ANDROID CONTROLLED FIRE FIGHTER ROBOT

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ABSTRACT

Nowadays fire accidents are common and sometimes it becomes very difficult for fireman to save human life. It is not possible for a human being to continuously monitor the accidental fire situation. Therefore in such cases firefighting robot used in picture. Robot will check fire remotely. These robots are mostly useful in industries where probability of accidental fire is large. To proposed vehicle is able to detect presence of fire and extinguishing it automatically by using gas sensor and temperature sensor. It contains gear and motor driver to handle 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) through Bluetooth module. The proposed robot has a water jet spray which is able to perform of sprinkling water. The sprinkler can be rotate towards the required direction. At the time of rotation towards the source of fire it may happen that it will come across some obstacles, then it has obstacle avoiding capability. It will used GUI for Arduino operation using android. It detects obstacles using ultrasonic sensors the range is 80m.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, broad rate.

KEYWORDS: Arduino, Bluetooth module, Sensors, Android application, Fire extinguishing:

1. INTRODUCTION

The project is designed to develop a fire fighting robot using android application device for remote operation. The robot vehicle is loaded with water tanker and pump which is controlled over wireless communication to throw water. An Arduino micro controller is used for the desired operation. At the transmitting end using android application device, commands are sent to the receiver to control the movement. The navigation of the robotics achieved by IR sensors and ultrasonic sensors.

The PIR sensor allows tracking of human beings.The deployment of the extigushing device used .All the important topics about the robot are explained in the data below. 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 8051 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 allows use of 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.

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.

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2. SOFTWARE REQUIRED:

• Arduino IDE is an open source software that is mainly used for writing and compiling the Code into the Arduino Module.
• It is an official Arduino software, making code compilation too easy that even a common Person with no prior technical knowledge can get their feet wet with the learning process.
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• It is easily available for operating systems like MAC, Windows, Linux and runs on the Java Platform that comes with inbuilt functions and commands that play a vital role for debugging, Editing and compiling the code in the environment.
• Each of them contains a microcontroller on the board that is actually programmed and accepts The information from on board is in the form of code.

•The main code, also known as a sketch, created on the IDE platfor generate. A Hex
• File which is Arduino Micro and many more.then transferred and uploaded in the controller on the boardthe IDE environment mainly contains two basic parts: Editor and Compiler where former is Used for writing the required code and later is used for compiling and uploading the code into The given Arduino Module.
• This environment supports both C and C++ languages.
• 1.5.1 How to Download You can download the Software from Arduino main website. As I said Earlier, the software is for common operating systems like Linux, Windows, and MAX, so make sure you are downloading the correct software version that is easily Compatible with your operating system.
• If you aim to download Windows app version, make sure you have Windows 8.1 or Windows 10, as app version is not compatible with Windows 7 or older version of this operating system. The IDE environment is mainly distributed into three sections
• 1. Menu Bar
• 2. Text Editor
• 3. Output Pan
• As you download and open the IDE software, it will appear like an image
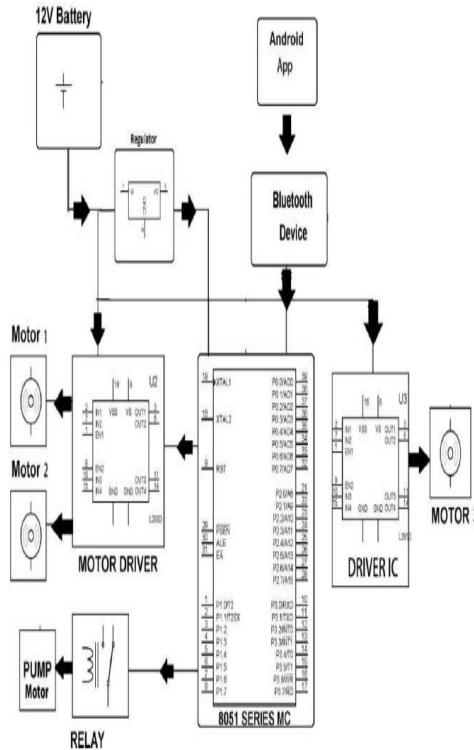
3. Methodology
Block Diagram:

FIG 2.1 ANDROID CONTROLLED FIRE FIGHTER ROBOT

3.1 Proposed System:

The project is designed to develop a fire fighting robot using android application device. for remote operation. The robotic vehicle is loaded with water tanker and a pump which is controlled over wireless communication to throw water. At the transmitting end using android application device, commands are sent to the receiver to control the movement. 33 At the receiving end, three motors are interface to the microcontroller. Out of these, two motors are used for the movement of robot and one is used to position the arm of the robot. Remote operation is one with android operating system.

