

# BLAZE ASPHYXIATOR

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**Abstract:** From past few decades, we have been witnessing severe fire accidents. These accidents results in great alarm, destruction of property and sometimes loss of lives. However, Fire hazards are often unanticipated and caused due to faulty wiring, defective products, and flammable liquids or due to lack of proper care. There are number of methods to reduce these fire accidents and reduce the severity of loss, but the damage is catastrophic, as a rescue service could not reach at right time due to improper communication. Thus, it is required to have intervention technologies in order to get adapted to the need of any such incident and respond to this emergency very rapidly. This system proposed in this paper is “Blaze asphyxiator” that makes use of the modern technology to detect the fire accident that might occur and inform the respective authorities with minimum delay.

**Keywords – Arduino, GSM module, Threshold value, Motor drive module, Sensors**

## I. INTRODUCTION

Fire safety measures include, measures taken to prevent ignition of an uncontrolled fire or to limit the effects of fire. The main objective of fire prevention is to create awareness among public about the best precaution that can be adapted to ensure fire safety.

There are many fire accidents in past few years that has created serious harm to people and properties.

- Plastic factory fire accident in Ludhiana in the year 2017
- A major fire accident at BACK plant in the year 2018
- A massive fire outbreak in a Lucknow situated hotel.

**Traditional way in turning down or extinguishing fire in such fire accidents included the firefighters to arrive at the spot and take charge of the situation or automated sprinkler systems.**

However, the above mentioned methods has its own disadvantages as automated sprinkler systems fails to extinguish high intensity of fire and also in case of firemen extinguishing fire can cause delay which may intensify the fire leading to abrupt destruction.

In this article, an efficient way of extinguishing fire in case of fire accidents is proposed. It is cost effective, requires minimum maintenance and is less complex.

## II. OBJECTIVE

Despite the fact that there are various types of technologies to control fire hazards there are numerous disadvantages with it as mentioned earlier, few methods are really time consuming and uneconomical. To overcome this problem, an idea of Blaze asphyxiator is proposed in this paper to ensure safety for both people and properties. It is also economical and present security system with maximum reliability.

## III. OPERATING PRINCIPLE

The proposed system is the most efficient way of controlling fire hazards, it involves both detecting and controlling of fire.

Detecting:

A ‘SMOKE DETECTOR CIRCUIT’ developed does detection of smoke. The smoke sensor used is very sensitive to light amount of smoke. The voltage that the sensor outputs, changes accordingly to the smoke or gas level that exists in the atmosphere. When the smoke reaches a certain level, buzzer starts beeping and a led will turn on. Simultaneously, a signal is delivered to the GSM module, which in-turn makes a call to the provided personnel in-charge with minimum delay and immediate actions can be taken to prevent the fire that might lead to serious threat.

Controlling:

Controlling involves both manual and automatic control of fire. Manual control is involved during short circuit and when effects of fire is low, where extinguishers or elide balls can be implemented and it can be controlled directly by the control authority. Sometimes, these fire accidents are abrupt, where we cannot control the fire manually. In this case, we have designed a Firefighting bot circuit which senses and controls the fire automatically.

