Smoke Alarm System Using Tinkercad, Arduino,Wifi Module and Thingspeak.

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Abstract : Generally multistory buildings use wireless sensor networks.There are various types of detectors equipped in buildings that repeatedly measure smoke, temperature or humidity for cloaking fires as soon as possible. The results of the model demonstrate the automatic smoke alarm system matches the design requirements. The project primarily encloses the development and application of monitoring and smoke detection systems based on wireless sensor networks. The smart alarm system continuously monitors the surroundings and records the temperature, humidity and smoke level using different sensors. The results display the thorough performance of the system is excellent.

Index Terms **- IOT, ESP module, smoke sensor, temperature sensor, thingspeak, buzzer.**

1. INTRODUCTION:

The physical conditions of the environment are recorded and monitored by by a network of spatially placed and dedicated sensors called Wireless sensor networks (WSNs) , the data gets collected and stored in a a central location. Factors such as sound, temperature, humidity, pollution levels, and wind is measured by WSNs. The data is transported wirelessly , it relies on networks which are formed spontaneously and wireless connectivity, which shows its similarity to ad hoc networks. The data is being collected simultaneously while controlling senor activity, it is a characteristic of modern network as it is bidirectional.

A Smoke detector is a combination of smoke sensor and necessary monitoring and alert systems, it senses smoke to issue a smoke alarm if the level of smoke gets above the programmed threshold. It may be implemented in a single location in household, or it can be used in an industry using IoT on a greater scale by using various types of sensors. Smoke sensors have a disc type structure in a plastic enclosure. It can detect smoke optically or by ionization process. Smoke sensors generally do not require much power until implemented on a large scale like in an industry, in an household system it is powered by a battery, so that it can trigger alarm even if there is a power shortage.

In this project, our focus is on developing a System that measures the live data of Smoke and sends the realtime data to the Think Speak Cloud.

The Cloud is used to store the data and process it. Once the Data is processed, it is sent to the Web Dashboard / Mobile App. and the Person can monitor the System.

2. LITERATURE SURVEY:

LPWAN Based IoT Surveillance System for Outdoor Fire Detection [1]- Authors: GABRIEL ROQUE AND VLADIMIR SANCHEZ PADILLA. In this paper, they have used suitable wireless technologies for the detection of fires in open grounds. They have noted the various digital response timing according to different conditions.

An Empirical Study on System Level Aspects of Internet of Things (IoT) [2]- Authors: S. NARASIMHA SWAMY AND SOLOMON RAJU KOTA This paper has everything about the Internet of Things. Different pillars of IOT are discussed in this paper. Various applications of IOT in Home automation are listed in this paper. Furthermore, emerging IOT applications are also added.

Fire Sensing Technologies: A Review [3]- Authors: Anshul Gaur, Abhishek Singh, Ashok Kumar, Kishor S. Kulkarni, Sayantani Lala, Kamal Kapoor. In this paper, they have noted the different locations where the fire has occurred and studied the reasons behind the happening. In reference to this they have used different types of fire sensing methods. They have also studied the existing fire sensing technologies and their characteristics.

A smart fire detection system using IoT technology with automatic water sprinkler [4]- Authors: Hamood A, A.Muneer, Suliman Mohamed Fati. In this paper, everything about sensors is studied. Proper placement of sensors can be studied in this paper. The connections of various sensors along with the functions and features of the Gas sensor are studied.

Smart Community Monitoring System using Thingspeak IoT Platform [5]- Authors: David N,Subodh Raj M.S. In this paper, the MQTT protocol is studied. The working of the Thingspeak platform was understood from this paper.

IoT-Based Intelligent Modeling of Smart Home Environment for Fire Prevention and Safety [6]- Authors: Faisal Saeed,Anand Paul,Abdul Rehman,Won Hwa Hong,Hyuncheol Seo. Home fire data analysis using various experiments was studied in this paper. We also studied the various graphs related to the fire.

