

Wifi Enabled Wireless Operated Fire Extinguisher Vehicle With Water Jet Spray

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1.ABSTRACT:

The main objective of the paper is to extinguish fire using robot which is remotely controlled through wireless. The robot can move through any path whose motion is controlled through the WIFI network using buttons interfaced by a software program. When the robot faces a fire then it is made to extinguish the fire with the help of pump motor connected to a water tank mounted on its body. PC works as a remote to control the motion of the robot either to move it forward or backward and the motion of the water pipe up and down of the robot through which it throws water to extinguish the fire. On the robot wifi is enabled through which it receives commands from the PC. A microcontroller is interfaced that delivers output accordingly for the motors via motor driver IC.

IndexTerms—Pc, Robot, Wifi, Motor Driver

2. AIM:

This paper is developed to extinguish the fire held in nearby areas which works similar to fire engine. It is operated using PC and the communication is carried out using WIFI on the electric DC motor. The Microcontroller is programmed using Embedded C language.

3. HARDWARE DESCRIPTION:

Microcontroller (P89V51RD2) , DC Motors, Relay , BC547, Nozzle , Pump motor , Resistors , Capacitors , Diode , Battery.

4. SOFTWARE DESCRIPTION:

Keil compiler Languages: Embedded C.

5. PURPOSE OF PAPER:

This paper is developed to extinguish the fire held in nearby areas which works similar to fire engine. It is operated using PC and the communication is carried out using WIFI.

6.PAPER APPROACH:

This section gives an outline of the way we developed the application, including the highest level milestones:

Phase I: P89V51RD2 Microcontroller With Board

This is the board which contains P89V51RD2 Microcontroller Chip as well as the clock Circuitry, Reset Circuit and Power Supply for the Micro Controller.

Phase II: ON BOARD MOTOR Driver

- a. Motors typically require voltages and/or currents that exceed what can be provided by the analog or digital signal processing circuitry that controls them.
- b. The motor driver provides the interface between the signal processing circuitry and the motor itself. It is essentially the “amplifier” for the motor.
- c. Motor drivers can be constructed from discrete components, completely integrated inside an IC,

or may employ both discrete and integrated components.

- d. When current and voltage levels allow, integration of the entire motor driver inside a single IC generally provides the highest level of functionality and performance at the smallest physical size.
- e. In addition to providing high-voltage and high-current drive, motor drivers also often integrate control circuitry, such as current regulation or digital state machines to operate the motor.

Phase III: Stepper Power Supply

This board contains the power Supply for the stepper motor and relay driver.

Phase IV: Fire Sensing Unit and Extinguisher

The fire sensor senses the fire and informs the Microcontroller which in turn actuates the Solenoid to pour the water on the fire to extinguish it.

Phase V: WIFI MODULE

1. WIFI is a popular technology that allows an electronic device to exchange data wirelessly using radio waves over a computer network, including high-speed Internet connections.
2. WIFI Module is a device that can use Wi-Fi to connect to a network resource such as the Internet via a wireless network access point. Such an access point has a range of about 20 meters indoors and a greater range outdoors.

7. PROJECT GOALS AND OBJECTIVES:

The goals and objectives for this paper will focus on implementing wireless operated wifi enabled fire extinguisher using water jet spray are as follows:

1. Performs an annual fire prevention inspection in each high rise building, commercial building and multi-family occupancy.
2. Perform fire and life safety inspections for new construction within two working days of request.

3. Perform quarterly fire prevention training and fire code updates for suppression personnel.
4. Provide fire extinguisher training and emergency evacuation planning for businesses in the City.
5. Continue meetings with the Industrial Fire Prevention Committee and the High Rise Committee to examine fire prevention and loss prevention programs in industrial facilities and high rise buildings.
6. Continue efforts to expand the public education program to incorporate programs that will be conducted in schools on a regular basis.
7. Review all fire prevention regulations to verify compliance with current fire prevention laws, regulations and practices.
8. Continue to assist with the coordination and training the public in Adult CPR at the annual Super CPR Saturday training event.
9. Assist the Police Department with home fire safety presentations as part of their neighborhood Watch Program.

