Android Control Fire-Fighter Robot

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Abstract— Our proposed project aims to develop an android controlled fire fighter robot that can be used to extinguish fires through remote handling. The vehicle consists of a water tank along with a pump which can throw water when needed. The system uses an 8051 microcontroller for this purpose. The android device is used as a transmitter to send over controlling commands to the vehicle. The android device provides a good touch-based GUI for controlling the robotic vehicle. The Bluetooth receiver on the vehicle is used to receive those commands sent by the android device. These are then fed to the motors responsible for controlling the vehicle movements in front, back, left and right directions. The Bluetooth receiver is interfaced with an atmega48 microcontroller for this purpose. The microcontroller after receiving input commands, operates the motors through a driver IC for vehicle movements. 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.

Indexed Terms— DC Motor, Relay, Arduino Board, Motor Drive, Flame Sensor.

I. 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 analyzing 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. Fuzzy logic control mechanism is used to control robot. That model does not need any mathematical model controlling. 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. At the same time robot can detect the obstacles and can avoid them by using ultrasonic sensors. Our project is designed to build an android application which can control operations of the firefighting robot Fireman can send commands to robot through Bluetooth module which is mounted on robot itself. Smart phones has facility of Bluetooth, through that

II. OBJECTIVES OF THE STUDY

1. An enormous amount of loss can be avoided if the fire is perceived at an early stage. Major deprivation and absence of important assets can be avoided if the fire is detected right in time.
2. Robotics field has gained publicity due to their multiple adjustment capabilities. The robot consists of a measuring device and fire extinguisher.
3. The Infrared (heat) sensors will measure acceptable distance and heat and will make the extinguisher to act according to the environment it will perceive. We have used a virtual android app to control the movement of the robot. And in which we use Bluetooth Module to provide communication between controller and android.
4. The controller can be interfaced to the Bluetooth module through UART protocol. Commands sent from the android application provide controls to the primary & secondary actions of the robot

III. LITERATURE SURVEY

1. Shivam Agrawal, Nidhi Agrawal proposed that the human can control the robot by using the Bluetooth module. The Bluetooth module is work with the

android application. In this the Bluetooth model communicate android application by using driving motor, arduino mega, voltage divider, tyres Bluetooth, motor driver.[1]

2. S. Jakthi Priyanka, R Sangeetha proposed that Arduino (UNO R3), gas sensor, motor driver, gear motor, Relay driver, Bluetooth module, pump and sprinkler are used. Used. To program Arduino UNO R3 open-source software Arduino IDE is required. The detection and extinguishing was done with the help of Arduino in which the temperature sensor gear motor and its driver, relay driver etc. are interfaced. The "Android controlled firefighting robot" is useful in everyday life such as in homes, laboratories, parking lots, supermarkets, companies, stores, shops etc. Important function of the robot is patrolling. Limitation of the robot is Bluetooth range and water capacity.[2]

3. P. Soni Ishawarya, stated that there are three different types of system unit is use
Locomotion system
Fire detection system
Extinguishing system
Communication system.
The Locomotion system is used for obstacle detection and four ultrasonic range finder to find the distance between obstacle and system. Fire detection system is used for the detection of fire in this the gas sensor is used. Extinguishing system is for successfully extinguish the fire.[3]

IV. METHODOLOGY

1. We are designing a Android control fire fighter robot to extinguish the fire at forest disaster area and which move in 'NEWS' direction
2. We are using cell phone to control the robot motion with the help of bluetooth.
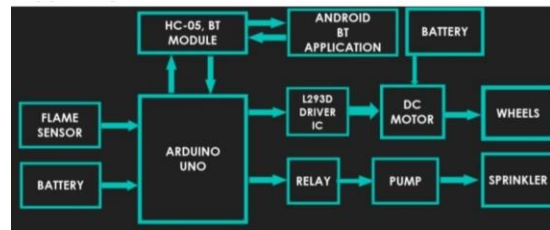
V. HARDWARE COMPONENT USED

- atmega48 Family Microcontroller
- Bluetooth
- Motor Driver IC
- DC Motors
- Batteries
- Water Tank

- Bluetooth Device.

VI. SOFTWARE COMPONENT USED

By using serial bluetooth terminal (SBT) Application.

VII. BLOCK DIAGRAM

Microcontroller controls all the parts of the robot using programming. In this robot as the fire sensor senses the fire, it sends the signal to microcontroller; since the signal of the sensor is very weak the amplifier is used so that it can amplify the signal and sends it to microcontroller. As soon as microcontroller receives the signal a buzzer sounds, the buzzer sound is to intimate the occurrence of fire accident.

After the sounding of the buzzer microcontroller actuates the driver circuit and it drives the robot towards fire place, as the robot reaches near the fire microcontroller actuates the relay and pump switch is made ON and water is sprinkled on the fire through the sprinkler this modules also include manual operation of robot for controlling movement with the help of Bluetooth and to extinguish fire.

VIII. CIRCUIT DIAGRAM
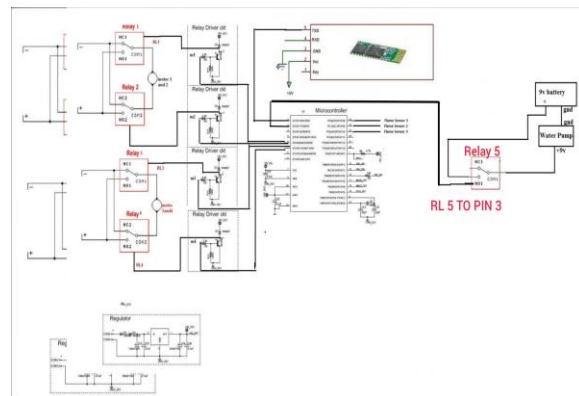
IX.   ADVANTAGES

1. Reduce Human efforts
2. Helpful at only forest disaster area
3. The ability to detect the source of fire

X.   PICTURE OF THE PROJECT

XI.   AKNOWLEDGEMENT

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XII.   FUTURE SCOPE

1. The module can be equipped with a faster and more capable microcontroller to integrate control of many more devices at the same time.
2. Another further intended development is to introduce time-controlled devices for use in commercial spaces. This, for example could be the control of a large display in a showroom between two different intervals of time, without the intervention of any user or technician.
3. If the numbers of relays are increased from the current relays, the number of
4. devices that can be controlled can also be increased.
5. The module can be equipped with other sensing equipment such as light and heat
6. sensors, accelerometers, strain gauges etc to monitor other real world physical quantities.
7. Advanced AVR microcontrollers with bigger flash memories can be used to create an increased

number of functions and programs for better functionality and for user friendly interface.
8. According to the range of communication constraint we can implement GSM Modem to our module.

CONCLUSION

Proposed approach of modular design strategy was a good solution in implementing the firefighting robot to help people at the critical condition. The proposed robot can move in forward, backward, left, right and can stop also. It reduces human efforts and protect their property. Robot detects fire and extinguish the fire with the help of sprinkler pump. For extinguishing that fire robot has to reach up to there and it moves towards the target with the obstacle avoidance property. In this way robot can detects obstacle and avoid them also.

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