

Smart Gas Ventilation

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THINGS AND ITS APPLICATIONS

Abstract

- This Smart Gas Ventilation System uses an ESP32 WiFi module, MQ-6 gas sensor, DHT11 sensor, exhaust fan, and a channel relay to ensure safety in enclosed spaces.
- The MQ-6 sensor detects hazardous gases (e.g., LPG, methane), and when gas levels exceed safe thresholds, the ESP32 activates the exhaust fan via the channel relay.
- The DHT11 sensor monitors temperature and humidity, optimizing ventilation.
- The ESP32 also enables remote monitoring via WiFi, providing real-time alerts and system control.
- This system enhances safety by automating gas detection, ventilation, and environmental control in real-time.

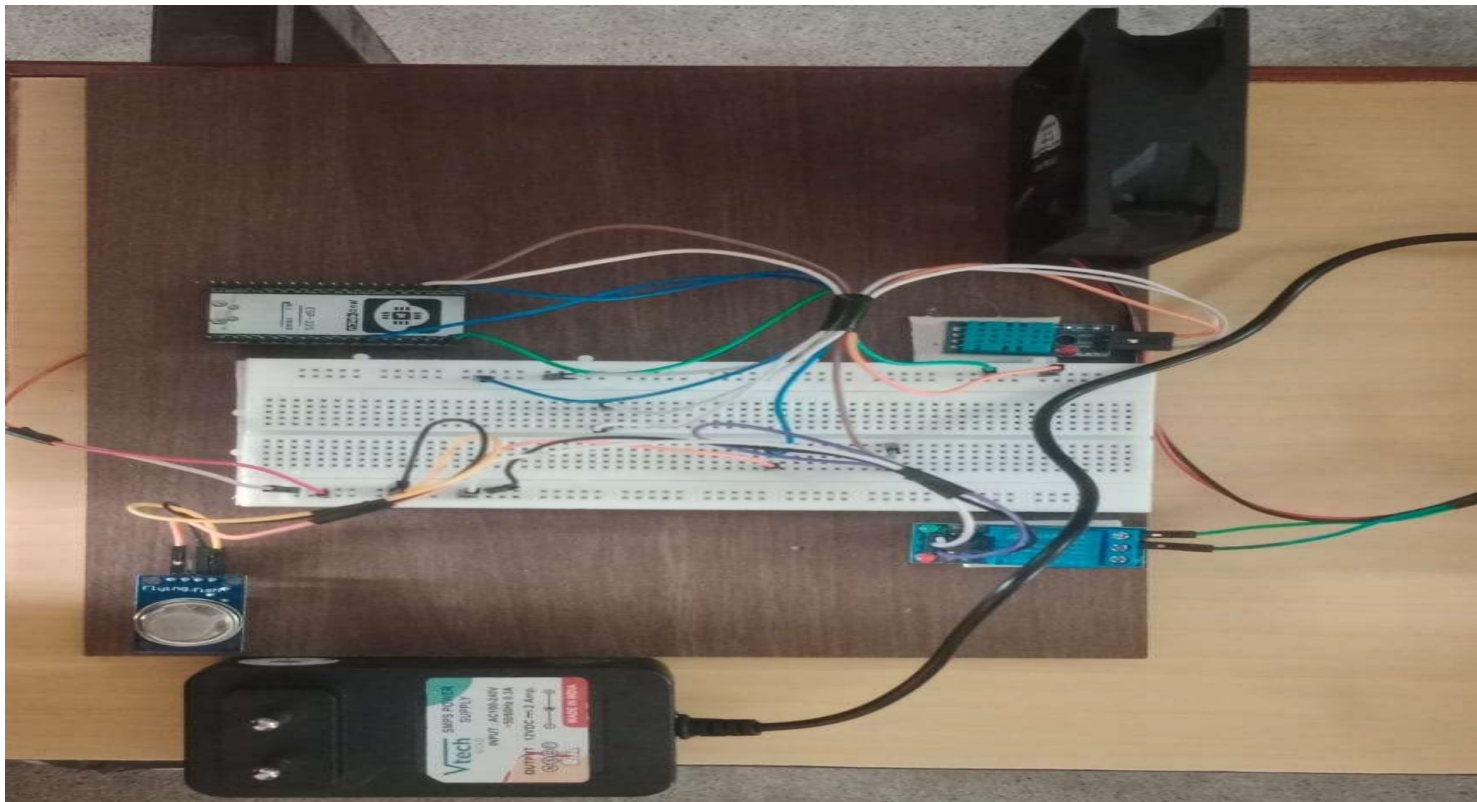
Objectives:

- ❑ Enhance Safety: Automatically detect hazardous gas levels (e.g., LPG, methane, CO) and activate ventilation to prevent accidents.
- ❑ Real-time Monitoring: Continuously monitor gas concentration, temperature, and humidity to ensure a safe and comfortable environment.
- ❑ User-friendly Operation: Simplify the control process by integrating sensors and actuators, enabling automated operation with minimal user intervention.

Components Required:

- ESP32 Wifi Module
- MQ-6 Gas Sensor (Detects LPG, Methane, Carbon Monoxide)
- DHT11 Temperature & Humidity Sensor
- Exhaust Fan
- Channel Relay
- Bread Board
- Jumper Wires

Screenshot:



Implementation on Hardware and Software:

HARDWARE:

- ESP32 WiFi Module : Acts as the central controller for sensor data processing and IoT communication. Connect to WiFi for remote monitoring via Blynk or a similar platform.
- MQ-6 Gas Sensor : Detects gases like LPG, Methane, and Carbon Monoxide. Connect the analog output pin of the MQ-6 to pin A0 (GPIO 32) of the ESP32.
- DHT11 Temperature & Humidity Sensor : Measures environmental temperature and humidity. Connect the data pin of the DHT11 to GPIO 22 on the ESP32.
- Exhaust Fan : Connected to the relay module for on/off control. Relay's signal pin connected to GPIO 23 on the ESP32.
- Channel Relay Module : Allows control of the exhaust fan based on gas levels or manual control from the app.

Implementation on Hardware and Software:

Software:

- **Arduino IDE** : Used to program the ESP32 microcontroller.

Libraries Required:

- **BlynkSimpleEsp32** : For communication with the Blynk IoT platform.
- **DHT** : For reading temperature and humidity data from the DHT11 sensor.
- **WiFi** : To connect the ESP32 to the WiFi network.

Workflow:

- **Gas Detection** : Monitor gas concentration using the MQ-6 sensor. Trigger the fan if the threshold is exceeded.
- **Environment Monitoring** : Measure temperature and humidity using the DHT11 sensor and send data to the Blynk app.
- **Fan Control** : Automatically or manually control the fan through the relay module based on the app input or sensor readings.
- **IoT Monitoring** : Send sensor data (gas levels, temperature, and humidity) to the cloud via Blynk for real-time monitoring.



THANK YOU!