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IOT Based-Fire and Gas Accident Detection System

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ABSTRACT: This paper provides an overview of existing types of fire detectors that can be understood one hundred percent complete in combination with the advancements associated with a programmed open flame alarm system dependent on an inexpensive, portable, and reliable microcontroller, because he is slightly attentive to small flames occurring both in homes and in professional premises. The purpose of our developed system is also the owner with precision even quickly by sending a short message via GSM network values and a transmitter to the central server using GPRS. Any linear built-in temperature sensor detects temperatures farther than the predetermined reference, although the solid-state sorting sensor will recognize the existence of smoke or even gasoline from chimney hazards. With successful fire detection, the device transmits data on the central server with GPRS coordinates that help us locate the exact position using the Maps application in Android Mobile, depending on the connection received via SMS. The detectors are positioned in parallel with each other in the required quantities. The indication read through each detector of any type of level can be monitored and controlled using the monitoring method.

I. INTRODUCTION

With the advancements in day to day life, fire-safety has become one of the primary problems. Fire hazards are deadly dangerous and detrimental to business and home safety, and devastating to human life. The obvious way to minimize the kind of loss is to respond to these emergency situations as quickly as possible. Thus, at present there is a huge demand and requirement for standalone autonomous flame detection techniques. These types of techniques carry out operations involving rapid reconnaissance, anti-theft warning and sometimes the initiation which consists of extinguishing the flame. These particular structures, equipped with smoke and temperature detectors, can easily identify annoying random situations, because they are equipped with the help of a control mechanism that can give instant warnings. Remote alert framework offers the proprietor of the reason, the principle favorable position of checking faraway districts along with catching quick reaction as soon as an unexpected crisis message is gotten. Far surveillance methods are performed in several ways that use the treatment of the Internet and as well as digital communication technology. Despite the fact that the methods are generally reliable and still have many advantages, they are associated with concerns about obtaining complex, poorly packaged, non-autonomous, expensive and obsolete devices. As a result, there is a prerequisite to get a method which can possibly be dependable and reactive as well as straightforward, easy implementable and economical.

II. LITERATURE SURVEY

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The development of UV/IR combination flame detectors.

