Gas and Fire Accident Avoider System

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Abstract: Now-a-days fire and gas accidents are very common issues in various places like industrial areas, homes and hotel kitchens. Accidents involving gas cylinders can cause serious injury or even death and loss of property. One of the preventive measures to avoid these type of accidents is to install the fire and gas leakage kit at vulnerable places. The main theme of our paper is to avoid the fire and gas accidents through some automatic actions. We are using the fire and gas sensors for detection. If the gas sensor detects the gas then automatically it shuts off the gas supply, thereby stopping the further leakage. It also starts exhaust fan to suck out all the gas and it also sends the message to the authorized user through the Blynk app to intimate about the incident. If the fire is detected by the fire sensor, then it shuts off the gas supply. Because at the time of the fire accidents, if the LPG cylinders also blast then it is very difficult to handle the situation.

Keywords: Gas Sensor, Fire Sensor, Node MCU, DC motor, Exhaust fan, Blynk app.

1. Introduction

Gas and fire accidents are becoming the major problem in the society. There may be chances of accidents and blasting and explosion of gas. The main theme of our system is to avoid the fire and the gas accidents. To control these fire and gas accidents we use safe and secure system without any cause to human. In our system we use the fire and gas sensors for detecting of the fire and gas. When the gas is detected it shuts off the gas supply using DC motor and sends message to the authorized user using Blynk app and it starts the exhaust fan to suck off the gas from the room. It is not only for the gas it is also used for the fire accidents when the fire sensor detects the fire, it shuts off the gas supply to avoid the explosion of gas and starts the exhaust fan to suck out all the smoke. We took the fire and gas accident avoider system as our provide to provide security and to avoid the accidents and human loss, based upon recent incident faced by navy, Mumbai.

Today**,** Internet application development demand is very high. So IOT is a major technology by which we can produce various useful internet applications. Basically, IOT is a network in which all physical objects are connected to the internet through network devices or routers and exchange data. IOT allows objects to be controlled remotely across existing network infrastructure. IOT is a very good and intelligent technique which reduces human effort as well as easy access to physical devices. This technique also has autonomous control feature by which any device can control without any human interaction.

As IOT is a upcoming technology so we used this technology in our project. In a span of ten years, from 2020 to 2030, IOT devices will grow from 75 billion to more than 100 billion, and the improvement from 4G to 5G in terms to grow IOT is most important. Today's 4G network

can support up to 5500 to 6000 NB-IOT devices on a single cell. In the upcoming years, IOT-based technology will offer advanced levels of services and practically change the way people lead their daily lives. Advancements in medicine, power, gene therapies, agriculture, smart cities, and smart homes are just a very few of the categorical examples where IoT is strongly established.

2. Literature Survey

V. Ramya et.al... [1] proposed the design of microcontroller based toxic gas detecting and alerting system. The hazardous gases like LPG and propane were sensed and displayed in the LCD display each and every second. Whenever the LPG leakage is detected an alarm is generated immediately and also sends an alert message to the authorized person through the GSM.

K. Padmapriya et.al..[2] proposed the design of wireless LPG monitoring system for home safety. This system detects the gas leakage and alerts the user through SMS and the power supply is turned off. It automatically monitor the level of the gas. So if the gas is around 2 kgs it automatically books the cylinder using a GSM module. This project is implemented using ARM 7 processor and simulated using keil software.

Prof. Pankaj C. Warule et.al..[3] LPG Detection, Metering and Control System Using Microcontroller proposed a system which contains a buzzer will alarm the user when the gas unit will come to the edge of end. The user can see the unit (kg) of gas remained for use on the LCD display. When the gas is detected it starts a buzzer and send notification to user.

Pooja Bhamare et.al..[4] proposed the design of GASBO for LPG Gas Detection and Controlling Using Mobile App. Whenever the gas leakage is detected it send alert message to owner for safety using android app and Buzzer blows on Gas detection. For closing the valve an automatic action is taken.

Aastha Singh et.al..[5] proposed the design of Detection of Liquefied petroleum gas using sensor through arduino uno microcontroller. In this system MQ-2 sensor is used to detect the gas. Whenever the gas is detected the installation generates a sound alert using buzzer and with the help of the GSM module it is capable to broadcast messages to the stakeholders about the LPG leak.

3. Existing System

There are some existing methods for gas and fire accident avoiding. In the first existing system, it sends only SMS to the user and fire officer. If they are near to the place then they can stop the accident. Otherwise they can't do anything even if they know about the incident. So, here only monitoring is possible and no automatic control. The second existed method raise only alarm whenever gas is detected at any place. Due to this alarm, people could start to run haphazardly. As a result worker in the factory get injured severely. Sometimes people do not realize the intensity of the fire and they can't escape from the fire affected building quickly. It could lead a highly destructive and if the exhaust fan is not proper then it will cause immediate explosion due to the flow of AC.

