"AGNI SHAMAK YANTRA" - FIRE FIGHTING ROBOT

Priyanshu Tomar

Department of CSE&Cybersecurity
New York Institute of Technology
Manhattan, NY, USA
ptomar@nyit.edu

ABSTRACT

The aim of this project is to the development of advance systems which is related to the design of an unmanned fire extinguisher robot. By this purpose, an attempt was made to develop a mobile robot in order to detect fires that could occur in an environment. Designing robot able to motion, beyond the barriers by sensor, find the flame sensor, and extinguish the fire by water, and it progresses in conjunction with the search for the fire to control it and react according to situation by using Bluetooth when it founded the fire and all of this is controlled by the microcontroller. The robot can move on the fire route without any delay and conducts a fire scan as it moves. By using the microcontroller module on it evaluates the data in the direction of the software and performs fire detection, flame detection, actuation, informing and extinguishing processes. Robot design and application process; the design and development of the system, and the preparation of the necessary software.

INTRODUCTION:

Now a days mobile robots are very useful in construction sites, warehouses and manufacturing plants. Mobile robots can also be used in material handling applications which applications are growing day by day. For analysing different items and for handling materials mobile robots can be used. Wireless navigation is also possible for movements of mobile robot, can be controlled through android. Control mechanism is used to control robot. Previously Fire Fighting Robots were controlled by using different electronics devices. But this reduces the scope of control of firefighting robot. However, with the advanced techniques we can build the same robot by using android application to control the actions of the robot. With the help of such robots, fireman's work really decreased and movements of robot are so much effective. By using an android app fireman man detect the fire and can able

to extinguish it. Our project is designed to build an android application which can control operations of the firefighting robot. Fireman can give commands to robot through Bluetooth module. Smart phones has facility of Bluetooth, through that Bluetooth fireman can control the movement of firefighting robot. For fire detection it is using sensors. One is temperature sensor and other one is smoke detector. Fire extinguishing system will be get activated when fire detection system detects fire. Water is used when it detects fire. At the transmitting end android application is used and at receiving end two motors are interface to micro-controller.

OBJECTIVE:

The main goal of the advanced firefighting robot application is to search the fire and used water tank when the fire is found. A variety of mechanical and electronic components were provided for this purpose and then the mobile robot was assembled. Finally, the designed robot has been programmed to perform the intended functions. And we named it as "advanced firefighting robot".

LITERATURE SURVEY:

Sushmitha.R et.al.2018 [1] nowadays, many places such as schools, colleges and our proposed project aims to develop an Arduino controlled fire fighter robot that can be used to extinguish the fire through remote handling. The vehicle consists of a water tank along with a pump which can throw water when needed. The system uses an Arduino Uno microcontroller board for this purpose. The Infrared receiver on the vehicle is used to receive the amount of flame. These values are used to find the location of the fire. These are then fed to the motors responsible for controlling the vehicle movements in front, back, left and right directions. The IR sensor is interfaced with an Arduino Uno microcontroller for this purpose. The microcontroller after receiving input commands operates the motors through a driver IC for vehicle movements. The use of android has one more advantage in addition to improved GUI. It also uses a sprinkler which is used to spray water with a desired pressure. It allows use of the Bluetooth technology for communication allowing the vehicle to operate in a good range from the device. The system can also be later enhanced through the use of a wireless camera to be used for monitoring purposes.

Snehal Adsul et.al. 2018[2] the proposed robot has a water spray which is capable of sprinkling watering 1800 angle. The sprinkler can be move towards the required direction. At the time of moving towards the source of fire it may happen that it will come across some obstacles, then it has obstacle avoiding capability. It detects obstacles using ultrasonic sensors. Communication between the mobile phone and robot will take place through Bluetooth, which will have GUI to control the movement of robot. When mobile gets connected to Bluetooth firstly it will set module name, baud rate .It is feasible to implement Bluetooth communication between smartphones and micro-controller. Android controlled robot can be used easily in everyday life such as in homes, market, companies etc. The development of apps for Android in Android SDK is easy and free of cost.