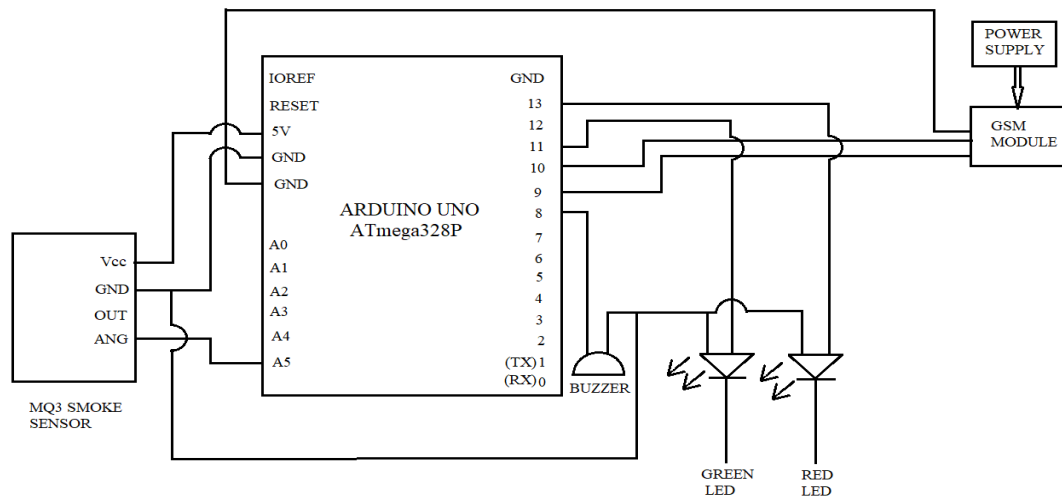


Fig 1: Circuit diagram of smoke detector circuit

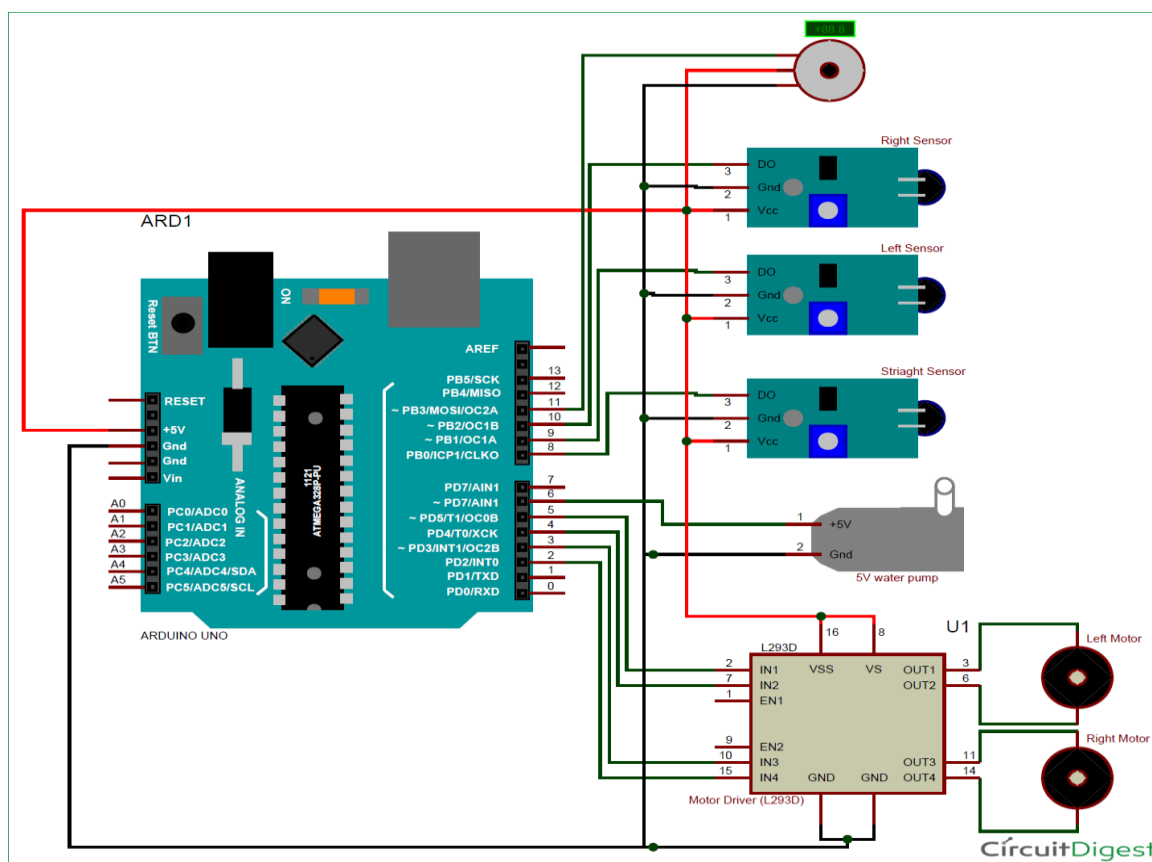


Fig 2: Circuit diagram of Fire-fighting bot circuit

#### IV. COMPONENT DESCRIPTION

##### A. Arduino

A Microcontroller slat which depends upon the ATmega328 is presented with Arduino Uno is shown in Figure 3. ATmega328 is a single-chip microcontroller created by Atmel in the mega-AVR family. It has a modified Harvard architecture 8-bit RISC processor core. It has fourteen input and output pins. Six pins can be considered as Pulse Width Modulation (PWM) Outputs, another six as analog inputs, next one connected to crystal oscillator (16MHz) and the last one connects with the Universal Serial Bus (USB). The Arduino Uno slat directly interconnecting to computer/laptop by USB chord. It is an open source software and very simple to apply control rules in the chip of the microcontroller slat.



Fig 3: Arduino Uno

##### B. Power Supply

The supply given here is the +5V D.C supply. The input voltage is 230V A.C, there is no need to convert it into +5V D.C since the input voltage is step down from 230V to 9-0-9V. The rectifier consists of diodes D1 and D2 converts the input voltage or the supply voltage into D.C. The output of ordinary power supply is fed to the voltage regulator that produces the final output.

