IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

FIRE DETECTION AND AUTOMATIC WATER SPRINKLER SYSTEM USING IOT

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Abstract: Fire presents significant threat to life due to its severe hazards and ability to spread rapidly. Fire poses a huge threat to human life. Fire detection systems, particularly alert based systems, identify flames before any loss or destruction occurs. In this model, we are trying to create a system which immediately alerts the user or client by generating a notification on android application and also prevent major damage to the property. The goal of the proposed system is to notify the remote user when a fire accident occurs. This system can be installed in any remote area where there is a risk of fire. Using this system, we can detect a fire by using a fire sensor. After detection of fire the NODEMCUESP8266 will be using the buzzer in order to alert the surroundings. To prevent major damage, the detector will detect flames caused by a fire accident and activate the water sprinkler, and also Air filter which filters the air which contains harmful gases released in a fire accident. And we will be using a Fan which eliminates the smoke with the help of air filter. The appliance system includes components such as a buzzer for alarming, displaying temperature, humidity and to put out the fire, we use motor pump which acts as a water sprinkler, we use DC Fan for removing air, we use Air filter for removing harmful gases formed in the accident.

Key words: **Nodemcu8266, buzzer, Air filter, DC Fan, Fire sensor, Android Application**

I. INTRODUCTION:

Fire is a serious threat to people and property all over the globe. It is usually caused by the combustion of materials, which produces an enormous quantity of heat and light. Fire accidents are prevalent in factories, homes, and markets due to inadequate fire protection and an absence of an adequate fire alarm system. As an outcome, we try to develop an automated fire detection system with a water sprinkler system because the event is extremely hazardous in our lives. An effective firefighting system reduces fire damage while also limiting the harm caused by the firefighting system. Fires have become a significant problem in recent years, and they must be dealt with quickly and efficiently in order to prevent the loss of lives and property.

Fire incidents are now a critical issue, which must be dealt with quickly and without unnecessary delay to prevent loss of life and property. When the monitored temperature exceeds 50o C, it is deemed a fire. Personnel arriving for assistance in fire hazards in critical places such as hospitals, schools, and banks takes about 15 minutes.

Early detection of a fire and the sounding of an appropriate alarm have been shown in the past to be important factors in avoiding large losses due to fire. Fire detection and alarm systems that are properly implemented and maintained can help to improve the survivability of occupants and emergency responders. While minimizing property damages.

Fire detection and alarm systems, along with automatic fire suppression systems, are components of active fire protection systems present in many buildings. Adopted building and/or fire codes may mandate the installation of fire detection and alarm systems to this purpose. These devices are typically installed and maintained by trained personnel. The ideal arrangement of fire alarms with proactive warnings could safeguard lives and reduce property losses. There are many different types of fire alarms, such as heat detectors and smoke detectors, and understanding these differences can help you determine which type is best for your home or store. When the temperature exceeds a certain level, for example, heat detectors are traditional options.

As a result, it is better suited for applications where a quick response is not needed or in environments where smoke detectors cannot be placed, such as frozen areas. Heat detectors have a reduced false alarm rate but still respond slowly due to the slow rise in temperature. Despite these shortcomings, smoke detectors continue to outperform heat monitors.

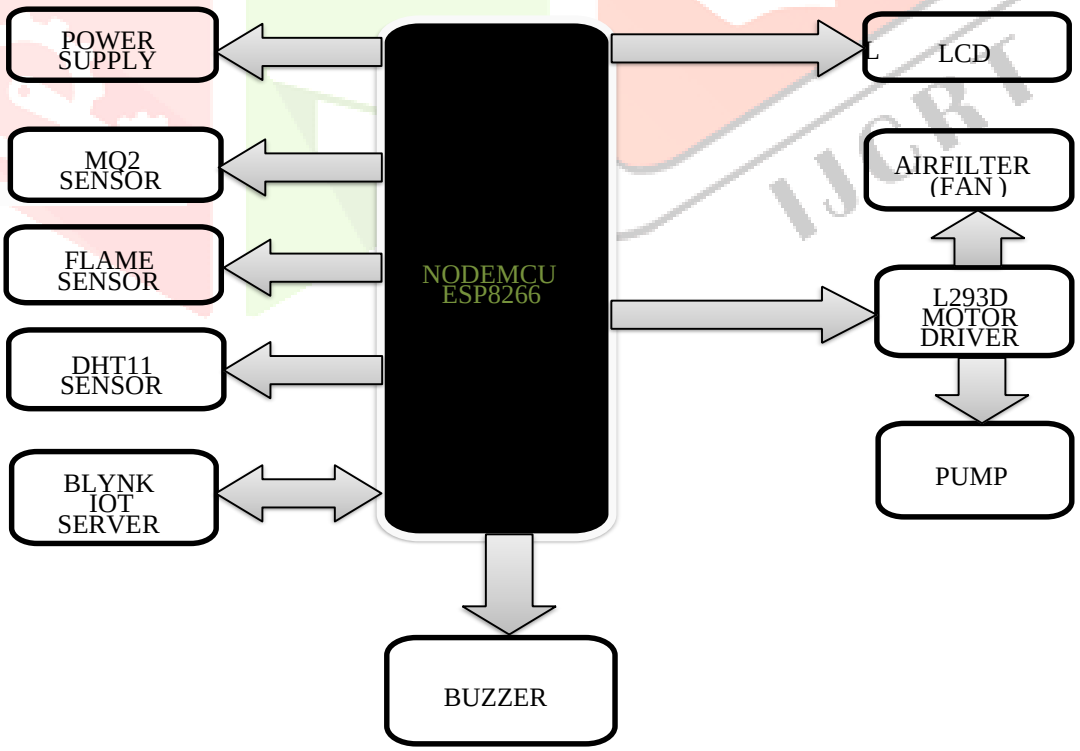
II. EXISTING SYSTEM:

Fire detection and automatic water sprinkler systems using IoT are designed to detect and suppress fires in homes, offices, and other buildings. The system works by using sensors that monitor the temperature, smoke, and other fire indicators in the environment. Once a fire is detected, the system automatically triggers the water sprinkler to put out the fire. The system is connected to a central control unit that can be accessed remotely through the internet. This allows building owners and operators to monitor the system in real-time, receive alerts in case of emergencies, and adjust settings as needed. The IoT-enabled system offers several benefits over traditional fire suppression systems, including real-time monitoring, faster response times, and reduced risk of false alarms. It is also more cost-effective than traditional systems as it requires less maintenance and fewer personnel to manage. Overall, fire detection and automatic water sprinkler systems using IoT are an effective and efficient way to protect buildings from fires and keep people safe:

III. PROPOSED SYSTEM:

A proposed system for fire detection and automatic water sprinkler using IoT would consist of various sensors and devices that can communicate with each other over a network. The system would include fire detectors and water sprinklers that are connected to a central hub or server through a wireless connection. The fire detectors would be installed in various locations throughout a building, and would constantly monitor for the presence of smoke or flames. When a fire is detected, the detectors would send a signal to the central hub, which would then trigger the water sprinklers to turn on automatically. The system would also be equipped with a control panel, which would allow building managers or firefighters to monitor the status of the system and manually trigger the sprinklers if necessary. The system could also be programmed to send notifications to the relevant authorities or emergency services in case of a fire. Overall, an IoT-based fire detection and automatic water sprinkler system would provide an efficient and reliable means of detecting and responding to fires, potentially saving lives and minimizing property damage.

IV. BLOCK DIAGRAM:



V. WORKING:

The fire detection system with automatic water sprinkler using IoT is a smart solution that can detect the occurrence of fire and take appropriate action to extinguish it. Here's how it works:

1.Detecting fire:

The flame sensor, gas sensor, and temperature sensor work together to detect the presence of fire. The flame sensor detects the presence of flames, while the gas sensor can detect smoke and other gases associated with a fire. The temperature sensor can detect sudden increases in temperature, indicating a fire.

2.Sending data to the IoT server:

The sensors send data to the IoT server, which processes the data and determines if there is a fire. If the server detects a fire, it triggers the alarm and activates the water sprinkler system.

3.Activating the alarm:

When the IoT server detects a fire, it triggers the buzzer to sound an alarm, alerting people in the area to the presence of a fire.

4.Activating the sprinkler system:

The IoT server also triggers the pump to start pumping water to the sprinkler system. The sprinkler system is designed to extinguish the fire by releasing water over the affected area.

5.Clearing the smoke:

The system can also activate a fan to clear the smoke in the room, making it easier for people to escape.

6.Remote control and monitoring:

The NodeMCU ESP8266 board connects the system to the internet, allowing users to control and monitor the system remotely. The Blynk app can be used to turn the system on and off, monitor the sensors, and receive alerts when the system detects a fire. Overall, the fire detection system with automatic water sprinkler using IoT is an effective and reliable solution that can detect and extinguish fires quickly, potentially saving lives and minimizing damage.

VI. ADVANTAGES:

- Detection from dangerous incidents.
- Minimization of ecological consequences-financial loss a threat to a human life
- Protect fire man from risk their life
- Provide facility to fire station to extinguish the fire.
- Reduce human effect.
- Reliable and economical.
- It reduces the time delay in reaching fire affected area.
- It reduces the errors and the limitations that are faced by human fire fighters.
- Sensors have long life time and less cost.

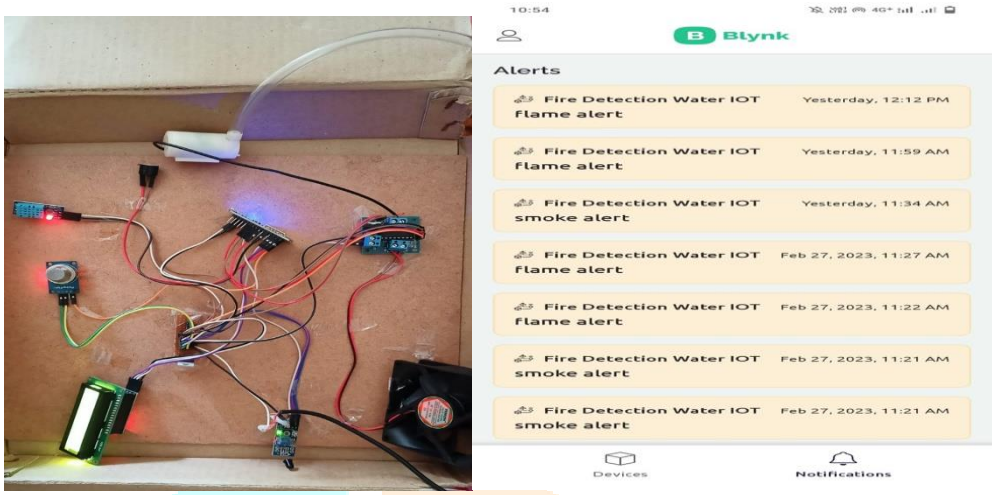
VII. APPLICATIONS:

- Fire department
- Factory
- High explosion area
- Chemical industries
- Petrol station

VIII. CONCLUSION:

This leads us to the conclusion that a fire and smoke warning system can be employed instead of people, lowering the risk to the firefighters' lives. They give us a better chance to spot the flame and put it out before it spreads out of control and poses a hazard to human life. Thus, this mechanism could be quite important.

IX. RESULT:



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