International Journal of Technical Innovation in Modern Engineering & Science (IJTIMES)
Impact Factor: 5.22 (SJIF-2017), e-ISSN: 2455-2585
Volume 4, Issue 9, September-2018

Advanced fire extinguisher robot controlling with Android mobile phone

[1]M.RAGHU RAMI REDDY, [2] Dr.B.DURGA PRASAD, [3] Dr. M.P. RANGAIAH

[1]*PG Research Scholar, Product design, Mechanical Engineering, JNTUA College of Engineering, Ananthapuramu, Andhra Pradesh, India*
[2]*Professor of Mechanical Engineering, JNTUA College of Engineering, Ananthapuramu, Andhra Pradesh,*
[3] *Lecturer of Mechanical Engineering, JNTUA College of Engineering, Ananthapuramu, Andhra Pradesh*

Abstract- Now a day's Fire disasters may occur anytime and obtain major losses. The main aim of fire-fighter is to extinguish fire quickly and safely prevent and reduce losses. Technology has been developed for bridge the gap b/w fire fighting and machines allowing for a more capable and successful method of fire fighting. The movement of robot is guarded by using Android mobiles via Wi-Fi networks by utilizing Wi-Fi module controlled in the robot. Commands are sent to the microcontroller and then translate into robotic movements. With the help of the water sprayer we can extinguish the fire.

Keywords: PIC microcontroller, Wi-Fi module, DC motor, Water sprayer, Android mobile phone.

I. INTRODUCTION

Fire fighting and rescue the sufferers are a risky task. Fire Fighters extinguish fire in climb high ladders buildings, heavy hoses, and carry fatalities from one place to another place. Fire fighters face unsociable environment like dust and low humidity, high temperature, and they were face life ominous situations like blast and fall down buildings. In the year 2000, 1.9 fire fighters per 100,000 structure fires have lost their lives per year in USA. Still, this rate was growing to 3 per 100,000 structure fires. The different causes of Line of Duty Deaths (LODD) are smoke gasp, burns, severe injuries and related trauma. This results we need fire fighting machines instead of fire fighters to avoid deaths by managing the dangerous situations. Hence, we are using Wi-Fi to control the robot and fire can be easily extinguished by using water sprayer.

II. LITERATURE SURVEY

[1] Fire Fighting Robots were guarded by electronic devices mounted on them. However, with development in technology, the same robot can be controlled remotely by using a smart phone. Hence our project aims to control the robot using Android Application. The main aim of this paper is to design an android application to control the operation of robot. Robot is able to watch prescribe area and quench fire. This type of robots will be helpful, for firemen will be easier and efficient despite of security. It will perform task faster. Android devices are powerful mobile equipment which has become popular in the world. Many smart phones are using the android functioning system because of its portability and many other features. We will develop android appliance to control fire fighting robot which is capable of navigation. The main aim of this project is to create android application to control fire fighter robot to carry out fire fighting operation.

[2] The main aim of this paper is to quench fire by using robot which is controlled through wireless. Robot will be move in any direction depends upon the path and motion with the help of WI-FI network which is interlinked by a programme. When the robot interface the fire then quench the water on that place PC acts as a remote to control the directions of robot either forward or backward and the motion of water pipe. Wi-Fi is receives commands from the PC. A microcontroller is interfaced to the system that delivers output.