8. TECHNOLOGY IMPLEMENTED:

- Robotics.
- Keil software.
- Flash magic.
- Wireless communication.

8.1 ROBOTICS:

- Robotics is the art and commerce of robots, design, manufacture, application and practical use. Robots will soon be everywhere in our home and at work.
- These days not only the college graduates, professors and professionals but even the schools are imparting robotics as part of their extra-curricular activities. Future aspect of the robotics, robots and their scope in every industry is very bright not only in India, but also in various countries.

- Docile X is our attempt to introduce you to this scintillating field. This can be your first venture to learn robotics in practice.
- Docile X is an intelligent robot which is modular, with a robust platform, multiple wings for mounting sensors which can be used to program to perform many a functions. Further, the mounting wings can be swiveled and rotated on an 180° plane to extract the maximum performance of the sensor. All these allow you to conduct hassle free experiments, tryouts and investigations on the robot.
- The 8051 mother board exclusively developed by Jay Robotix, integrated into Docile X is completely programmable. It can support a whopping 20 ports for connecting external inputs like sensors, LEDs. As you will learn further in the manual and our on-going workshops, all these aid in making the robot multi functional to the highest level there is and will challenge your creative ability to make the best use of the robot kit.
- Doing all this will also develop the practical applications of all theories you've studied until now. Robotics being a highly inter disciplinary field, you can learn and improve your fundamentals in many fields, viz. mechanics, real time circuit building, programming and logic control etc. to find out when and how a particular type of sensor can be used to perform what function(s), how to write simple codes to perform complex actions, to make a few improvements on an existing logic to make it capable of performing multiple functions etc.
- The fundamentals learnt through such practical methods will go a long way and make you a better competitor which will guide you through complex situations and problems to find the most obvious, evident and straight forward solutions.

8.2 KNOWING OUR DOCILE X IN DETAIL:

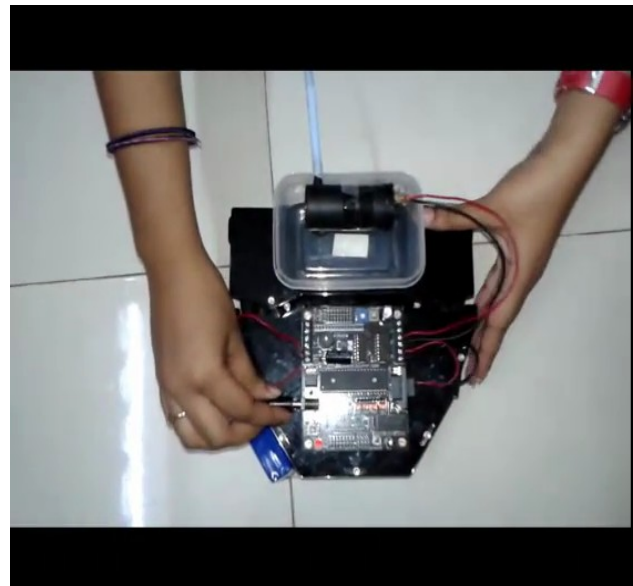
- 100rpm, 5kg-cm@12v torque DC Motors
- 72mm diameter nylon wheels with nitrile rubber tyre
- 11.1v, 1300mah rechargeable Li-Po battery pack
- 8 wings, 3mm slots to mount sensors

- Steel ball castor
- P89V51RD2 microcontroller working at 11.0592 MHz
- On board regulated power supply.
- Power indicator LED.
- Buzzer.
- Two onboard 1A dual full H-Bridge motor drivers.
- Separate ON/OFF switches for power and motor drivers.
- LED's for status/debugging purposes.
- switches for external inputs/interrupts.
- Onboard RS232 interface for UART communication.
- In system programming facility.
- Wide operating voltages ranging from 7V-15V.
- Programming: Using Flash Magic or any other similar software via serial port

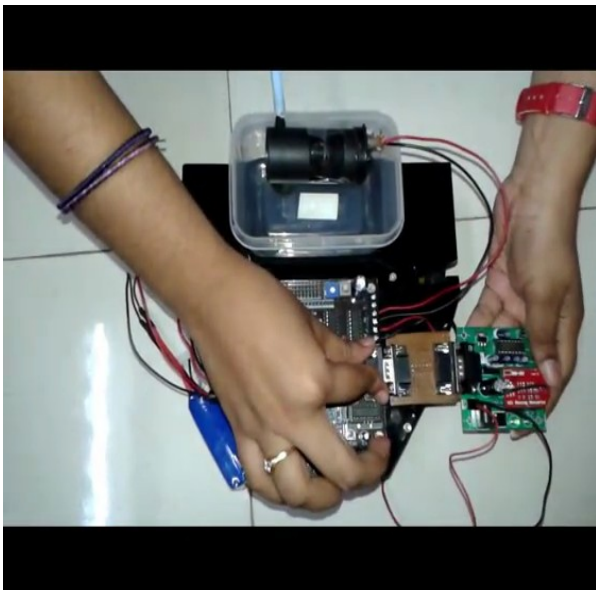
9.PROJECT SCENARIO:

Steps how the robot will work:

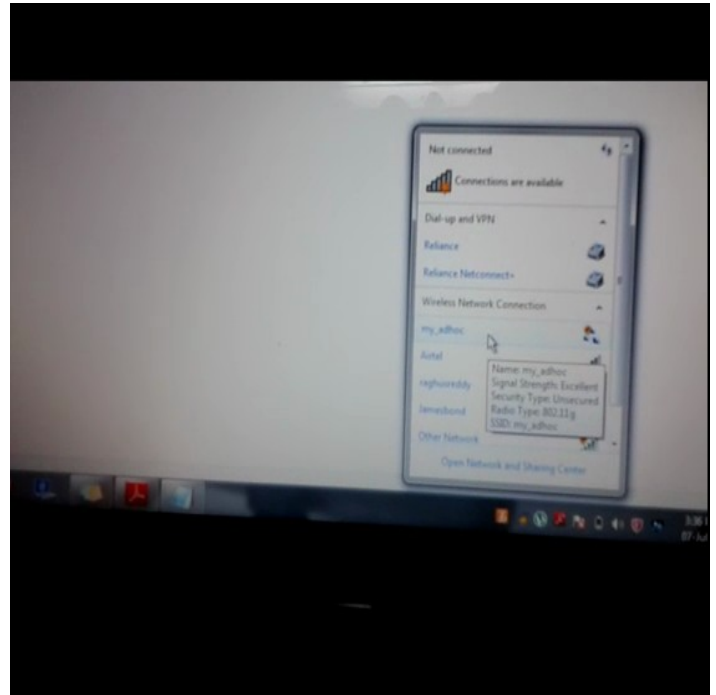
Step 1: Connect the power supply to the robot



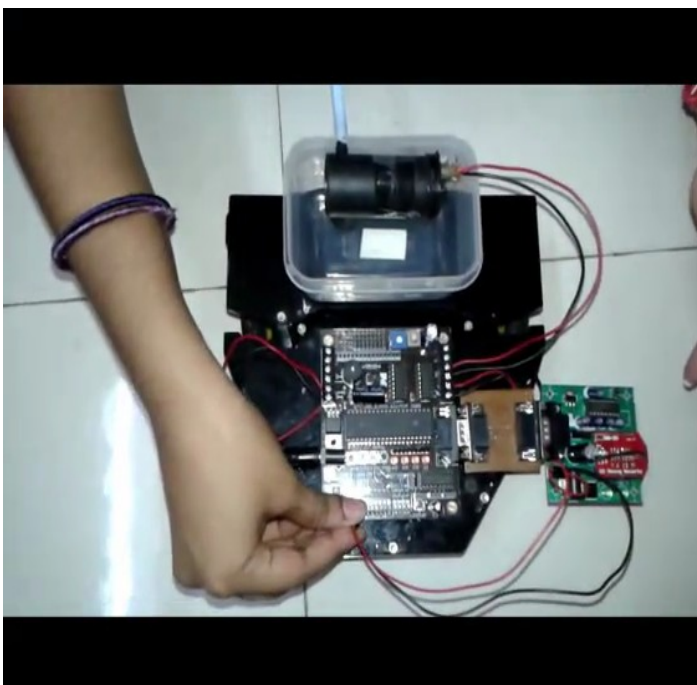
Step 2: connect wifi module to the robot