M. S. M. Hasimi et.al.2018 [3] Firefighting is an important but dangerous occupation. Robots are designed to find a fire, before it rages out of control, could one day work with fire fighters greatly reducing the risk of injury to victims. l Fire Fighting Robot Competition is a contest purposely to simulate the real-world operation of an autonomous robot rescuing 10 victims (table tennis balls) and stop 5 fires (emergency candles) in a house within three minutes. The robot development is consisting of three elements which is the hardware, electronic, and programming. The robot have three DC motor, two for driving system and another single DC motor for ball suction subsystem and the fire blowing subsystem. Various sensors are also interfaced with PIC16F877A as a feedback to the robot such as photoelectric sensors, fiber optic sensor and RGB colour sensors. LCD display also gives the graphical information of the robot status to the user. For the programming part, C language is used to determine the robot action gain from the sensors input.

Makhare Sonal et.al. 2017 [4] from this project we explain the implementation and designing of firefighting 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.

Sushrut Khajuria et.al 2015[5] Firefighting is an important but dangerous occupation. Robots are designed to find a fire, before it rages out of control, could one day work with fire fighters greatly reducing the risk of injury to victims. l Fire Fighting Robot Competition is a contest purposely to simulate the real-world operation of an autonomous robot rescuing 10 victims (table tennis balls) and stop 5 fires (emergency candles) in a house within three

minutes. The robot development is consisting of three elements which is the hardware, electronic, and programming. The robot have three DC motor, two for driving system and another single DC motor for ball suction subsystem and the fire blowing subsystem. Various sensors are also interfaced with PIC16F877A as a feedback to the robot such as photoelectric sensors, fibre optic sensor and RGB colour sensors. LCD display also gives the graphical information of the robot status to the user. For the programming part, C language is used to determine the robot action gain from the sensors input.

LITERATURE SURVEY CONCLUSION:

In the fire-extinguishing robot project, the aim was to develop a system that detects and extinguishes the fire before the fire starts and informs the electronic environment. In this project, targets are microcontroller and motor control with reductive motor, flame detection with flame sensor, Bluetooth communication. The mobile robot which is designed as a result of this study communicates with the mobile phone through the serial port via the serial port and processes the analog and digital data received from the sensors in the microcontroller control so as to determine the fire in the environment while determining the fire in the environment. In this work, a system that works successfully both hardware and software has been realized.

PROPOSED SYSTEM:

Bluetooth-based Bluetooth-Serial Module Card is used for communication. The Bluetooth-Serial Module Card is designed for use with Bluetooth SPS (Serial Port Standard) and wireless serial communication applications. The possibility Arduino and pins needed to be used comfortably in various circuits have been taken out. When the Bluetooth module is connected to the Arduino circuit, the first module name, baud rate and password are set. In order to pass the Bluetooth module to the configuration mode, the 5V connection was made while holding down the button on the module. When entering the configuration mode, the frequency of the led lit on the module is set as standard. The flashing of the led indicates to us that the module is in communication mode. The module is set to be listed in the scans made by other Bluetooth devices while in the communication mode. When connected to a device mode in communication mode, the led flashes briefly once every 3 seconds to indicate

