Smart Fire Detection System with Water Head Sprinkler

Praveen Rai[1*], Sudarshan Rai[2], Ranjana Sharma[3], Safal Rai[4], Mausan Pradhan[5],
Birendra Hang Subba[6], Mukesh Kumar Sharma[7], Tenzing Sherpa[8]

[1,2,3,4,5,6]*Student, Department of Electrical and Electronics Engineering,, Centre for Computer and Communication Technology, Namchi, India*

[7]*Head of the Department, Department of Electrical and Electronics Engineering, Centre for Computer and Communication Technology, Namchi, India*

[8]*Senoir Lecturer, Department of Electrical and Electronics Engineering, Centre for Computer and Communication Technology, Namchi, India*

***Abstract*: It describes about the Smart fire detection system with water head sprinkler. The main aim of this project is a security system for the people to alert from fire disaster. The fire detection system saves many lives of people and also decrease the property losses. In this project we used Arduino Atmega328P and done a program for software. We used DHT11 temperature and gas sensor for detection of environmental changes. We also used buzzer to alert the people from the fire. For water sprinkler we used a 5v relay and dc water pump, relay is connected with dc water pump and pump will suck the water and extinguish through sprinkler head. Also, we used an LCD to display the alphabet image when the sensor senses the fire and smoke.**

***Keywords*: Arduino atmega 328P, DHT11 temperature sensor, Gas sensor, Buzzer, DC water pump, LCD.**

1. Introduction

Fire hazard is the major problem for the builders, designers and godown workers. Many of people died every year due to fire hazard. It is observed a fire situation when the temperature goes above 60*C. This project is a security system which can relevant anywhere and by anyone. The main purpose of the fire detection system is to suggest or give signal to the people. So that they can remove from that place or take immediate action to the fire effect as soon as possible. Sensor were used to detect fire and smoke. Buzzer will alert the people. Sprinkler system is used to extinguish the fire or affected area around its boundary. The proper allotment of fire alarm with a proactive warning can save lives and decrease property losses. Fire alarm system has become very important or useful to us, because nowadays we come to know that the fire disaster is increasing day by day and also people are dying because of this incident. This project helps in many places such as buildings, factories, schools or colleges and other area. The fire detection system is very convenient for people because the fire incident will not come by saying to the people, this incident will happen unconditionally because it's a natural disaster. We can use

different type of alarm like bell, horn and siren. This type of alarm is very convenient for the people whose hearing sense is less and also who are stuck in the accidental places. Sometimes fire detection system detects false alarm because of our room temperature, kitchen work and other

2. Guidelines

A. To construct this Smart Fire Detection system there are mainly two parts

1) Software

In programming we need Arduino ide software to program Arduino atmega328P. We also did a simulation on proteus 8.8 version. We need to write a program in Arduino ide that we need to compile and upload it. After uploading we need to take out an ATMEGA 328P from Arduino software and place it in system.

2) Hardware

In hardware parts we used DHT11 temperature, Gas sensor, Buzzer, DC water pump, LCDs, LEDs, and relay. Design the hardware circuit as same in simulation or also design in PCB. We need to assemble the PCB components. For water system we used a 5v relay connected with DC water pump and sprinkler head to extinguish the affected area. Now we need to assemble all the hardware parts in PCB and also made a design for frame i.e in square shape. We also need a water storage tank for water sprinkler system.

3. Figures

We observe that in Smart Fire detection system, when the fire temperature goes above 30 degree Celsius the DHT11 temperature sensor and Gas sensor senses the fire and get activated. Once the sensor senses the fire the buzzer will buzz and also led will glow. Apart of buzzing buzzer and glowing led we also observed that when the sensor senses the fire the relay

*Corresponding author: raiprabin17@gmail.com

will trigger the DC water pump, and pump will suck the water and the water will comes over the sprinkler head.
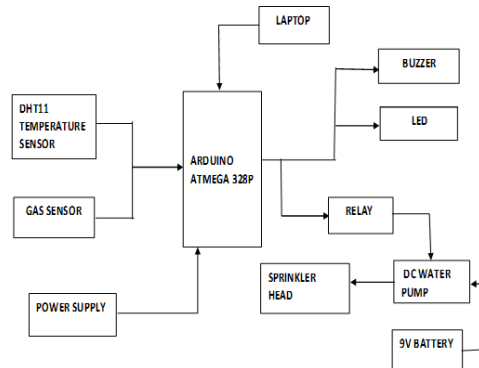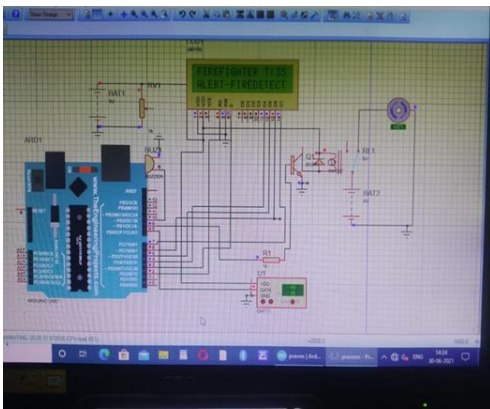

Fig. 1. Block diagram

Fig. 2. Simulation on proteus

Fig. 3. Smart fire detection system

4. Conclusion

This study presented the development of a fire alarm system using the Arduino ATMEGA 328P, DHT11 temperature and Gas sensors. The fire alarm operates to warn people to remove that location were fire is present. This project is made for the slow response issue of fire disaster. The fire alarm constructed by this project work is reliable at low cost. For further we can improve this project by using different parts and sensors like heat sensor, flame sensor etc. This project can also be done by using GSM module to get notify in our mobile phones when fire is detected. And we can add some new innovation in this project and make this project better.

References

[1] Hamood Alqourabah, Amgad Muneer, Suliman Mohamad Fati (IJECE). A smart fire detection system using Iot technology with automatic water sprinkler, vol.9, no.4, August 2020.
[2] Faisal Saeed, Anand Paul, Abdul Rehman, Won Hwa Hong, Hyuncheol Seo (JSAN). Iot based intelligent modelling of smart home environment for fire prevention and safety.
[3] W.L Hsu, J. Y. Jhuang, C. S Huang, C. K Liang and Y. C Shiau. Application of internet of things in a kitchen fire prevention, vol.9, 17, 2019.