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# Fire Fighting Robot/Car using Arduino

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**ABSTRACT:** Now days most of the accidents happen due to fire in buildings and many of people can lose their lives. Fire fighters are at constant risk of being burned, becoming trapped, inhaling smoke, and so many more things that could be avoided by using the IOT. Under this project we have make a fire fighting robot using the Arduino. This robot can find the fireplace within the homes, building. Then this robot is going to the direction of the fireplace and sprinkles the water through the servo motor towards the fireplace. This fire fighting robot is incredibly helpful for firefighting departments to save lots of the human's lives. The goal is to make an autonomous robot/car that can navigate around a duplicate house to go looking for sources of fire and extinguish them.

**KEYWORDS:** Arduino UNO, Servo Motor, Flame Sensor, Motor Driver, IDE.

## I. INTRODUCTION

The main brain of this project is the Arduino, however but in-order to sense fireplace we tend to use the Fire **sensor module** (flame sensor). Once the fire burns it emits a little quantity of Infrared light, then this light going to be received by the IR receiver on the fire sensor module. Then we tend to use an Op-Amp to visualize the modification in voltage across the IR Receiver, so that if a fire is detected the output pin (DO) will give 0V (LOW) and if the is no fire the output pin are going to be 5V (HIGH).

So, we tend to place 3 sensors in 3 directions of the robot to sense or find on that direction the fireplace is burning. Using this sensor we will find the direction of the fireplace we will use the DC motors to move close to the fireplace by driving our motors through the **L293D module**. Once close to a fireplace have to put it out using water. Using a small container we will carry water, a 5V pump is additionally placed within the container and therefore the whole container is placed on high of a **servo motor** and manage the direction during which the water has got to be sprayed.

The robot is in a position to find a tone like a sort of fireplace alarm, avoid obstacles, and maneuver on completely different flooring. The firefighting robot has a water tanker to pump water and spray it on fire; it's controlled through wireless communication.

## II. LITERATURE SURVEY

This project is developing for the fighters so as that we'll deflate lose of human lives. Detecting fireplace and extinguishing it is a dangerous job that puts period of a firefighter in risk.

There are many fireplace accidents that fireplace fighter had to lose their lives among the duty annually throughout the earth. The analysis and development within the field of AI has given rise to Artificial intelligence. Robots are enforced in various areas like Industries, Producing, and Medicines etc. Hence, Artificial intelligence will be wont to assist firefighters to perform this task of fire fighting and therefore cut back the chance of their lives. Firefighter robot could be designed for use in such extreme conditions. It can be operated and controlled by remote user and has the flexibility to extinguish fire after locating the source of fire.

## III. SYSTEM COMPONENTS

### a) Fire sensor

A flame notice or could be a detector designed to detect and reply to the presence of a flame or fire, permitting flame detection. A flame notice or usually respond quicker and a lot of accurately than a smoke or heat detector because of the mechanisms it uses to detect the flame.

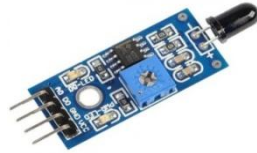


Fig 1. Fire sensor

b) Bread Board

A bread board may be a rectangular plastic board with a bunch of little holes in it. These holes allow you to simply insert electronic parts to example (meaning to make associated check associate early version of) an electronic circuit, like this one with battery, switch, resistor, associated an LED (light-emitting diode).

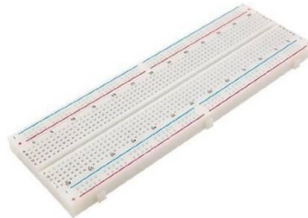


Fig 2. Bread Board

c) Motor Driver

A motor driver could be little Current Amplifier whose operate is to require a low-current management signal then flip it into a higher-current signal that may driver a motor. The L293D could be a typical Motor Driver which might drive a pair of DC motors at the same time.



Fig 3. Motor Driver

d) Connecting wires

Connecting wires permits associate degree electrical current to travel from one purpose on a circuit to a different as a result of electricity desires a medium through that it will move. Mainly the connecting wires are created from copper.



Fig 4. Connecting wires

e) Chassis

Chassis is that the main support structure of the vehicle that is additionally referred to as 'Frame'. It takes all the stresses of the vehicle in each static and dynamic condition. During a vehicle, it's analogous to the skeleton in living organisms.



Fig 5. Chassis

f) DC motor

DC motors are appropriate for several applications — as well as conveyors, turntables et al. that adjustable speed, and they conjointly work well in dynamic braking and reversing applications that are common in several industrial machines.



Fig 6. DC Motor

g) Register

A Register could be an assortment of flip-flops. A flip-flop is employed to store single bit digital information. For storing high number of bits, the storage capability is magnified by grouping quite one flip-flop.