##### C. Global System for Mobile Communication (GSM)

It is an open, digital cellular technology for transmitting mobile voice and data services. GSM module is used to establish communication between a computer and a GSM system. It is an architecture used for mobile communication in most of the countries. This module consists of a GSM modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc.) for computer. It is designed for communication of computer with the GSM network. It requires a SIM (Subscriber Identity Module) card. It can perform the following operations:

- Receive, send or delete SMS messages in a SIM.
- Read, add, search phonebook entries of the SIM.
- Make, receive or reject a voice call.

The modem needs AT commands, for interfacing with processor or controller, which are communicated through serial communication. These commands are sent by the controller/processor. GSM supports data transfers speeds 9.6 kb/s, allowing the transmission of basic data services such as SMS (Short Message Service).



Fig 4: Global System for Mobile Communication (GSM)

**D. SENSORS**

- **MQ-3 SENSOR (Used in SMOKE DETECTOR CIRCUIT)**

A sensor is a device that detects and responds to some type of physical environment. The specific input could be light, heat, smoke, motion, etc. A smoke sensor or detector is a device that senses smoke, typically as an indicator of fire. Commercial security devices issue a signal to a fire alarm control panel as a part of fire alarm system while household smoke sensor, also known as smoke alarms, generally issue a local audible or visual alarm from the detector itself. MQ-3 Sensor module is a useful module for detecting smoke concentration.



**Fig 6: MQ-3 sensor**

- **FLAME SENSOR (Used in FIREFIGHTING BOT CIRCUIT)**

A flame sensor detects and responds to the presence of a flame or fire. They take no direct action beyond notifying the operator or control system. A flame detector can often respond faster and more accurately than a smoke or heat detector due to the mechanisms it uses to detect the flame.

**Fig 7: Flame sensor**

**E. BUZZER**

A buzzer or beeper is an audio signaling device which maybe mechanical, electromechanical or piezoelectric (piezo for short). It is usually electronic, typically used in automobiles, household appliances such as micro-oven, etc. It consists of switches and or sensors that is connected to a control unit, which determines the pre-set time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of continuous buzzing or beeping sound. Typical uses of buzzers include alarm devices, timers and confirmation of user input such as mouse click or keystroke.



**Fig**

**8: A buzzer**

**F. SERVO MOTOR SG90**

A SERVO MOTOR is a lightweight motor with high output power. A servo can rotate approximately 180 degrees (90 degrees in each direction) and works similar to standard kinds but smaller in size.

