



FACULTY OF COMPUTERS AND ARTIFICIAL INTELLIGENCE

INTERNET OF THINGS PROJECT

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● INTRODUCTION

In this project, we used several IoT functions to help users use the most advanced network infrastructure and the Internet to enable digital services and model a tiny house. We implemented this project as a website using Python Flask for the backend and HTML/CSS for the frontend. Our goal is to provide safe and easy use for people in their homes. Through this project, we aim to highlight the power of the Internet of Things and its applications in real-world scenarios.

This project allows the user to easily control some home appliances, such as lighting, fan control, inquiring about the temperature, knowing if there is a gas leak in the home, and some other features.

The mechanism of work, for example, if the user wants to turn on the light, he claps, and the sound sensor activates, and the lamp lights up. When he inquires about the temperature, he senses the temperature, and then it is sent through the website linked to the system, and it can be easily inquired about. When some gas leak is detected, the alarm bell is activated.

• PROBLEM STATEMENT AND OBJECTIVES

Many homes suffer from a lack of advanced technology. For example, it is possible for people who are unable to monitor the temperature inside the house from the inside or do not know if there is a gas leak inside the house. We must warn them and help them in such matters.

The project aims to create a smart home through which people who are unable to monitor gas leaks, temperature, etc. can operate some devices inside the house, such as a lamp and a fan

• PROPOSED SOLUTION

A system will be created to simulate a smart home that will monitor gas leaks through a gas sensor. If a gas leak is detected, the alarm will be triggered, and it will also turn on the light by emitting a sound. It will also monitor the temperature and send it to the user via a web page, through which the user can turn on the fan or Turn it off.

