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IOT BASED FIRE DETECTING AND ALERTING SYSTEM

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ABSTRACT:

Real-world Internet of Things (IoT)-based systems have the way real-world systems are interconnected through the internet. At present, the application of IoT-based systems has extended to real-time detection and warning systems. However, cost has been a major factor for the development and implementation of IoT systems. Considering the cost and ease of implementation, this paper proposes a low-cost yet efficient IoT system called Fire Not for warning and alerting fire incidents. Fire Not is a cloud-based system that uses sensors (hardware) to detect fire and alert the user through the internet. It is maintained and monitored using a simple Android app. The Fire Not system uses a Raspberry Pi programmed in the Python language and utilises the Google API for location detection. This paper practically demonstrates the Fire Not system through extensive testing on various operations, and the Fire Not system is proven to be efficient.

KEYWORDS:

Internet of things (IOT), flame sensor, MQ-3 gas sensor, buzzer, emergency lights, exaust fan, blink app, relay module, mobile notification, Email notification.

INTRODUCTION:

The IOT (Inter of Things) is basically a network of things by which physical things can exchange data with the help of sensors, electronics, software, and connectivity. These systems do not require any human interaction. Detectors play a very important role in industries, shops, malls, residential complexes, parking areas, etc. They help in detecting fire or smoke at an early stage and can help in saving lives. We have designed an IOT based Fire Alerting System using temperature and a smoke sensor which would not only signal the presence of a fire in a particular premise but also send related information through IOT. A fire alarm system warns people when smoke, fire, carbon monoxide or other fire-related emergencies are detected. These alarms may be activated automatically by smoke detectors and heat detectors, or may also be activated via manual fire alarm activation devices such as manual call points or pull stations.

EXISTED WORK:

The existing fire alarm system that is widely used is not quite digitized. The sensors usually used are smoke and fire detectors. Notification systems are pull stations or sound alarms. Inputs from various sensors are collected in a fire alarm control unit where the data is monitored. This component, the MCU of the system, monitors inputs and system integrity, controls outputs, and relays information. This existing system is an electrical hardware system that is used in a localised environment with a huge deployment cost and is, to a point, out of date.

PROPOSED WORK:

In this work, proposing an IOT-based fire alerting system that has the ability to think and recognise patterns based on experience, aka collected data and algorithms, that has a high probability of resulting in an unwanted hazardous fire. Here we are proposing a two-component fire alarm system.

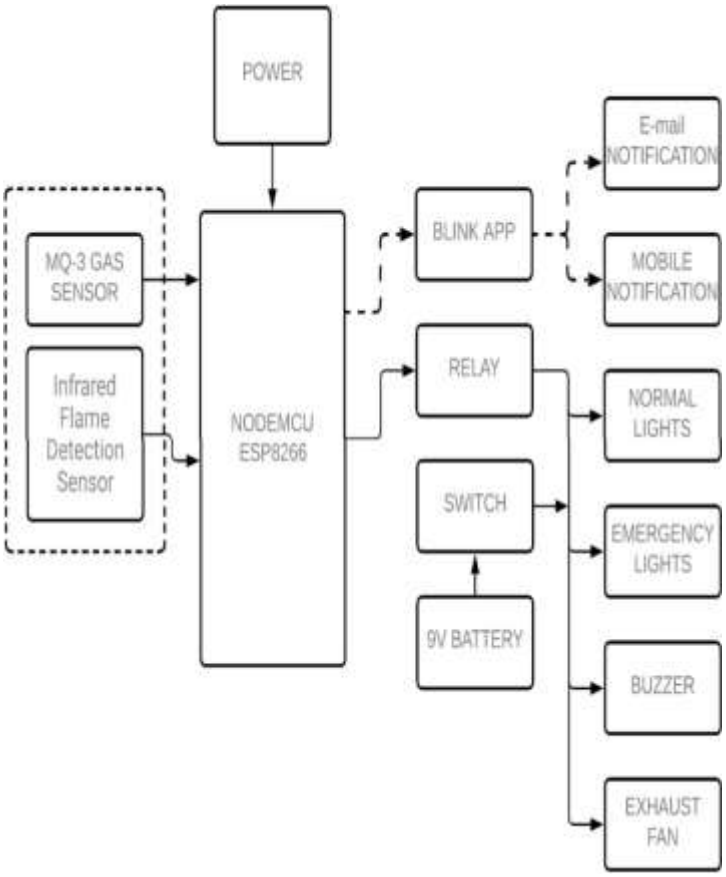
1. **Sensor Nodes (Sensor & Actuator):**

Depending on the risk, we can integrate a heat and humidity sensor and use a commercial power supply as a power source. We will need to connect these sensors to a micro controller or a Wi-Fi module so we can send the collected data to our cloud platform using the internet.