Fire hazard in buildings: review, assessment, and strategies for improving fire safety [7]- Authors: Venkatesh Kodur and Puneet Kumar and Muhammad Masood Rafi. The current fire protection methods along with fire protection features, is studied in this paper. The various resources used for firefighting and different technologies are listed in this paper.

Non-Wearable IoT-Based Smart Ambient Behavior Observation System [8]- Author: Muhammad Irfan, Husnain Jawad, Barkoum Betra Felix, Saadullah Farooq Abbasi, Tomi Westerlund, and Wei Chen. In this paper, we have studied the smart home automation. Information about Pressure and temperature sensor was also studied in this paper.
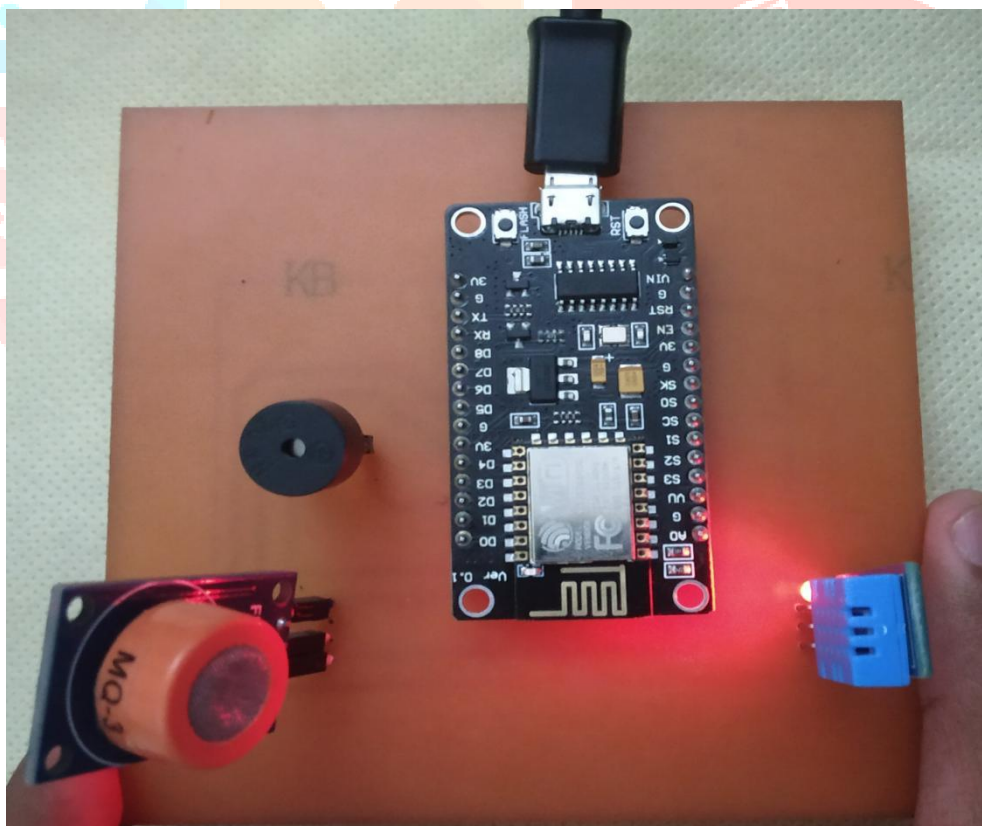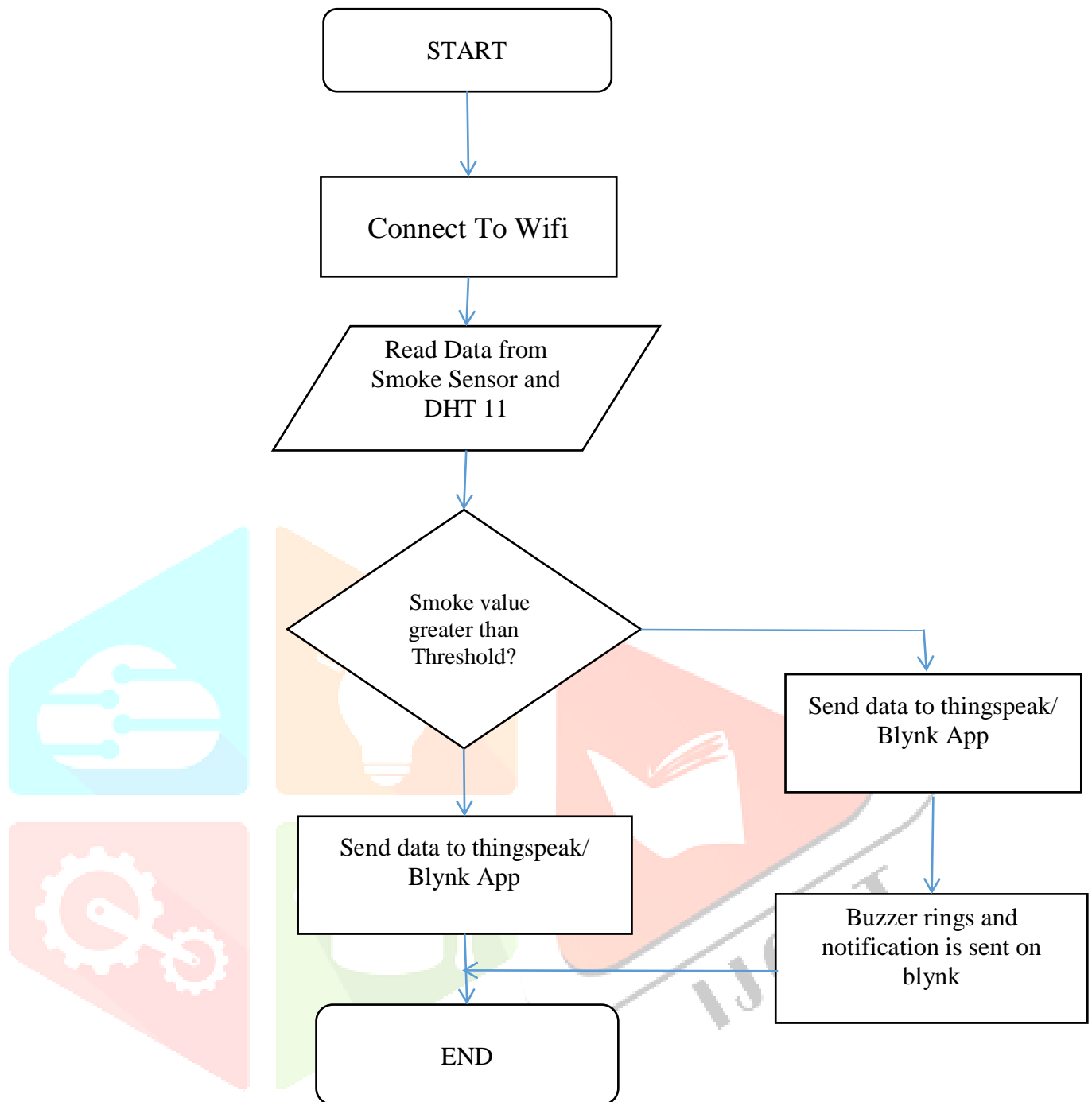
3. BLOCK DIAGRAM:
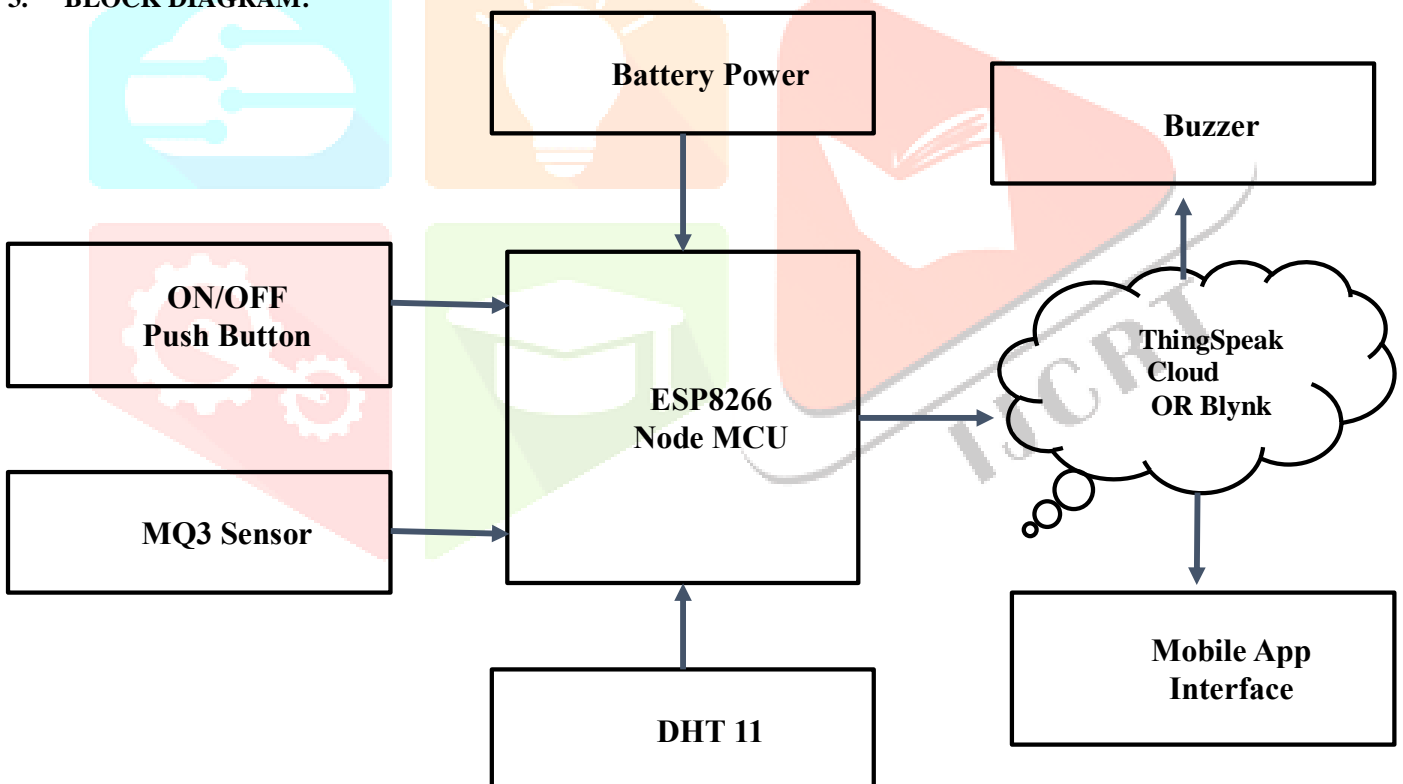
4. CIRCUIT DIAGRAM:
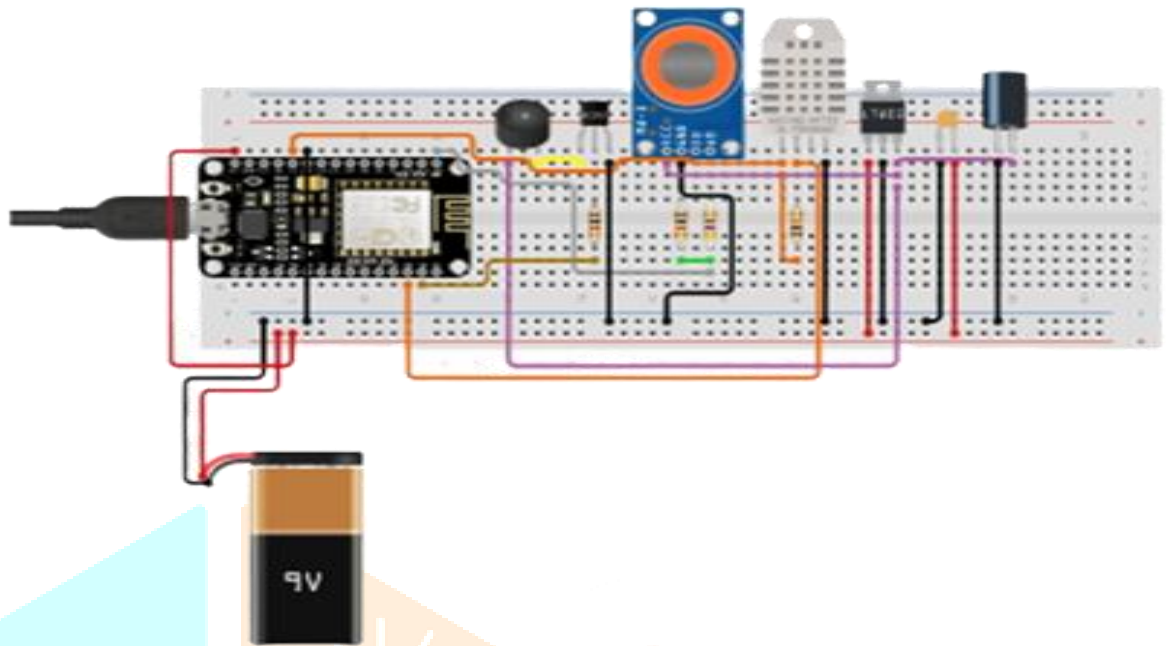
5. IMPLEMENTATION:

