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Fire Detection and Alerting System

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Abstract - Fire detection systems are intended to identify fires early in the development when time is still available for safe evacuation of residents. Early detection is also important in ensuring the safety of emergency response personnel. Property loss will be reduced, and the duration of the operation will be reduced as a result of early detection as a result of management activities begun while the fire remains small. At the moment, the use of IoT-based systems is being extended to real-time detection and warning systems. However, cost has been a key barrier to the development and deployment of IoT devices. Given the low cost and ease of installation, the suggested system presents a low-cost yet effective IoT system for warning and alerting hearth occurrences. The suggested system includes sensors that collect data from the physical environment and send it to a cloud platform on a continual basis. When the temperature rises beyond the predefined threshold, the http webhook is activated, and a notification is sent to the fire department. The amount of equipment that fire departments must bring can be controlled with the help of the displayed number of people in the affected region, which has been incorporated to the proposed system.

Key Words: IOT, Infra-red, Temperature, ThingSpeak, http webhook, LCD, Arduino IDE, Tinker CAD.

1. INTRODUCTION

The Internet of Things (IoT) is a network that comprises of physical systems equipped with sensors that are linked to a cloud where data is exchanged with the help of a gateway that facilitates communication of data connected via the internet. Our main goal here is to reduce the loss caused by fire accidents and to save persons who are in danger as soon as possible. The suggested project will be deployed in each room of an apartment, allowing us to detect the temperature at any moment and upload it to the cloud, allowing for real-time monitoring. The sensors (infrared and temperature) will collect information from the physical world. The collected data is continuously sent to the cloud platform (ThingSpeak). The http webhook will be triggered if the temperature rises beyond the current threshold value. The fire brigade will be notified, and the number of persons in the different areas (rooms) in the affected area (building) will be displayed on the LCD.

Applications-

- Most advanced fire alarm systems rely on wireless technology and smart devices to protect and manage automated buildings via a remote-control panel, which is often a mobile app that can be downloaded, installed, and administered via a smartphone.
- Because control measures are initiated while the fire is still small, property loss and downtime for the operation can be reduced.
- Most alarm systems offer emergency responders with information on the location of the fire, which speeds up the firefighting procedure.

2. Proposed Design

2.1 Flow Chart

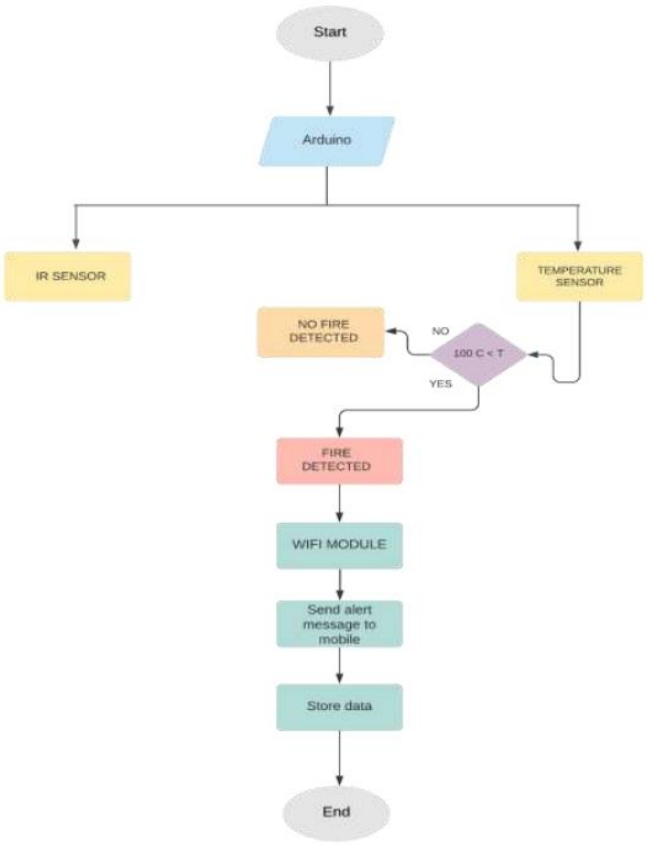

Fig -1: Flow Chart

The IR detector is used here, which is a device that monitors and detects actinic rays in their immediate surroundings. The
detector components detect thermal radiation (infrared radiation) that changes over time in response to human movement in an exceedingly narrow angle range. There are two IR sensors connected to the entry, which are once again

linked to the Arduino for a number of persons within the regarded area, as indicated in the alphanumeric display screen.

The data is understood and sent in real time with objects talk cloud, and users can receive an alert when temperatures surpass the specified price threshold.

2.2 Block Diagram

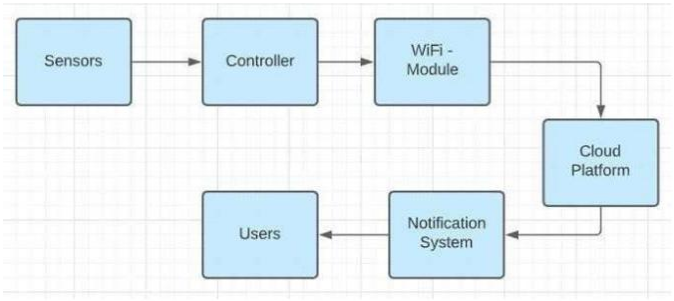

Fig -2: Block Diagram

Here, we're utilizing the temperature detector LM335, temperature sensor that's simply labeled to know the temperature of the surroundings (room) that's linked to Arduino. Arduino is linked to the ThingSpeak cloud, which sends instant and accurate visualizations and analysis data denoted by your devices to ThingSpeak, allowing you to execute on-line analysis and processing of the information in real time. This is typically used for IoT system prototype and proof of concept. The IFTTT application software connects two or more apps or devices. It enables you to try and accomplish something that those apps or devices could not do on their own. It is tied to the cloud here, which is utilized to deliver the warning (notice) to movable device such as a mobile phone. The inexpensive commitment to writing is completed using the software system tools Tinker CAD and Arduino IDE.

2.3 Circuit Diagram

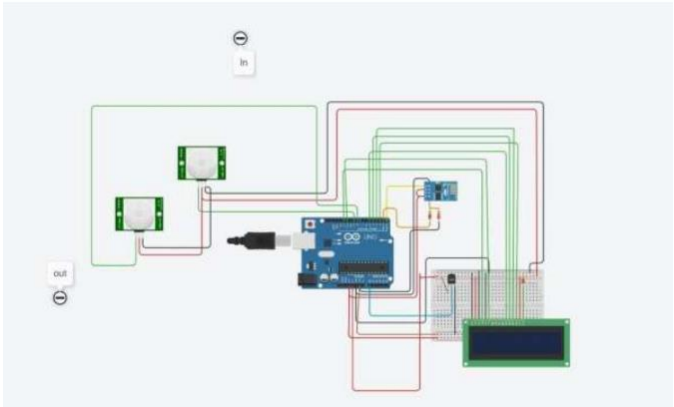

Fig-3: Circuit Diagram

3. CODE

```
#include<LiquidCrystal.h>
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
String ssid     = "Simulator Wifi";
String password = "";
String host     = "api.thingspeak.com";
const int httpPort   = 80;
String uri     = "/update?api_key=BIEH2VYO6INCICPP&field1=";
int sensePin = A0;
int sensorInput;
double temp;
const int in = 9;
const int out = 8;
int c1=0;
int c2=0;
int setupESP8266(void) {
Serial.begin(115200);
Serial.println("AT");
delay(10);
  if (!Serial.find("OK")) return 1;
Serial.println("AT+CWJAP=\"" + ssid + "\",\"" + password + "\"");
delay(10);
  if (!Serial.find("OK")) return 2;
Serial.println("AT+CIPSTART=\"TCP\",\"" + host + "\"," + httpPort);
delay(50);
```

Fig-4: Code

```
  return 0;
}
void anydata(void) {
sensorInput = analogRead(A0);
  temp = (double)sensorInput / 1024;
  temp = temp * 5;
  temp = temp - 0.5;
  temp = temp * 100;
  String httpPacket = "GET " + uri + String(temp) + " HTTP/1.1\r\nHost: " + host + "\r\n\r\n";
  int length = httpPacket.length();
Serial.print("AT+CIPSEND=");
Serial.println(length);
delay(10);
Serial.print(httpPacket);
delay(10);
  if (!Serial.find("SEND OK\r\n")) return;
}
void setup() {
  setupESP8266();
lcd.begin(16, 2);
lcd.setCursor(0,0);
lcd.print("WELCOME!");
pinMode(in,INPUT);
pinMode(out,INPUT);
}
```

Fig-5: Code

```
pinMode(out,INPUT);
}
void loop() {
anydata();
delay(100);
  if(digitalRead(in)==1)
  {
    c1=c1+1;
lcd.clear();
lcd.setCursor(0,0);
lcd.print("No of people ");
lcd.setCursor(0,1);
lcd.print(c1);
delay(100);

  }
  if(digitalRead(out)==1)
  {
    if(c1>0){
      c1=c1-1;}
lcd.clear();
lcd.setCursor(0,0);
lcd.print("No of people ");
lcd.setCursor(0,1);
lcd.print(c1);
delay(100);
}
```

Fig-6: Code

4. CONFIGURATIONS

4.1 ThingSpeak

- View of the channel from which we can see the updated data in the cloud.

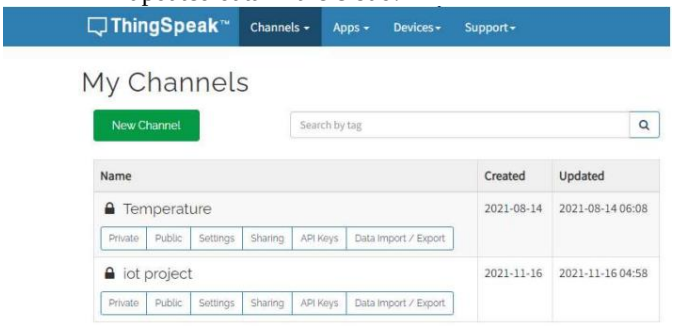

Fig-7: Channels

- A one-of-a-kind API key is necessary to send data to our cloud, which will be obtained.

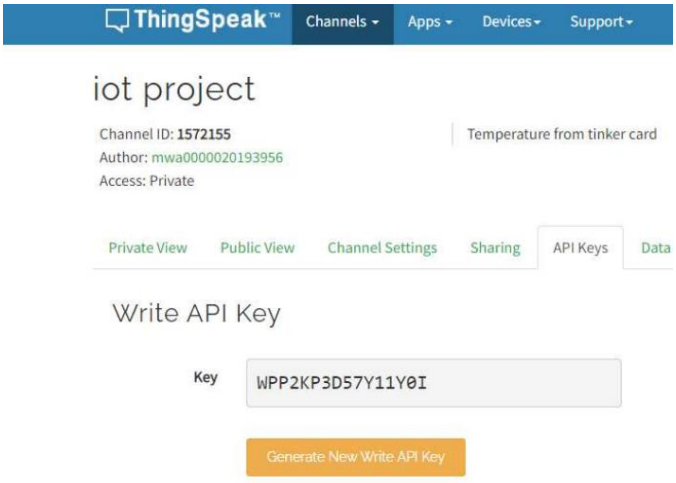

Fig-8: Channels

- Thing HTTP, which connects the React and Thingspeak channels.

Fig-9: Apps

- When the data in the ThingSpeak cloud reaches a certain value (pre threshold), React is utilized to trigger the specific URL.

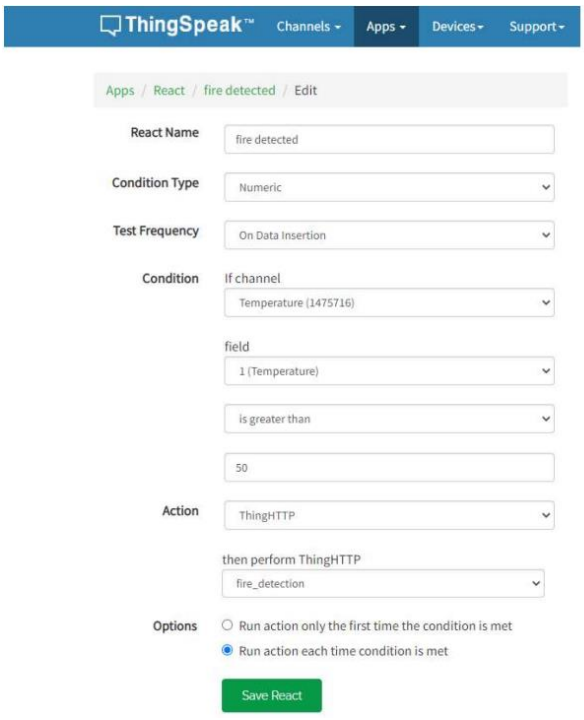

Fig-10: Apps

4.2 IFTTT

We're utilizing the IFTTT Applet to notify the registered user when the webhook is activated.

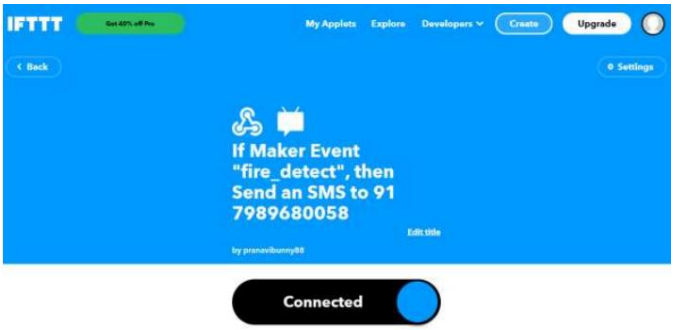

Fig-11: IFTT

We can retrieve the link from the documentation here.

Fig-12: IFTT

5. RESULTS OBTAINED

- The count is computed using the difference in PIR sensors.
- The number of persons is displayed on the LCD screens.

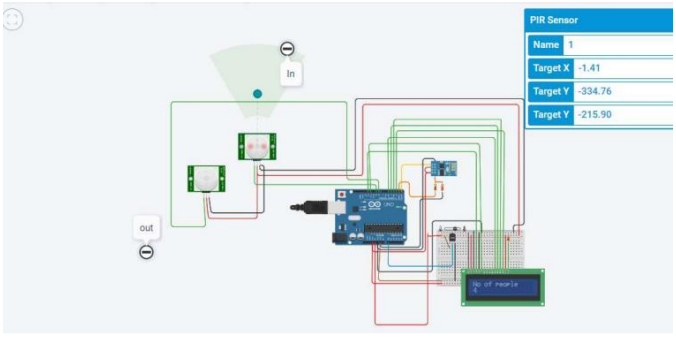

Fig-13: Circuit Diagram

SMS was sent to the registered cellphone number.

Fig-14: SMS

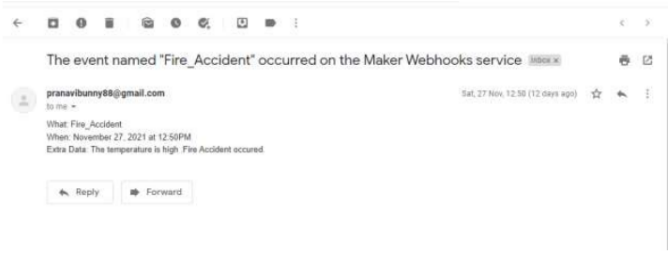

Fig-15: Mail

6. CONCLUSION

The project was a success overall. The project met the initial technical problem of creating a circuit that would sound an alarm when the heat in the atmosphere reached a dangerous degree. Furthermore, the project came in substantially within the predicted overall project cost, making the project a good product because the application was effectively proven and the circuit pricing was acceptable. The identification and localization of fires is an essential aspect of fire police job. The data collected by various detectors put in various areas and information are transferred to Arduino Uno placed in various locations. As a result, the proposed model is tested with the ThingSpeak net interface, and sensor data is gathered for fireplace detection testing.

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REFERENCES

1. 2018 International Conference on Information Technology (ICIT), Bhubaneswar, India, 2018, pp. 161-165, doi: 10.1109/ICIT.2018.00042. https://ieeexplore.ieee.org/document/8724380

2. 2019 1st International Conference on Advances in Science, Engineering and Robotics Technology (ICASERT), Dhaka, Bangladesh, 2019,pp. 15,doi:10.1109/ICASERT.2019.8934458. https://ieeexplore.ieee.org/document/8934458

3. IECON 2016 – 42nd Annual Conference of the IEEE Industrial Electronics Society Florence, Italy. DOI: 10.1109/IECON.2016.7794000 https://ieeexplore.ieee.org/document/7794000