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Fire Detection System with SMS Alert Safety Using Microcontroller

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ABSTRACT: The fire is an unexpected tragedy. This can happen in the woodland area or in the residential area. It will usually be detected only when the flames have spread and the intensity of the smoke has increased. The aim of this study is to detect fire using MQ-2 smoke sensor, DS18B20 temperature sensor and fire sensor. Using the Arduino Uno as the controller, the output of this system is in the form of alarm buzzer, short message service (SMS) information using SIM800L and automatic fire pump. The system works to detect temperature changes, smoke levels, and the presence of fire extinguishers that sound an alarm in the form of a siren if two of the three sensors are activated. After that, the information is sent via short message service (SMS) and the resulting pump is automatically triggered. The fire sensor can detect hotspots with a maximum distance of 80 cm and the DS18B20 temperature sensor has a 0.27°C reading error and a 0.5°C maximum reading error. The MQ-2 smoke sensor can detect smoke where changes occur. The concentration of smoke is directly proportional to the sensor output voltage. There are three conditions for determining the condition of fire, namely, the temperature sensor reads above 55°C and the fire sensor is active or the temperature sensor reads above 55°C and the smoke sensor reads above 1000 ppm, or the fire sensor is activated and the smoke sensor reads above 1000 ppm.

KEYWORDS: Power supply, sensors, LCD Display, BUZZER

I. INTRODUCTION

Fire is an oxidation process of three elements air, fuel, and heat source. Conflagration is an unpredictable tragedy. This disaster can occur in the forest areas as well as in residential areas, this incident is not expected by the community because it will cause material, psychological losses and allow for casualties. The fires in urban areas are generally caused by an electrical short circuit (short circuit) on the power cable, a leak in the LPG gas cylinder pipe, or human negligence, such as throwing cigarette butts carelessly. Apart from those caused by human factors, fire disasters can also be caused by natural factors such as lightning, earthquakes, volcanic eruptions, long droughts etc. In general, the fires will only be known if the flames have enlarged and smoke has risen. These conditions will cause casualties, the detriment which are not small and the cessation of business activities or causing environmental damage. When the fires occur, the community worked together to extinguish before the firefighters arrived, the real fact that, the problems were often occurred when firefighters arrive at the location are due to several factors, are delay in information, congested roads to the location, areas that are difficult to reach and the readiness of the officers.



II. IMPLEMENTATION

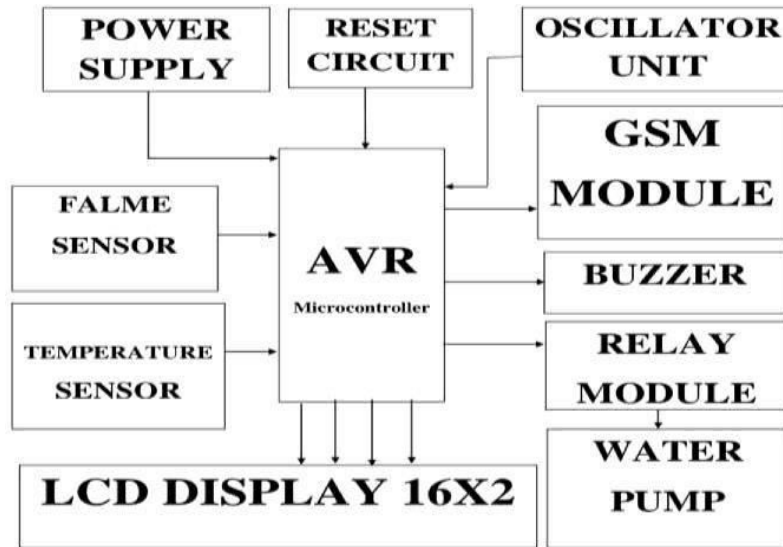


Fig No. 1 Block Diagram

A. Flame Sensor

One sensor that is most sensitive to normal light is known as a flame sensor. Hence this sensor module is used in flame alarms. This sensor detects wavelengths from the light source in the range of 760 nm to 1100 nm otherwise flame. This sensor can be easily damaged at high temperatures. So this sensor can be placed at a certain distance from the light. Flame detection can be done from a distance of 100cm and the detection angle will be 60°. The output of this sensor is either analog signal or digital signal. These sensors are used in firefighting robots as flame alarms.

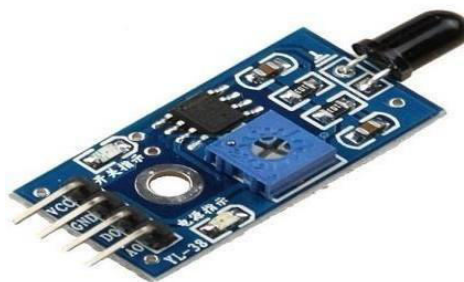


Fig No. 2 Flame Sensor

B. Temperature sensor

A temperature sensor is an electronic device that measures the temperature of its environment and converts input data into electronic data to record, monitor or signal temperature changes. There are many types of temperature sensors. Some temperature sensors require direct contact with the physical object being monitored (contact temperature



Fig No. 3 Temperature Sensor

C. LCD Display

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc. These displays are mainly preferred for multi-segment light-emitting diodes and seven segments. The main benefits of using this module are inexpensive; simply programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc.