6. FLOWCHART:

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                    ┌─────────────────┐
                    │      START      │
                    └────────┬────────┘
                             │
                    ┌────────▼────────┐
                    │  Connect To Wifi │
                    └────────┬────────┘
                             │
                    ╱─────────────────╲
                    │  Read Data from  │
                    │ Smoke Sensor and │
                    │     DHT 11       │
                    ╲─────────────────╱
                             │
                          ◇─────◇
                       Smoke value
                     greater than ──────────┐
                       Threshold?           │
                          ◇─────◇           │
                             │              ▼
                             │    ┌────────────────────┐
                             │    │ Send data to thingspeak/│
                             │    │     Blynk App      │
                             │    └──────────┬─────────┘
                             │               │
                    ┌────────▼────────┐      ▼
                    │Send data to     │ ┌────────────────────┐
                    │thingspeak/      │ │ Buzzer rings and   │
                    │Blynk App        │ │ notification is    │
                    └────────┬────────┘ │ sent on blynk      │
                             │          └──────────┬─────────┘
                    ┌────────▼────────┐◄───────────┘
                    │      END        │
                    └─────────────────┘
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7. WORKING:

In the event of a fire, these smoke detector devices detect smoke and heat. Sensing the extremely high temperature in the environment, these devices react to them. After activation, the device will signal the alarm system to perform a programmed response to the area. Since fire alarms are generally more likely to detect smoke and heat, these devices are usually not called "fire alarms." These devices can be referred to as "smoke detectors" and "heat detectors," respectively. Some of these devices are standalone devices that only detect smoke or high temperature, while others are multi-functional and detect the presence of smoke and high temperature, which are the most reliable ones.

In this project, there are two sensors, DHT 11 and MQ-3 sensor, which are two receptor nodes present. The device is turned on and off with the help of a switch or direct power that is supplied to it. The supply can be given directly through a battery attached to it. The DHT-11 senses temperature and humidity in the surrounding, while the MQ-3 sensor senses presence of any alcohol gas emitted during the fire and smoke due to the fire. When there is a fire breakout, both the sensors continuously sensing their respective parameters feel the sudden rise in it. When the value of any parameter, i.e., temperature, gas emission, and smoke, goes beyond the set limit, it sets off the alarm. The sensor sends the data to the ESP 8266 Node MCU, which processes the received data and proceeds to upload it on the Thingspeak cloud or Blynk App. This is followed by a signal for the buzzer to buzz and notify the users around that there has been a fire breakout, and the users also get a notification on their mobiles and email via the Blynk app.