III. IMPLEMENTATION

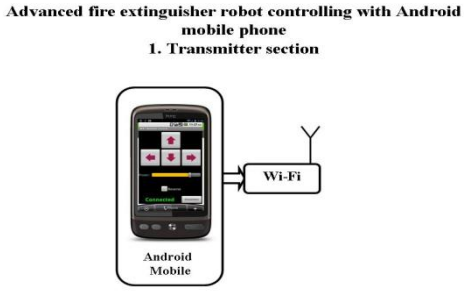

Fig.1 Block diagram of Android mobile phone

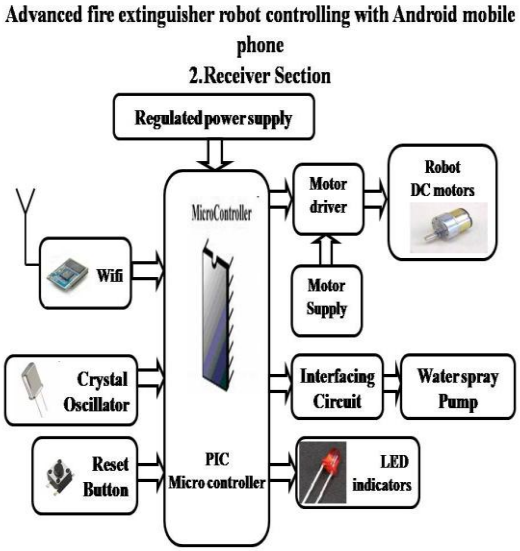

Fig.2 Block diagram of advanced fire extinguisher robot controlling with android mobile phone

Microcontroller is a key component in this project. Wi-Fi, Water spray and DC Motor along with the driver is interlinked to the microcontroller. Microcontroller acts as a controlling device which can be data sent from mobile by using WI-FI module, and reads the data and execute the direction of robot which is operated by DC motor. The water spray pump can be operated whenever fire is present. By using the C language this task will be executed.

IV. RELATED WORK

The brief introduction of different modules used in this project is discussed below:

PIC16F72 MICROCONTROLLER:

Fig.3 PIC16F72 Micro controller

The PIC16F72 belongs to the Mid-Range family of the PIC micro devices. It contains 2K words, which can be transforming to 2048 instructions, and each 14-bit program memory word is the same width RAM contains 128 bytes.

- Change on PORTB interrupt
- Timer0 clock input
- Timer1 clock/oscillator
- A/D converter
- SPI/I2C

GEARED DC MOTOR:

The 12V DC gear motors are simply an extension of the DC motors. The gear assembly is used for reducing the speed and increasing the torque of the motor. This motor contains 500 RPM .The speed of the motor can be varied by changing the given input voltage to the motor.

Fig.4 Geared DC motor

H BRIDGE (DC MOTOR DRIVER):

This motor driver is used for enable a voltage applied across a load. These types of circuits are used in robotics.

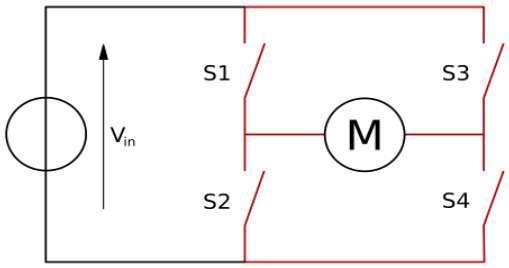

Fig.5 H Bridge circuit

When the switches (and S2 and S3 are open) S1 and S4 are closed a positive voltage will be apply across the motor. By closing S2 and S3 switches and opening S1 and S4 switches and, this voltage is overturned, allowing reverse operation of the motor.

WI-FI MODULE (ESP8266):

It is a self contained SOC with included TCP/IP protocol stack that can be forward to the microcontroller and access to your Wi-Fi network. This module comes pre-programmed with an AT command set firmware, meaning, and arduino device can be applied.

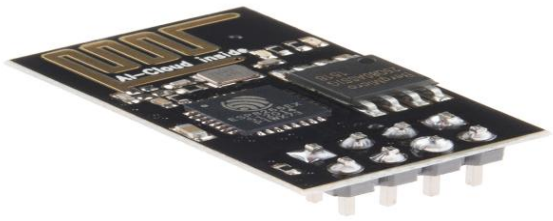

Fig.6 Wi-Fi module

Electrical Characteristics:

Working Voltage: 3.3V

Max IO Driving Power IMAX: 12 mA

Max IO Voltage Level VMAX: 3.6V

Current Consumption: 100mAmp

WATER SPRAYER:

Fig.7 Water sprayer

A water sprayer head is made up of only a few parts. It has a trigger lever, which activates a small pump. This pump is connected to plastic tube from the bottom of sump. The pump sucks this liquid down a narrow point and injects out from the gun muzzle. Nozzle, helps to increase the velocity of the water and it forms a stream.

