

Review on IOT Based Fire Alarm Notification and Extinguisher System

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Abstract: Because of the potential loss of life and property, a fire outbreak must be avoided at all costs. If left unattended, a fire can quickly spread and take days to extinguish. As a result, when this technology becomes available, it will aid in the reduction of uncontrollable this technology must be used to reduce or possibly eliminate this significant risk as a result of the cause of heavy damage. A fire alarm detection, notification, and extinguisher system was designed in this study. When a fire occurs, this system includes a GSM module that allows it to send SMS (short messaging service) notifications and phone calls to shop owners or house owners about the fire incident before the fire makes damage. The study also identifies a system that is both affordable and can be accessible by the general public and private sector, allowing it to be used to protect people and property in homes, offices, shops, public places, and schools. If and when the system is commercially available, fires. It has grown 50% because it will warn potentially harmful situations prior to a fire accidents. If the smoke sensor detects a temperature that is not within the range we specify, the fire alarm will sound using a buzzer; if the temperature exceeds the specified level, the photo will be sent to the owner via mail, and a call and message will be sent to the specified owner. If the owner confirms and sends a message indicating to turn on the pump, the extinguisher will activate.

Keywords : GSM SIM MODEL, SMS, FIRE ALARM DETECTION SYSTEM.

I. INTRODUCTION

Throughout India, fire outbreaks have become a major issue. Fire breakouts have become the most common, catastrophic, and influential calamity when compared to other risks.

Many fires have occurred in India as a result of home owners' inability to discover the fire's initial source. According to the ADSI data, there had been 11,037 fire accidents across the country in 2019. In comparison to the previous year, the number of such fire accidents had fallen by almost 16 percent. The decline was more pronounced than the previous year, when it was around 2%. The majority of home fire detection systems on the market today are expensive, need a lengthy installation, and some include the expense of a separate system. Furthermore, because they are monitored by a security service company, some of the systems are subject to monthly subscriptions. As a result, the system is now only available to those who can afford it and are ready to pay more to maintain a home security and fire-related system. In actuality, whether they leave for a short or lengthy amount of time, the house owner may have difficulty knowing the exact present state of their home,

particularly in the event of a fire. If a fire occurs without warning, the owner may suffer significant losses, particularly in terms of material destruction and human life. As a result, the

installation of a fire detection system is required to avoid fire hazards and to keep our family safe. Controlling and monitoring services, particularly in the threats of home fire safety, can be exposed and addressed by the house owner as new technologies improve. The Internet of Things can be used to improve device efficiency while also providing financial rewards. It has recently been used in a variety of applications due to its low cost and ease of development. As a result, a home fire detection system that takes advantage of the Internet of Things should be developed to identify early fires, which plays an important role in preserving the safety of home owners. Furthermore, property loss can be decreased if suitable control measures are adopted while the fire is still small. A fire detection system gives early fire notification so the people may be rescued and an necessary action could be taken to halt or extinguish the fire as quickly as possible, ensuring that property and people are not threatened. Fire safety issues have become increasingly important as human technology advances. Fires have become one of the most dangerous side effects of technological advancements, claiming many lives and ruining uncountable homes and businesses. In the majority of systems, a Fire Control Panel with a Digital Alarm Communicator Transmitter that transmits data to the central unit is used. Only some panels have this DACT built in, while some others require an additional DACT device to transmit data. Obsolescence occurs as a result of the rising hardware and networking requirements. Furthermore, current fire alarm systems lack the ability to communicate With the world. The sensors are made to help you find out what's going on in your environment. This could imply Outsiders can't see what's going on inside a building. In the event of a fire, the structure will be evacuated. A firefighter is unable to do so. As certain the fire's extent from the outside dynamically spread around the building itA tourist who owns a house can't know what's going on in his region from where he is, but the situation of his burning house implies that there has been a substantial loss of lives and property, according to their research. Property may be discovered and dealt with before a fire threat can be identified. Ethernet, wireless sensor networks, and other digital technologies can be used to create remote monitoring systems, but they have drawbacks such as being too sophisticated, expensive, and lacking in redundancy, as well as being too bulky. As a result, an SMS and phone call-based fire alarm and detection system was developed, which uses a Text and phone call alert system that is configurable to notify to a given quantity of individuals as well as a nearby Fire Services Department. This is a low cost fire detection that reliably Assures fire safety and can be easily installed in a variety of locations, including residences, factories, offices, and restaurants. By combining several devices, each for a single level or unit, the proposed system can monitor a larger industrial or residential area.. The purpose of this project is to



create a dependable quick response fire detection system using SMS and phone alerts. We have built an IoT-based home fire detection alerting system in this study. Using an Arduino as a microcontroller, this system was created to prevent fires from spreading by informing the owner as well as anyone close when a fire is detected.

II. LITERATURE SURVEY

Elbehery, H., 2012. Developed intelligent fire alarm system. Journal of American Science. Which helped us in knowing about the fire alarm project.