that communication is on. After the installation, the software and the devices were introduced to each other by making the configuration. The mobile robot is designed to complete the cycle by controlling the right side so that the route will travel in a certain environment. The block diagram of the project as shows Fig.1
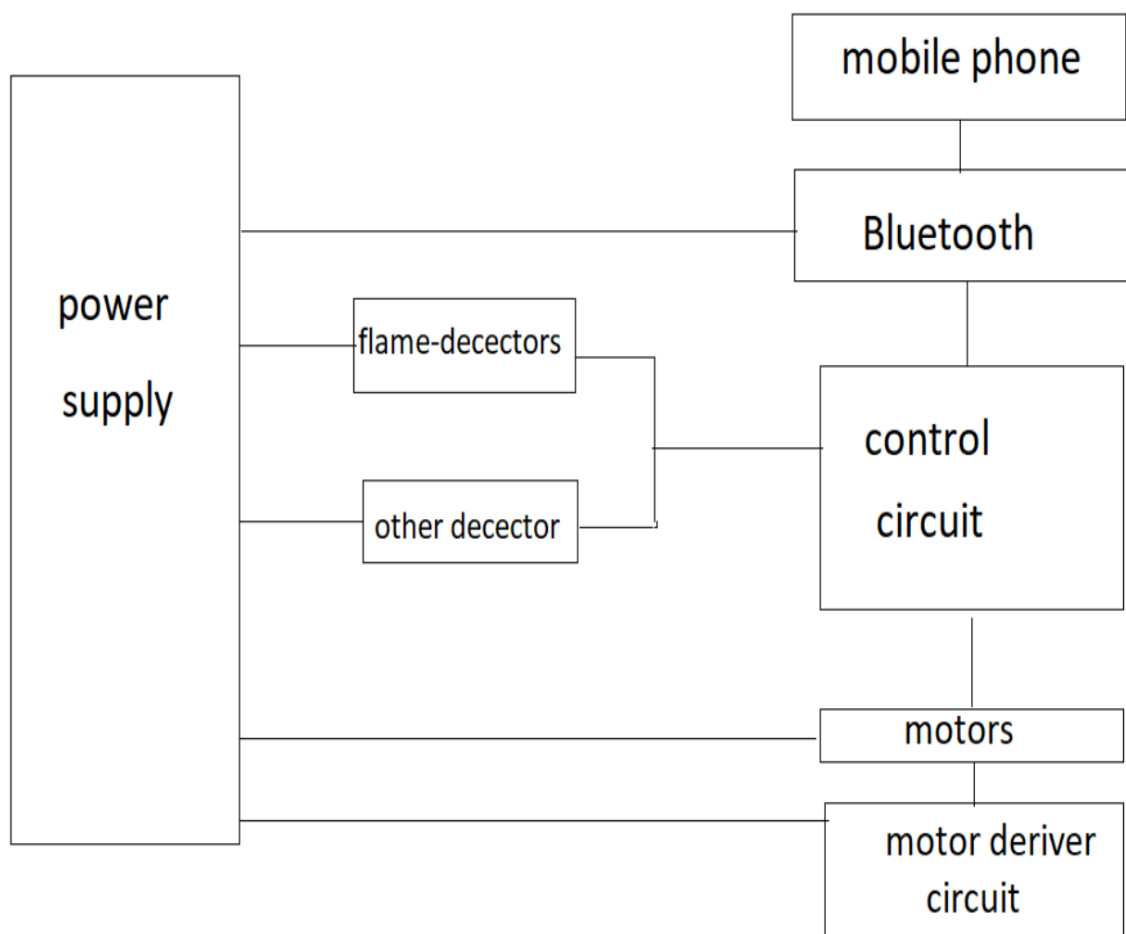
Fig1 - Block diagram

HARDWARE REQUIREMENTS:

- Arduino Uno
- Wheels
- 2 L298N
- Wi-Fi module
- LCD
- Bluetooth
- LM35
- Buzzer
- Water Tank
- Nozzle
- Motor

SOFTWARE REQUIREMENTS:

- Arduino IDE software
- Embedded C

ADVANTAGES:

- It reduces human efforts and protect their property.
- Fireman's work really decreased and movements of robot are so much effective.
- Less time consuming.
- Use in household and as well as office environment.
- Helpful in schools and in hospitals.

FUTURE WORK:

Proposed approach of modular design strategy was a good solution in implementing the firefighting robot to help people at the critical condition. It reduces human efforts and protect their property. Robot detects fire and extinguish the fire with the help of water tank. If we talk about its future scope than we can make it fully automatic and can communicate with it with the help of gsm technique and we can find live location also by using some other techniques.

REFERENCES:

[1] Sushmitha.R, Uma Bharathi.S, Sandiya.S, BE Student "Arduino Based Fire Fighting Robot with High Pressure Water Sprinkler" 2018 IJESC

[2] Snehal Adsul, Ujjwala Lokhande, Snehal Motghare, Pranita Dagale, Prof. M. D. Sale "Android Controlled Firefighting Robot using Arduino" 2018 IRJET

[3] M. S. M. Hasimi, W. H. W. Zuha, Suhaidi Shafie, M. Hamiruce Marhaban "Fire Fighting Robot" 2018 IRJET

[4] Makhare Sonal, Mane Bharat, Sapkal Saraswati, Prof.V.U.Bansude "Fire Fighting Robot" 2017 IRJET

[5] Sushrut Khajuria, Rakesh Johar, Varenyam Sharma, Abhideep Bhatti "Arduino Based Fire Fighter Robot" 2015 IJSER