VELLORE INSTITUTE OF TECHNOLOGY

AMRAVATI

FIRE LOCATOING ROBOT

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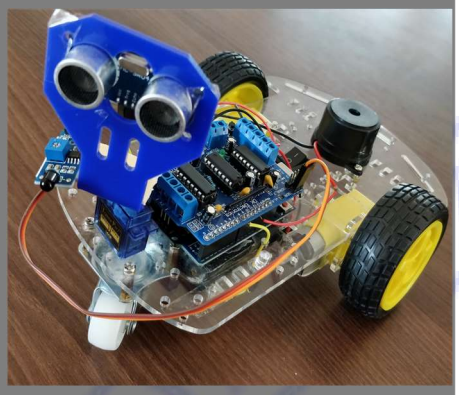
SUMMARY



What will you do when you know there is a fire present but you don't know where?

In this situation what will help is our fire locating robot. Which is a fully self-operating car which does not need a remote control to move it.

It moves on its own randomly around the place trying to locate the fire. And to overcome any obstacle it is also equipped with an ultrasonic sensor which does not allow any obstacle to stop the robot from finding the fire.

To help locate the fire it sounds an buzzer which would help us locate the fire and extinguish it. While its small and compact size adds to its advantage to move.

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INTRODUCTION

Think about having your own personal fire alarm system m and locator which would cost no more than two thousand from your budget and in form of maintenance you would just need to replace 4 double A cells from the bottom of the locator. Wouldn't it be just wonderful?

That's what our whole project is all about. The Fire Locator Robot is a 2-wheeler and one 360degree wheel car, which would move around your house randomly whenever you smell a fire around.

You just have to press the switch and then just wait and listen for the alarm to sound. The car would move around randomly in search of the fire if any and would set off an alarm for you to locate the fire.

To overcome the difficulty of the car colliding with any obstacle it is equipped with an ultrasonic sensor so as to avoid any obstacle coming in the way of the car and the fire.

Then with the help of a servo motor the ultrasonic sensor would move 90 degrees in both direction i.e. left and right and that would help the ultrasonic sensor to help the car find a path where there is no obstacle and then it would move in that direction by taking a left or a right turn and if it has no option available it would go back in the direction it came from. And move in some other direction.

Once locating the fire, the car is equipped with a buzzer which would sound an alarm loud enough for you to hear from 15 to 20 meters.

This car is also equipped with some LEDs so if someone without any knowledge about the car wants to know if the car is operational or not the glowing LEDs would indicate the user that the car is perfectly functional.

BACKGROUND

We have all seen a fire sensors in the corridors of schools, colleges, offices, hotels and many more places where the fire detector is placed on the ceiling if the floor where you would need many detectors to cover the whole floor as their range is small.

A flame detector is a sensor designed to detect and respond to the presence of a flame or fire, allowing flame detection. Responses to a detected flame depend on the installation, but can include sounding an alarm, deactivating a fuel line (such as a propane or a natural gas line), and activating a fire suppression system. When used in applications such as industrial furnaces, their role is to provide confirmation that the furnace is properly lit; in these cases 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.

Till now a self operating moveable fire alarm robot was not created and it's a first of its kind and economical

PROBLEM DEFINITION

Fire are caused to due many reasons, some due to electrical equipment or wirings and some due to the careless nature of humans which end up life threatening

All major fires start with unnoticed or unlocatable fires and which lead to maximum damage. In recent times the life-threatening fire have all started with an unnoticed fire or a fire not being located having the knowledge of the fire or many times we are not able to see through the smoke which makes locating the fire even more difficult for us

We don't have anything due to which we are able to locate fires in daily life which would just need to be switched on and it would help you locate the fires even if they are in the smallest of the places

OBJECTIVE

Objective of the project is to make a suitable robot with many advantages including small size, flame sensing, obstacle avoiding, self-operating and many more

This robot will find its path across the place moving randomly in search of fire and once the fire is detected it would sound a buzzer loud enough for the human ears to hear it and extinguish the fire before the fire expands its area and grows into a bigger threat

