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Detection and Prevention of Fire Accident IOT

M.Bharathiraja[1],R.Priyadharshini[2],

[1]Associate Professor/CSE, V.S.B College of Engineering Technical Campus, Coimbatore, Tamil Nadu, India, bharathivsbap.@gmail.com.

[2,]UG Student/CSE, V.S.B College of Engineering Technical Campus, Coimbatore, Tamil Nadu, India , priyadharshinirangaraj418@gmail.com.

Abstract: The presence of hazardous gas and oil leakage in a domestic, work place, and, increase in temperature can cause blast in gas and oil industries, home, and factories. For that sake, an alarm unit is used to vibrate an alarm which is buzzer. Buzzer gives an audible sign of the presence of gas and oil leakage or increase in room temperature. It can be developed associate degree Arduino based fire detection alarm, if gas and oil leakage happens. The gas detector MQ6 is associate degree correct gas and the temperature sensor will give alarm when the room temperature increases as well as when oil leakage happens, Liquid Level sensor will detect oil leakage. The importance and connection of the paper is very beneficiary for man because of it is a vital caution for our domestic life.

Keywords: IOT, Fire alarm, Sensors.

1. Introduction

With the advancement in the day to day life, fire-safety has become one of the primary problems Fire hazards are fatally dangerous and denigrating regrading business and home security, further devastating regarding human life. The obvious way to minimize the kind loss is to respond to these emergency situations as quickly as possible. Thus, at present there is a huge demand and requirement for standalone autonomous flame detection techniques. These kind of techniques render the operation involving quick recognition, burglar alert warning and sometimes inception involving flame quenching. The adoption of standalone autonomous flame detection techniques has become increasingly prevalent in various settings. Commercial establishments, residential buildings, industrial facilities, and public spaces are among the areas that benefit greatly from these advanced fire safety solutions. By employing such techniques, businesses and homeowners can have peace of mind, knowing that their premises are equipped with state-of-the-art fire detection and response systems.

2. Existing Methodology

The current fire detection system integrates IoT technology with a combination of sensors, notably the LM35 thermal sensor and a gas sensor, to identify LPG gas leaks, yet crucially lacks a flame sensor, vital for detecting fire incidents initiated by flame ignition. The LM35 thermal sensor detects temperature variations within the monitored environment, sending data to the central processing unit for analysis, while the gas sensor specifically identifies LPG gas leakage, triggering alerts upon surpassing predefined thresholds. However, the LM35 sensor's outdated nature compromises temperature accuracy compared to modern counterparts, and the system's limited temperature monitoring fails to consider variations across different areas, potentially yielding inaccurate readings. This inaccuracy diminishes the system's efficacy in detecting fire incidents. Additionally, the absence of a flame sensor heightens the risk of delayed response to fire emergencies. Disadvantages of the system include the outdated sensor technology of the LM35 thermal sensor, which may not provide accurate temperature readings compared to modern sensor technologies, and the limited temperature monitoring capability that only accounts for the immediate environment, neglecting variations across different areas. Drawbacks further include the inaccuracy in temperature monitoring due to the LM35 sensor's limitations and lack of consideration for temperature variations, reducing the system's

effectiveness in detecting fire incidents, and the absence of a flame sensor, essential for promptly identifying fire accidents caused by flame ignition. Overall, while the existing system utilizes IoT technology and sensors to detect potential fire hazards, its reliance on outdated sensor technology and the absence of a flame sensor pose significant limitations and drawbacks, impacting its effectiveness in accurately detecting and preventing fire accidents.

3. Proposed Methodology

The presence of hazardous gas leakage poses a significant threat in various settings such as domestic households, workplaces, and industrial environments. One particular concern is the potential for explosions in cracker factories, homes, and industries due to a combination of leaked gas and increased temperature. To address this safety issue, an alarm unit equipped with a buzzer is utilized. This buzzer serves as an audible indicator, alerting individuals to the presence of gas or a rise in room temperature. An effective approach to developing such an alarm system involves employing an Arduino-based fire detection mechanism. In the event of a gas leakage, the detector MQ6 is employed to accurately detect the presence of gas, same as if oil leakage it will be detected by liquid level sensor, while the temperature sensor acts as a trigger to sound the alarm when the room temperature exceeds a certain threshold. The significance and relevance of this paper lie in its potential to greatly benefit individuals in their daily lives. By serving as a crucial cautionary measure, this alarm system can effectively mitigate the risks associated with gas and oil leakage, safeguarding the well-being and safety of individuals in domestic, work, and industrial settings.

