

# Real Time Fire Detection

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**Abstract-** *In modern architecture there is a high probability of fire occurrence which leads to huge losses in people's lives and property. In order to reduce the fire in the buildings and forests automatic fire alarm equipment placed into a necessity. This paper discusses the real time fire detection, the composition and working principle. The system will be collected through the fire alarm detector to the fire such information will be sent to the fire alarm control through GSM, and then start from the controller, sound, alarm and other devices, and automatically print a fire information. This paper describes the overall structure of the real time fire detection. The detection of fire will help the mankind to safeguard from the huge losses.*

**Indexed Terms-** *GSM, Buzzer, Arduino uno, DC 5v motor and Fire sensor*

## I. INTRODUCTION

To protect human life, our property, and Earth natural resources from fire and other emergencies, there is a need of fire detection. [1] With fluctuation in demands, the Fire and Rescue Service must equip with the best techniques, training regime and equipment to meet public expectations. With good planning and preparedness, the fast response can be achieved.[2] Wireless Sensor Network can be used to collect various parameters and all the information needed by environments such as in industrial, shipboard, home, building, utilities and transportation system. The main function of wireless sensor network is to determine the environmental conditions that are monitored by sensing some physical event. Sensor network mostly have a lot of sensors nodes used in a big place to measure and track the activities of real-time environment.[3] This sensor nodes help to gather data like temperature, humidity, and acceleration from the environment. As a result, a monitoring system of alarm system for fire detection using Arduino micro

controller was design.[4] The circuit are includes with a buzzer, fire sensor and a GSM.[5] All the data taken from fire sensor will be send to data monitoring system and will alert through an SMS to the registered mobile number. This will help the fire fighter to pinpoint the source of the fire in the building and make the rescue operation smoother. [6]

## II. EMBEDDED SYSTEM

An installed framework is a specific reason PC framework intended to perform one or a couple of committed capacities, regularly with ongoing processing imperatives. It is generally installed as a component of a total gadget including equipment and mechanical parts. Interestingly, a broadly useful PC, for example, a PC, can do a wide range of errands relying upon programming. Implanted frameworks have become significant today as they control a large number of the basic gadgets we use. Since the inserted framework is devoted to explicit undertakings, plan specialists can streamline it, decreasing the size and cost of the item, or expanding the unwavering quality and execution. Some inserted frameworks are mass-created, profiting by economies of scale. By and large, "implanted framework" isn't a precisely characterized term, the same number of frameworks have some component of programmability. For instance, Handheld PCs share a few components with implanted frameworks —, for example, the working frameworks and microchips which power them — however are not genuinely inserted frameworks, since they permit various applications to be stacked and peripherals to be associated. Inserted frameworks give a few capacities. Monitor the earth; installed frameworks read information from input sensors. This information is then prepared and the outcomes showed in some arrangement to a client or clients. Control the earth; implanted frameworks create and transmit orders for actuators. Transform the data; implanted frameworks change the information gathered in some significant

manner, for example, information pressure/decompression. In spite of the fact that collaboration with the outer world by means of sensors and actuators is a significant part of inserted frameworks, these frameworks additionally give usefulness explicit to their applications. Installed frameworks ordinarily execute applications, for example, control laws, limited state machines, and sign handling calculations. These frameworks should likewise distinguish and respond to flaws in both the inward registering condition just as the encompassing electromechanical frameworks.

### III. PROPOSED METHOD

In proposed method we use Arduino micro controller, fire sensor, buzzer, GSM module and DC 5v motor. When the fire sensor detects the fire it starts buzzer alarm and automatically sends the message to the register mobile number using GSM. Further using water motor the fire can be stopped.



### IV. COMPONENTS

#### A. Arduino uno

Arduino uno is a kind of micro controller based on the Atmega 328 microcontroller; it runs at 16 MHz and has 1 hardware serial port, 6 ADC inputs, 14 digital I/O pins and runs on 5volt power [4]. A microcontroller is a mini computer in a chip of silicon and can accept instructions and follow those instructions. To change the operation of the microcontroller, we only need to write a new set of instructions or program. The Atmega 328 microcontroller is a very versatile device that is adequate for the role intended in this project, which is to monitor and control the rest of the hardware. It is able to provide 40mA of drive current for any device connected to its ports. The board also has an on-board

5volt regulator, which means it can run from a power supply even higher than 5 volts.

