# FIRE AND SMOKE DETECTION SYSTEM USING ARDUINO

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**Abstract** - Over the years death rates by fire has increased tremendously. Fire consumes homes and commercial premises quickly, indiscriminately taking lives and ruining property. No one should have to be become a victim of fire, but the reality is that people do become victims every day. Fire and Smoke detection system has been proven for applications such as industrial, houses, colleges, schools, & offices, etc. To prevent losses caused by the fire we develop the fire and smoke detection system. Fire detection technology still faces challenges related to reducing false alarms, increasing sensitivity and dynamic response, as well as providing protections for highly expensive and complex installations to better safeguard the public and meet evolving regulations.

## I. INTRODUCTION

Fire is a serious threat to human life and property, so fire prevention technology is constantly being innovated with the development of science and technology. Fire outbreaks are often accompanied by smoke. In fact, was an early fire, and a lot of smoke was generated due to the fuel temperature, and the combustion was insufficient. Detecting fires before they start and opening doors and windows can help to detect and prevent fires from starting and spreading and reduce material and economic damage to people. Several fire and smoke detection systems are currently available. However, all these systems only provide warning signal for either fire or smoke. After that, detection was largely done by visual inspection and human confirmation. This project proposes a cheap and affordable fire and smoke detection system to solve these problems.

## II. LITERATURE SURVEY

**AMEY MORE, JYOTI LOKARE, POONAM PATOLE, SHIBUN LYTEB, KALINDI KALEBERE**: Designed a smart surveillance system capable of recording /capturing video /image and transmitting to a smart phone. Its advantages as it offer reliability & privacy on both sides. It offers only the person concerned to view the details. Necessary action can be taken in short span of time in the case of emergency conditions such as smart homes, offices & industries.

**San Nyein Khine, Zaw Tun:** The temperature sensor analysis and the light intensity sensor analysis have been examined, and the control system for smart home has been constructed and tested successfully to minimize the power consumption due to the lack of awareness of human beings. The system is costeffective and time efficient and is very accurate in its operation. LCD can be used to monitor the set temperature, the measured temperature, light intensity, and LED ON/OFF condition. The proposed system is easy to install and gives the user satisfaction.

**Leo Louis:** In this paper, we have studied the working principle of Arduino, its hardware / software features and its applications as to where it is currently being used and where all it can be used. We have also learnt how to write sketches for Arduino in its own IDE (software). Developing new ideas with Arduino is endless, with the help of this paper we have learnt to build new devices of our own to create and implement innovative things. From wearable fashion to space research, the possibilities of using an Arduino to learn and develop new ideas is infinite. Though it does have its own limitations, it is a great tool that can be used in learning.

**Mr. Aneesh . A, Mr. Austine Cyriac, Mr. Shafeek Basheer:** This paper describe an idea to built "A Smart Real Time Fire and Smoke Detection System". It gives an easy and less expensive way to implement a fire and smoke detection system with a notification to nearest fire station. By using this system, the fighters can subdue fire before it causes damage at a greater extend. This system is one of the useful, costless and fastest system for safety precaution. Thus an efficient microprocessor based system that provide an early warning to the nearest fire station, if there is a chance of fire is successfully developed.

## III. ARCHITECTURE

**Existing Systems:**

A smoke detector or smoke alarm is a device that detects smoke and issues an alarm to alert nearby people of the threat of a potential fire. A household smoke detector will typically be mounted in a disk-shaped plastic enclosure about 150 mm in diameter and 25 mm thick, but the shape can vary by manufacturer. Because smoke rises, most detectors are mounted on the ceiling or on a wall near the ceiling. There are two basic types of passive smoke detectors: photoelectric (optical) and ionisation (physical process). A combination of the two types of alarm (dual sensor smoke alarm) is recommended for maximum protection from both fast flaming and slow smouldering fires. Smoke alarms detect particles in the air. They most commonly do this using two types of detection technologies. First, the ionization detectors. These use a small bit of safely shielded radioactive material that electrically charges, or ionizes, the air molecules between two metal plates. This produces a small electric current flowing from one plate to the other in the air. The other type of commonly used detection technology is called photoelectric. This technology works by detecting light that is reflected off particles from a light beam inside the sensing chamber. When no particles are present in the sensing chamber, the light from the beam does not strike the light detector, indicating all clear. When there are particles present and the amount of light 9 registered by the light detector reaches a certain threshold level, the alarm sounds.