III. HARDWARE AND REQUIREMENTS
BLOCK DIAGRAM

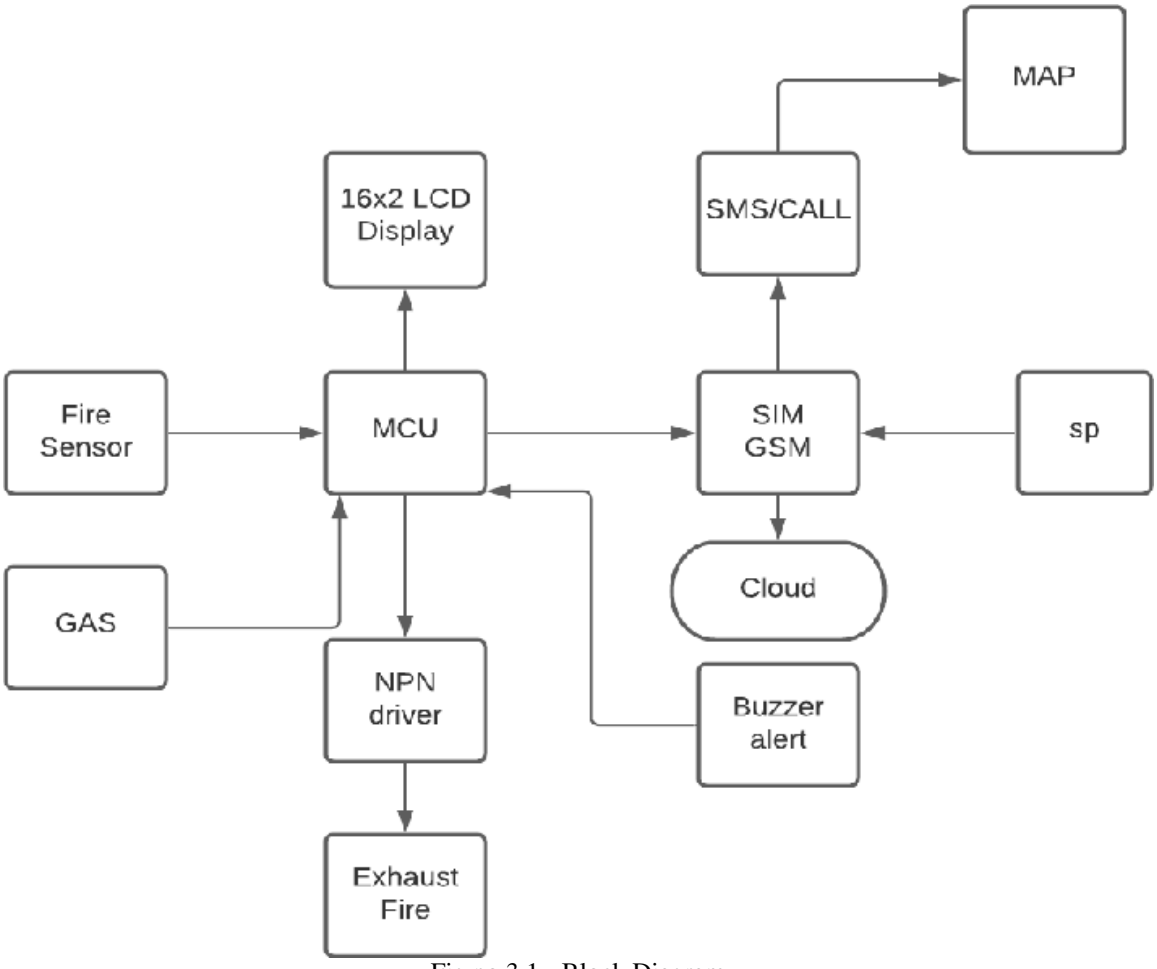

Fig.no 3.1 - Block Diagram

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MICROCONTROLLER

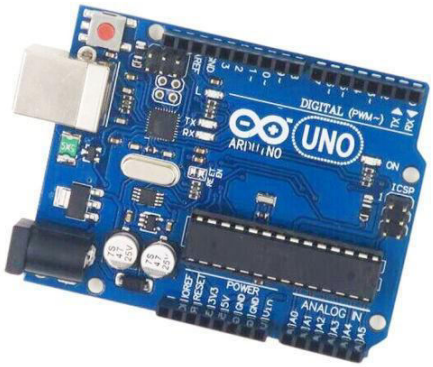

Fig.no 3.2 – Microcontroller

Arduino is an open-source project that created microcontroller-based kits for building digital devices and interactive objects capable of sensing and controlling physical devices. The project is based on microcontroller board designs, produced by different vendors, using different microcontrollers. These systems provide sets of digital and analog input/output (I/O) pins that can interface to various expansion boards (termed shields) and other circuits.

2. Liquid Crystal Display

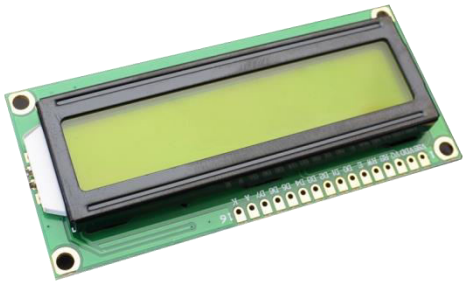

Fig.no 3.3 - LCD Display

This LCD Display is designed for E-blocks. It has a 16 character, 2-line alphanumeric LCD display connected to a single 9-way D-type connector. This device will be connected to E-Block I/O ports. The display requires 5V power supply. The device cannot exceed 5V, as this will cause damage to the device. The 5V power supply can be generated from either E-blocks Multi programmers or a 5V fixed regulated power supply. The 16 x 2 intelligent alphanumeric dot matrix can display 224 different characters and symbols.

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3. GAS SENSOR

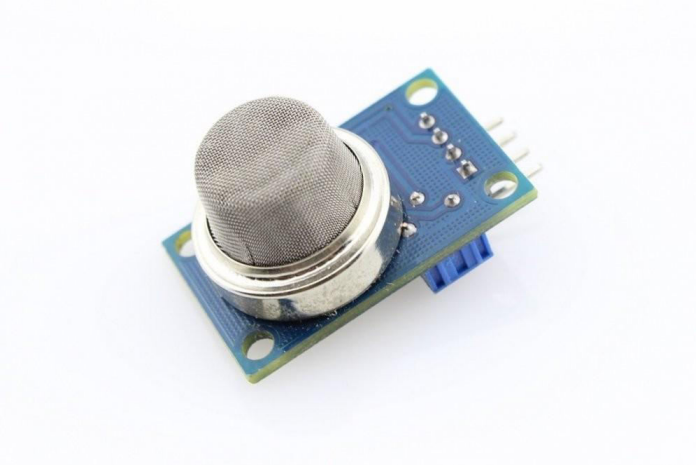

Fig.no 3.4 - Gas Detector

The gas sensors react spontaneously to gasses, now the system is updated on all modifications that occur in the concentration of molecules in the gaseous state. The gas sensor module comprises a steel exoskeleton under which a location component is housed. This detection element is subjected to a current through the connecting leads. This current is called heating current passing through it, gasses approaching the sensing element are ionized and absorbed by the sensing element.

