**Baby monitoring:**

**IoT Baby Monitoring System using ESP32 + Blynk + DHT22 + MPU6050 + Servo**

**What This System Does:**

* Monitors **temperature** and **humidity in the room**
* Detects **baby movement**
* Takes **baby cry input**
* Swings the **cradle** using a **servo** (on user input from Blynk)
* Sends baby status ("Sleeping", "Crying", or "Baby Moving") to Blynk

**STEP 1: Required Components**

| **Component** | **Quantity** |
| --- | --- |
| ESP32 | 1 |
| DHT22 Sensor | 1 |
| MPU6050 Module | 1 |
| Servo Motor | 1 |
| Jumper Wires | As needed |

**STEP 2: Circuit Connections**

| **Module** | **Pin on ESP32** |
| --- | --- |
| DHT22 VCC | 3.3V |
| DHT22 GND | GND |
| DHT22 DATA | GPIO 21 |
| MPU6050 VCC | 3.3V |
| MPU6050 GND | GND |
| MPU6050 SDA | GPIO 21 |
| MPU6050 SCL | GPIO 22 |
| Servo Signal | GPIO 15 |
| Servo VCC | External 5V (recommended) |
| Servo GND | GND |

**STEP 3: Blynk Cloud Setup**

1. **Go to** <https://blynk.cloud>
2. Login and click **“Templates” → “+ New Template”**
   * Name: baby care
   * Hardware: ESP32
   * Connection: WiFi
3. Click **“Datastreams”** and add:

| **Datastream Name** | **Type** | **Virtual Pin** |
| --- | --- | --- |
| Temperature | Double | V1 |
| Humidity | Double | V0 |
| Baby Status | String | V2 |
| Cradle Switch | Integer | V6 |

1. Copy your:
   * BLYNK\_TEMPLATE\_ID
   * BLYNK\_TEMPLATE\_NAME
   * BLYNK\_AUTH\_TOKEN

**STEP 4: Blynk App Setup (Mobile)**

1. Download the **Blynk IoT App** from Play Store or App Store.
2. Log in → Your device will auto-appear.
3. Click device → tap **Edit icon**.
4. Add 3 widgets:
   * **Label (V0)** → Humidity
   * **Label (V1)** → Temperature
   * **Label (V2)** → Baby Status
   * **Switch (V6)** → Cradle Swing ON/OFF

**STEP 5: Arduino IDE Setup**

**Install Required Libraries:**

* Blynk (from Library Manager)
* DHT sensor library
* Adafruit Unified Sensor
* Wire
* MPU6050 (by Electronic Cats)
* ESP32Servo

**Select Board:**

* Tools → Board: ESP32 Dev Module
* Tools → Port: Your COM port

**STEP 7: Monitor on Blynk App**

You will now see live:

* Temperature on **V1**
* Humidity on **V0**
* Baby Status on **V2**
* Cradle Swing controlled by **Switch on V6**

**Code:**

#define BLYNK\_TEMPLATE\_ID "TMPL3Y2oN4mEB"

#define BLYNK\_TEMPLATE\_NAME "baby care"

#define BLYNK\_AUTH\_TOKEN "LY36RWAyM2D9gFjvqb9I64jjHe46t-Cl"

#include <WiFi.h>

#include <Wire.h>

#include <DHT.h>

#include <BlynkSimpleEsp32.h>

#include <ESP32Servo.h>

#include "MPU6050.h"

char ssid[] = "Wokwi-GUEST";

char pass[] = "";

#define DHTPIN 19

#define DHTTYPE DHT22

DHT dht(DHTPIN, DHTTYPE);

Servo cradleServo;

#define SERVOPIN 15

MPU6050 mpu;

int16\_t ax, ay, az;

int16\_t gx, gy, gz;

bool swing = false;

String cryStatus = "Sleeping";

String movementStatus = "Baby Sleeping";

BLYNK\_WRITE(V6) {

  swing = param.asInt();

}

void swingCradle() {

  cradleServo.write(45);

  delay(100);

  cradleServo.write(135);

  delay(100);

}

void setup() {

**Serial**.begin(9600);

  Blynk.begin(BLYNK\_AUTH\_TOKEN, ssid, pass);

  dht.begin();

**Wire**.begin();

  mpu.initialize();

  cradleServo.setPeriodHertz(50);

  cradleServo.attach(SERVOPIN, 500, 2400);

}

void loop() {

  Blynk.run();

  if (**Serial**.available()) {

    String input = **Serial**.readStringUntil('\n');

    input.trim();

    if (input == "cry") {

      cryStatus = "Crying";

**Serial**.println("Baby is crying");

    } else if (input == "sleep") {

      cryStatus = "Sleeping";

**Serial**.println("Baby is sleeping");

    } else {

**Serial**.println("Unknown input. Type 'cry' or 'sleep'");

    }

  }

  float temp = dht.readTemperature();

  float hum = dht.readHumidity();

  Blynk.virtualWrite(V7, temp);

  Blynk.virtualWrite(V8, hum);

**Serial**.print("Temperature: ");

**Serial**.print(temp);

**Serial**.print(" °C, Humidity: ");

**Serial**.print(hum);

**Serial**.println(" %");

  // Read sensor values

  mpu.getAcceleration(&ax, &ay, &az);

  mpu.getRotation(&gx, &gy, &gz);

  // Convert to units

  float ax\_g = ax / 16384.0;

  float ay\_g = ay / 16384.0;

  float az\_g = az / 16384.0;

  float gx\_d = gx / 131.0;

  float gy\_d = gy / 131.0;

  float gz\_d = gz / 131.0;

  // Print raw values

**Serial**.print("Accel (g): X=");

**Serial**.print(ax\_g);

**Serial**.print(" Y=");

**Serial**.print(ay\_g);

**Serial**.print(" Z=");

**Serial**.println(az\_g);

**Serial**.print("Gyro (°/s): X=");

**Serial**.print(gx\_d);

**Serial**.print(" Y=");

**Serial**.print(gy\_d);

**Serial**.print(" Z=");

**Serial**.println(gz\_d);

  // ✅ Final fix: check only for actual movement

  bool accel\_movement = abs(ax\_g) > 0.6 || abs(ay\_g) > 0.6 || abs(az\_g) > 1.2;

  bool gyro\_movement = abs(gx\_d) > 30 || abs(gy\_d) > 30 || abs(gz\_d) > 30;

  if (accel\_movement || gyro\_movement) {

    movementStatus = "Baby Moving";

**Serial**.println("Movement detected!");

  } else {

    movementStatus = "Baby Sleeping";

**Serial**.println("No significant movement.");

  }

  String combinedStatus;

  if (cryStatus == "Crying") {

    combinedStatus = "Crying";

  } else if (movementStatus == "Baby Moving") {

    combinedStatus = "Baby Moving";

  } else {

    combinedStatus = "Sleeping";

  }

  Blynk.virtualWrite(V2, combinedStatus);

  if (swing) swingCradle();

  else cradleServo.write(90);

  delay(1000);

}