2. **Controller:**

On our cloud platform, we will store the data in a relational database. The reading of temperature and humidity around every single node will be stored with a timestamp and an identifier for each node, preferably denoting their physical position. Once a set of data is stored, we will need to compare them with reference values of temperature and humidity readings, and based on the result of said comparison, we can trigger different actions. Like calling various predefined APIs or web hooks that can send SMS to concerned parties, or sound an alarm, or make an evacuation announcement, or start pouring or tinkling water in the particular areas.

BLOCK DIAGRAM:



POWER SUPPLY:

Power supply is an electrical device that supplies electric power to an electrical load. The primary function of a power supply is to convert electric current from a source to the correct voltage, current, a frequency to power the load. As a result, power suppliesare sometimes referred to as electric power converters. Some power supplies are separate standalone pieces of equipment, while others are built into the load appliancesthat they power. Examples of the latter include power supplies.

All power supplies have a power input connection, which receives energy in the form of electric current from a source, and one or more power output connections that delivercurrent to the load. The source power may come from the electric power grid, such asan electrical outlet, energy storage devices such its input voltage or load current changes. Adjustable power supplies allow the output voltage or current to be programmed by mechanical controls A power supply is a component that supplies power to at least one electric load. Typically, it converts one type of electrical power to another, but it mayalso convert a different form of energy such as solar, mechanical, or chemical - into

electrical energy.

NODEMCU(ESP8266):

The NodeMCU ESP8266 Wifi Module is an open-source Lua-based firmware and development board specially targeted for IoT-based applications. It includes firmware that runs on Espressif Systems' ESP8266 WiFi SoC and hardware based on the ESP12 module.

DHT SENSOR:

DHT sensors are made up of two parts. They are acapacitive humidity sensor and a thermistor. There is also a very simple chip inside that does analog-to-digital conversions and spits out a digital signal along with temperature and humidity. The digital signal is easy to read using any microcontroller.

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IR FLAME SENSOR:

Flame sensors are used in many environments, such as hydrogen stations, industrial heating systems and drying systems, industrial gas turbines, home heating systems and gas cooking appliances. Their purpose is to reduce the risks associated with the combustion.

GAS SENSOR:

A gas sensor is a device that can detects the presence of the gases in the surrounding environment. The sensor creates a corresponding potential difference depending on the gas concentration which regulates the resistanceof the material inside the sensor, which can be determined as the output voltage. They are often used to detect toxic or explosive gases and to measure gas concentration. Gas sensors are used in factories and manufacturing plants to identify gas leaks and detect smoke and carbon monoxide in homes

RELAY MODULE:

A power relay module is an electrical switch that is operated by an electromagnet. The electromagnet is activated by a separate low-power signal from a microcontroller. When activated, the electromagnet pulls to either open or close an electrical circuit.

EMERGENCY LIGHTS:

Emergency lighting is lighting provided in an emergency situation where a power failure causes normal lighting to be interrupted. A fire or a power outage could cause a loss of power to the normal lighting.

EXHAUST FAN:

During a fire, smoke and fire gases spread throughout an entire building. Smoke extract fans secure the building by extracting smoke and heat.

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BUZZER:

This is small PCB Mountable 5V Passive Buzzer. It is great to add Audio Alert to your electronic designs. It operates on 5V DC Power supply, uses a coil element to generate an audible tone.

WATER SPRINKLE:

A sprinkler is a device that is used to spray water. Sprinkler systems are intended to control or extinguish a fire.Control mode sprinklers are intended to control the rate of heat release from the fire to prevent building structure collapse and pre-wet surrounding combustibles to prevent fire spread.

PUSH BUTTON:

The "push-button" has been utilized in calculators, push-button telephones, kitchen appliances, and various other mechanical and electronic devices, home and commercial.

In industrial and commercial applications, push buttons can be connected together by a mechanical linkage so that the act of pushing one button causes the other button to be released. In this way, a stop button can "force" a start button to be released. This method of linkage is used in simple manual operations in which the machine or process has no electrical circuits for control.

Red pushbuttons can also have large heads (called mushroom heads) for easy operation and to facilitate the stopping of a machine. These pushbuttons are called emergency stop buttons and for increased safety are mandated by the electrical code in many jurisdictions. This large mushroom shape can also be found in buttons for use with operators who need to wear gloves for their work andcould not actuate a regular flush-mounted push button.

