

# Arduino Fire Fighting Robot With SMS And Call Alert

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**Abstract-** Fire incidents are disasters that can potentially lead to the loss of life and property. It can also beget damage and endless disability to the affected victim. Fire fighters are primarily assigned to handle fire incidents, but they're frequently exposed to high pitfalls when extinguishing the fire, especially in a dangerous area. A one-stop result for all fire-related accidents like fire outbreak, bank and combustive gas leakage is hereby considered. This study presents the development of a fire extinguishing robot with an SMS alert point that can sound an alarm to inhabitants of the structure, shoot an alert SMS communication to the registered phone number, and also do to extinguish the fire unmanned. It's designed to be compact for ease of movement into narrow spaces. The robot is equipped with an ultrasonic detector to avoid collision with any handicap and girding objects, while the honey detector alongside a bank detector, was used to descry the fire. This developed independent system demonstrates the capabilities of relating fire locales automatically and extinguishes the fire using the stored water in the vessel on it.

**Keywords-** Fire alarm, SMS, robot, LM2596 buck convertor, L293 Motor Driver.

## I. INTRODUCTION

The design that's being presented is concentrated on a fire fighting robot. Robots are able of performing tasks in a more effective, cost-effective, and accurate manner than humans. It has grown in fashion ability as technology has advanced, making mortal work simpler. The firefighting robot is programmed to checkup for and extinguish fires in affected areas. The consequences of fire cannot be averted, and they can do in both youthful, recently formed timbers and mature natural timbers. Fire has a focused impact on factory growth because it destroys undesirable foliage, allowing other species to crop. To enthrall Gas detector, tank which consists of water, wireless remote, wireless android device and Wi- Fi powered camera are each important factors in the robot's construction( 1). A wireless robot can conduct successful work, allowing the robot to be operated from a distance (2). LTDAR is an

algorithm developed ultraviolet radiation detector to reliably find fire using a long surge infrared camera, and created for a mobile intelligent firefighting robot.( 2). LTDAR is an algorithm developed ultraviolet radiation detector to reliably find fire using a long surge infrared camera, and created for a mobile intelligent firefighting robot( 3). The act of smattering water on a fire is known as fire-fighting. The robotic vehicle is equipped with water tanks and a pump that's operated by wireless communication (4). As a result of a fire outbreak (or) fire explosion, we're demanding that we use mortal coffers that aren't secure to put out the fire. It's veritably important possible to replace mortal work in putting out a fire in a dangerous terrain by using advanced technology, specifically robotics,

## 1.1 Background

### A. Definition:

Robots are able of performing tasks in a more effective, cost-effective, and accurate manner than humans. It has grown in fashion ability as technology has advanced, making mortal work simpler. The fire-fighting robot is programmed to checkup for and extinguish fires in affected areas.

### B. Arduino Uno R3:



Fig 1: Arduino Uno R3

Arduino Uno R3 Arduino UNO is a microcontroller board grounded on the ATmega328P. It has 14 digital input/

affair legs( of which 6 can be used as PWM labors), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack( 4). Arduino Uno can be powered through a USB connection or by an external power force, and the power source is named automatically. It can be operated at a voltage of 7V to 12V

C. SIM 800 L:



Fig 2: Sim 800 L

IM 800 L Fig 2 Sim 800 L The SIM800L GSM/GPRS board features compact size and low current consumption. With power saving fashion, the current consumption is as low as 1mA in sleep mode. It communicates with microcontroller via UART harborage, supports command. Its operating voltage is 3.7-4.2V, peak current is 1A.

D. Flame Sensor:



Fig 3: Flame Sensor

A Flame Sensor is a type of detector that can descry and respond to the presence of a honey. These sensors have the capability to identify smokeless liquid and bank that can produce open fire. For illustration, in boiler furnaces honey sensors are extensively used, as a honey sensor can descry heat, bank, and fire

E. Relay Module:



Fig 4: Relay Module

A Relay motorist IC is an electro- glamorous switch that will be used whenever we want to use a low voltage circuit to switch a light bulb ON and OFF which is connected to 220V mains supply.

F. MQ2 Module:



Fig 5: MQ2 module

MQ2 Gas detector is a Essence Oxide Semiconductor( MOS) type Gas Sensor substantially used to descry feasts like Methane, Butane, LPG, Bank, etc. It's also known as Chemi- resistors as the gas discovery is grounded on the change of resistance of the seeing material when the Gas comes in to communicate.

G. Servo Motor:



Fig 6: Servo Motor

Servo motor is a DC motor with a closed feedback system in which the position of its rotor will be communicated back to the control circuit in the servo motor. This motor consists of a DC motor, a set of gear, potentiometer, and the control circuit. Potentiometer serves to define the limits of the angle of rotation servo. While the angle of the axis servo motors regulated by pulse width signal sent through the legs of servo motor cable..

H. DC Motor:



Fig 7: DC Motor

A DC motor is any of a class of rotary electrical motors that converts direct current electrical energy into mechanical energy.

I. LM 2596 Buck Converter:



Fig 8: LM 2596 buck converter

LM 2596 buck motor Specification Input Voltage 3-40V. Output Voltage 1.5- 35V (malleable). Output Current Rated current is 2A, maximum 3A (fresh heat Gommorrah is needed). Dimension 45 x 20 x 14 mm (L x W x H).

