Timer Cube

A creative and physical approach to time management using an ESP32, MPU6050 accelerometer, and a capacitive touch sensor. This Pomodoro Timer supports intuitive mode switching by rotating the cube, manual mode selection via touch, and visual feedback through LEDs with a breathing effect.

Features

1. Start/Pause Timer
2. Pomodoro Timer – 2 min
3. Short Break – 30 sec
4. Long Break – 1 min
5. Reset Timer

Features Summary

- **MPU6050-Based Mode Switching**
  Rotate the cube to change modes based on orientation.
- **Touch Sensor Interaction**
  Tap to pause/resume or acknowledge. Long press to reset. Works even when MPU is not connected.
- **LED Feedback**
  - Breathing effect when the timer is running
  - Solid light when paused or completed
  - All LEDs off when idle
- **Buzzer Alerts**

  Audio feedback for state transitions and when the timer is done.
- **Fallback Support**
  If the MPU6050 fails, the timer still works using only the touch sensor.

Requirements

Hardware Components:

1. ESP32 – x1
2. 6DOF Accelerometer Gyroscope GY-521 MPU-6050 – x1
3. LED Indicator – x3
4. Resistors – x3
5. Buzzer – x1
6. TP4056 Lithium Battery Charger (Type-C) – x1
7. DC to DC Booster – x1
8. Battery Case – x1
9. Li-ion Battery – x1
10. ON/OFF Switch – x1
11. Vero Board
12. Wires

Software:

- Arduino IDE
- Libraries:
    - MPU6050 by Jeff Rowberg
    - Wire (I2C communication)

Pin Configuration

Component	GPIO Pin
Touch Sensor	4
Buzzer	5
LED – Pomodoro	18
LED – Short Break	19
LED – Long Break	23
MPU6050 SDA	21
MPU6050 SCL	22

Touch Controls

Action	Description
Short Tap (running)	Pause/Resume the timer
Short Tap (after done)	Acknowledge timer completion
Long Press	Reset the timer
Short Tap (no MPU)	Cycle through modes manually