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IoT Based Fire detection and Controlling System

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ABSTRACT: Fire management is one of the main issue that the developed or developing cities are facing. Fire accidental cases are increasing because of bad fire management by those peoples who don't know how to handle it and some of them are known but they can't afford the devices. Sometimes Peoples are out of town that they don't even get aware of the situation of their homes. That's the reason why we developed this device which constantly checks weather fire is detected or not even if someone is out of town they will get a notification via the Blynk application if fire is detected. This project Fire Detection and controlling system using IOT is a system which will co-operate to keep the Citizens aware of their homes situation. This system has a flame sensor which gives an digital signal to the ESP8266 which creates an notification and sends to the user .By this user can get early info of the detected fire and can take immediate action.

KEYWORDS: Fire detection, ESP8266, Flame sensor, Blynk, IOT.

I. INTRODUCTION

The objective of this project is to inform the user about any fire detection. It collects data from flame sensor in the form of digital signal and alerts the user through Blynk Application. The flame sensor sends data to the ESP8266 wi-fi module and it converts that signal into 0 or 1 and runs if else condition by which output is displayed on screen and even user is notified with a notification. This project is IOT Based and its complete solution for all those problems which users complaints about.

II. LITERATURE REVIEW

1. This project is based on IoT as it uses a NodeMCU wi-fi module which gets signal into digital format from flame sensor and triggers the relay.
2. Then it starts the fan then fan helps to extinguish the fire. Also the user gets notified by an App called Blynk. So user can take immediate action on it.
3. This project is best for home fire detection and it is even more cheaper than other products.

III. DESIGN

Resources required-

1. Node MCU ESP8266 12-E Development Board: - The Development board equips the ESP-12E module containing Esp8266 chip having a Tensilica Xtensa 32-bit LX106 RISC microprocessor which operates at 80 to 160 MHz adjustable clock frequency and supports RTOS.

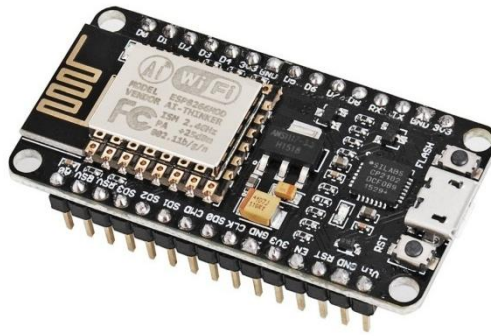


Fig.1.Node MCU ESP8266

2. A Relay Module: - It works on the principle of an electromagnetic attraction. When the circuit of the relay senses the fault current, it energises the electromagnetic field which produces the temporary magnetic flux. This magnetic field moves the relay armature for opening or closing the connection.



Fig.2. Relay Module

3. Infrared Flame Sensor: - A Flame Sensor module or Fire Sensor module is a small size electronics device that can detect a fire source or any other bright light sources. This sensor basically detects IR (Infrared) light wavelength between 760 nm – 1100 nm that's emitted from the hearth flame or light.

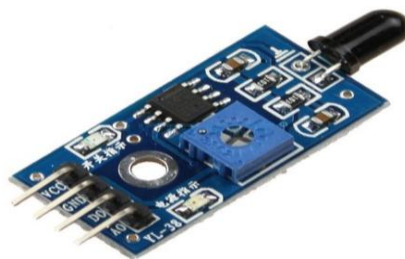


Fig.3.Flame sensor

4. Breadboard: - Breadboards are designed to work with through-hole electronic components. These components have long metal leads that are designed to be inserted through holes during a computer circuit board (PCB) that are plated with a skinny copper coating, which allows the components' results in be soldered to the board.