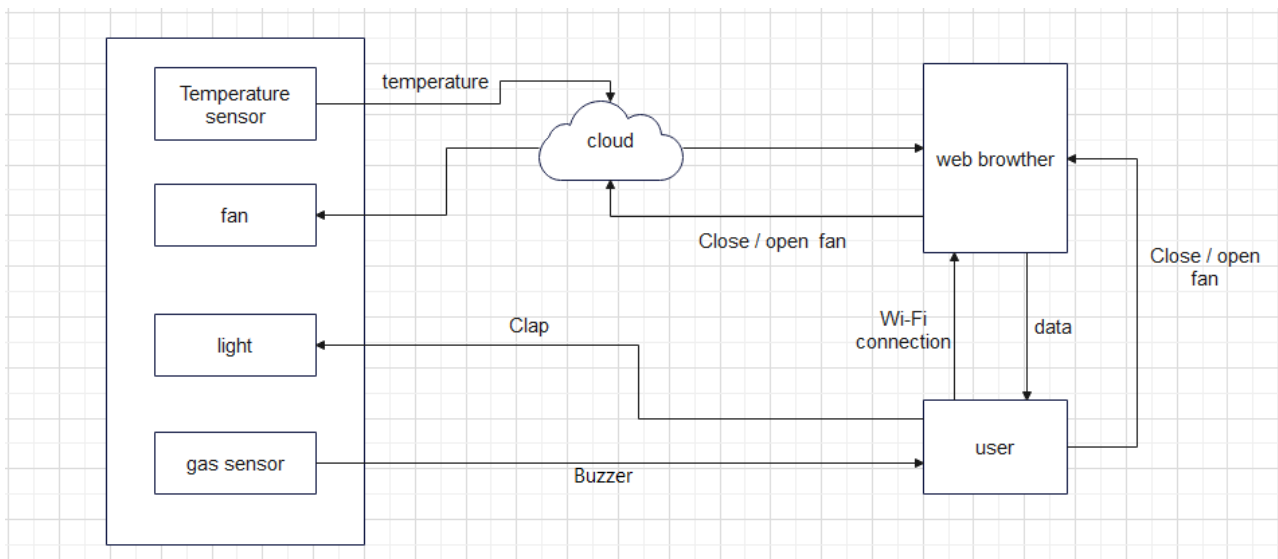
● THE SENSORS AND ACTUATORS

| Sensor | Function |
|--|--|
| Sound Sensor Module. | It is used to detect sound levels in the environment. It usually consists of a microphone, an amplifier circuit, and output pins for communicating with microcontrollers. The unit can detect differences in sound intensity and convert them into electrical signals that can be processed by a microcontroller for applications such as noise level monitoring or audio recording. |
| Cooling Fan 12V (40x40 mm) Used. | A cooling fan with a specification of "12V (40 x 40 mm)" usually refers to a small-sized fan used to cool electronic components or devices. |
| 1 Channel 5V Relay Module with High/Low Level Trigger. | It is an electronic component used to control high-power devices (such as lights, motors, or appliances) using a low-power microcontroller or digital circuit. |
| MQ-2 Smoke Gas LPG Butane Hydrogen Sensor Module. | Gas Detection The MQ-2 sensor can detect a range of gases, including smoke, LPG (commonly used in households for cooking and heating), butane (found in lighters and some fuels), and hydrogen. |
| DHT11 Digital Humidity & Temperature Sensor Module. | DHT11 can measure temperature with sensor (°C). It accurately outputs the temperature reading. A DAC or other digital device using a protocol such as one-wire or I ² C. It sends digital signals representing humidity and temperature data. |

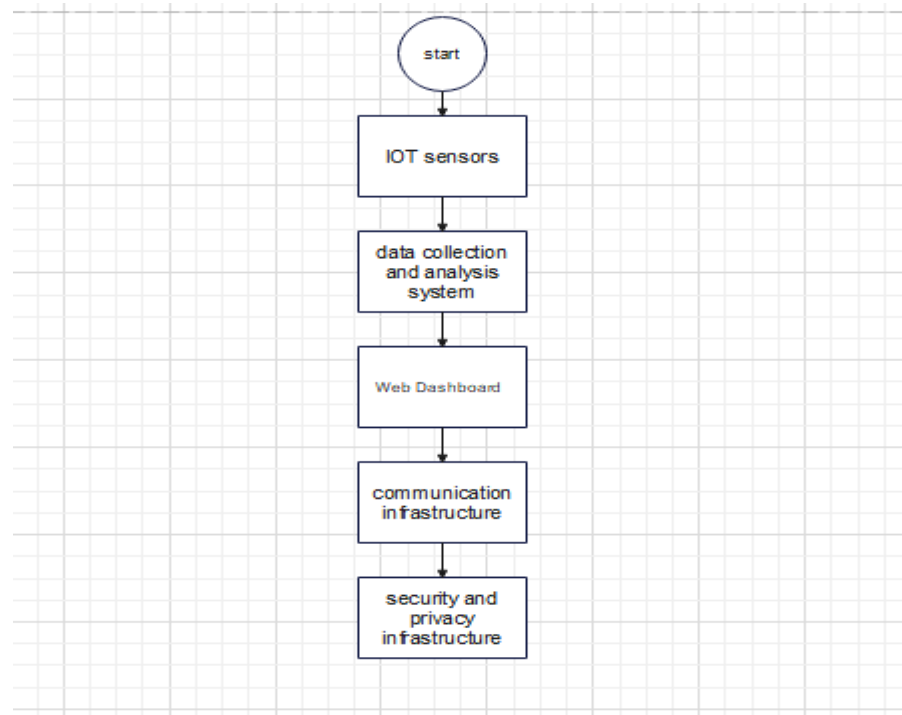
• THE INPUTS AND OUTPUTS

| | inputs | outputs |
|--------------------|-------------|---|
| Temperature sensor | temperature | Read the temperature in the form of a graph |
| Gas sensor | Gas | Bell sound |
| Sound sensor | voice | light |

• SYSTEM ARCHITECTURE

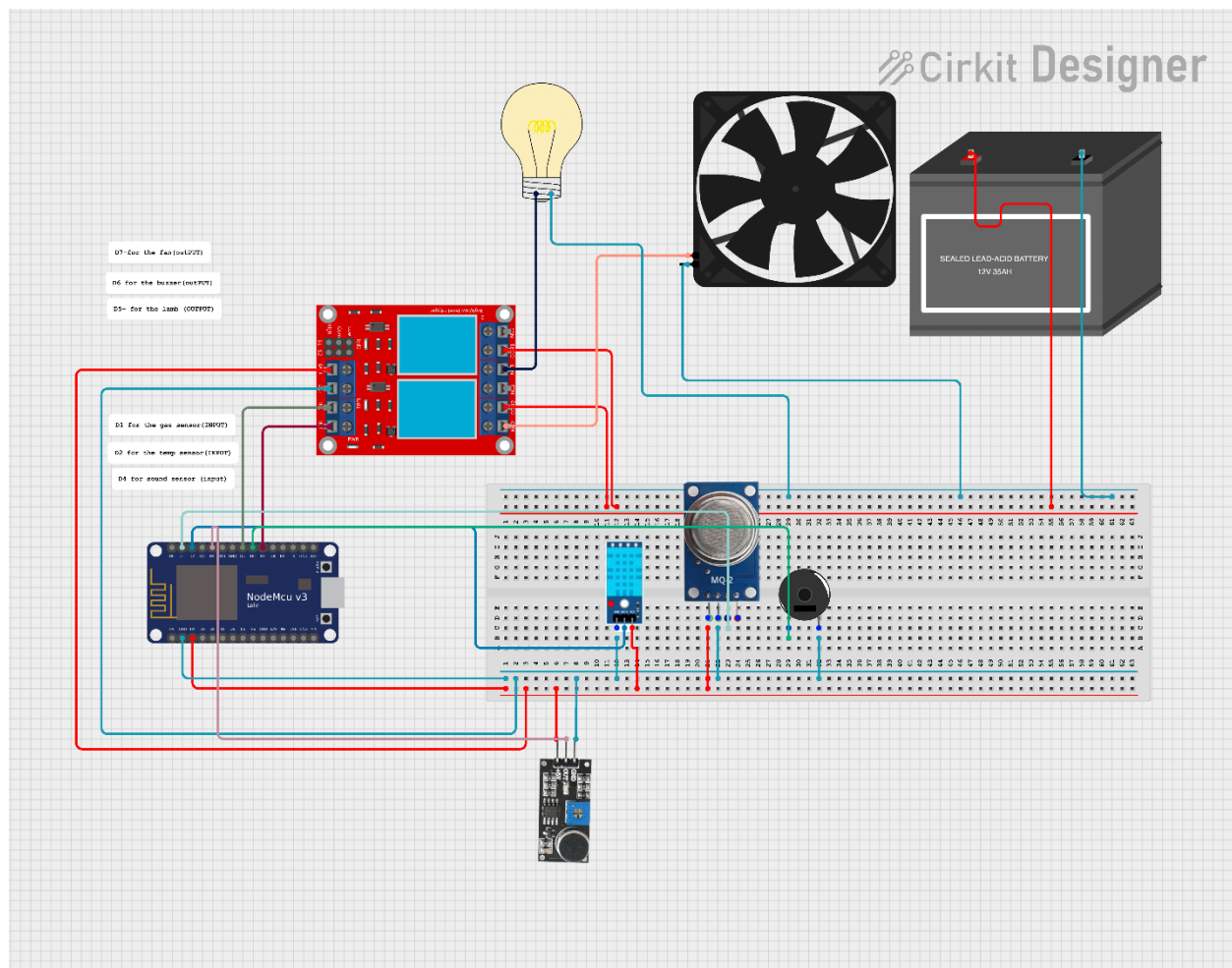


• BLOCK DIAGRAMS

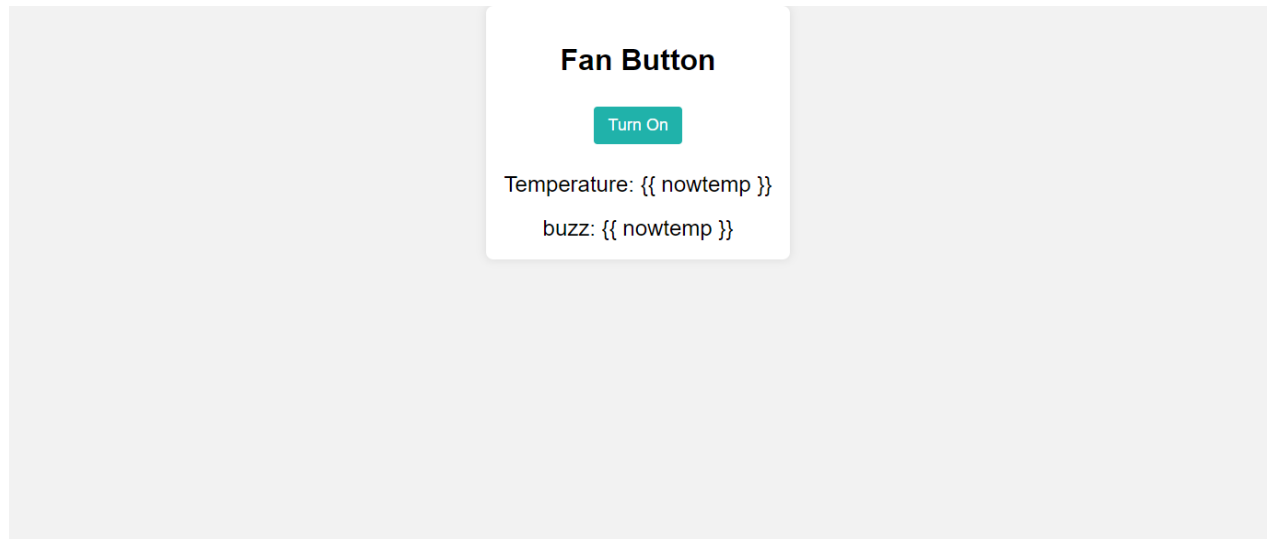


• REQUIREMENTS

➤ **hardware and software components:** (LEDs, Buzzer, DC Fan, Sound Sensor, Temperature Sensor, MQ-2 Smoke Gas LPG Butane Hydrogen Sensor, Male x female wire, female x female wire, male x male wire, Python language, HTML/CSS, Python Flask)



➤ A special interface will be developed for the user (website), which will display the temperature taken from the temperature sensor, and through it users will be allowed to turn on and off the fan.



Test Case:

This photo is testing gas and temperature.

```
gas: 331.00
331.00
Sensor data sent to Firebase: 331.00
temp_sens: 28.50
New fire message: 28.50
Sensor data sent to Firebase: 28.50
gas: 326.00
326.00
Sensor data sent to Firebase: 326.00
temp_sens: 28.50
New fire message: 28.50
Sensor data sent to Firebase: 28.50
gas: 321.00
321.00
Sensor data sent to Firebase: 321.00
temp_sens: 28.50
New fire message: 28.50
```

This photo is testing Fan


```
# Start the flask server
app.run()
```

```
* Serving Flask app '__main__'
* Debug mode: off
```

```
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
```

```
127.0.0.1 - - [16/May/2024 13:17:23] "POST /toggle HTTP/1.1" 200 -
Button turned ON
```

```
127.0.0.1 - - [16/May/2024 13:17:30] "POST /toggle HTTP/1.1" 200 -
Button turned OFF
```

```
127.0.0.1 - - [16/May/2024 13:17:31] "POST /toggle HTTP/1.1" 200 -
Button turned ON
```

```
127.0.0.1 - - [16/May/2024 13:17:32] "POST /toggle HTTP/1.1" 200 -
Button turned OFF
```

This photo is Visualizing Data in Web site

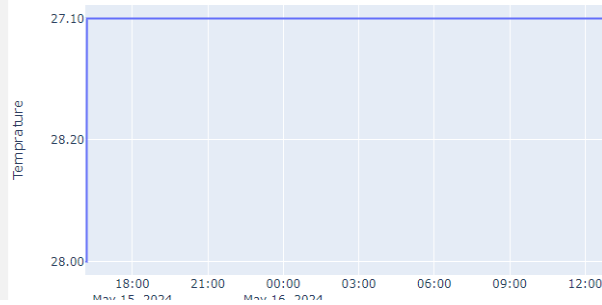
Fan Button

TurnOn

Temperature: 28.50

gas: 0

Temprature Over Day



Temprature Over Day

