**ARDUINO PROJECT**

**FIRE-FIGHTING & VOICE CONTROLLED CAR**

|  |  |  |
| --- | --- | --- |
| **S.NO** | **Topics** | **Page No.** |
| 1. | INTRODUCTION | 2 |
| 2. | PROJECT  DESCRIPTION | 3 |
| 3. | DETAILS OF  THE PROJECT | 5 |
| 4. | WORKING AND  OPERATING  PROCEDURE | 8 |
| 5. | CONCLUSION | 13 |
|  |  |  |

# INTRODUCTION :-

In this report we thoroughly look into the working of a fire fighting Car which is also a voice controller.

For this we use open source hardware Arduino where our car gets commands in the form of source code. In real life scenarios this project works as an extinguisher of fire on a large area. Whenever it detects the fire it will move towards the direction of fire and spills water on it.

This project mainly contains 3 steps:

**1.** Sending commands like forward, backward, right, left through bluetooth module which is attached to our car. So the car receives the signals and move accordingly.

**2** .Our car detects the direction of fire and move towards the fire. This can be achieved with the help of flame sensors.  **3** .The third and final step is after the detection of fire, it spills water onto the fire which can be done by using motor pump.

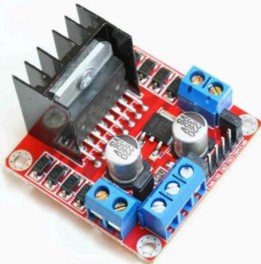
# DESCRIPTION :-

**Fire-fighting voice controlled car**  at first moves into the fire radius with the help of voice controller. The bluetooth module attached to the car receives signals from the source code through a code which is executed onto the car. Then the fire will be detected by the flaming sensors attached to the car. After the detection of fire, it spills water onto the fire through the motor pump which will work only when the fire is detected. It can be used as a fire extinguisher tool and easily controllable using voice controller.

**Hardware requirements** :-

* Arduino Uno board
* LC motor driver
* Bluetooth module
* 9V battery
* Motor pump
* 3 Flame sensors
* Jumper wires
* A car with motors attached to wheels
* Water glass

1. **Arduino Uno board** :-

 The Arduino Uno is an open source microcontroller board based on the microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output pins. The board has 14 digital I/O pins(six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE via a type B USB cable. It can be powered by the USB cable or by an external 9V battery. Types of pins along with their names were shown in fig.

1. **LC motor driver(L293d)** :-

LC motor driver controls the movement of wheels through motors attached to the wheels. Its a 2 motor controller (controls two motors at a time).for motor A there will be two pins: one pin is attached to ground and another pin is attached to Arduino to be controlled by the Arduino code. Similarly for motor B.The three pins in the figure are:Vcc, 5v, Gnd pins. L293D Motor Driver Module is a medium power motor driver perfect

for driving DC Motors and Stepper

Motors. It uses the

popular L293 motor driver IC. It can drive 4 DC motors on and off,

or drive 2 DC motors with directional and speed control.

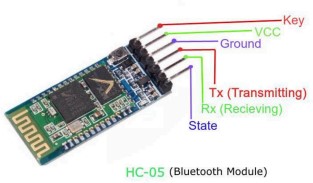
3.  **Bluetooth Module** :-

Bluetooth module is a device which receives signals

through a bluetooth module app.it consists of 6 pins.key, Vcc, Ground, Tx, Rx, state. Key - this pinis used to set the data mode or and AT command mode.

**Vcc** - This is connected to +5 V power supply.

**Ground** - Connected to ground of powering system

 **Tx(Transmitter)** - This pin transmits the received data serially.  **Rx(Receiver)** - Used for broadcasting data serially over bluetooth.  **State** - Used to check if the bluetooth is working properly.

4. **Flame sensors** :-

 A flame sensoris one kind of detector which is mainly designed for detecting as well as responding to the occurrence of a

fire or a flame. The flame detection

response can depend on its fitting. It includes an alarm system, a natural gas line, propane & a fire suppression system. This sensor is used in industrial boilers. The main function of this is to give authentication whether

the boiler is properly working or not. The response of these sensors faster as well as more accurate compare with a heat/smoke detector because of its mechanism while detecting the flame.

**Working principle**:- This sensor/detector can be built with an electric circuit using a receiver like electromagnetic radiation .This sensor uses the infrared flame flash method, which allows the sensor to work through a coating of oil, just, water vapour, otherwise ice.

* Pin1 (VCC pin): Voltage supply rages from 3.3V to 5.3 V •

Pin2 (GND): This is a ground pin

* Pin3 (AOUT): This is an analog output pin (MCU.IO) • Pin4 (DOUT): This is a digital output pin (MCU.IO)

**Code:-**  int motor\_input1=4; //right int motor\_input2=3; //right int motor\_input3=5; //left int motor\_input4=6; //left String voice; boolean fire = false;

#define Left\_S 9 // left sensor

#define Right\_S 13 // right sensor

#define Forward\_S 8 //forward sensor

#define pump 12

void setup()

{

Serial.begin(9600); pinMode(Left\_S, INPUT); pinMode(Right\_S, INPUT); pinMode(Forward\_S, INPUT); pinMode(motor\_input1, OUTPUT); pinMode(motor\_input2, OUTPUT); pinMode(motor\_input3, OUTPUT); pinMode(motor\_input4, OUTPUT); pinMode(pump, OUTPUT);

}

void put\_off\_fire()