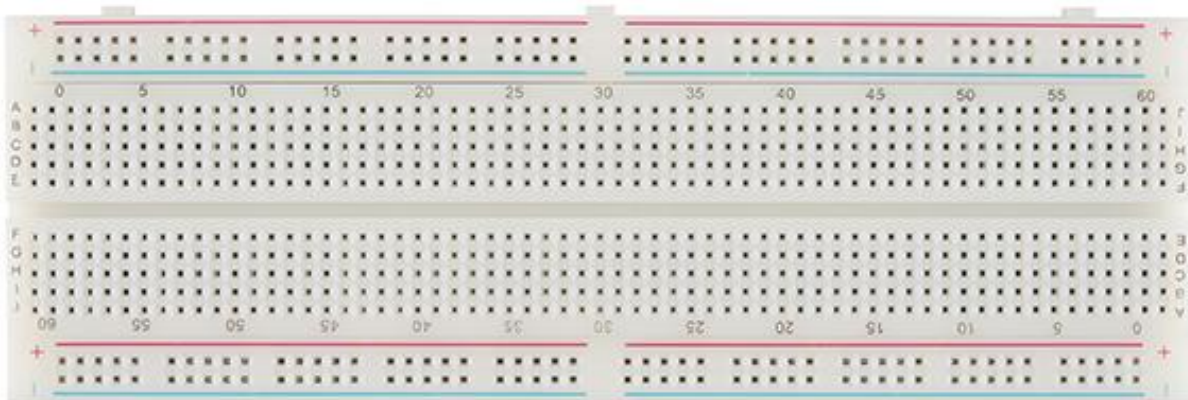


Fig.4.BreadBoard

IV. WORKING

This circuit diagram includes a flame sensor, Node MCU model, a relay module and a 12v DC fan with some jumper wires and Led light.

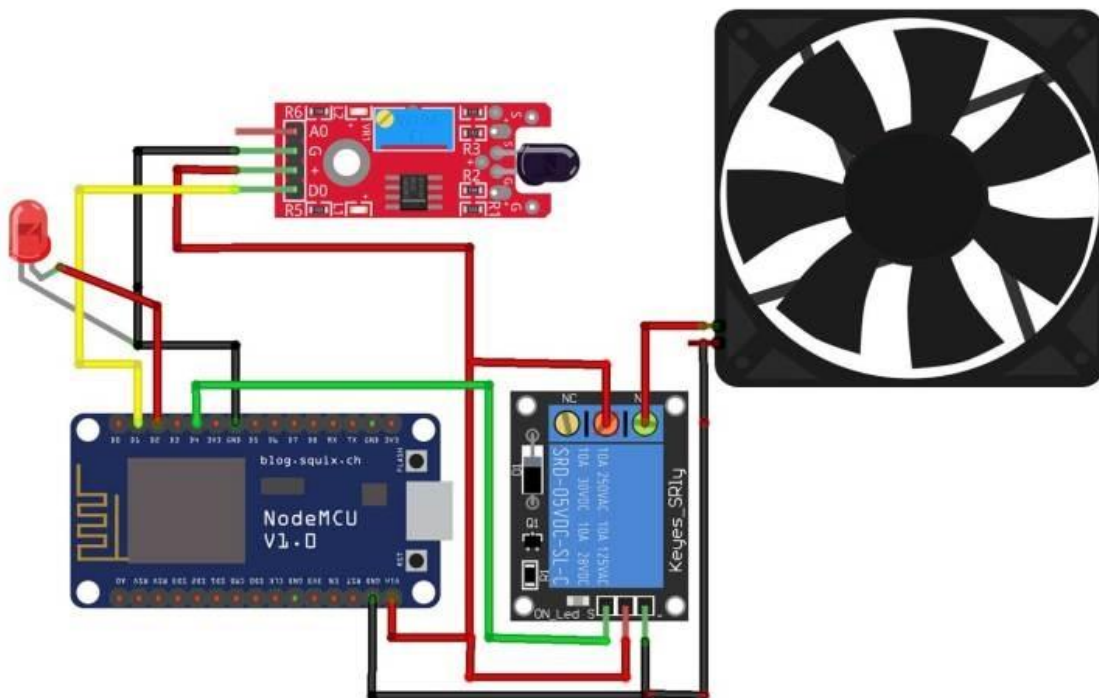


Fig.5.Circuit Diagram

- Firstly connect the Vcc pin to the positive side on the breadboard.
- Then connect GND (ground) Pin to the negative side of the breadboard.
- To establish connection with the flame sensor Connect Vcc and GND pind of flame sensor to Vcc and GND pins on the breadboard.

- Next Connect the D0 pin(signal pin of the flame sensor) to the D1 pin of NodeMCU (ESP8266) to get the signal in digital format.
- After that connect the Negative terminal of LED to GND Pin of NodeMCU and Positive Terminal of LED to D2 pin of NodeMCU.
- Connect the pins of single channel relay GND and Vcc to the GND and Vcc pins on breadboard then connect the Input Pin of single channel relay to the D4 Pin of NodeMCU.
- Then connect the 12v DC fan's Vcc pin to normally open (NO) Pin of single channel relay and connect the positive pin of the 12V adaptor to the common pin of the relay.
- At last connect the Negative pin of the 12v DC fan to the Negative pin of 12v adapter.

After all the connections are done compile and upload the code in the ESP8266 module which is designed for the purpose of collecting the data from flame sensor and implementing it in the code. After successful upload check the project is working or not by testing it.

