

A project under CSE 316

# FireCop

A Miniature Firefighting Robot

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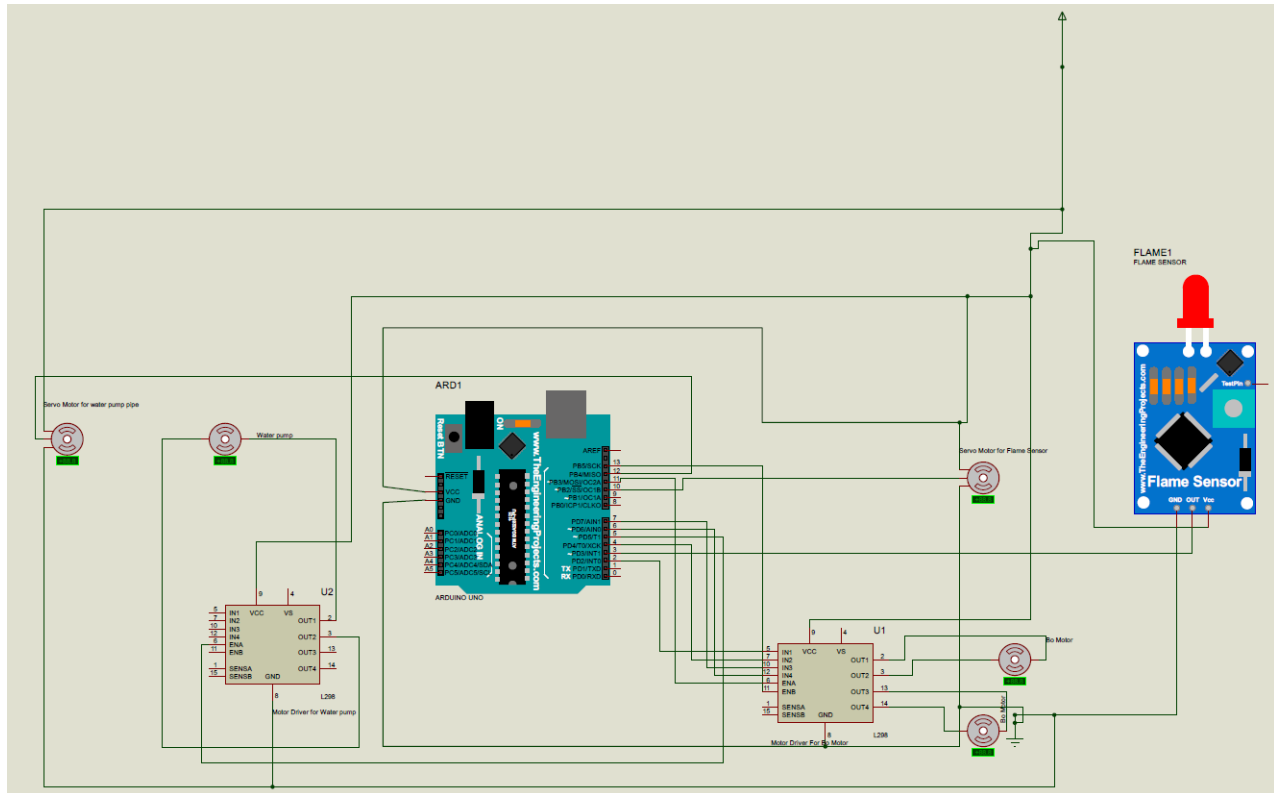
# 1 Introduction

FireCop is a miniature fire fighting robot built as a project under our Micro-processor and Micro-controller course. This robot was motivated with an objective of mitigating fire in a small space and with less cost. Our robot is operated with an Arduino UNO and it detects fire with the help of a flame sensor. The robot can detect fire from a distance, then move towards the fire and finally throws water with the help of a water pump from a safe distance until the fire is put off.

## 2 Instruments

Name of Instrument	Quantity
Arduino UNO	1
Flame Sensor	1
DC Gear Motor	4
Motor Driver-L298N	2
Servo Motor	1
Water Pump	1
Wheels	4
Water Container and pipe	1
Breadboard	2
3.7V Li-ion Battery	3

### 3 Circuit Diagram



### 4 Problems and Solutions

- **Power Issue:**  
At first we used 9V battery but that could not provide enough power to the circuit. Later on, we used three 3.7 Li-ion batteries which solved the power issues.
- **Speed control issue:**  
We were using both the enable pins of the motor driver by shorting them and then writing digital value to the shorted connection. As a result, we could not control the speed of the bo motors with the help of the analog value.  
Then, we connected one enable pin to Arduino and kept the other pin disconnected. This time when we wrote the analog value to the pin, we could control the speed of the Bo motors successfully.
- **Servo motor issue:**  
The maximum range of rotation of a servo motor is 180 degrees. For some unknown reasons the motor rotated upto 270 degrees sometimes.  
This issue was unresolved.
- **Battery charge issue:**  
When the batteries lost some of their charge after using them for a while, it could not

provide enough power to run the whole circuit. As a result sometimes the bo motors did not run, sometimes the water pump did not work and other times the bo motors could not have enough speed to drive the car.

- Flame sensor issue:

We tried to make a car as cost friendly as possible, and so our flame sensor was not of the very best quality. As a result, the flame sensor had a poor performance on analog reading. To overcome this issue we used the digital readings mainly.

Also, the sensors sometimes detect sunlight as flame which is out of their range.

## 5 Discussion

We started FireCop with a motive of building it up to the industry standard. In the end though we could not reach our goal completely due to the lack of time and problems faced with different hardware components. In spite of that we enjoyed making this robot and we hope that in the future we will be able to extend our work and reach our objective eventually.