J. L 293 Motor Driver:

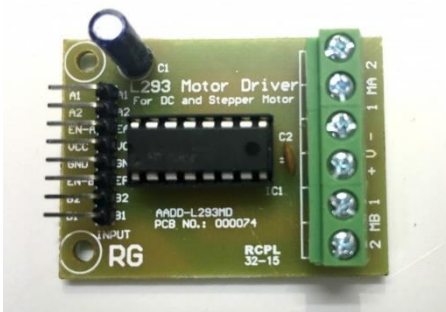


Fig 9: L293 Motor Driver

L2596 Buck Converter, The L293 bias are quadruple high-current half- H motorists. The L293 is designed to give bidirectional drive currents of over to 1 A at voltages from 4.5 V to 36 V. The L293D is designed to give bidirectional drive currents of over to 600- mama at voltages from 4.5 V to 36V.

K. Mini Water Pump:



Fig: Mini Water Pump

This DC 3- 6 V Mini Micro Submersible Water Pump is a low cost, small size Submersible Pump Motor which can be operated from a 2.5 6V power force It can take up to 120 liters per hour with a veritably low current consumption of 220mA

1.2 Configuration of Fire Fighting Robot:

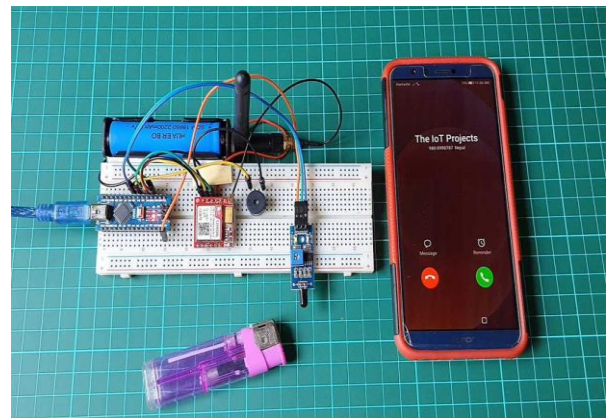


Fig -4 Configuration of Fire Fighting Robot

This system comprises of many components this on an overview has converters MQ2 smoke sensor as soon as gets heated its sends signal to the controller and buck converter where the ration of smoke is it will move towards it. Then motor driver come to use and with servo the pump is used to extinguish the fire.

2. Design Methods

A. Material and tools:

Accoutrements used in the design of tackle, among others

- 1) Arduino Uno R3 Microcontroller as a data processor.
- 2) MQ2 Smoke Sensor.
- 3) DC motor.
- 4) Barrel Jack appendage for external power force for Arduino and peripherals.

- 5) LM2596 Buck converter.
- 6) L293 Motor Driver.
- 7) Relay Module.
- 8) SIM 800L.
- 9) Flame Sensor.
- 10) Servo Motor.
- 11) Mini Water Pump.
- 12) The factors of electronics, lines, PCB( Printing Circuit Board), lead and connectors.

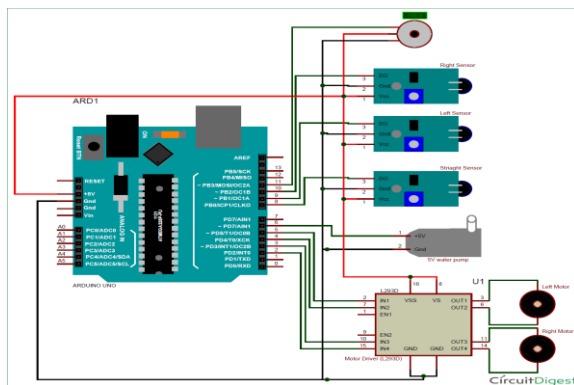
#### B. Software:

The supporting software's used in our work are

- 1) The Arduino IDE is used to produce the program in the microcontroller.
- 2) AdaFruit library and detectors perceptivity operation.

#### C. Hardware Design:

The general description of the system can be observed on block diagram below:



**Fig -5** Block Diagram of Fire Fighting Robot



**Fig -6.** Actual Fire Fighting Robot

## II. RESULT

The robot was switched on using a switch which kept the system in hibernation as long as there was no presence of fire in its terrain having to put on a white LED to show that the robotics on. As soon as bank and honey was detected, the red and blue LEDs came on and were blinking continuously while the buzzer was sounding an alarm. An SMS was entered on the registered number to warn there was a fire and the robot was advancing to extinguish it. Fire was burned on wood as a simulation of fire out break and obstacles were set on the path of the robot towards the fire. The wood generated enough bank and honey touched off the activation of the robot and thee robot advanced autonomously. The robot kept on moving forward and avoided the obstacles on its path by turning to the left wing of right and still advancing forward to keep the fire source in view. On successful man oeuvre around the obstacles, the robot progressed towards the fire and stopped at a distance of 30 cm from the fire source and actuated its pump. A pipe was extended from the tank on the top of the robot and the content of the tank was scattered onto the fire source. As soon as the fire was quenched, an SMS was transferred to the registered number to notify the stoner of the current situation and the buzzer was killed while the red and blue LEDs were killed while the white LED comes on.

## III. CONCLUSION

In this design we aim to reduce the effect of fires accidents which generally start from small honey, thus people life and plutocrat would be saved. The robot can successfully find fire and reach it without running into handicap. Through relay circuit.

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