

# Smart Kitchen Extractor Fan Controller

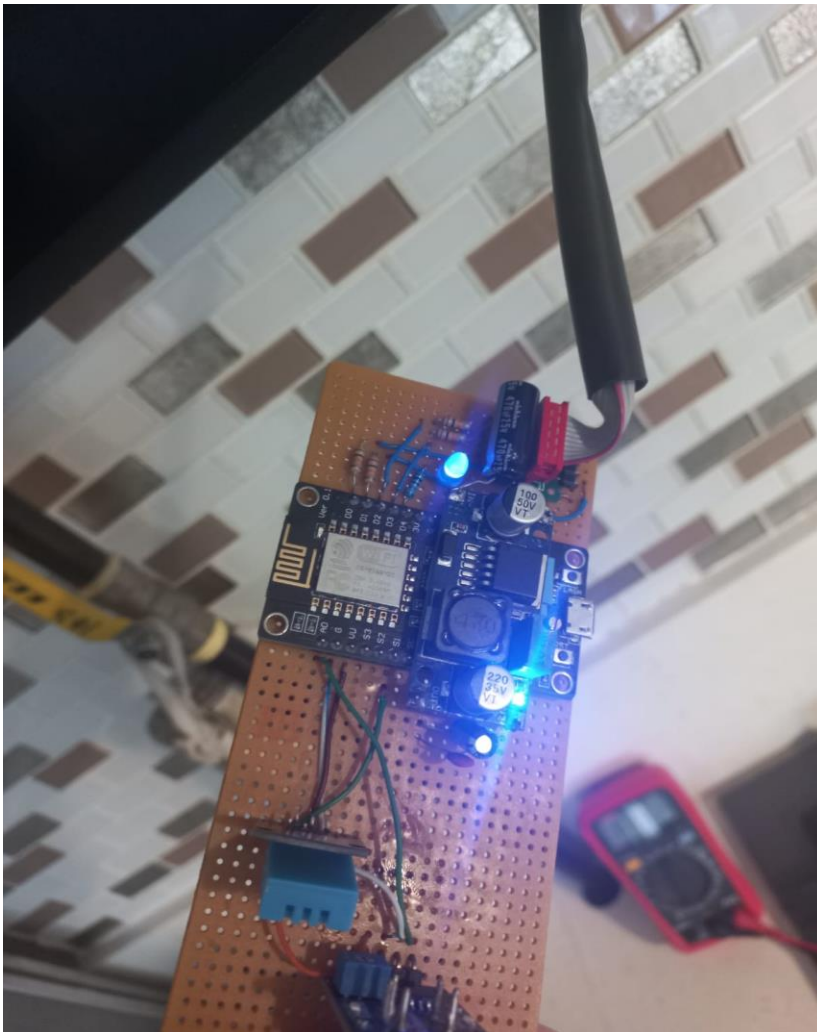
ESP8266 + Arduino IoT Cloud-Based Smart Extractor Control System

## 1. Project Objective

This project aims to automatically control a kitchen extractor fan at three different speed levels by monitoring gas, temperature, and humidity conditions in the kitchen. The system utilizes the Arduino IoT Cloud infrastructure for remote user access.

## 2. Hardware Used

- ESP8266 (NodeMCU v3)
- MQ135 Gas Sensor (for VOC detection)
- DHT11 Temperature and Humidity Sensor
- 3 Output Channels (for fan control)
- Lamp Output



### 3. Software and Algorithms

- Fuzzy Logic:

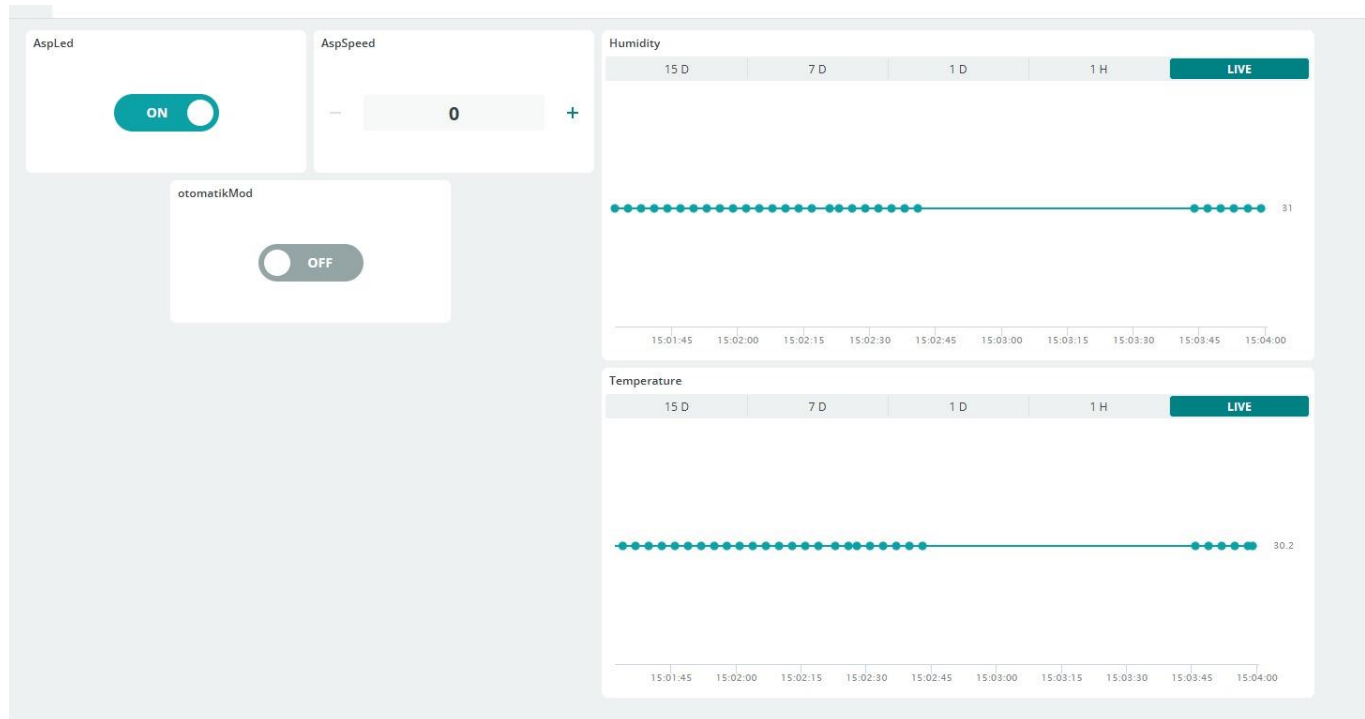
- - Inputs: Average temperature, humidity, and VOC ppm value
- - Output: Fan speed level (0-1-2-3)

- Watchdog Timer: Safety measure against system freezes

- MQTT Protocol: For data communication with Arduino IoT Cloud

### 4. IoT Features

- MQTT-based connection with Arduino IoT Cloud
- Manual mode: Fan speed and lamp control
- Automatic mode: Smart fan control updated every minute
- Mobile and web access supported
- 



## 5. System Working Principle

1. Sensors collect data every 3 seconds.
2. Data arrays of 20 measurements are created.
3. Average values are calculated.
4. Fan level is determined via fuzzy logic engine.
5. Watchdog is reset to ensure system liveliness.

## 6. Skills Learned / Developed

- Using the MQTT protocol and Arduino IoT Cloud
- Developing and implementing Fuzzy Logic algorithms in real-time
- Task scheduling and watchdog integration using C
- IoT system design, security, and user interfaces

## 7. Example Serial Output

[illegible]

## 8. Source Code Sharing

<https://drive.google.com/drive/folders/1wCmbf9hQZ8wpyRUn-GYRqEHd80sfGl6?usp=sharing>