ANDROID:

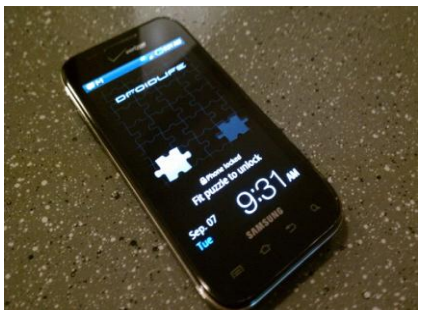

Fig.8 Android Mobile phone

It is an open source functioning system, created by Google in particular for use on mobile devices .Linux based (2.6 kernel)Can be programme in C/C++ but most app improvement is done in Java .

RELAY:

It is an electrically operated switch. It is used to control a circuit by a low-power signal, must be controlled by one signal. A type of relay that can hold the high power required to directly drive an electric motor is called a contractor. Sometimes multiple operating coils are used to protect circuit from heavy loads. These functions are perform by digital instrument still called “protection relays”.

Fig.9 Relay

LED INDICATOR:

A light emitting diode (LED) is a semiconductor mild basis. Pushers are used as marker lighting in numerous gadgets, and are logically used for lighting fixtures. Displayed as a sensible electronic segment in late 1962, early LED's created low-pressure crimson light, but cutting-edge variations are on hand over the unmistakable, vivid and infrared wavelengths, with excessive brilliance. The inward shape and components of a drove are seemed in figures. The shape of the Light Emitting Diode mild is surely unique in connection to that of the light. Unfathomably, the Light Emitting Diode has a clear and strong shape. The light-transmitting semiconductor cloth is the component that chooses the Light Emitting Diodes shading. The Light Emitting Diode relies upon the semiconductor diode.

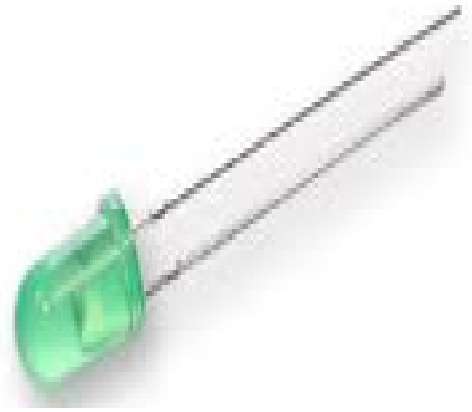

Fig.10 LED Indicator

V. CONCLUSION

This project describe about the real time firefighting robot which moves at a constant speed and then extinguish with the help of pumping mechanism. The extinguishing is complete with the help of PIC microcontroller in which the motor and its driver, h-bridge driver etc. are interfaced. The robot is connected with mobile phone through the Wi-Fi module. Both hardware and software has been realized successfully in this project. The “Advanced fire extinguisher robot controlling with Android mobile phone “ can be used with no trouble in daily life such as in homes, laboratories, parking lots, supermarkets, etc.. However, in this project, extinguish of fire is done with the water.

VI. ACKNOWLEDGEMENT

We would like to thank all the authors of different research papers referred during writing this paper. It was very knowledge gaining and helpful for the further research to be done in future.

VII. REFERENCES

[1] Handbook of robotics and manipulating the movements of the robot.
https://www.ijirset.com/upload/2016/may/138_Fire.pdf

[2] Development of Automatic fire fighting and Research in computer engineering and technology.

http://ijarcet.org/wp-content/uploads/IJARCET-VOL-4-ISSUE-1-176-182.pdf

[3] International Journal of Recent Research in Computer science and Technology-Abilash, Dhumathar, Sumit, Bhiogade, vol.2, Issue, April 2015.

[4] International Journal of Research in Computer and communication Engineering, IJARCCE DOI.1017148\2015.494612, VOL.4, Issue9, September 2015.