Drawbacks in existing system:

- Monitoring is possible.
- Intimation is possible.
- Automation is not possible.

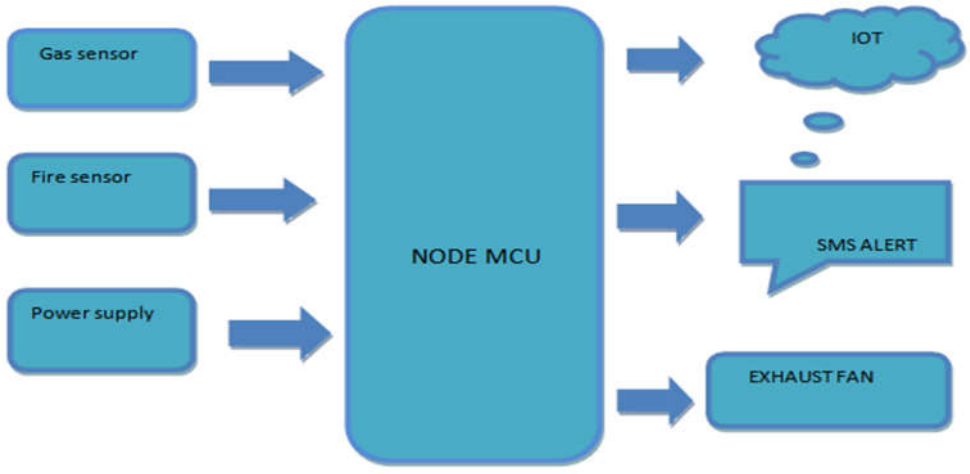
4. Proposed System

Here we designed a system called gas and fire accident avoider system that smartly avoids fire as well as gas accidents by detecting fire and gas leakages and taking measures to avoid any accidents from happening. The system consists of fire and gas sensors for detection purpose. If system detects a gas leakage, the system first shuts off the gas supply and starts an exhaust fan and also sends SMS to the authorized user through the Blynk app.The system also has a fire sensor to detect fires. As soon as a fire is detected, the system sends the SMS to the authorized person and shuts off the gas supply thus preventing the fire from spreading further and avoiding any chances of explosions.

Advantages in the proposed system:

- Monitoring and as well as controlling also possible.
- Automation is available.
- No need of Human Interaction.
- Less maintenance.
- No Possibility of Manual Errors.
- Simple & Economical

5. Methodology for proposed system



Gas sensor and fire sensor are connected to the Node MCU. It detects the harm and perform some automatic actions like shuts off gas supply by using DC motor, starts an exhaust fan on

and sends alert message to the user through Blynk app. To make the entire system works, the user need to supply the power to the system.

6. MODULES

The different modules used in our project are:

- Gas and Fire Detecting Module
- Analysis Module
- Action Module

Gas and Fire Detecting Module

Gas Sensor: Gas sensor is a sensor which detects the presence of gases in an area, often as part of a safety system. When the gases is detected the sensor will give value as one, if no particular gas is detected it returns zero.

Fire Sensor: A fire detector is a sensor designed to detect and respond to the presence of a flame or fire thus preventing the fire from spreading further and avoiding any chances of explosions.

Analysis Module

Node MCU The best way to develop an IOT application quickly with less Integrated circuits to add is to choose this circuit "Node MCU". It is an open-source firmware and development kit that plays a vital role in designing a proper IOT product. The module is mainly based on ESP8266 that is a low-cost Wi-Fi microchip. The ESP8266 Node MCU is a complex device, which combines some features of the ordinary Arduino board with the possibility of connecting to the internet.

Action module

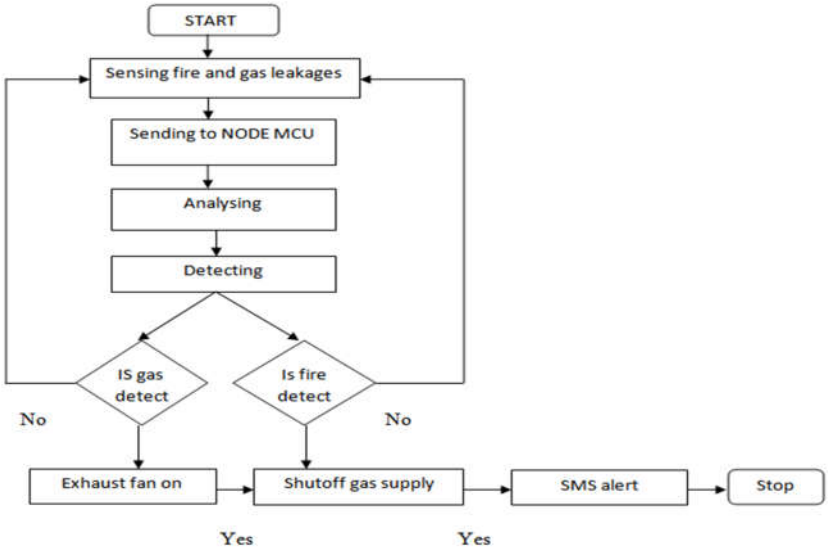
Exhaust fan : Whenever the gas is detected the system starts an exhaust fan to suck out all the leaked gas from room.

DC motor: If the system detects the gas leakage, system first shuts off the gas supply using DC motor without any human interaction to avoid more gas leakage.

Blynk app:

Blynk is a new platform that allows you to quickly build interfaces for monitoring and controlling your hardware projects from your iOS and Android device. First user has to download the Blynk app. After downloading the Blynk app, we can create a project dashboard and arrange buttons, sliders, graphs, and other widgets onto the screen. Using the widgets, you can turn pins on and off or display data from sensors User receives the notifications about the gas and fire incidents in that screen in the Blynk app.

7. Flow chart



8. Working model & procedure

In the proposed system fire and gas sensors are connected to the Node MCU. Those sensors senses and sends the result to the Node MCU. Node MCU analyses the results and detect whether there is any harm are not. If harm is detected, Then it checks whether it is gas leakage or fire. If gas leakage is detected, it shuts off the gas supply using DC Motor, starts an exhaust fan and send the SMS alert to the user through Blynk app. If fire is detected then it shuts off the gas supply and sends SMS to the user.

9. Results

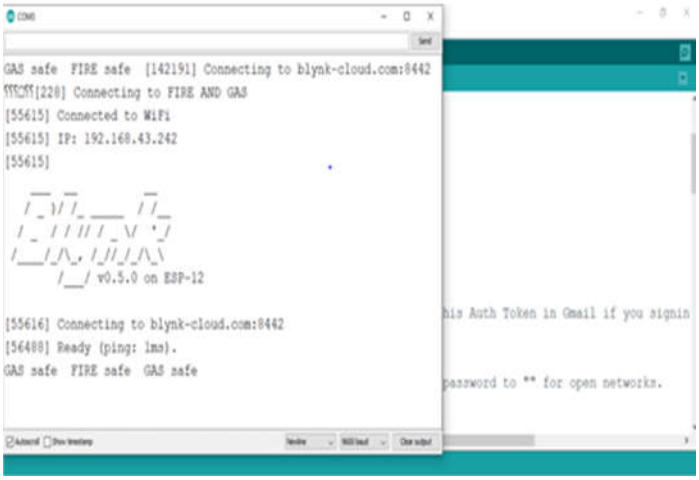


Fig 1: Result in serial port



Fig 2: When fire is detected and gas is safe



Fig 3: Blynk app

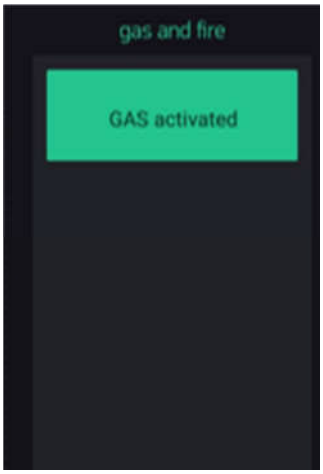


Fig 4: Alert message in Blynk app

10. Conclusion and Future Scope

In the existed system there is a possibility of manual errors. But the project which we developed has no possibility of manual errors because all actions are automated. It provides safety and security. We can add advanced features in future like turn off the main power supply for more safety and in the proposed system, if the user want to get the SMS alerts about the incident then he/she need to install the Blynk app and perform some steps. Every time when the user open the Blynk app then they know about the incident. If the user not open the Blynk app then they don't know about the incident. So in future, we want to develop a system which sends the messages directly to the user mobile without using any app. However notifications sending to the user is just for intimating the user about the incident but the users need not perform any actions. So it is not much considerable. This project definitely help the people to protect their lives, home and

hotel kitchens from gas leakages. Our project reduces both financial loss as well as human injuries. However our project is feasible for coming versions, which are planned to develop in future. So, the conclusion of the proposed system is user centered.

11. References

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