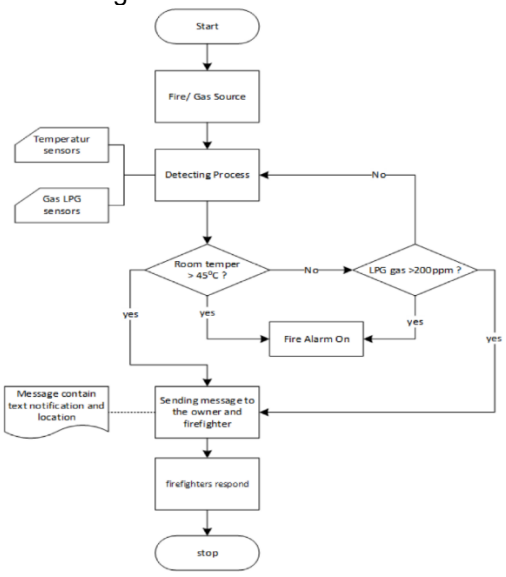

Figure 1: Block diagram of proposed ideology

A fire alarm system is an active fire protection system that controls all the fire alarm modules in a building. It is composed of alarm initiating devices (smoke detectors and heat sensors), alarm notification appliances (sirens or devices that produce loud noises), fire control units (sprinkler systems or fire extinguisher systems), power supplies and wirings. The fire alarm system can be set off automatically by smoke detectors, heat detectors or manually. These sensors are set to detect certain levels of heat or smoke that could be an indication of fire. A loud bell or a siren sometimes accompanied by blinking or flashing lights for individuals who have hearing problems, blasts to alert occupants in the building. To truly understand how a fire alarm system works, let us go further into the components of the fire alarm system. In a fire alarm system there is always a smoke detector to detect smoke or fire. The process of this system When this system is powered on, the Node mcu board connects to the Blynk cloud through the internet. Then, we can turn ON and OFF this system using the Blynk app interface. When the system is activated, the smartphone receives a push notification as soon as the red LED and buzzer is activated in the event of a fire. Afterward, the system goes back to normal. Then the green LED bulb is activated.

4. Architecture of Fire Detection System

A large number of sensor nodes are used in wireless sensor networks. These sensor nodes are used for typical purposes, such as event monitoring, fault detection, humidity measurement and so on. To some extent, sensor nodes are also responsible for detection and processing. The sensor device consists of four main components: Detection unit: usually consists of the following components. It consists of two sub-modules: sensor and analog-to-digital converter (ADC).

1. ADC converts the analogue signal produced by the sensor based on the observed phenomenon into a digital signal, which is then fed to the processing unit.
2. Processing unit: Manage the program executed by the sensor. One node communicates with other nodes to perform assigned discovery tasks.
3. Usually associated with small storage. Transceiver: Connect the node to the network.
4. Power supply: Since wireless sensor networks pay more attention to energy efficiency rather than quality of service (QoS), this is one of the most important components of detecting nodes. The power source can be compatible with energy recovery equipment (such as solar panels). Sensor nodes can only be equipped with limited power supplies.
5. There are other sectors depending on the application: location finder: usually required, because most of the technical tasks involved in routing and discovering

sensor networks require knowledge High positioning accuracy.
6. Mobilizer: Sometimes it may be necessary to move the sensor to complete the assigned task.

5. CONCLUSION

The proposed system has been made in order to overcome the problem of catch the fire due to electric short circuit or any other reason. Based on the results obtained, the fire detection system is doable and functional to protect the property. In fact, the system built is cheap in value compared to another existing alarm system in the market and easy to apply anywhere. The ability to detect smoke or high temperature, rise in humidity is undeniable because of the use of MQ-06 and Temperature sensor in the system. This device can be applied in varied areas due to its flexibility and simplicity in handling. This will make the user aware of the dangerous situation and can easily prevent it. Thus, the design system provides a better and safer environment.

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