Project Title: Fire Prevention System

Group Number: G26	Student Index Numbers: 200566R, 200571D, 200582L

1. Introduction

Fire safety is a critical concern for any organization or community. Fires can cause significant damage to property, infrastructure, and even human life. Considering this, it is essential to implement effective fire prevention systems to minimize the risk of fires and protect people and assets. Fire prevention systems help us to minimize the risk of fire. This project proposal aims to develop and implement a comprehensive fire prevention system that will include various equipment, devices, and procedures to detect, suppress, and control fires. Through this project, we aim to create a safer environment for people and property and reduce the potential for devastating consequences from fire.

2. Objectives

- Detection of fire
  - Identify the type of fire.
- Early warning
  - Alarm system
  - SMS Alter System
  - Calling system
  - Informing related department about the fire with GPS location.
- Suppression of fire
  - Water Sprinkle
  - Exhaust Fan
  - Automatic fire extinguisher
- Protection property
- Protection fire

3. Proposed Methodology

We use a temperature sensor, a smoke sensor, a gas sensor along with IR sensor. With an IR sensor, we are able to detect fire flame and then detect the fire. But that fire may be small like a lighter flame. So, we need another measurement to identify the state of fire. Small fire flame does not release smoke. By measuring the temperature and smoke, we can identify the real fire. With that mechanism, we can reduce fault fire warnings.

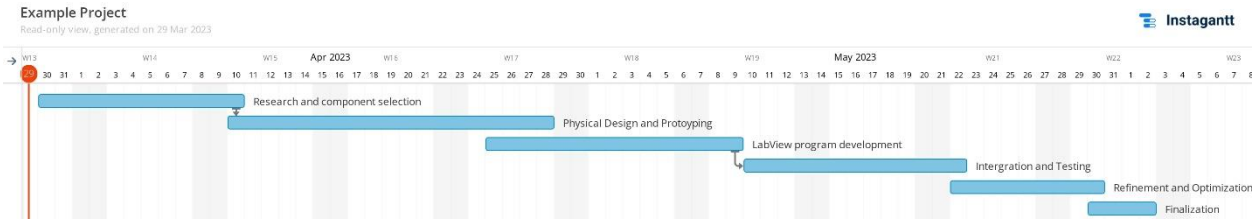
We use another gas sensor to identify gases released from the fire. With that, we can identify the type of fire. It is essential part because we can't use the same method to blow out the fire. If it is an electric fire, we can't use a water sprinkler system for that. We must use the fire extinguisher.

After detecting the fire, we need to act based on our sensor feedback. First, we need to inform humans who is in the building. We can use the Alarm system for that. We need to start Exhaust fans to remove smoke and hot air from the building. Hot air and smoke may cause the spreading of the fire throughout the building. By removing the hot air and smoke, we can reduce fire risk somehow. Another reason to remove smoke and hot air is that it may cause human injury. We must supply safety exit path for humans to leave the building. So, it is very helpful to use exhaust fans. Then we can use a water sprinkler or fire extinguishers based on the type of fire.

All the above methods can be seen in a formal fire prevention system. As an improvement, we add some features to the system. The Liquid Cristal Display which is attached to the system shows the room temperature and humidity level of the room regularly. And, if there is a fire risk, LCD shows some messages about that like increasing of room temperature without detecting any fire flame. And there are Red and Green LEDs attached to the system. If the fire prevention system is turned ON, we can see the Green LED is lit up. If there is a fire risk, we can see the red LED shows that.

Additionally, we add a GSM module to the system. With that, we can get information about the location of the fire, and we can inform the owner with SMS alter and phone calls. Then we can inform the police station and Fire Dept using SMS Alert. To add those contact numbers to the fire prevention system, we can use a Bluetooth module along with a mobile app. We can add those three-contact numbers through the app. By scanning the QR code owner can download the app.

4. Project Timeline



5. Estimated Budget

- 2 Arduino UNO boards – Rs. 3200
- GSM- GPRS shield – SIM800_1 – Rs.1640
- Temperature Sensor – LM35 – Rs. 180
- HC -05 Bluetooth module – Rs. 1250
- CO, CH4 Gas sensor – Rs.550
- Breadboard – Rs. 180
- DC Motor – Rs. 650
- D400 transistor – Rs. 20
- RED and Green LED – Rs. 50
- LCD Display – Rs.740
- Smoke sensor – Rs. 500
- Exhaust fan – Rs. 1740
- Transport and other necessary items - Rs. 1000

Total – Rs. 11700

6. References

- **National Instruments, "LabVIEW for Data Acquisition," National Instruments Corporation, 2018.**
- **TRONIC.LK. (n.d.-a). Tronic.Lk. Retrieved March 29, 2023, from https://tronic.lk/**
- **Fire prevention. (n.d.-b). Health and Safety Authority. Retrieved March 29, 2023, https://www.hsa.ie/eng/topics/fire/fire_prevention/**