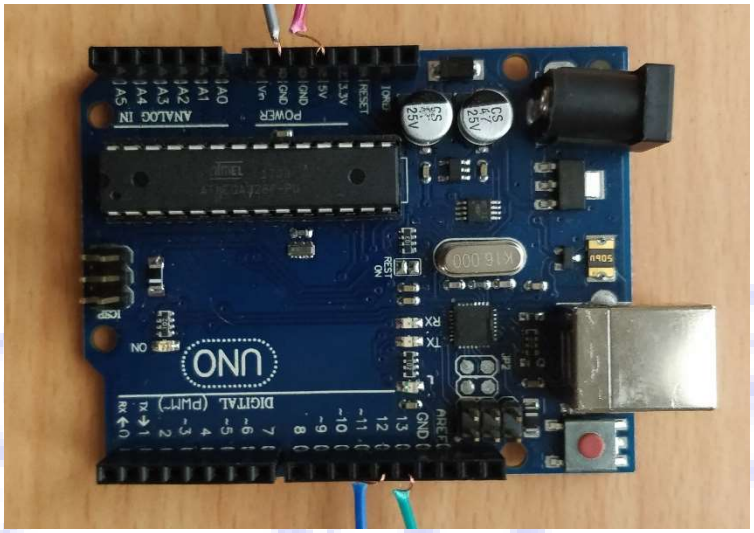
And the plan is also on making it with minimal cost so as it would be in budget for everyone and could keep it in their home for any emergency purposes.

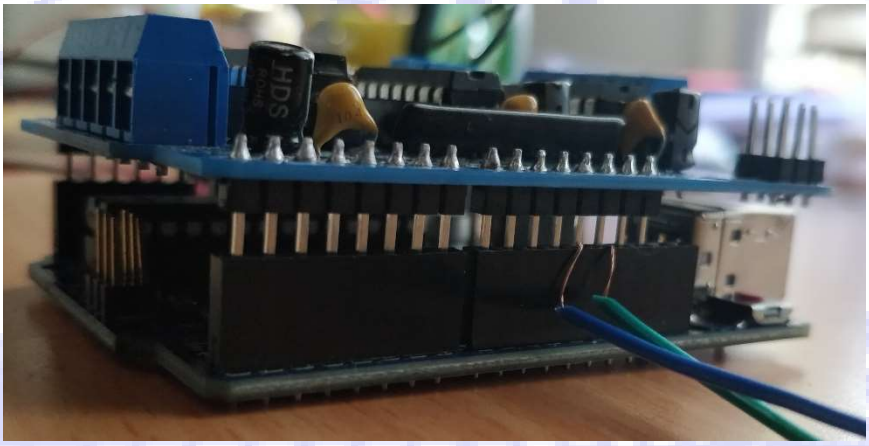
METHODOLOGY

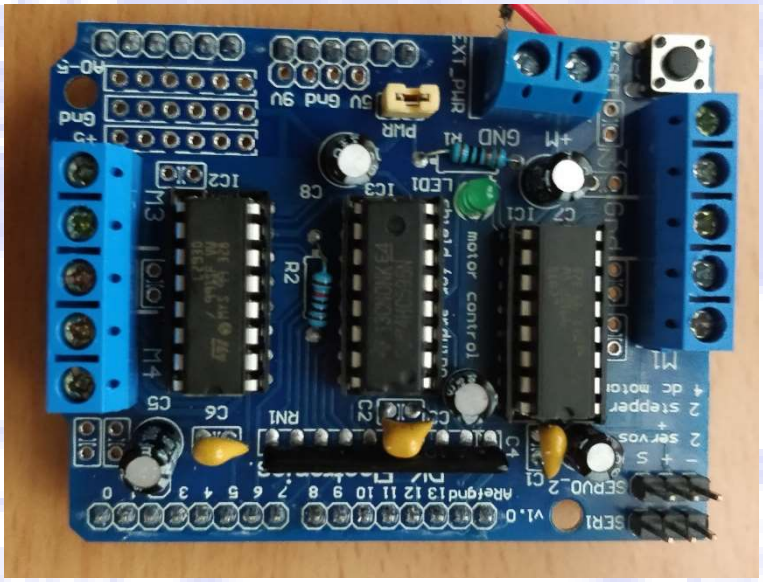
The procedure used to make this robot is very simple.

