

# Arduino-Based Fire Fighting Robot :

Develop an firefighting robot using arduino and that can navigate through simulated environment detect fires ,extinguish them

## Case Study :

This firefighting robotic system is powered by Arduino Uno development board it consists of the HC-SR04 ultra-sonic sensor for obstacles detection and it is also equipped with the fire flame sensor for detecting and approaching fire it also makes use of water tank and spray mechanism for extinguishing the fire.

# Components Required :

- IR 4 pin flame sensors (3)
- Arduino UNO
- chachies
- relays /switches
- BO motors (4) ,(+4 wheels)
- L298 motor driver
- Solder less bread board
- mini servo
- 5-9 V water pump + pipe
- water tank/bottle
- 3.7 V batteries (18650)\*2
- jumper wires
- Tip 122 Transistor + 104 pf capacitor + 1k resistor

# Software Implementation

## Arduino IDE

Develop and upload code with programming language: python.

## Algorithm

It reads sensors and compares values against thresholds. It activates alerts if exceeded.

## Alerts

Buzzer activates and an alert displays on LCD/LED screens.

```

def __init__(self):
    self.file = None
    self.fingerprints = set()
    self.logdups = True
    self.debug = debug
    self.logger = logging.getLogger(__name__)
    if path:
        self.file = open(os.path.join(path, 'fingerprint.log'), 'a')
        self.file.seek(0)
        self.fingerprints.update(fingerprints)

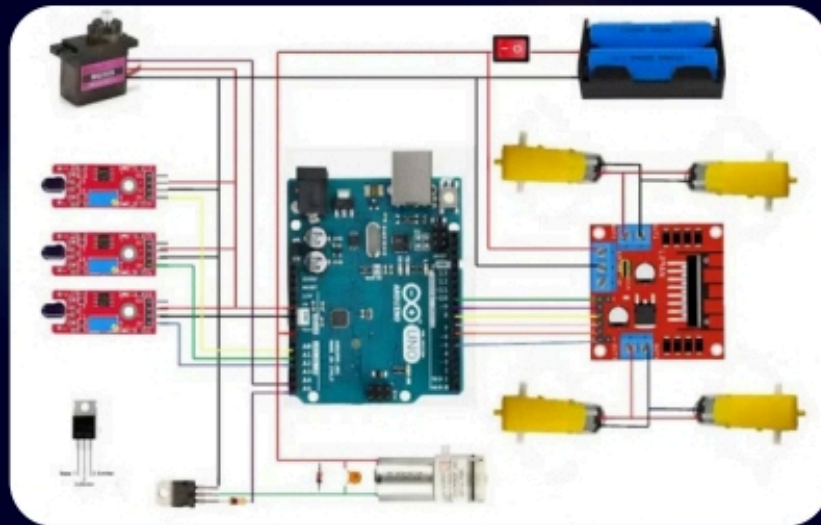
    @classmethod
    def from_settings(cls, settings):
        debug = settings.getbool('DEBUG')
        return cls(job_dir(settings), debug)

    def request_seen(self, request):
        fp = self.request_fingerprint(request)
        if fp in self.fingerprints:
            return True
        self.fingerprints.add(fp)
        if self.file:
            self.file.write(fp + os.linesep)

    def request_fingerprint(self, request):
        return re.sub(r'\s+', '', request.get_full_path())

```





# BLOCK DIAGRAM

# Working

The flame sensor sense the fire and send the information to the Arduino which is the brain of this robot. The brain will take the action according to the condition and information getting from the sensor. Arduino will give the commands to the Motors to start in the walk in the desired direction. if left sensor give the information about the fire then the Arduino will run the motor in left direction. same for the front and right side motor.

The robot will stop near to the fire and start watering to it till the fire will be under control

# Advantages :

1. **Safety Enhancement**
2. **Cost-Effective Arduino**
3. **Automation and Efficiency**
4. **Real-Time Fire Detection**
5. **Flexibility and Customization**
6. **Remote Control and Monitoring**
7. **Scalability and Upgradability**
8. **Environmental Benefits**

# Benefits:

1. Low Cost
2. Easy to Program
3. Flexibility
4. Real-Time Monitoring
5. Automated Response
6. Compact and Portable
7. Open-Source Community
8. Rapid Prototyping
9. Scalability
10. Learning and Education