Firefighting Android Controlled Robot Using Arduino

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Abstract- *Now a days, fire accidents are very common and sometimes it becomes very difficult for a fireman to save someone's life. It is not possible to appoint a person to continuously observe for accidental fire where robot can do that. Therefore in such cases fire fighting robot comes in picture . Robot will detect fire remotely. These robots are mostly useful in industries where probability of accidental fire is more.*

The proposed vehicle is able to detect presence of fire and extinguishing it automatically by using gas sensor and temperature sensor. It contains gear motors and motor driver to control the movement of robot . Relay circuit is used to control the pump and when it will detect fire then it will communicate with microcontroller (Arduino UNO R3) through Bluetooth module. The proposed robot has a water jet spray which is capable of sprinkling water. 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 will provide GUI for arduino operation using android. It detects obstacles using ultrasonic sensors upto range of 80 m . 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 microcontroller. 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.

Keywords- Arduino Board , Temperature Sensor ,Gas Sensor ,Ultrasonic sensor

I. INTRODUCTION

Previously Fire Fighting Robots were controlled by using different electronics devices But this reduces the scope of control of fire fighting robot .However ,with the advanced techniques we cane build the same robot by using android application to control the actions of the robot . With the help of such robots ,fireman´A ´Zs 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 fire fighting robot . Fireman can send commands to robot through Bluetooth module which is mounted on robot itself. Smart phones has facility of Bluetooth , through that Bluetooth fireman can control the movement of firefighting robot . For fire detection it is using two sensors. One is temperature sensor and second is smoke detector. Fire extinguishing system will be get activated when fire detection system detects fire .Sprinkler will start sprinkling water when it detects fire . At the transmitting end android application is used and at receiving end two motors are interface to microcontroller.
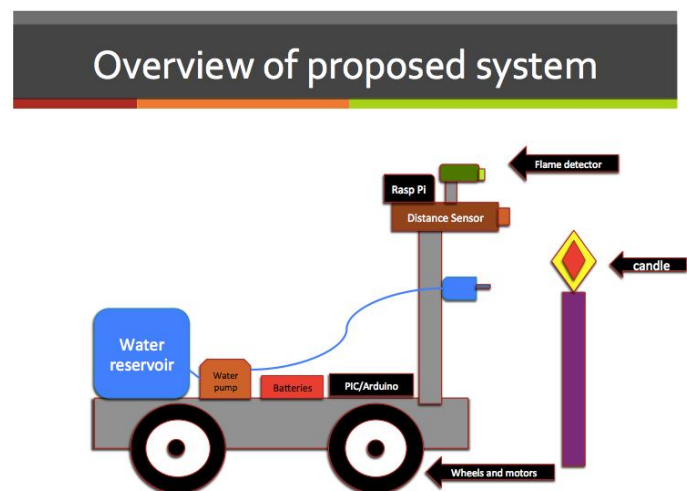

Fig: Fire Fighting Robot .

II. SYSTEM OVERVIEW

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fireman can control the movement of firefighting robot . For fire detection it is using two sensors. One is temperature sensor and second is smoke detector. Fire extinguishing system will be get activated when fire detection system detects fire. Sprinkler will start sprinkling water when it detects fire . At the transmitting end android application is used and at receiving end two motors are interface to micro-controller.

There are two types of robot navigation in unknown environment by using FLC.

Tracking Fuzzy Logic Controller (TFLC)
Obstacles Avoiding Fuzzy Logic Controller (OAFLC)

III. FUNCTIONAL REQUIREMENTS

Arduino Board:

Arduino is a computer hardware ,software company, project, and user community that manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. Arduino boards are accessible commercially in preassembled. The Arduino project provides an IDE (integrated development environment) based on the Processing language project.

The software and hardware requirements are as follows:

1. Ultrasonic Sensor
2. Gas Sensor.
3. Temperature Sensor
4. Bluetooth module.
5. Relay Driver.
6. Gear Motor.
7. DC motor.
8. Arduino UNO R-3
9. Embedded C.
10. Smart Phone

Android Application

Description and Priority

Android application is developed for easy use of fireman .He can easily pass commands to the micro-controller. In earlier days instead of android app they use electronic devices for these purpose but nowadays its very easy by using android application. For doing this, Firstly fireman should pair Bluetooth of his smart phone with the Bluetooth which is on robot . If pairing is done successfully then GUI will be visible ,on which different buttons will be there. Fireman can move robot by pressing those buttons .

Response Sequence

1. If fireman presses left button then robot will move to the left direction and same as for all other directions.
2. If obstacle is detected in this process then robot will automatically get stopped.

Functional requirements
1. Android Phone 2. Bluetooth connection 3. Android SDK.

IV. CONCLUSION

Thus we will be developing a robot which will be used for fire fighting purpose. This proposes a great chance for automation and will be useful at places where human cannot reach or is dangerous.

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