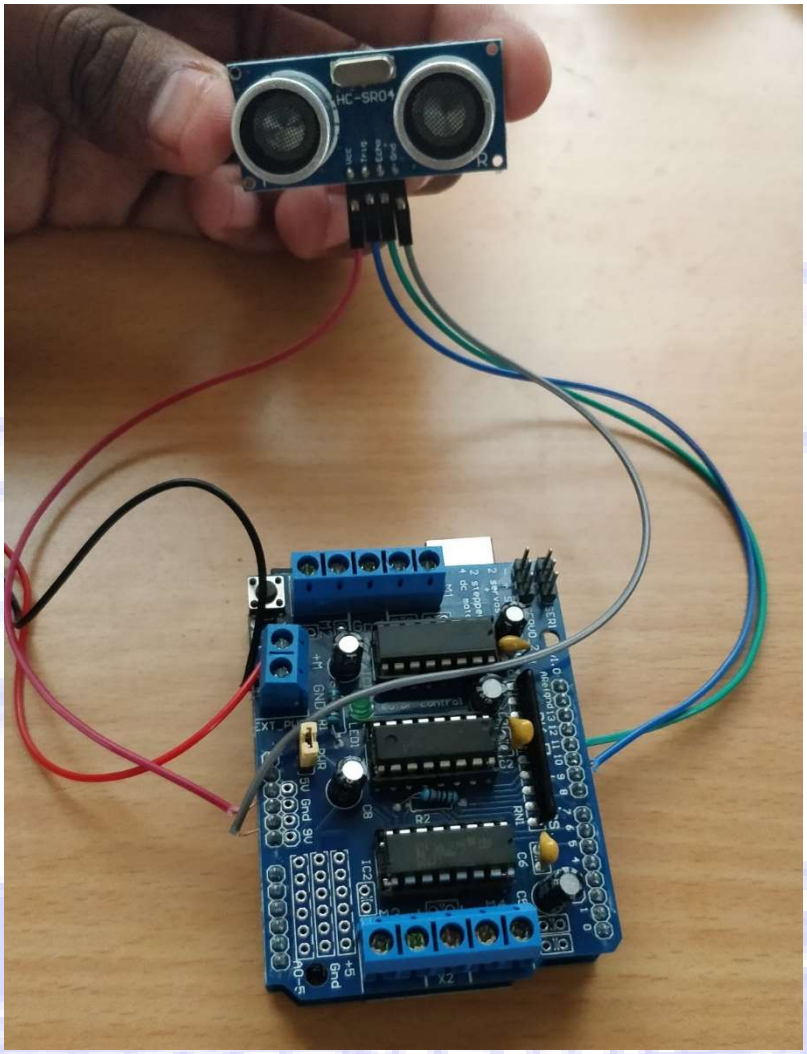
We have used two 5V DC motors, two wheels, connecting wires, flame sensor, ultra-sonic sensor, motor shield, Arduino Uno, a small 360-degree wheel, servo motor SG90, ultrasonic sensor bracket, four 1.5V AA cells and an LED.

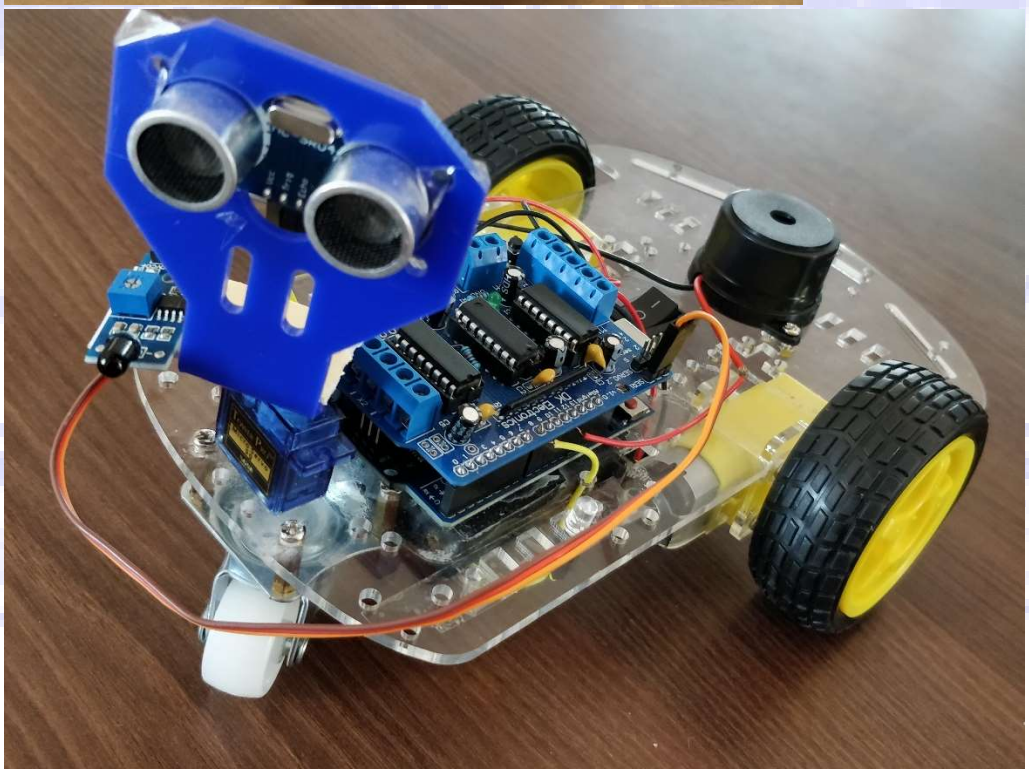
We have connected the components as shown in the circuit diagram shown in the next 2 sheets for Arduino Uno and motor shield and placed the motor shield above the Arduino Uno and coded the Arduino Uno to do what is needed of the robot