**Proposed System:**

We are proposing a system using Arduino, TMP36 sensor and MQ-2 Gas sensor to detect fire and smoke and alert the surrounding by LED and Buzzer.

• We are also using LCD to continuously display environment temperature and gas concentration level along with the message of Safe or Danger.

• The buzzer and LED will become high if temperature is above 40C or Gas concentration value is above 700.

• The servo motor connected to doors/windows will rotate at an angle of 90 to open the door/window for release of gas, cooling of temperature and an exit gate if needed.

• The LED and Buzzer will be high until a reset button is pressed, even if the environment is safe to ensure less damage.

**Flowchart:**
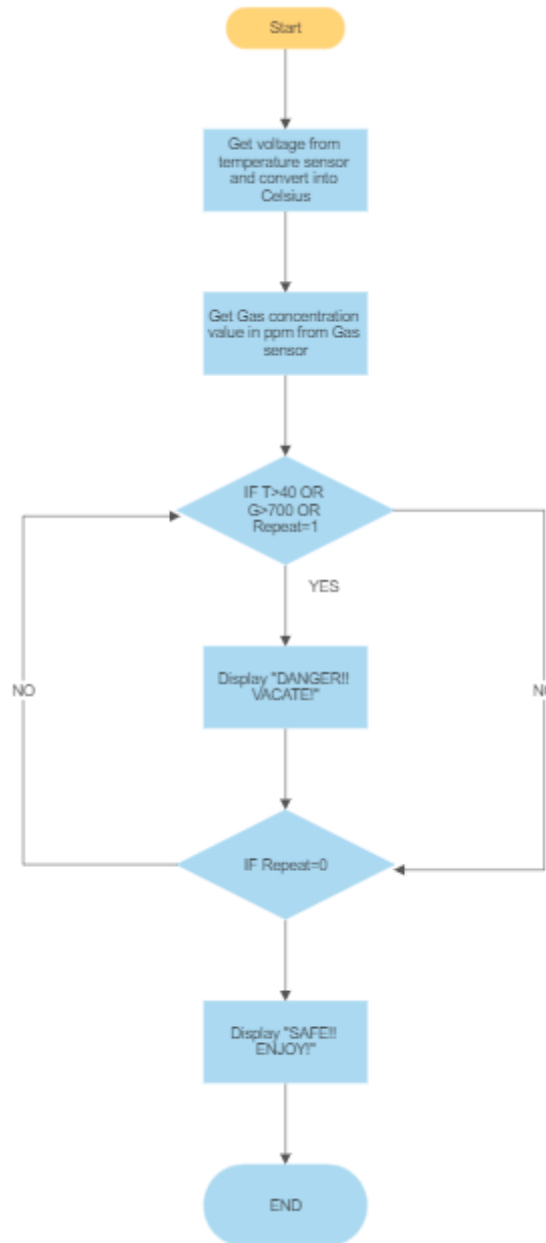


## IV. CONCLUSIONS

This project describes an idea to build "A Fire and Smoke Detection System". It gives an easy and less expensive way to implement a fire and smoke detection system with a feature to control door/windows using motor and a message on LCD display. By using this system, the occupants can get a quick idea of fire, smoke or both before it causes damage at a greater extent. This system is one of the useful, costless and fastest system for safety precaution.

## V. REFERENCES

[1] https://www.ijedr.org/papers/IJEDR1902018.pdf

[2] https://www.researchgate.net/publication/44061274_Review_of_Recent_Developments_in_Fire_Detection_Technologies

[3] https://www.researchgate.net/publication/326316390_Working_Principle_of_Arduino_and_Using_it_as_a_Tool_for_Study_and_Research

[4] https://www.ijsrp.org/research-paper-0618.php?rp=P787461

[5] https://www.jetir.org/view?paper=JETIR2008282