AN IOT LAB WITH MINI PROJECT REPORT ON

SMART YOGA ROOM

Problem Statement

In a traditional yoga room, adjusting the environment for different types of yoga, such as active standing poses and meditative sitting postures, requires manual intervention. Bright lighting and energizing music are ideal for standing yoga, while dim lighting and calming music enhance meditation-focused sitting yoga. However, switching between these settings disrupts the session, making it less effective and immersive. How can a system automatically adapt the ambiance based on whether a person is performing standing or sitting yoga, ensuring a seamless and distraction-free experience?

Circuit Connection

The circuit connection of the Smart Yoga Room system integrates multiple components, including the ESP32-WROOM-32 microcontroller, HC-SR04 ultrasonic sensor, DFPlayer Mini MP3 module, LEDs, speaker, and microSD card. Each component is connected as follows:

1. ESP32-WROOM-32 as the Controller:
   The ESP32 serves as the main processing unit, receiving input from the ultrasonic sensor and controlling the LEDs and DFPlayer Mini MP3 module accordingly.

2. HC-SR04 Ultrasonic Sensor Connection:
   - The VCC pin of the HC-SR04 is connected to the 3.3V of the ESP32.
   - The GND pin is connected to the ESP32's GND.
   - The TRIG pin is connected to a digital GPIO pin on the ESP32.
   - The ECHO pin is connected to another digital GPIO pin, allowing distance measurement.
3. DFPlayer Mini MP3 Module Connection:
   - The VCC pin of DFPlayer Mini is connected to ESP32's 5V.
   - The GND pin is connected to ESP32 GND.
   - The RX and TX pins of the DFPlayer are connected to the ESP32's UART (TX and RX) pins, enabling communication.
   - A MicroSD card is inserted into the DFPlayer module to store the music files.

4. Speaker (8Ω, 5W) Connection:

The speaker's two terminals are connected to the SPK1 and SPK2 pins of the DFPlayer Mini MP3 module, allowing it to play sound.

5. LEDs for Lighting Indication:
    - Two LEDs are used: o LED 1 and LED 2 are connected to two GPIO pins of the ESP32. O
    - The cathode (negative) of each LED is connected to the ESP32's GND, while the anode (positive) is connected via a current-limiting resistor to the assigned GPIO pin.
6. Power Supply and Circuit Completion:
    - The entire system is powered through the ESP32's USB port connected to the laptop. O
    - Jumper wires and a breadboard are used for easy prototyping and connections.

This circuit setup ensures that when the HC-SR04 detects the user's posture, the ESP32 processes the data and triggers the corresponding LEDs and music playback based on whether the person is standing or sitting. If no user is present, the system turns off the LEDs and stops the music, optimizing energy usage.