ANALOG IN
POWER
UNO
DIGITAL (PWM~)




EXT_PWR
PWR
motor control
shield for arduino

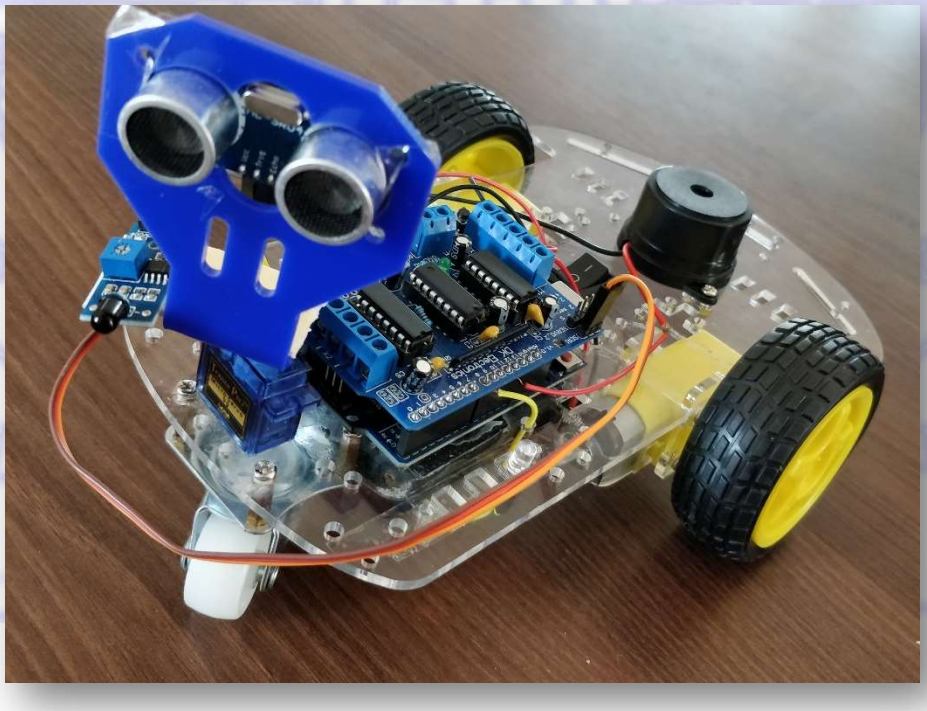

HC-SR04



RESULT

Using the above procedure to make this robot we have been successful to make a car that can roam around randomly and would move around any obstacle which it detects it its path it would interfere with so it finds an alternative path for it and continues moving around in search of the fire.

Once the fire is detected it would sound a buzzer helping us to get the exact location of the fire and do the required and preventing any further growing of the fire by extinguishing it



FUTURE SCOPE

With some further research and development this robot could be equipped with an fire extinguisher itself with an mechanism to help locate and also extinguish it using the fire extinguisher it is equipped with.

