

## Fire Fighting Robot

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**Abstract:** From this project we explain the implementation and designing of fire fighting robot using web server. There are two dc motors used for motions. There are three sensors used Temperature for detecting the increase in fire, Smoke(gas) for detection of smoke and IR for detection of obstacle. Dc water pump is used to pump water for extinguishing the fire.

**Key Words:** Microcontroller LPC2138, Temperature Sensor, IR Sensor, Smoke Sensor, Dc Motors, LCD Display, Dc water pump, Bluetooth ,Buzzer.

**1.INTRODUCTION:** The project presented here is based on fire fighting robotic. It has term that has since been used refer to a machine that performs works to assist people or work that humans which find difficult or undesirable. They are capable of performing repetitive tasks more quickly, cheaply and accurately than humans. Robotics has gained popularity due to the advancement of many technologies of computing and non technology making humanoid is easier and comfortable. The fire fighting robot is design to search for a fire in a small floor plan house of the specific dimension.

Mobile is attached to the head of the robot to provide video from the fire prone area. The robot also has the capability to avoid obstacles and upon detection of fire, it forwards a message to a predefined number. The basic block diagram is as shown in Fig 1. The robot moves through a model structure and if fire still exists, it can be extinguished with the help of pump and sprays.

### 2. WORKING

The designed fire fighting robot consists of Microcontroller LPC 2138, LCD display, temperature sensor, Smoke sensor, IR sensor, Relay, Pump ,DC Driver IC, DC motors ,Bluetooth module and is having one Android phone. We are going to design a Server for

handling the robot from web page and can able to monitor the different parameters from web server.

**Video streaming:** The video streaming robot will continuously capture images with the help of camera of Android phone and are sent to the web server so we are able to see the current scenario of area where that robot will be present , being anywhere from web server.

**Temperature monitoring:** The robot will continuously monitor the temperature where that robot will be present with the help of temperature sensor interfaced to the controller and send these parameters on web from Android phone via Bluetooth module interfaced to the controller. The temperature sensor readings are displayed on the LCD display present on the robot and are also displayed on the web page.

**Fire detection:** Apart from increase in temperature the fire is also detected with the help of Smoke sensor. The fire detection is done with the help of Smoke sensor present in the system. After detecting fire by the sensor the fire fighting robot will automatically turn on the pump in order to extinguish fire catches.

**Obstacle detection:** The IR sensor is used for detecting the obstacle in the path of robot. So that robot can change its direction accordingly after detet.

**Remote handling from web server:** All the data from robot is sent to the Android phone via Bluetooth module interfaced to the controller and is then sent to the web server from Android phone. So that one is able to control the robot movement left/right from web server.

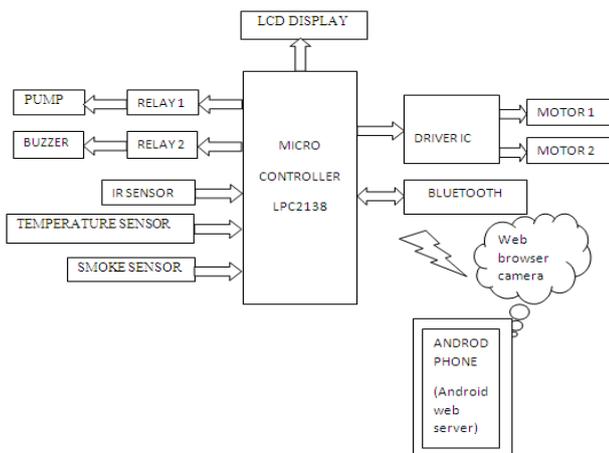


Fig -1: Block Diagram

### 2.1. Microcontroller PLC 2138



Fig.1. LPC 2138

#### Features

- Removable Processor Board
- Small Size: 75mm\*60mm
- ISP programming through inbuilt Bootloader of LPC21XX series
- Power On/Off Switch
- 8 indicator led's with separate jumpers for enable/disable
- On board 3.3V regulator
- Rest and INT1 switches
- Potentiometer for ADC1
- JTAG standard port
- All port pins accessible through standard 8bit 10 pin connector
- 4 DC motor driver interface with PWM.
- PWM for motor selectable through Jumpers
- Optional power pins through jumpers to reduce power consumption
- Capacitor filters at all power pins to reduce glitches
- DTR, RTS signals for reset and bootloader enter point
- Dual UART interface UART0 & UART1
- UART0/Programmer selection switch on ISP Programmer
- Simple 8 wire interface

- Compatible with LPC2138 development board
- Programmer compatible with Flash magic, LPC21ISP & LPC2000 flash utility(NXP)

### 2.2. IR Sensor:

IR sensor stands for passive infrared sensor. It is an electronic appliance measures infrared radiation from objects in generated field by IR detector. Sometimes it called PID – Passive Infrared detector. It detects changes in amount of IR radiation, which is depends upon the outside characteristics and temperature of the objects in front of detector. It means if human being or animal will come in range of detector it will detect the movement of body because live body eliminates warm energy in form of IR radiation. So it will give you signal by light or alarm when any live object in front of IR.



Fig 2 TSOP

### 2.3. Temperature sensor:

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centi- grade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of  $\pm 1/4^{\circ}\text{C}$  at room temperature and  $\pm 3/4^{\circ}\text{C}$  over a full  $-55$  to  $+150^{\circ}\text{C}$  temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output imped- ance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy.

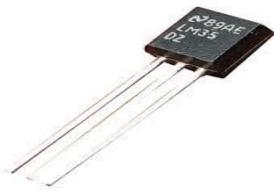


Fig 3. LM35

#### 2.4. Buzzer:



Fig 4 Buzzer

#### Features:-

- 1) operating power: 3-6V DC / 25mA
- 2) extremely compact, ultrathin construction
- 3) no electrical noise
- 4) low current consumption yet high sound pressure level

#### Specifications:-

- 1) operating voltage: 3-6V DC
- 2) rated voltage: 5V DC
- 3) current consumption: 25mA
- 4) oscillator frequency: 3.2kHz
- 5) sound level: 87DB

### 3. CONCLUSION

This project is been implemented by using android application and web server. The water container is placed on the robot when the fire is detected , it sprays the water on the fire and extinguish it.

### 4. REFERENCES

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