{

delay (500); digitalWrite(motor\_input1, LOW); digitalWrite(motor\_input2, LOW); digitalWrite(motor\_input3, LOW); digitalWrite(motor\_input4, LOW);

digitalWrite(pump, HIGH); delay(500);

digitalWrite(pump,LOW); fire=false;

}

void loop()

{

while(Serial.available()>0)

{

delay(10); char c=Serial.read();

if(c=='#')

{

break;

}

voice+=c;

}

if(voice=="forward"){

digitalWrite(motor\_input1, LOW); digitalWrite(motor\_input2, HIGH); digitalWrite(motor\_input3, LOW); digitalWrite(motor\_input4, HIGH);

delay(1500);

}

else

if(voice=="left"){ digitalWrite(motor\_input1, HIGH); digitalWrite(motor\_input2, LOW); digitalWrite(motor\_input3, LOW); digitalWrite(motor\_input4, HIGH);

delay(400);}

else

if(voice=="back"){

digitalWrite(motor\_input1, HIGH); digitalWrite(motor\_input2, LOW); digitalWrite(motor\_input3, HIGH); digitalWrite(motor\_input4, LOW);

delay(1500);

}

else

if(voice=="right"){

digitalWrite(motor\_input1, LOW); digitalWrite(motor\_input2, HIGH); digitalWrite(motor\_input3, HIGH); digitalWrite(motor\_input4, LOW);

delay(400);

}

else

if(voice=="stop"){

digitalWrite(motor\_input1, LOW); digitalWrite(motor\_input2, LOW); digitalWrite(motor\_input3, LOW); digitalWrite(motor\_input4, LOW);

delay(400);

}

if(voice.length()>0)

{

Serial.println(voice); voice=""; digitalWrite(motor\_input1, LOW); digitalWrite(motor\_input2, LOW); digitalWrite(motor\_input3, LOW); digitalWrite(motor\_input4, LOW);

}

if (digitalRead(Left\_S) ==1 && digitalRead(Right\_S)==1 && digitalRead(Forward\_S)

==1) //If Fire not detected all sensors are zero

{

//Do not move the robot digitalWrite(motor\_input1, LOW); digitalWrite(motor\_input2, LOW); digitalWrite(motor\_input3, LOW); digitalWrite(motor\_input4, LOW);

}

else if (digitalRead(Forward\_S) ==0) //If Fire is

straight ahead

{

//Move the robot forward digitalWrite(motor\_input1, LOW); digitalWrite(motor\_input2, HIGH); digitalWrite(motor\_input3, LOW);

digitalWrite(motor\_input4, HIGH); fire = true;

}

else if (digitalRead(Left\_S) ==0) //If Fire is to the left

{

//Move the robot left digitalWrite(motor\_input1, HIGH); digitalWrite(motor\_input2, LOW); digitalWrite(motor\_input3, LOW);

digitalWrite(motor\_input4, HIGH);

}

else if (digitalRead(Right\_S) ==0) //If Fire is to the right

{

//Move the robot right digitalWrite(motor\_input1, LOW); digitalWrite(motor\_input2, HIGH); digitalWrite(motor\_input3, HIGH);

digitalWrite(motor\_input4, LOW);

}

delay(300); //Slow down the speed of robot

while (fire == true)

{

put\_off\_fire();

}

}

4.  **Working** :-

Based on the code written in Arduino IDE, we will describe the working of our project. At first we will navigate our car into the detecting radius of the flame sensors. For this navigation, we use commands forward, back, right and left. So we will open bluetooth module app which is designed for the connection of bluetooth module. Then we will connect the mobile with the module using bluetooth(device name:HC05). If we click on speak button in that app, it shows us “ *Try saying something* ” then speak“ **forward** ”.Now The pins 2 and 4 reads HIGH and pins 1 and 3 reads LOW. Similarly for “ **back** ” the pins 1 and 3 reads HIGH and the pins 2 and 4 are set to LOW. For command “ **left** ” the pins 1 and 4 reads HIGH and pins 2 and 3 reads LOW. For command “ **right** ” the pins 2 and 3 are set to HIGH and pins 1 and 4 reads LOW.

In this way we navigate our car to the radius of the fire which can be detected by our flame sensors.

Then the flame is detected by the flame sensors. If any one of the three flame sensors detects the flame, i.e, if any one of the pins 9 or 13 or 8 reads an input 0, fire is detected by the flame sensors. If all the 3 pins are 1’s then it means none of the three sensors hasn’t detected the flame. So if the fire is straight ahead, the car has to move forward, i.e, the pins 8 is HIGH and pins 1 and 3 reads HIGH and pins 2 and 4 reads LOW.

if the fire is to the left then the car moves towards left or the pin 9 reads HIGH, pins 1 and 4 reads HIGH and pins 2 and 3 reads LOW.

If the fire is to the right then the car moves towards right or the pin 13 reads HIGH, pins 1 and 4 reads LOW and pins 2 and 3 reads HIGH.

Then after the movement of car towards the direction of fire, the car will stop at a certain distance from the fire. Then the pin 12

will set to HIGH such that it spills the water present in a water glass on to the fire and then puts it off.

In this way we can write our code in Arduino IDE according to the on/off of the respective pins.

# . CONCLUSION :-

A s a result of this system, there is a lot of advantages to our society. Now a days many people were facing fire accidents which may cause death. So using this type of a voice controlled fire fighting car which is very easy to use, we can prevent many fire accidents