Fig No. 4 LCD Display

D. Buzzer

An audio signalling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren.



Fig No. 5 Buzzer



III. RESULTS AND DISCUSSION

To see the efficiency and response of the system in adverse fire conditions, 10 individual simulation tests. Was done with different smoke, gas and temperature conditions. Test results indicate the system. Reliably presents the desired instruction response in different test situations

IV. FUTURE SCOPE

The designed fire alarm system is simple but it has wide area of application in household and industrial safety, especially in developing countries. Using this system, quick and reliable alert response is possible to initiate preventive measures to avert danger of fire hazards and minimize losses of life and property. This is a cost effective fire alarm system which performs reliably to ensure safety from fire, and can be installed in houses, industries, offices, warehouses etc. very easily. It can be used to detect burnable gas like methane, LPG etc. as well. The designed systems have coverage up to 100 square meter area by using a category-6 cable as data line. Large industrial or residential area can be monitored through the proposed system installing multiple modules, each for one floor or unit. The system can be further developed with added features like web server interconnect, fire area tracking and fire extinguisher interfacing etc.

I. Circuit Diagram of Power Supply

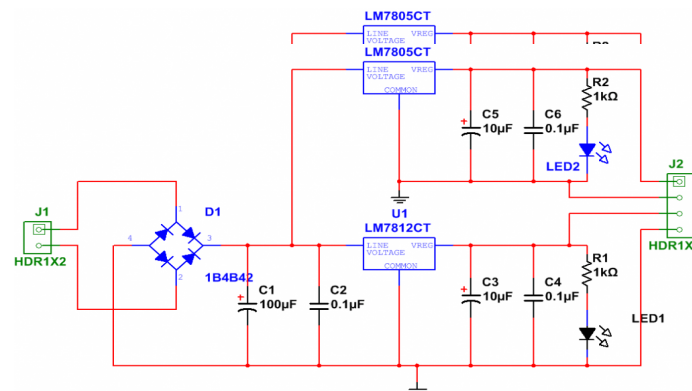


Fig No. 6 Circuit Diagram of Power Supply

II. Block diagram of power supply

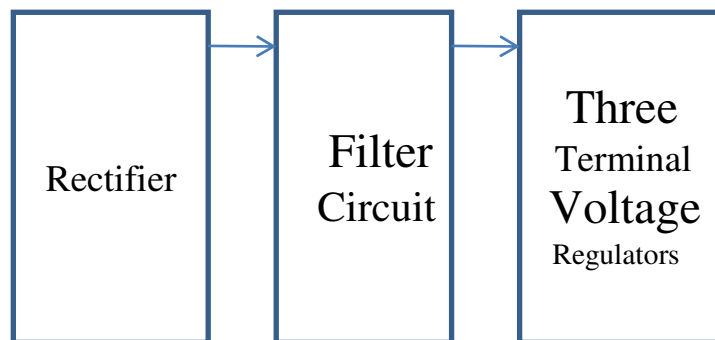


Fig No. 7 Block Diagram Of Power Supply



V. CONCLUSION

Such a conclusion can be drawn on the basis of the tests performed and the output can provide design of home fire detection system and SMS gateway Firefighters and firefighters to reduce the damage and damage to a homeowner quickly Minimize potential deaths. When tested in a real environment, it works at will ten successful attempts to send SMS and sound the alarm.

The prototype developed in this work is designed for the user to remotely control the fire alarm system it. Helps the user if he is not in the building or is unaware of the emergency situation. use this The prototype will survive the unforeseen situation or any critical situation that may occur in residential Areas without the awareness of the resident. Home alert system is assumed to be functional by triggering fire extinguisher. Found the use of a sensor coupled to a temperature sensor and a smoke detector be more appropriate than using only one of them.

VI. GSM MODULE

The SIM900A is a readily available GSM/GPRS module, used in many mobile phones and PDA. The module can also be used for developing IOT (Internet of Things) and Embedded Applications. SIM900A is a dual-band GSM/GPRS engine that works on frequencies EGSM 900MHz and DCS 1800MHz. SIM900A features GPRS multi-slot class 10/ class 8 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. As Shown above, the communication with this module is done through UART or RS232 Interface. The data is sent to the module or received from the module through UART interface.