#### B. Buzzer

A buzzer is a small component made to add sound features to our project/system. It is a small and compact 2-pin structure hence can be used on bread board, Perf Board and even on PCBs which makes this a widely used component in most electronic applications. There are two types are buzzers that are commonly available. The one shown here is a simple buzzer which when powered will make a Continuous Beeeeeepp... sound, the other type is called a readymade buzzer which will look bulkier than this and will produce a Beep. Beep. Beep. This sound is produced due to the internal oscillating circuit present inside it. But, the one shown here is most widely used because it can be customized with help of other circuits to fit easily in our application. The DC power supply used to power the buzzer ranges from 4V to 9V. A simple 9V battery can also be used, but it is recommended to use a regulated +5V or +6V DC supply. The buzzer is associated with a switching circuit in order to make it turn ON or turn OFF.

#### C. Fire Sensor

This fire sensor circuit misuses the temperature detecting property of a normal sign diode IN 34 to identify heat from fire. Right now it detects heat, an uproarious caution reproducing that of Fire detachment will be delivered. The circuit is excessively delicate and can distinguish an ascent in temperature of 10 degree or more in its region. Normal sign diodes like IN 34 and OA 71 shows this property and the inside obstruction of these gadgets will diminish when temperature rises. The fire sensor circuit is excessively touchy and can recognize an ascent in temperature of 10 degree or more in its region. Standard sign diodes like IN 34 and OA 71 displays this property and the interior opposition of these gadgets will diminish when temperature rises. In the converse one-sided mode, this impact will be increasingly critical. Ordinarily the diode can create around 600 milli volts at 5 degree centigrade. For every degree ascend in temperature; the diode creates 2 mV yield voltage. That is at 5 degree it is 10 mV and when the temperature ascends to 50 degree, the diode will give 100 milli volts. This voltage is utilized to trigger the rest of the circuit. Transistor T1 is a

temperature controlled switch and its base voltage relies upon the voltage from the diode and from VR and R1. Ordinarily T1 conducts (because of the voltage set by VR) and LED sparkles. This shows typical temperature. [3]

#### D. GSM Module

GSM is a portable correspondence modem; it represents worldwide framework for versatile correspondence (GSM). The possibility of GSM was created at Bell Laboratories in 1970. It is generally utilized versatile correspondence framework on the planet. GSM is utilized for transmitting portable voice and information administrations works at the 850MHz, 900MHz, 1800MHz and 1900MHz recurrence groups. GSM framework was created as an advanced framework utilizing time division different access (TDMA) method for correspondence reason. A GSM digitizes and diminishes the information, at that point sends it down through a channel with two distinct surges of customer information, each in its own specific time allotment. The advanced framework has a capacity to convey 64 kbps to 120 Mbps of information rates.

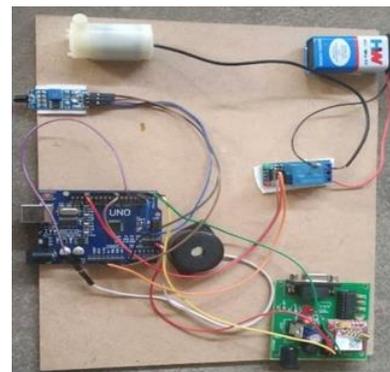
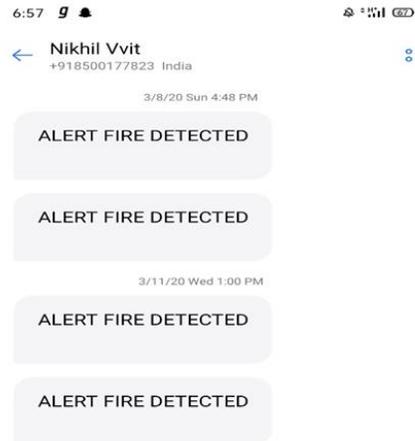
#### E. DC motor

