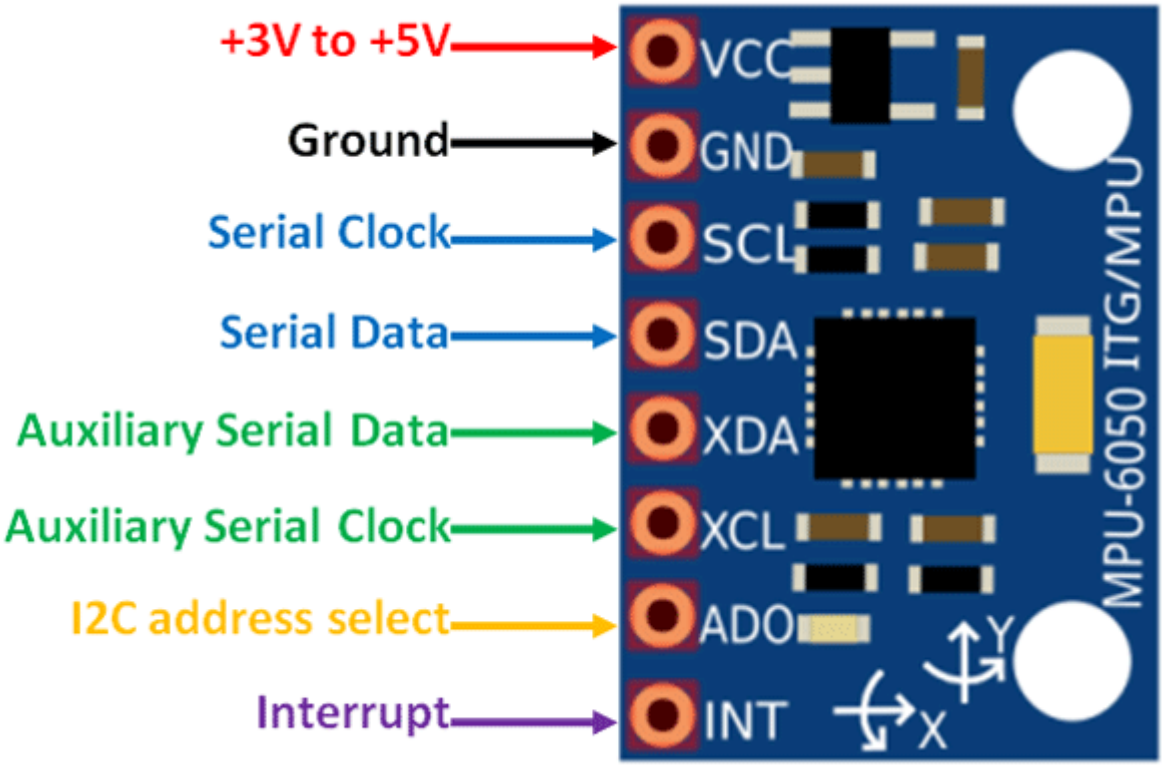
Smart protective Helmet for construction worker

Objective

The main goal of this project is to monitor and enhance worker safety at construction sites. The system detects falls, impacts, or emergency situations and immediately sends an alert with the worker's live GPS location to the supervisor via an IoT platform.
This reduces response time and helps prevent serious injuries or fatalities.

Components
STM32F407VG Discovery Board
ESP32
NEO6M
MPU6050
Emergency button

MPU6050 Accelerometer



Features
Purpose: Detects fall, impact, or abnormal motion of the worker.

Features:

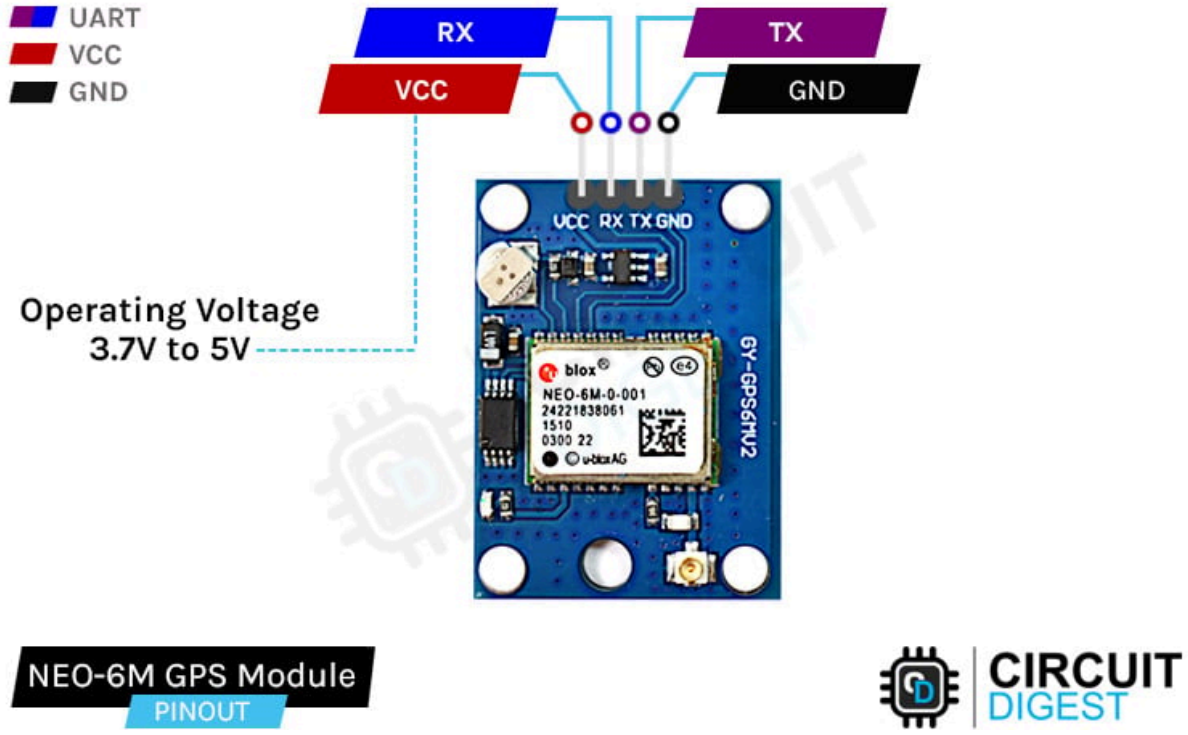
3-axis accelerometer + 3-axis gyroscope

I²C communication

Motion and orientation detection

High sensitivity and fast response

NEO6M gps sensor



Features
GPS Module (e.g., NEO-6M)

Purpose: Provides real-time location coordinates of the worker.

Features:

High-sensitivity GPS receiver

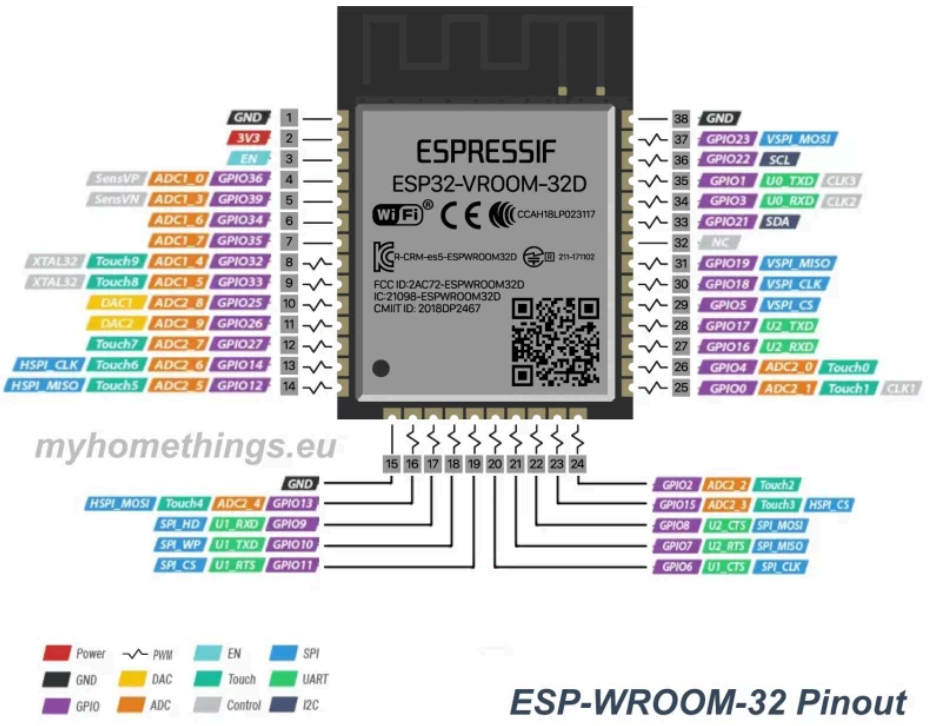
UART interface

Position accuracy: ~2.5 meters

Low power consumption

Compatible with 3.3V logic

Esp32



Features
ESP32 Wi-Fi Module

Purpose: IoT communication and cloud data transfer

Features:

Dual-core 32-bit processor (240 MHz)

Built-in Wi-Fi and Bluetooth

Supports HTTP / MQTT protocols

UART, SPI, and I²C communication interfaces

Low power consumption suitable for battery operation