8. METHODOLOGY:

- Simple Smoke Detector Alarm circuit using MQ-3 designed with few easily available components. Main part of this circuit is Gas sensor MQ-3 which is capable of detecting Smoke, LPG, Propane and Hydrogen and alcohol. It can be used in different types of applications where the smoke and other mentioned gas leak detection required.

- The Live data of Smoke Level is sent to the ThingSpeak Cloud or sent to the Blynk Dashboard.

- When the Gas value reaches the maximum value of the threshold, then the Alarm attached to it is triggered. The following prototype is a test circuit and it can be constructed through breakout board and PCB after calibration of each component. This smoke detector circuit will produce audible alert when smoke detected.
- Also, it will Plot the real time data on ThingSpeak Dashboard or send notification on Blynk.

9. RESULTS:

When the gas level goes above the threshold value the buzzer rings, it acknowledges the people near the area, so that they can evacuate the area, and necessary measures can be taken to contain the smoke, which prevents harm and loss of life.
The figure below shows the email sent to the owner of the household that there is a leakage of gas in the kitchen.
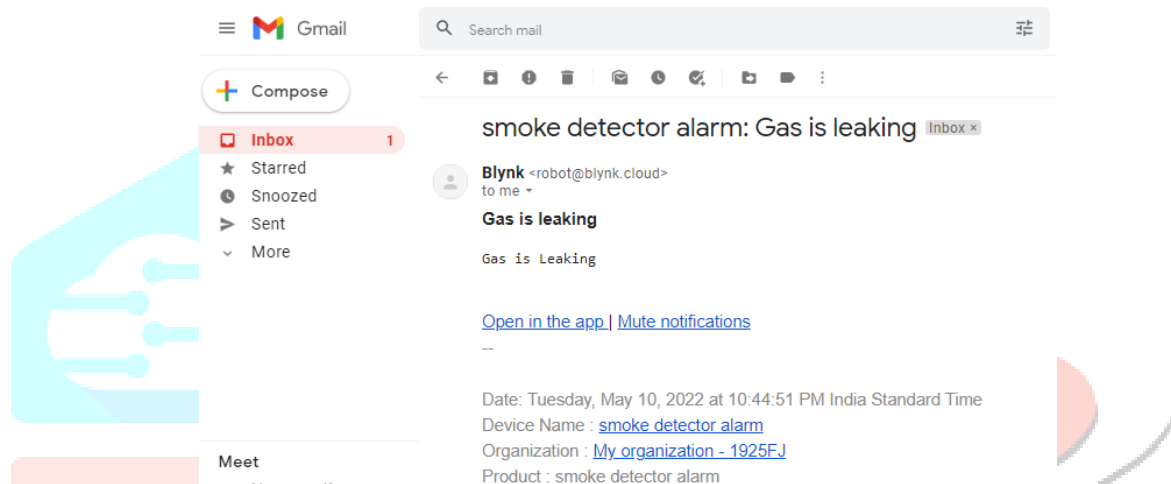

Figure 9.1: Email sent to user.

The figure below shows the blynk app interface, the icon on the top right corner can be used to access the setting and change the interface, and it also shows weather the system is online or offline.
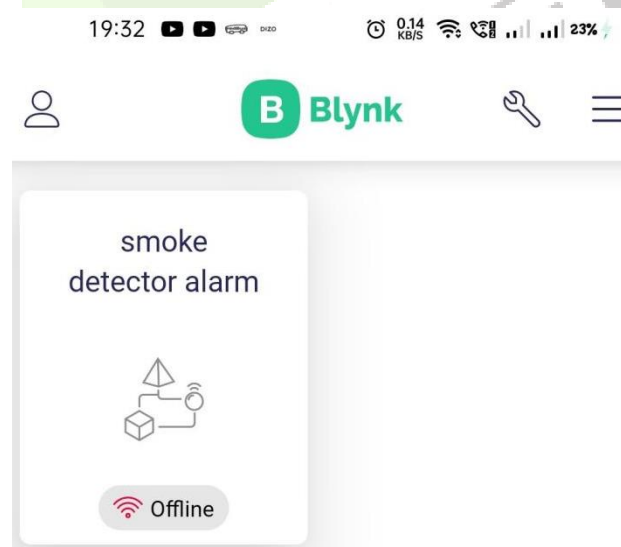

Figure 9.2 :Blynk App Interface.