This modifies the resistance of the sensing element which modifies the value of the current which leaves it. The sensor connection cables are thick so that the sensor can be firmly connected to the circuit and a sufficient amount of heat is drawn inside. They are cast in copper and covered with a tin plating.

FLAME SENSOR

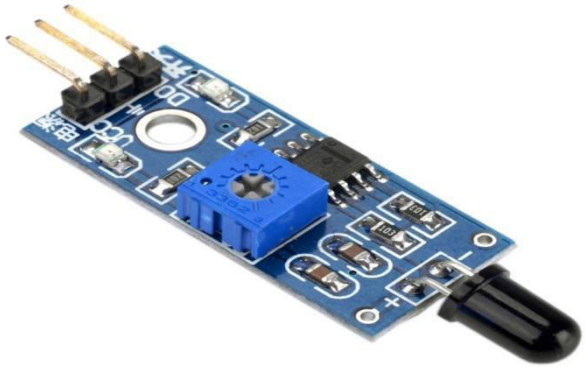

Fig.no 3.5 - Flame Sensor

A flame detector is a sensor that is designed to detect and react to the presence of flame or fire. A flame can also detect normal light sources in the range of 760nm to1100nm wavelength which can cover upto the distance of 100cm. The flame detector can emit a digital or analog signal.The sensor and the flame must maintain a certain distance of 80 cm, so as not to damage the temperature of the lighter sensor for the test flames.

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TRANSFORMER

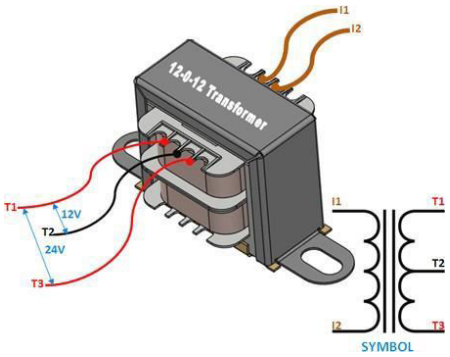

Fig.no 3.6 – Transformer

It is a chassis mounting mains transformer. Transformer consists of 240V primary windings and a center tapped secondary winding. The transformer has insulated connecting leads. The Transformer acts as a step down transformer that reduces AC power supply of - 240V to - 12V. Electromagnetic induction produces an electromotive force in a conductor that is exposed to time-varying magnetic fields. Transformers are used in step up or step down of alternating voltages in power supply applications.

SIMCOM GSM MODEM

This GSM modem can operate with any SIM card of the GSM network operator, such as a mobile phone with your own phone number. One of the advantages is that the RS232 port of the modem can be used to communicate and develop embedded applications. Applications such as SMS control and data transfer can be developed simply using this.

The modem can be connected to the PC serial port directly or any microcontroller via MAX232. It can be used to send or receive SMS and calls. It can also be used in GPRS mode to connect to the internet and run many applications for data logging and control. Data can be updated and FTP servers can be connected in GPRS mode.

Fig.no 3.6 - SIMCOM GSM Modem

IV. RESULTS

The data from the sensor is sent to the microcontroller. An alert message is also sent to the mobile number of the concerned parties. Simultaneously the location of the potential accident place is also sent. This is how the project works and can be operated easily by anyone.

V. FUTURE SCOPE

Having implemented this project, it sends out an alert of a potential fire accident and probably can stop or control the fire accident. It can be further developed by using advanced technologies so that the economy of the whole project

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can be reduced and it can be made more compact and space friendly.

VI. CONCLUSION

In conclusion, our proposed system was capable of achieving its main goals which were mainly building an IoT based fire detection system that is capable of detecting the presence of fire, prevent or control potential fire accidents, and send SMS. Additionally, location of the potential fire accident place will be shared to the concerned parties.

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