Asif .O, Hossain, Md.B. Hasan, M., Rahman, M.T. and Chowdhury, "Fire Detector Review and Design of an Automated Quick Responsive Fire-Alarm System". Helped us in knowing about the SMS alert can be sent to the user

Suvan Kumar "Gsm Based Industrial Security System" developed a fire notification system used for an industry fire accidents. Helped us in knowing not only sms we can send mail to the shops or industries.

Rifat Husain "An Intelligent Fire Detection and Mitigation System Safe from Fire" Department of CSE, detects the fire and helps to safe guard the properties. This project made to think how to protect or extinguish the fire.

Karthiyayini J, Dhanya Shree, Simran Killedar, Ummadi Pawan Kumar and Kishan Kumar. Charging station for E-Vehicles using solar Using IOT. This helped to recharge vehicles using solar. We took the concepts used in IoT from this project.

Karthiyayini, J. Robot Assisted Emergency and Rescue System with Wireless Sensors. International Journal of Research and Scientific Innovation. Usage of wireless sensors to rescue devices. This project helped us in knowing different type of sensors.

Srinivasan, L., & Nalini, C.(2019).Abadent Object Detection & IOT Based Multi-sensor Smart Robot for Surveillance Security System. International Journal of Scientific Research in Computer Science, Engineering and Information Technology,9(4),669-677.

Vachan, B., & , Deepthi, S., & Geetha, B., Srinivasan, L.(2020).Landmine Detection using Wireless Robot. International Research Journal of Engineering and Technology. Iot used to detect the dangerous elements.

Vandana, C.P., & Aashika M Suresh, & Nikitha Nanju, K., & Sanjana V Nagvekar. Solar Energy Equipped IoT Based Vacuum Cleaner. International Journal of Scientific Research in Computer Science, Engineering and Information Technology. Used to detect the small particles using IOT.

Vandana, C. P., & Chikkamannur, A. A. (2019). Semantic ontology based IoT-resource description. International Journal of Advanced Networking and Applications. Identify the usage of product using IOT.

III. METHODOLOGY

A. Existing System

Using an Arduino Uno and a GSM module created a house fire alarm notification system. The project is for the house's

safety, with the main goal of preventing fire accidents for occupants and property within the house. It uses the Arduino Uno board and MQ135 sensor control a house fire alarm that is triggered by a temperature sensor. Due to a high rise in temperature in the house, the sensor detects this and will send an SMS to the users via GSM module. GSM SIM card is connected into the module for communication purposes and delivers information on house fire detection. Meanwhile, we created fire detection and alarm system that uses an Arduino Uno as a microprocessor to operate the fire sensors and then activate GSM which will send an alert message and phone call to house owner. In addition, this system sends a notification to the registered mobile number.

To identify any malfunction or temperature increase, the system used an Arduino Uno, a temperature sensor, and a GSM module. This technique benefited the user because they did not need to bring any additional equipment to receive an alert message because most people had their phones with them the majority of the time, resulting in the development of a low-cost automated security system at home. This project was created to warn the user of a fire at their home while the owners were away, as well as to immediately notify the fire station. The GSM module was utilised by the system to transmit an alarm message and phone call to the users. The system made use of an Arduino Uno, various types of sensors and an autonomous action module to boost the fire monitoring system's functionality.

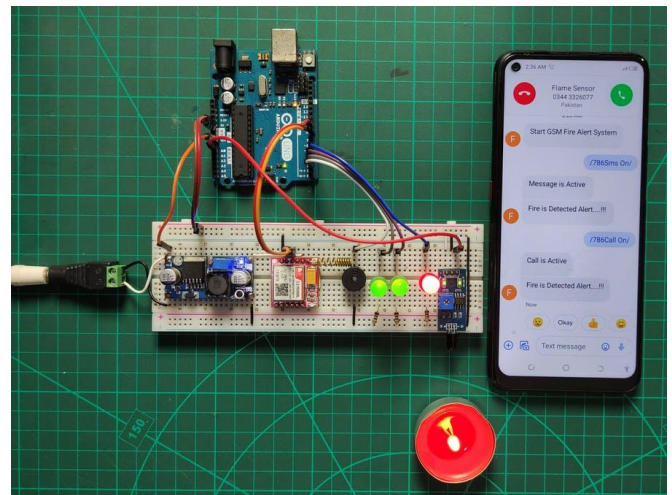


Fig. 1.

B. Fire Detector System Introduction

Fire is an auto gaseous mixtures reaction that produces varying degrees of light and heat. This alert system is prompted to sense the heat and provide an intelligent alarm in the event of a fire emergency. In every country around the world, fire alarm systems are regarded as critical for a variety of physical facilities, including businesses, retail malls, and private residences. A fire alarm system serves two functions: first, to remove the premises in the event of a fire, and second, to notify the appropriate authorities of the incident. The fire alarm system identifies four states or conditions: normal, alert, difficulty, and supervisory.

C. Study Objectives:

The project's goal is to design and construct a fire detector system that is linked to a microcontroller, a GSM module, and

has SMS wireless communication capabilities. Within the scope of this project, the prototype model is outfitted with a specific identification Module. The processes can be carried out with very little power consumption. If there was no network connectivity, the system would be unable to communicate and obtain the true status of the location, which is a disadvantage of this project.

D. Proposed System

The key condition that allows the component and module to function efficiently is given considerable focus in the research. This section covers all of the components as well as their functions. The most difficult aspect of engineering design is articulating design requirements thoroughly and correctly. The "Fire Detection and notification System Using GSM" system design process includes the phases below:

1. A thorough examination of the System's specifications.
2. Hardware development.

One of the hardware responsibilities is to define and analyse acceptable electronics components for use in developing the Fire Detection circuit using Messages. The environmental sensors detect a fire, high heat, or internal emissions event and will send data to Micro controller. This defines whether the mixture of wearable sensors are true fire detected or a false detected; if true fire is detected, the microcontroller activates the GSM and will send an alert message to the house owner or shop owner. To extinguish the fire, a servo managed by the micro - controller bends a fire bucket and dowses the fires with retardant chemicals.

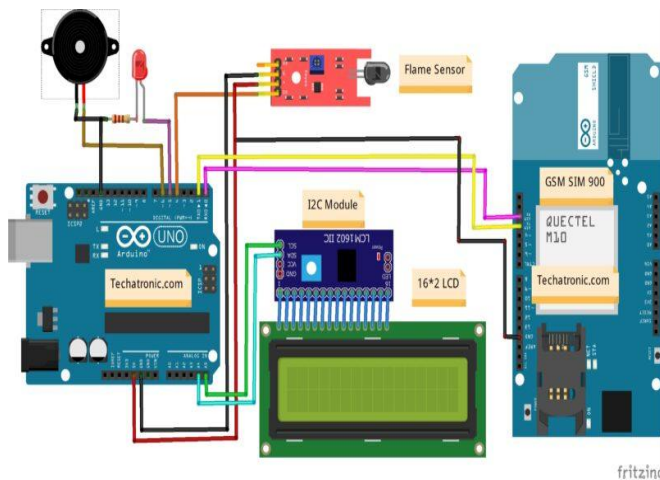


Fig. 2.

E. MAIN SENSORS USED

1) ARDUINO UNO



Fig. 3.

Arduino Uno is referred as the heart of an IoT project. In this project we made use of this arduino uno as it is cost effective and easy to program using c and c++ language. This micro controller has total of 14 i/o pins. A USB cable is present in this board which is used to connect with Arduino IDE used to program the board.

2) MQ135 SENSOR



Fig. 4.

These sensors are used to detect smoke and dangerous gases. Harmful gases like ammonia, NH₃, Benzene are detected by using this sensor. In this project this sensor is used to detect the smoke as it has qualities or features like wide detecting scope, high sensitivity and fast response.

3) GSM MODEM SIM 900



Fig. 5.

This GSM is used to transfer information to the sender. GSM full form is Global System for Mobile communication. In this a sim is inserted and from this, the destination user receives appropriate message when fire is detected. A proper communication takes place between user and device. By using this GSM we can receive message also. Hence it detects and turns on our extinguisher.

4) BUZZER



Fig. 6.

Buzzer is used to give signals in the form of noise or sound. The buzzer used here is piezo buzzer. This tiny speaker is connected to the Arduino uno directly. It makes sound at the frequency you set. Between two conductors it has piezo crystals. When you apply a potential these crystals will push and pull the conductor and this gives us a sound wave.

IV. RESULTS

Extinguishers are applied directly to the flames or heat, which prevents the combustibles and can cool the combustion process. In the early stages of fire growth these extinguishers are most effective, when the fire is manageable. After user receives a message when the fire is caught, He will send a message to the gsm modem to turn on the extinguisher. These Extinguishers will control the fire growth in minutes after activation message is sent which results in less damage than what occur otherwise .

Extinguishers have the following potential advantages:

1. A developing fire must be identified and controlled as soon as possible. Extinguishers are activated at all times, including when there is little or no occupancy. In most cases, control is instantaneous.

2. Immediate action is required. Automatic extinguishers may detect with a small fire. Hence a temperature is set in programming. And for confirmation a message is sent to the user and he will turn on the extinguisher to safe guard the products.

3. Heat or Fire damage has been reduced. When a fire is extinguished at an early stage, significantly less heat and smoke are produced.

4. Increased life safety. When fire growth is slowed, staff, visitors, and fire fighters will be in less danger.

V. CONCLUSION

The project explains low-cost, user-friendly residential and industrial alarm systems. It is a real time notification and extinguisher system built with basic software and hardware that facilitates the chance of an error-free secure platform.. The system is simple to install and maintain, and the highly secured at a minimal price is a substantial improvement over original alarm systems.

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