This could be a very helpful robot for many. In houses in case of emergencies, with some more equipment and features it could be used by the fire fighters also where this robot would be of a better quality and with lot of features including the ones it currently posses

REFRENCES

www.arduinohub.org

http://mertarduinotutorial.blogspot.in/2016/12/arduino-project-tutorial-01-obstacle.html

https://youtu.be/Es8D1q_b-c4

http://www.instructables.com/id/Flame-detection-using-Arduino-and-flame-sensor/

CODE

```
#include <AFMotor.h>
#include <Servo.h>
#include<SoftwareSerial.h>

#define TRIG_PIN 6
#define ECHO_PIN 7

AF_DCMotor leftMotor(1, MOTOR12_8KHZ);
AF_DCMotor rightMotor(2, MOTOR12_8KHZ);
Servo neckControllerServoMotor;

const int buzzer = 8;
int sensorPin = A0;
int sensorValue = 0;
int curDist = 0;
int dist1 = 0;
int dist2 = 0;
```

```
void setup()
{
    pinMode(buzzer, OUTPUT);
    neckControllerServoMotor.attach(10);
    neckControllerServoMotor.write(90);
    pinMode(TRIG_PIN, OUTPUT);
    pinMode(ECHO_PIN, INPUT);
    leftMotor.setSpeed(255);
    rightMotor.setSpeed(255);
    noTone(buzzer);
    neckControllerServoMotor.write(90);
    moveforward();
    digitalWrite(buzzer, LOW);
    Serial.begin(9600);
}

void loop( )
{
    Serial.println("code starts");
    moveforward( );
    moveStop( );
```

```
        checkObstacle( );
        checkFire();
}
void moveforward()
{
        Serial.println("moving forward");
        leftMotor.run(FORWARD);
        rightMotor.run(FORWARD);
        delay(1000);
}
void checkObstacle()
{
         int curDist1;
         curDist = readping( );
         if (curDist < 20)
         {
                  Serial.println("obstacle sensed");
                  moveStop( );
                  checkFire( );
                  neckControllerServoMotor.write(180);
//180 degrees meaning sensor is on left
```

```
            dist1 = readping( );
            delay(2000);
            neckControllerServoMotor.write(0);
            dist2 = readping( );
//0 degrees meaning sensor is on right
            delay(2000);
            if (dist1 < dist2)
            {
                  leftTurn( );
            }
            if (dist2 < dist1)
            {
                  rightTurn( );
            }
            if (dist1 == dist2)
            {
                  leftTurn( );
            }
            neckControllerServoMotor.write(90);
            moveforward();
      }
```

```
}
void rightTurn()
{
        Serial.println("right");
        leftMotor.run(FORWARD);
        rightMotor.run(BACKWARD);
        delay(400);
//how much u want to turn
        leftMotor.run(FORWARD);
        rightMotor.run(FORWARD);
}
void leftTurn()
{
        Serial.println("left");
        leftMotor.run(BACKWARD);
        rightMotor.run(FORWARD);
        delay(400);
//how much u want to turn
        leftMotor.run(FORWARD);
        rightMotor.run(FORWARD);
}
```

```
int readping()
{
        int duration, distance;
// start the scan
        digitalWrite(TRIG_PIN, LOW);
        delayMicroseconds(2);
// delays are required for a successful sensor operation.
        digitalWrite(TRIG_PIN, HIGH);
        delayMicroseconds(10);
//this delay is required as well!
        digitalWrite(TRIG_PIN, LOW);
        duration = pulseIn(ECHO_PIN, HIGH);
        distance = (duration / 2) / 29.1;
//convert the distance to centimetres.
        Serial.println("DISTANCE IS");
        Serial.println(distance);
        return distance;
}
void checkFire( )
{
        Serial.println("FLAME SENSOR VALUE");
        sensorValue = analogRead(sensorPin);
```

```
        Serial.println(sensorValue);
        if (sensorValue > 100)
        {
                Serial.println("BUZZER NO");
                noTone(buzzer);
        }
        while (sensorValue < 100)
        {
                moveStop();
                Serial.println("BUZZER YES");
                tone(buzzer, 1000);
                delay(5000);
                noTone(buzzer);
                delay(5000);
        }
}
void moveStop( )
{
        leftMotor.run(RELEASE);
        rightMotor.run(RELEASE);
}
```