Virtual Shield – Secure and Smart Home Automation System

A home automation system with several automated features with an emphasized focus on security and ease of access.

Features:-

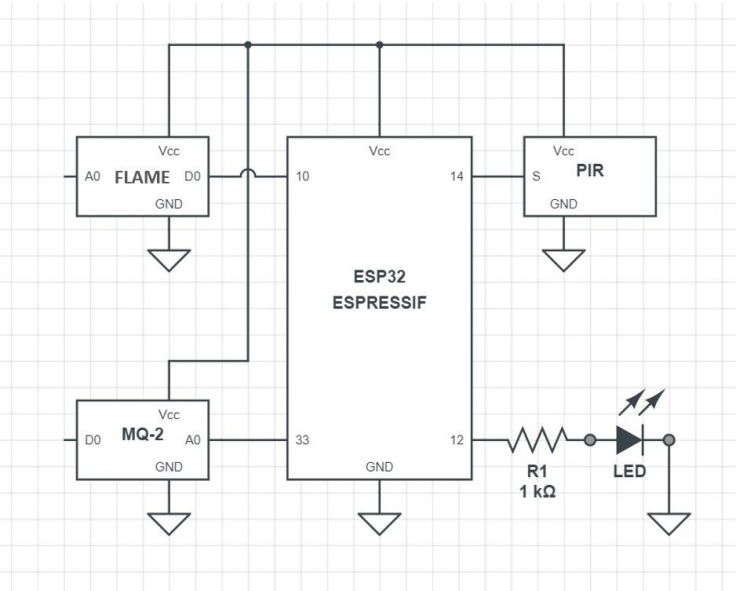
- Authorized access with facial recognition using Camera.
- Anti-theft system with alerts on an android application in case of a breach.
- Fire/smoke detection and emergency evacuation measures.
- Smart Light control based on sunlight and weather forecast using AWS.
- Monitoring the gas and temperature readings.

The hardware includes 2 ESP modules –

- ESP32 to control all sensors and actuators
- ESP-EYE camera at main door and safe room access (only 1 camera used interchangeably for prototyping)

The connection diagram is shown below –

- The ESP-EYE is plug and play.
- ESP32 microcontroller –



The **main** folder contains the code to control the sensors and actuators. This was flashed on to the ESP32 from the Arduino IDE.

The **CameraMain** folder contains code to control the ESP-EYE.

For the cloud, we have used a combination of AWS IoT Core and Blynk. An app was built on the Blynk Platform to control all the sensors and get status updates. Once up and running, the sensors should be getting information and uploading them to the cloud. AWS IoT stores the information in a DynamoDB instance for analytics purpose. [Future Work – update shadow]

The Blynk Cloud is primarily used for routing data and controlling actuators. Most of the decision making is made on the Blynk Cloud or on the Edge device (ESP32) based on the criticality of the device in the real world (a fire alarm would need a faster response than a ambience based room light control).