Fig No. 8 GSM Module



VI. ACTUAL MODAL & HARDWARE

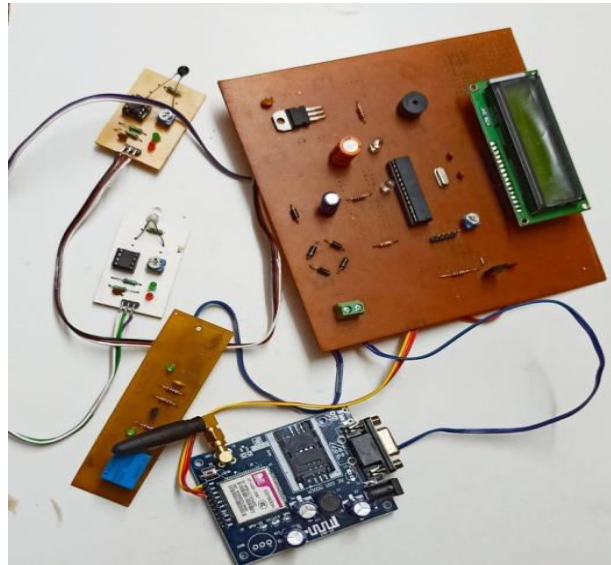
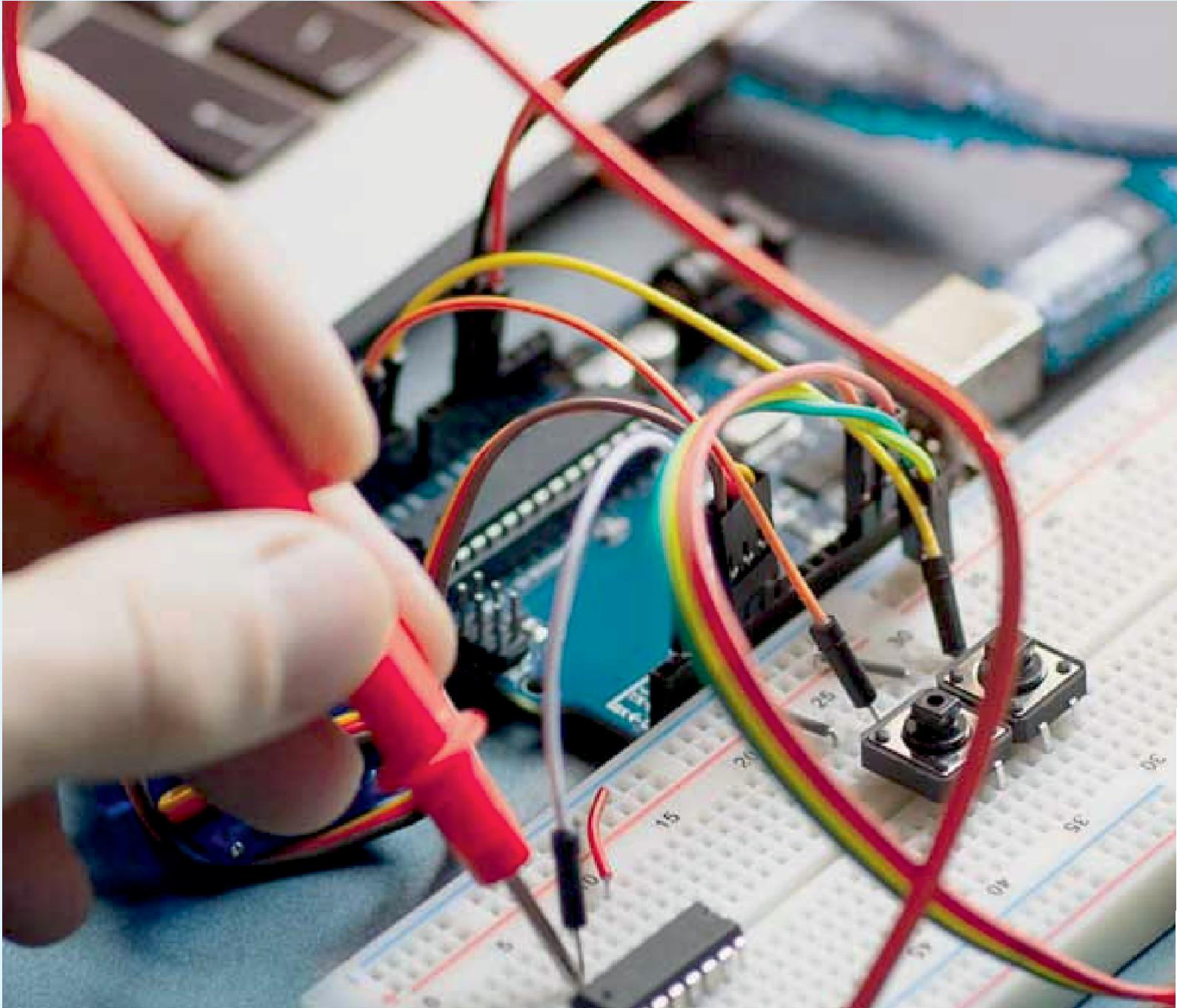


Fig No. 9 Modal & Hardware Photo

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