The figure below shows the blynk notification on app, as well as the two meters showing the level of smoke and temperature of the surroundings respectively.
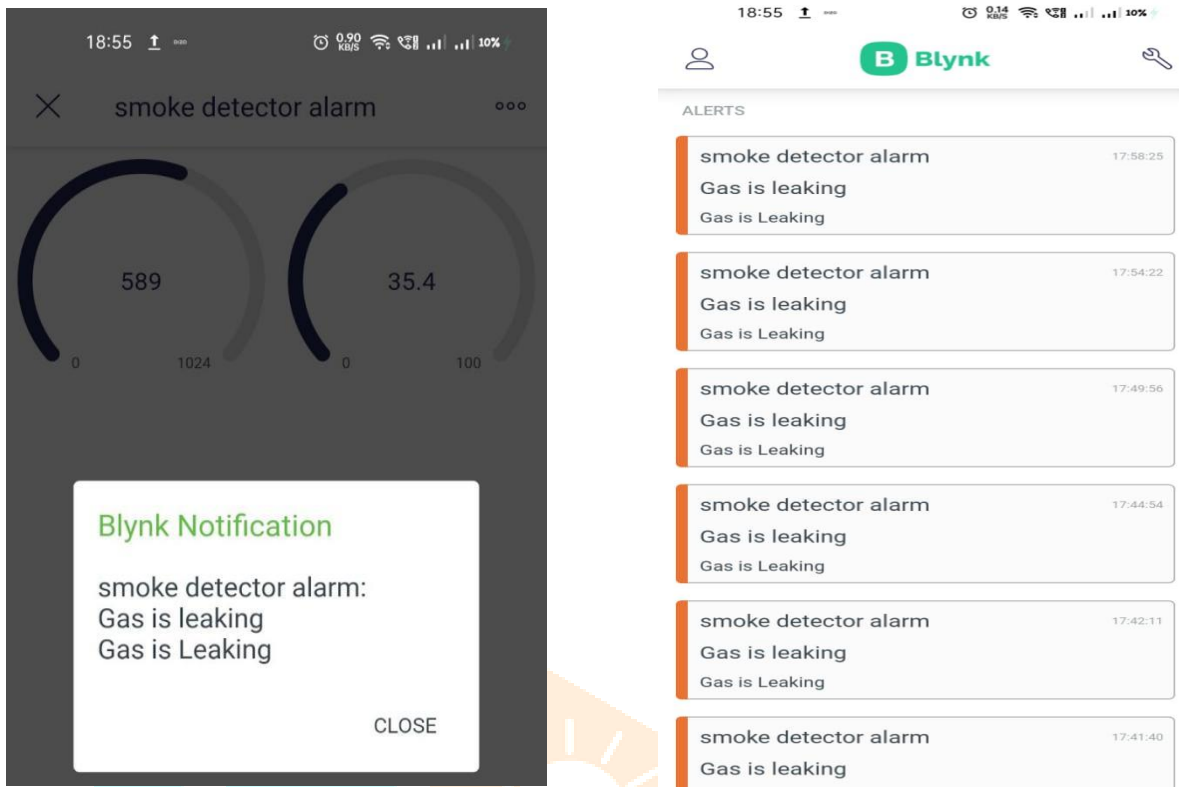

Figure 9.3. Blynk notification on mobile

10. CONCLUSION:

The model continuously monitors temperature and smoke levels in the surroundings and sends alarms to users. The reception and system we propose can achieve its primary goal, mainly to build an IoT-based fire alarm system. Notify them when you find the fire. The answer is sent to the user via the Blynk app. This project can help people learn quickly about the incident, and the nearest fire department can be notified about it. You will receive a valid notification, and also you can check the detailed report on the Thingspeak software. It is a cheap and easy-to-install protection device.

11. REFERENCES:

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