Fig 7. Register

h) LED

To turn on associate LED, the Arduino has to send a HIGH signal to at least one of its pins. To show off the diode, it has to send a low signal to the pin. You'll create the LED flash by dynamical the length of the HIGH and LOW states.

i) Servo motor

A Servo Motor could be a little device that has output shaft. This shaft will be positioned to specific angular positions by causing the servo a coded signal. As long because the coded signal exists on the input line, the servo can maintain the spatial relation of the shaft.



Fig 8. Servo Motor

j) Submersible pump

A submersible pump may be a device that includes a hermetically sealed motor close-coupled to the pump body. The full assembly is submerged within the fluid to be pumped.



Fig 9. Submersible pump

#### IV. WORKING

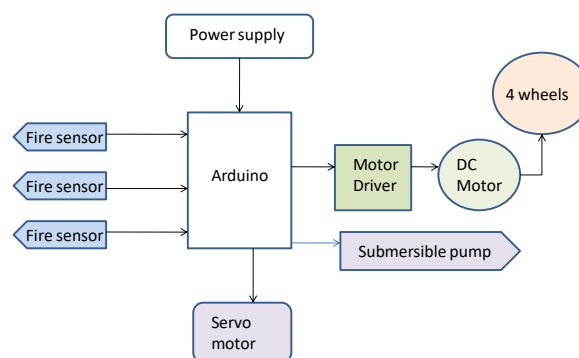


Fig 1. Block Diagram

The Car continuously monitors the variation of the encircling area using the sensor. Whenever the temperature exceeds the limit value and the flame and smoke detected it identifies that there is the presence of fire. In this situation, the robot will reach the point and start sprinkling the water it works on a function called as en route distancing/ routing method.

The microcontroller recognizes the digital output at the input pins of the motor driver IC to regulate the motion of the robot. For the car movement, 12V geared DC motors are attached to the wheels. These geared DC motors are available

with a big selection of RPM and Torque, which permits a robot/car to move based on the control signal it receives from the motor driver IC. The robot motion is principally controlled by the rear wheels. Since its automatic, it turns left and moves forward to succeed in an appropriate spot if the fire is sensed by the left sensor. It changes towards the right and moves forward to achieve an appropriate spot if a fire is sensed by the proper sensor.

## V. RESULTS

The car when detects a fire moves on its own. Arduino will control the motor through the motor driver Module. To rotate in either right or left direction, one motor will remain off and another one will move, thus leading to rotation of the body. If Arduino flame sensor will detect the fireplace then the car will move forward to the fire slowly. Here, the algorithm is written such it makes a slow approach of the robot towards the fire. As soon because it detects a fire, the car must stop at a specific limit and should not run over the fire.

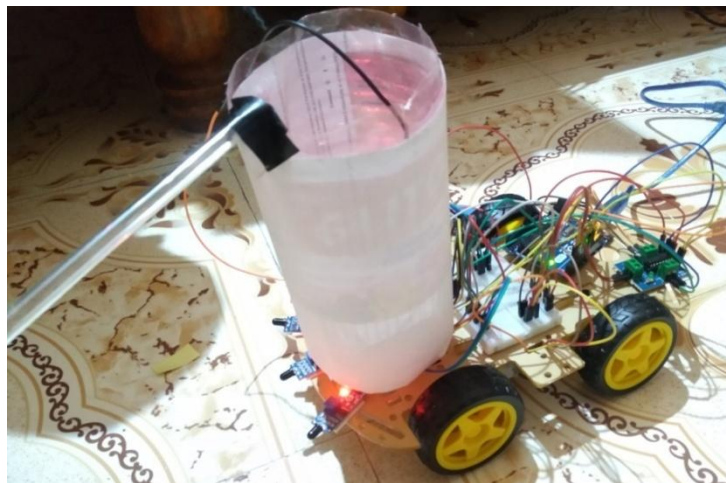


Fig 1. OUTPUT

## VI. CONCLUSION

The simulation results The fire fighting car is built up used various sensors and components such as car chassis i.e used as the base of this model, DC motors which help wheels to rotate, submersible pump to be used to extinguish the fire. Flame Sensor is used to detect any presence of fire and to know the direction we have used three fire sensors in different directions. This model will reduce human efforts as well as the damage caused during an accident. An accuracy of a fire sensor increase in dark and small regional areas. Throughout the project, we have learned various things such as the installation of IDE, Connections, code compilation. For future scopes, we can increase the amount of water weight the car can bear so it will increase the usability of the model. This car can be controlled through voice recognition to pass commands. A SMS module can be added to it to send notifications, messages to officials.

## VII. ACKNOWLEDGEMENT

With immense pleasure, we present the review paper on "Fire Fighting Robot/Car" as part of the curriculum of the Diploma (Computer). We express sincere and profound thanks to Head of Department Mr. V. S. Solanke, who is ready to help with the most diverse problems that we have encountered along the way. This would not have been feasible without encouragement and guidance of our Project Co-ordinate, Mrs. Geeta Joshi.

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