This is a minimal effort little sub type water siphon that chips away at 3-6V DC. It is incredibly straightforward and simple to utilize. Simply submerge the siphon in water, interface a reasonable funnel to the outlet and force the engine with 3-6V to begin siphoning water. Extraordinary for building science ventures, fire-quenchers, putting out fires robots, wellsprings, cascades, plant watering frameworks and so on. This engine is little, conservative and light. It tends to be controlled from a small scale controller/Arduino utilizing our DC Motor Drivers or one of our Relay Boards. You may utilize our 5V SMPS Power Supply Adapter to run this siphon. You may likewise utilize our 6V Solar Panel to run the siphon with proper a 6V voltage controller. Try not to run the siphon dry (without placing it in water) and don't utilize it to siphon flammable fluids.

#### V. WORKING

During the framework fire up, the microcontroller tests all the equipment to affirm equipment blunders. It at that point continues to close down the GSM

module for appropriate power the board. Along these lines, it starts perusing the sensors and averaging their readings to wipe out blunders and forestall bogus alerts. At the point when any sensor perusing leaves the range thought about typical, the GSM module it brought on the web, permitted to secure the system and a message is sent showing which sensor. This gives the client a more noteworthy familiarity with the ecological parameters in his living arrangement or office. On the off chance that a blend of readings meets the preset models for a fire, an alarm message is sent to the server. The framework functions true to form and the sensors produce repeatable that is, comparable yield each time the natural triggers, in particular hot temperature and smoke contamination, happen inside the model house. This demonstrates dependability. Additionally, the framework effectively recognizes the zone wherein the natural abnormality starts. With everything taken into account, it gives a trustworthy framework for early recognition of fire and smoke perils.



## CONCLUSION

Taking everything into account, the Fire Alarm and Detection System utilizing SMS is a practical and medium inclusion strategy for recognizing, cautioning and controlling fire and fire related occurrences in a private setting or mechanical condition. It utilizes a recognizable innovation and exploits SMS abilities so as to accomplish its proposed objective successfully. This framework work would spare expense, give solid administrations, and alarm closest local group of fire-fighters, accordingly decreasing (or in any event, annihilating) loss of lives and property. Its applications go from the normal family unit setting even to huge mechanical situations, presenting huge adaptability. Thus the fire detection and alarm through SMS using GSM provides us the information when the fire is detected and helps us to prevent from such hazards.

<http://www.sciencedirect.com/science/article/pii/S0924424711004596>

- [6] V. Jelacic; M. Magno; G. Paci; D. Brunelli; L. Benini, "Design, characterization and management of a wireless sensor network for smart gas monitoring," in 2011 4th IEEE Int. Workshop on Adv. in Sensors and Interfaces (IWASI), pp. 115-120

## REFERENCES

- [1] Cytron USB to UART Converter User Manual, Cytron Technology Inc., 2011, pp. 1-23.
- [2] S. D. Dissanayake; P. P. C. R. Karunasekara; ,D. D. Lakmanarachchi; A. J. D. Rathnayaka; A. T. L. K. Samarasinghe, "ZigBee wireless vehicular identification and authentication system," International Conference on Information and Automation for Sustainability, 2008, pp.257-260.
- [3] F. He; Z. Du; Y. Sun, "Indoor dangerous gas environment detected by mobile robot," in 2009 IEEE International Conference on Robotics and Biomimetic (ROBIO), pp. 396-401.
- [4] M. F. Jan; Q. Habib; M. Irfan, Jan, M.F.; Habib, Q.; Irfan, M.; Murad, M.; Yahya, K.M.; Hassan, G.M., "Carbon monoxide detection and autonomous countermeasure system for a steel mill using Wireless Sensor and Actuator Network," in 2010 6th International Conference on Emerging Technologies (ICET), pp. 405-409
- [5] A. Somov; A. Baranov; A. Savkin; D. Spirjakin; A. Spirjakin; R. Passerone. (2011, Nov). Development of wireless sensor network for combustible gas monitoring. *Sensors & Actuators A: Physical* [Online]. 171(2), pp. 1-8. Available: