INTERNET OF THINGS: A FIRE DETECTION, MONITORING, AND ALERTING SYSTEM

[#1]KAMA KANISHKA, *Asst. Professor,*
[#2]MUTTNOORI NAVEEN, *Asst. Professor,*
Department of Electronics Communication Engineering,
Sree Chaitanya Institute of Technological Sciences, Karimnagar, Ts.

Abstract:
Businesses have adapted to new methods of doing things enabled by the Internet of Things, in which gadgets and people are linked via the internet. The Internet of Things (IoT) refines the process and offers the data and communication capabilities that disaster management requires to quickly and effectively deploy these assets. This study suggests an Internet of Things (IoT)-based paradigm for assessing and studying quick reactions to fire dangers. Fire is a leading cause of accidental death in many regions of the world. This proposed setup consists of an affordable Wi-Fi module, gas and flame sensors, a warning alarm, and temperature sensors. Data is collected by the system's gadgets and forwarded to local emergency agencies. Through a connected module, the technology also informs the user and operator with their specific location. This alerts the necessary authorities, such as fire stations, police stations, and hospitals. The Internet of Things (IoT) is being used to create a complex and interconnected system capable of efficiently countering these threats to people's safety and property.

***Keywords*:** Ardino board, Fire detection, IoT based monitor,Wi-Fi module.
DOI Number: 10.48047/nq.2021.19.2.NQ21060 **NeuroQuantology 2021; 19(2): 351-354**

1. INTRODUCTION

The goal of this study is to create an Internet of Things (IoT)-based fire alarm and monitoring system that may be used in both commercial and residential settings. Fires, the biggest cause of accidental death, are terrifying because they kill people and create significant property damage. The most important aspect of fire is that it completely destroys everything in its path. This is why early detection of fires is critical for preserving lives and property. The device is capable of detecting smoke, severe heat, and the spread of fires. It communicates this data to a remote control unit via GSM technology, where it can be processed and used to activate the proper safety reactions and inform local help as quickly as feasible. The instrument under consideration is a gas and combustion smoke detector.

The planned system's goal is to alert local emergency services such as fire stations, police stations, and hospitals to the location of potential hazards. This Internet of Things (IoT) platform's major goal is to develop a fire and gas detection system, consequently improving public safety and delivering services that allow individuals to make a living. Figure 1 depicts the standard configuration of a fire alarm system. The MQ-6 flammable gas sensor detects combustible gases such as LPG and LNG, whereas the PT333B spark detector sensor detects stray sparks. The GPS component is also in charge of pinpointing the device's precise location. A Wi-Fi microcontroller connects these devices to the internet. This enables them to relay the status of threats to the nearest support centers.

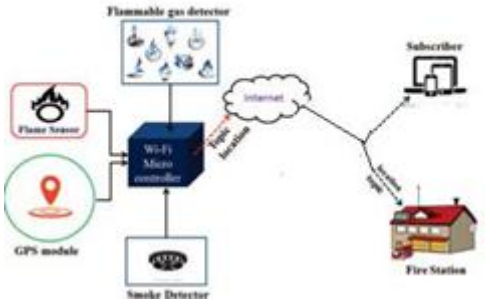

Fig.1.The provided content is about a schematic diagram.

Internet of Things

The "Internet of Things" (IoT) refers to the spread of internet-enabled devices and everyday objects. Because they share data via a remote system and have access to a wide range of equipment, such as sensors, these embedded devices may be regularly

monitored and updated. Machine learning, runtime analysis, sensors, embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and other advances have transformed the original Internet of Things (IoT) concept. The Internet of Things (IoT) is widely used in "smart home" consumer electronics. When it comes to the ease and utility given by a well-integrated smart home system, items such as cell phones and speakers are simply the tip of the iceberg. Researchers are using IoT in their effort to instantly assess risk and detect changeable risks. Because of this adaptability, new components can be added as needed, boosting the system's usability and dependability.

Aboutthis project

A fire is a horrific calamity that can do significant damage to both people and property. Every year, fires destroy several homes and take an unknown number of people. A lot of property damage can be avoided by being attentive and implementing fire safety precautions. People and businesses in the industrialized world can feel safe in their premises because of the security measures in place. However, keep in mind that these amenities will not be available in underdeveloped or neglected areas. The proposed strategy is intended to be preventative, sending out alerts at the appropriate times to reduce fatalities and avoid further occurrences. Because of its low cost, this technique will be available to a wide range of people, regardless of their financial situation. The goal of this method is to make neighborhoods, businesses, and educational institutions safer for everyone who visits them. The key constraint was the necessity to keep the approach inexpensive so that it could be widely used. The device's installation provides adequate security for both people and property at a low cost.

Billing if the overall system

Table1The amount of money set aside for expenditure.

Component	Quantity	Cost(In Rs)
LM35	1	80
Infrarred Sensor PT333b	1	55
MQ6	1	150
Adapter	1	200
Buzzer	1	60
Aurdino	1	350
16*2 LCD Display	1	230

2. EXPERIMENTAL SETUP AND WORKING

The LM35 and MQ6 sensors are built onto the Arduino board, as this conception shows. Temperatures are measured using the LM35 thermometer. Under typical environmental conditions, the LM35 sensor can offer trustworthy data. The MQ6 sensor was used as a smoke detector in this study. This detector is designed to detect smoke particles. The gas sensor in question is intended to be adaptable. The instrument can detect a wide range of gases and chemicals contained in smoke. LPG, isobutane, propane, hydrogen, and methane are among them. The sensor's great sensitivity and quick response time are very appealing. The monitor's output is proportional to the concentration of the gas. A central processing unit, which is implemented by a small-scale CPU, receives and processes quality measures from numerous sensors. Each structure has its own wind chime. The system as a whole benefits from a Wi-Fi module, which allows sensor data to be transmitted to other devices. Each structure has its own unique identifying code. Before the system can be set up and used, customers must supply identification documents, installation and contact information, and passwords.

Fig. 2. Context-Dependent Interpretation Analysis

In a crisis, a person's contact information is critical. A website was created to better assist those with more complex medical needs and to ensure the accuracy of the data presented. The internet allows the local fire department to monitor the state and functionality of the devices. This safeguard is in place for your safety. The Wi-Fi module will send data to this location indefinitely, making it easier for the framework's sensors to collect data. Experts you can trust are probably up to date on everything going on right now in every area. If the detected sensor's value unexpectedly changes, a notification will be sent to the local fire department and any registered firefighters. When the limit is reached, a notification will be delivered. If the temperature or gas levels rise sufficiently, the sirens will sound. The local fire department will be contacted right away. Because the area has been registered with the fire department, it is assumed that assistance will arrive quickly in the case of a fire. Following that, a signal is transmitted from the city's central fire department to the fire station located nearest to the event. Furthermore, a notification is sent to the nearest medical facility so that emergency aid can be dispatched as soon as possible if necessary.

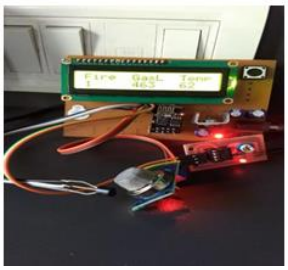

Fig.3.Experimental setup

3. HARDWARE ASPECTS

Gassensor (MQ6)

The MQ-06 detector is capable of detecting potentially explosive gas levels. The sensor can detect any gaseous object that produces carbon dioxide into the atmosphere upon inflation. If a specific level is exceeded, this sensor will issue a warning. Au and Pt electrodes are used to heat the gases, while Ni-Cr metal heater coils are used to heat the electricity.

Fig.4.Image of Gas sensor

Spark Sensor

Seeing the first flicker of an electrical spark as it passes through flammable materials or a spark plug. Pt333B was used as the sensor material in this work. This module belongs to the LM358 family. The ESP8285 has a brightness of 1 MiB, making it comparable to but superior to the ESP8266. As a result, it is a viable alternative for devices equipped with single-chip Wi-Fi adapters.

Fig.5.Spark sensor

ArduinoUnoBoard

This project's Arduino code was written in a variety of programming languages. The Arduino board gets data from the system via a Wi-Fi module and sends it to the server and client. Considering the line and the frequency with which combustion occurs, the Arduino Uno is a microcontroller board with a Wi-Fi module and numerous sensors linked into it. It is then connected to the machine for processing.

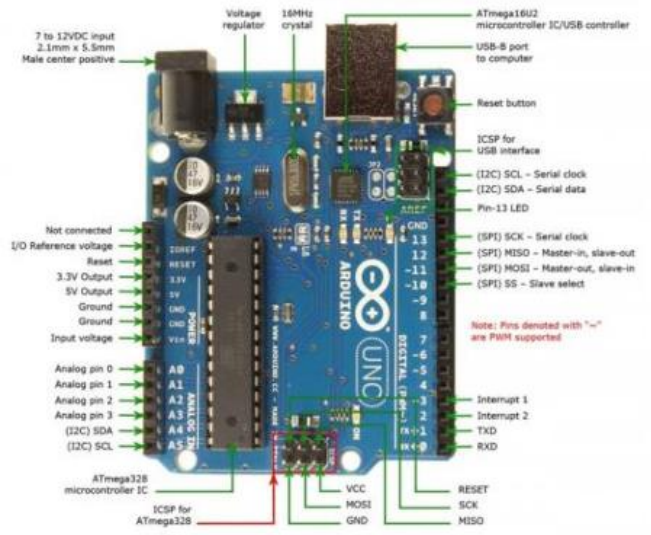

Fig.6.Micro controller board

Temperature sensor(LM-35)

The LM35 temperature monitor detects and notifies you of rising ambient temperatures.

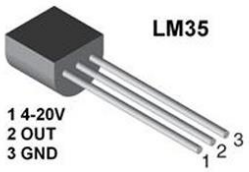

Fig.7.Image of temperature sensor

Wi-Fi module(ESP8266)

Fig.8.Wi-Fi module ESP8266

Wireless communication with the system and the web application is facilitated by the Wi-Fi module. Following that, it collects data from all of the sensors and sends it to the specified web service. The ESP8285 is essentially an improved version of the ESP8266, with a brightness capacity of 1 MiB. This is an important consideration when addressing the features of Wi-Fi-enabled single-chip devices.

4. SOFTWARE ASPECTS

The Arduino board's code was written in a variety of programming languages. The data is sent to the server and the user using the Arduino board's Wi-Fi module. Personal Home Page (PHP) was used to create the graphical representations of the Chart and Spark sensors. HTML and CSS were used to improve the visual appearance of the page and website.

Software enables the development of programs that

may be uploaded to the Arduino board. This tool supports a variety of operating systems, including Windows, Linux, Mac OS X, and Portable IDE. The technology under discussion is an easy-to-use open-source tool for producing both hardware and software, making it suitable for building electronics. Among other benefits, the Arduino Integrated Development Environment (IDE) improves prototyping and assists students who lack knowledge in hardware and software development. Programming beginners are given an environment that matches their needs for simplicity, adaptability, and clarity.

5. CONCLUSION

If a fire spreads unchecked, many lives and structures can be lost. Their consequences are usually negative, often fatal, and always destructive. Because the amount of the damage is difficult to quantify, this scientific paper proposes building an IoT-enabled fire department alert system. When a fire breaks out, the aforementioned gear promptly alerts its owner and the nearest fire station. This software was created for people who do not have a security guard or other designated person watching over their home, place of business, or other assets. When users are not present, its principal role is to sound an alarm and warn authorities of potential fire threats. This software will promptly inform them and contact the local fire department, saving lives. The application instantaneously warns the user, the nearest fire department, and the housekeeper, allowing them to take proper action. It's also very efficient, which makes it simple to use. This method has been utilized to address a wide range of challenges concerning the security of homes and their contents.

REFERENCES

1. InternetofThingsGlobalStandardsInitiative.ITU.
2. An IoT based Fire Alarming and Authentication System for Workhouse
3. Using Raspberry Pi3, International Conference on Electrical, Computer and Communication Engineering (ECCE), February 16-18, 2017, Coxs Bazar, Bangladesh.
4. Wang Jun, Zhang Di, Liu Meng, Xu Fang, Sui Hu-Lin, Yang Shu-Feng,“DiscussionofSocietyFire-fightingSafetyManagementInternetofThings Technology System,” 2014 Fifth International Conference on Intelligent Systems Design and Engineering Applications.
5. Chen, Thou-Ho, et al.The smoke detection for early fire-alarming system based on video processing, in Proceedings of International Conference on Intelligent Information Hiding and Multimedia,2006.
6. KaushikSen,Jeetsarkar,SutapaSaha,Anukrishanaroy,Dipsetudey,Sumit Baitalik, Chandrasekhar Nandi, “Automated Fire Detection andControllingSystem,”ininternationaladvancedresearchjournalinscience,engineering and technology,pp. 34-37,2015.
7. San-Miguel-Ayanz J, Ravail N. “Active fire detection for fire emergency management: Potential and limitations for the operational use of remote sensing, ”Natural Hazards Journal, 2005July.35(3),361–376
8. R.K.Kodali,S.SoratkalandL.Boppana,“IoTbasedcontrolofappliances,”2016InternationalConferenceonComputing,CommunicationandAutomation(ICCCA), Noida,2016,pp.1293-1297.