

Arduino Based Fire Fighter Robot

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Abstract: The purpose of this paper is to provide a design for a Arduino based Fire Fighter Robot. Arduino is an open-source electronics platform that is based on easy-to-use hardware and software. Arduino board can be controlled by sending a set of instructions to the microcontroller. It has been designed to develop a fire fighting robot using Arduino technology for remote operation. Firefighting is the act of extinguishing fires, i.e.; our robot sprinkles water on to fire. The robotic vehicle is loaded with the water tanker and a pump which is controlled by wireless communication to throw water. An Arduino Mega microcontroller issued for the desired operation. A firefighter robot suppresses and extinguishes fires to prevent loss of life and destruction of property and the environment.

Keywords: Arduino, Fire Fighter, Water Canon, Transmitter, Receiver

1. Introduction

The project consists of a user controllable fire fighter robot which has a water tank and a gun attached to it for extinguishing fires. For this purpose, the system uses an RF remote, to remotely control the robot along with microcontroller circuit based on RF for operating the robotic vehicle to move in all the directions. With the help of the RF remote, the user commands are sent by RF signals, which are sent by the wireless remote transmission unit. The commands that are sent by the user are received by the receiver circuit on the robot chassis and then decode them. It then forwards it to the microcontroller. After that, the microcontroller processes these instructions and then instructs the vehicle motors to run the vehicle in desired directions. The robot operates within a 17 feet range of the remote.



2. Components Used

- Robot Metal Chassis
- Arduino Mega Board
- 433 MHz RF module
- Motor Drivers L293D
- DC Motors 6-18V
- Voltage regulator 7805
- LiPo 2200MahBattery
- Battery 9V

- Water Canon Assembly
- Bomb throwing Assembly
- Camera Set (receiver, antenna, probes, camera)

3. Architecture

3.1 Arduino MEGA ADK board

The Arduino MEGA ADK is a microcontroller board which is based on the ATmega2560. It can be connected to the host with the help of USB interface to connect with Android based phones, based on the MAX3421e IC. There are 54 digital input/output pins (out of which 15 can be used as PWM outputs), a USB connection, 16 analog inputs, 4 UARTs (hardware serial ports), an ICSP header, a 16 MHz crystal oscillator, a power jack, and a reset button. The Arduino MEGA ADK can be supplied with power via the USB connection or with an external power supply. The power source is selected automatically.

3.2 Block Diagram of Project

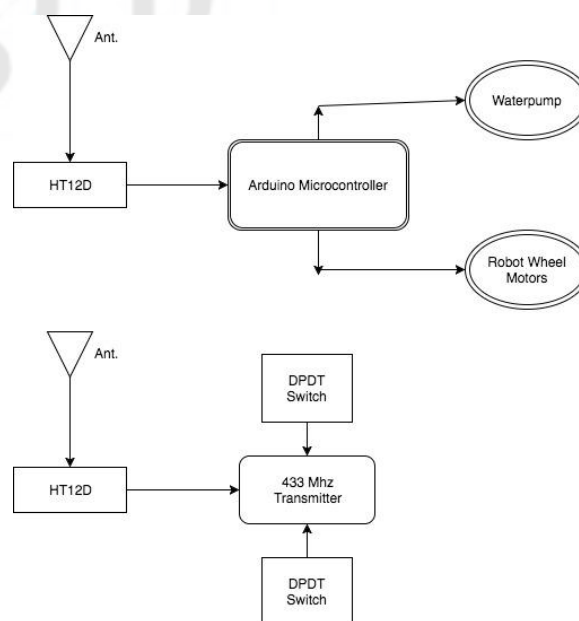


Figure 1: Block diagram of Arduino based Fire Fighter Robot

4. Software Specification

Arduino 1.8.1.

The Arduino Software, IDE is open source software and the code that is to be implemented can be easily written in it. It can be made to run on Windows, Mac OS X, and Linux. The software is written in Java. This software can be used with any Arduino board.

The Arduino IDE supports C and C++ using special rules of code structuring.

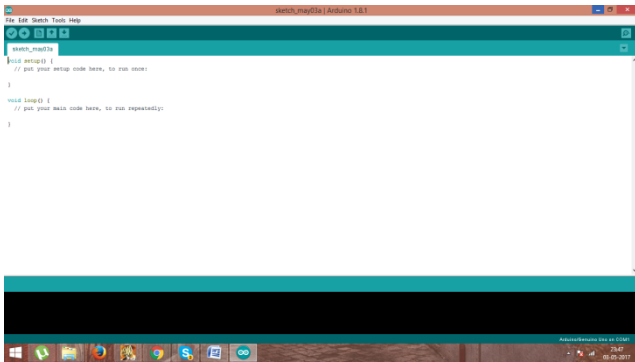


Figure 2: Diagram of Arduino IDE software

5. Working

The project consists of a user controllable fire fighter robot which has a water tank and a gun attached to it for extinguishing fires.. For this purpose, an RF remote has been used for remote operation along with RF receiver based microcontroller circuit so as to operate the robotic vehicle and water pump. The RF based remote transfers the commands sent by the user through RF signals to the receiver circuit. The receiver circuit then decodes the data commands sent. The commands are then sent to the microcontroller which then processes these instructions and then instructs the vehicle motors to run the vehicle in the desired direction. On the basis of the user commands, the water pump is controlled. This allows the user to operate the robot and extinguish the fire by standing at a safe distance. The range of the robot is within 7 metres of that of the remote. This robot also has a wireless camera mounted over it. This camera helps the user to move the robot body in whichever direction as required. By installing the water pump assembly and the camera, the robot is able to extinguish the fire when required ensuring the safety of the user.

6. Conclusion

With the help of the above described robot, it can be concluded that a robot can be used in place of humans, thereby reducing the risk of the life of fire fighter. It can be used in our labs, homes, offices etc. They provide great efficiency and can extinguish the fire before it becomes uncontrollable and a threat to life.

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