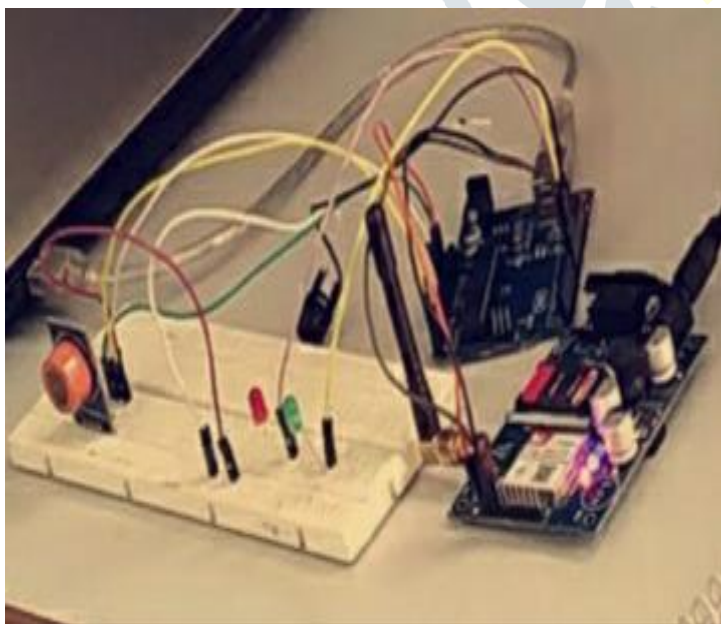


**Fig 9: Servo Motor (SG90)**

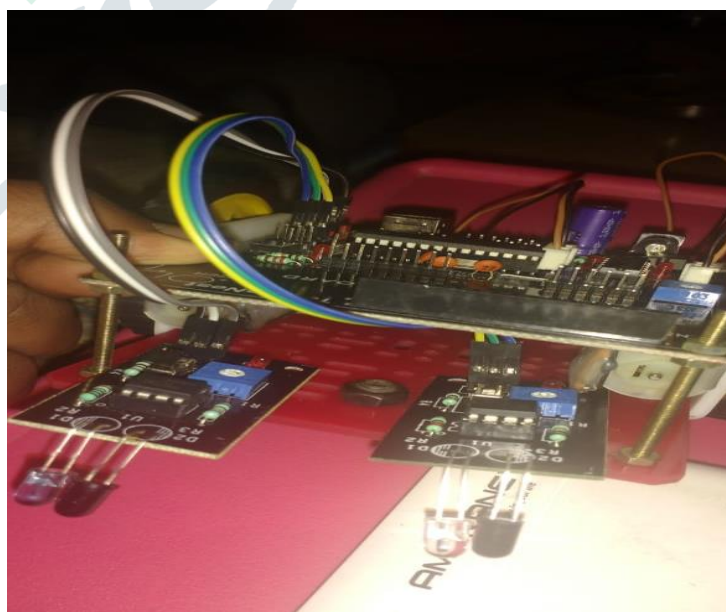
**G. L293D MOTOR DRIVE MODULE**

The Motor Driver module allows to control the working speed and direction of two motors simultaneously. This Motor Driver is designed and developed based on L293D IC. L293D is a 16 Pin Motor Driver IC. This is designed to provide bidirectional drive currents at voltages from 5 V to 36 V.

**Fig 10: L293D Motor Module**



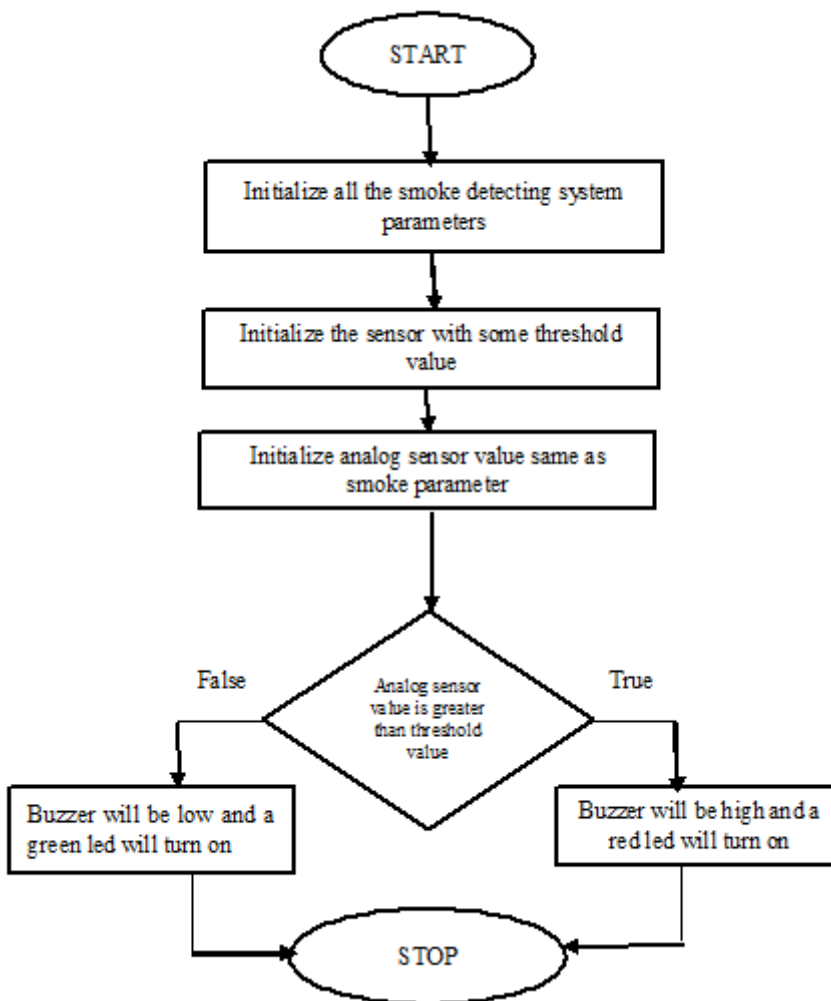
**Fig 11: Hardware design of SMOKE DETECTOR CIRCUIT**



**Fig 12: Hardware design of FIREFIGHTING BOT CIRCUIT**

**List of components required**

1. Arduino UNO
2. GSM Module
3. Power supply
4. Buzzer
5. Light Emitting Diode (LED)
6. MQ-3 Sensor
7. Fire sensor or Flame sensor
8. L293D Motor Drive Module
9. Servo Motor (SG90)

**FLOWCHART****V. ADVANTAGES**

1. It is the present security system with maximum reliability.
2. It is user friendly.
3. It is a real time security system with simple hardware, which simplifies the possibility of error free security system.
4. Low cost with high security system.

**VI. APPLICATIONS**

1. Smoke detector circuit can be used in Automobiles and it can also be employed in railways.
2. This whole system can be employed in industries.
3. It can be used in public places like shopping malls, hospitals, etc.
4. It can be used as home security system.

**VII. RESULTS AND DISCUSSIONS**

As safety is a serious concern with respect to both people and property this system “BLAZE ASPHYXIATOR” is successfully designed and tested in order to meet the requirement. Presence of every component and module is reasoned out and it is placed in a right way thus contributing to the best working of each unit. In this project, highly advanced IC’s and growing technology is used and the project is successfully implemented.

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