V. RESULT

At the end the system is working fine after testing it. It successfully works as expected. The flame sensor sends digital signal 1(indicates fire detected) to ESP8266 wi-fi module after detecting any fire near it and then ESP executes the code. After the execution of the code relay gets clipped and it turns on our 12v dc fan that helps to extinguish the fire. Also it send the notification to the user via Blynk application that "Alert fire detected" after the fire gets extinguish the flame sensor again sends a digital signal 0(indicates fire not detected) to the ESP module and then again relay gets clipped and fan stops. Also it sends a notification to the user that "Fire extinguished stay calm" and that's how our IOT based fire detection and controlling system works.

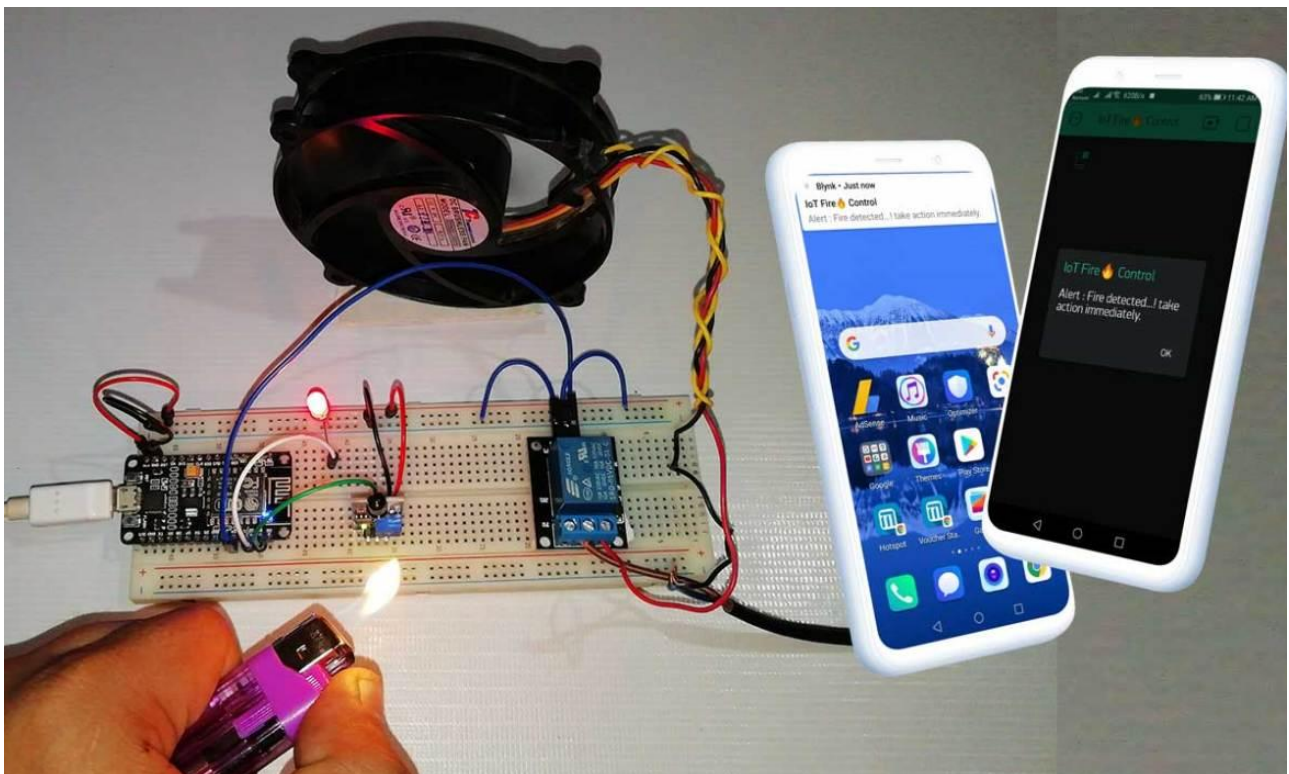


Fig.6.Working of Project



VI. CONCLUSION AND FUTURE WORK

This project task is the execution of fire detection and controlling system using IOT (sensor, wi-fi module). This system satisfies the fire control and detects it when senses the fire nearby. Hoping that this IOT based fire detection and controlling system could help society to overcome the situation of bad fire management and could be the best device to reduce fire accidents hence it's a good project.

- Fire spreads faster and can do Serious damage that's why some more precaution is needed and cannot be depended on a fan.
- In our Project system sends a message on user's mobile to alert user but it can be improved further by sending that message directly to the Fire department.

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