Actuator is located on the top of the extinguisher. Actuators are used to activate the sensors. All of the

occurs autonomously without any human intervention. A robot which is result of this project communicates with mobile application through Bluetooth and with microcontroller and other hardware using serial port communication.

Microcontroller can handle both analog and digital data received from mobile app and hardwares to detect fire and extinguish it .This project is can be used in day today life if more professionals are

selected .It an be used in this markets ,malls, stores, companies and even at homes.In this project fire is extinguish by water which is stored in water tank which is mounted on robot , instead of this we can carry water pump. For providing more safety we should add some obstacle detector fire at left and right.

4. DEVELOPMENTATION AND IMPLEMENTATION
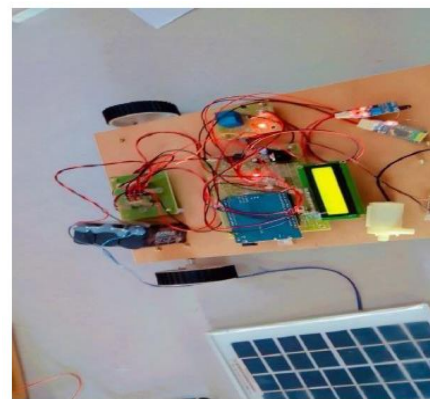
Schematic Diagram:

Fig 3.1 Shematic diagram for Andriod controlled fire fighter robot

Working:

Our project is designed to develop android application for remote operation of fire fighter robot. The fire extinguishing system is activated once the sensors detect the fire. Two sensors are used to detect the fire i.e. smoke sensor(light intensity) and another is temperature sensors. When these two sensors are simultaneously activated, the fire is detected. The fire extinguisher is mounted on the robotic vehicle which is then controlled over the wireless communication. At the transmitting end android application device is used. Commands like moving forward, left and right

are sent to robot by using android device. At the receiving end, three motors are interface to the microcontroller. Out of these, two motors are used for the movement of robot and one is used to position the arm of the robot. Remote operation is achieved by any smart phone with android operating system. The android application device acts as a remote control. Receiver has a wireless device fed to the microcontroller. Actuator is located on the top of the extinguisher. Actuators are used to activate the sensors. All of the process occurs autonomously without any human intervention.

5. Problem Statement:

The project has been motivated by the desire to design a style that can detect fires and take appropriate action, without any human intervention. Thisprovides us the opportunity to pass on to robots tasks that traditionally humans had to do but we're inherently life threating. 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.

Advantages:

The fire detecting robot helps in following ways:

➢ To detect the exact direction of the fire source.

➢ Capability of sensing accurately with increased flexibility.

➢ Reduce human effort.

➢ Reliable and Economical.

➢ Not sensitive to weather conditions.

Disadvantages:

➢ No monitoring system for the vehicle.

➢ No remote control for the robotic moment.

➢ Our system used only for less than 3.5 kg application.

➢ It is not used to put out large fires.

6. Result:

7. Conclusion:

The Circuit of our project was designed and setup using Arduino Uno which is very reliable & stable. In the fire extinguishing robot project, we developed a system that

detects and extinguishes the fire before the fire starts and Informs the electronic environment. Here targets are microcontroller and motor control with reductive motor, flame Detection with fire Sensor. The robot which is designed here as a result of this study communicates 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 open or close environment. In this work, a system that works successfully both Hardware and software has been realized. This system "fire detection and extinguishing robot" is capable of being used In our everyday life, if

8. Future Scope:

The knowledge is ever expanding and so are the problems Which the mankind strive to solve. In this spirit, it is hoped That the current activity will lead to further enhancements. Further modification can be done by replacing the sensors With the Camera to provide the accuracy and overcome The issues suffered by the sensors.

For example:

• Work on future for the Military purpose by the robot.

 • Fire Fighting Robot can be made by enabling a robotic

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