BLYNK:

Blynk was created with the Internet of Things in mind. It can control hardware remotely, display sensor data, save and visualise data, and perform a variety of other tasks.

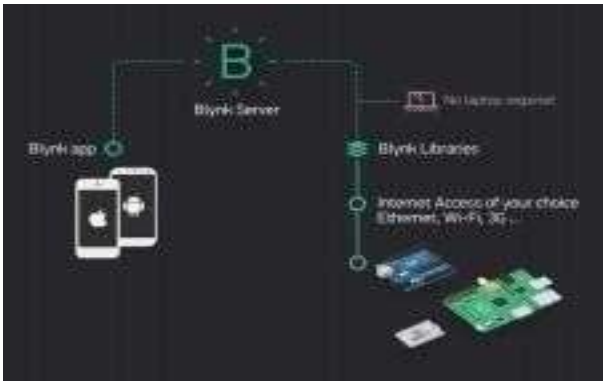
The platform consists of three primary components:

1. Blynk App- helps you to develop stunning interfaces for your projects by combining a variety of tools.
2. Blynk Server- All communication between the Smartphone and the hardware is handled by the Blynk Server. You can use our Blynk Cloud or set up your own Blynk server on your own computer. It's open-source, capable of supporting thousands of devices, and can even run on a Raspberry Pi.

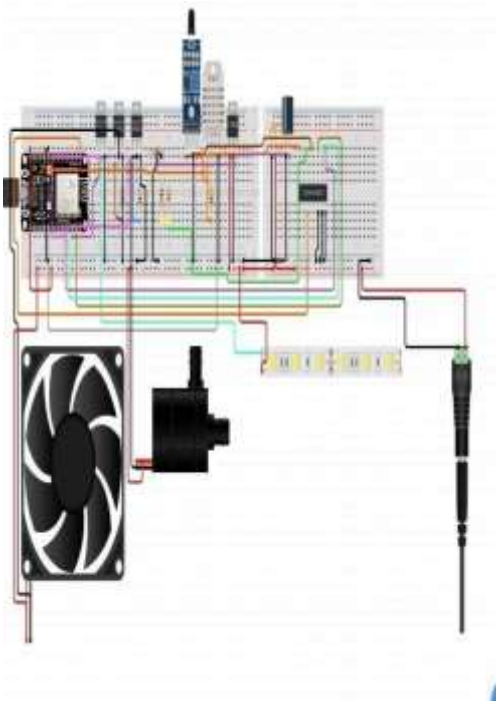
3. Blynk Libraries- facilitate server communication and handle all incoming and outgoing commands for all popular hardware platforms.

Imagine that every time you push a button in the Blynk app, the message is transmitted to a satellite, then to the Blynk Cloud, where it is magically delivered to your devices. It is effective.

Everything happens in the blink of an eye in the opposite direction.



CIRCUIT DIAGRAM:



WORKING:

The fire detector is used to detects the smoke or heat.In the event of a fire, these devices react to smoke or extremely high temperatures.Upon activation, the device will send a signal to the alarm system to perform a programmed response on the zone. Since fire alarms are generally more likely to detect smoke and/or heat than actual fires, these devices are generally not called "fire alarms". These devices may be referred to as "smoke detectors" and "heat detectors" respectively. Some of these devices are standalone devices that only detect smoke or high high temperatures, while others are multifunctional and detect the presence of smoke and high temperatures. When it comes to detecting fires, multifunction devices are generally the most reliable. Single-function machines, on the other hand, are usually less expensive. In addition, multi-function devices may not be suitable for all fields. For example, there may be a room in it. In households that smoke regularly, this may include the kitchen or designated smoking rooms. For these areas, a thermal sensor with one function may be more suitable than a smoke and heat detector with dual functions. After the smoke and/or heat detector is activated, a signal is sent to the alarm system to achieve a predefined response. Many users configure their systems to send emergency calls to the central monitoring station as soon as the device is activated. Ensure that the fire department arrives at the scene as soon as possible. However, it is also common for the detector to receive the fire confirmation before sending the message.

CONCLUSION:

The model continuously monitors fire alarms and sends alarms to users. The reception and system we propose can achieve its main goal, namely to build an IoT-based fire detection and alerting system. Call them when you find the fire. The answer is sent to the user via SMS through blink app. Using this product can help these people quickly learn about the incident and the nearest fire department. You will receive a valid notification. It is cheap and easy to install.

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