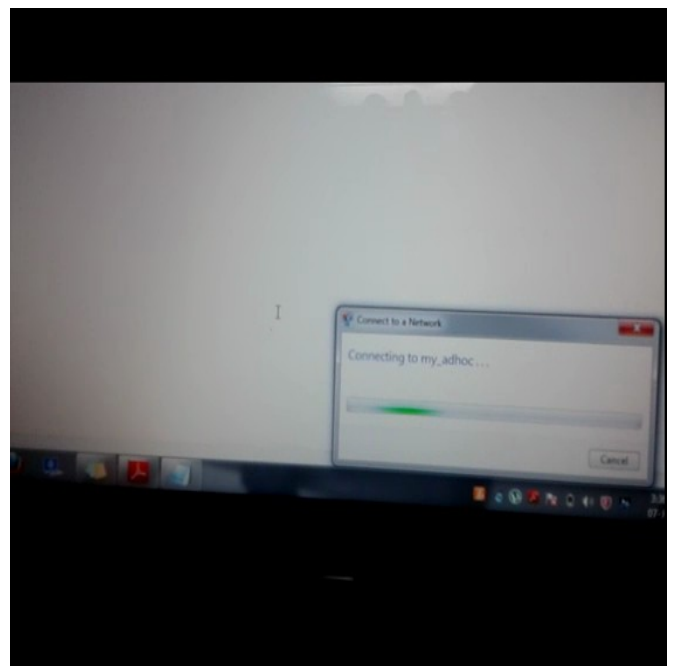
Step 3:The wires which supply voltage to the wifi module are connected to Vcc and ground of port 1.



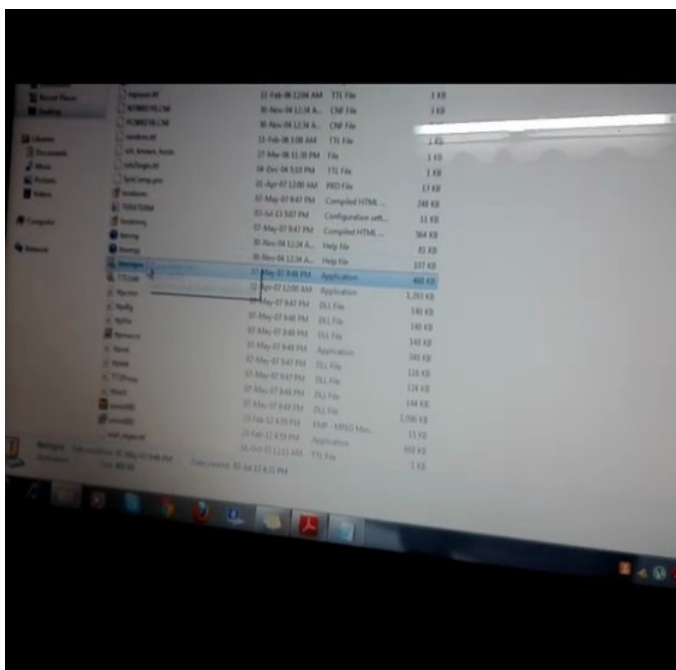
Step 5:The connection is established



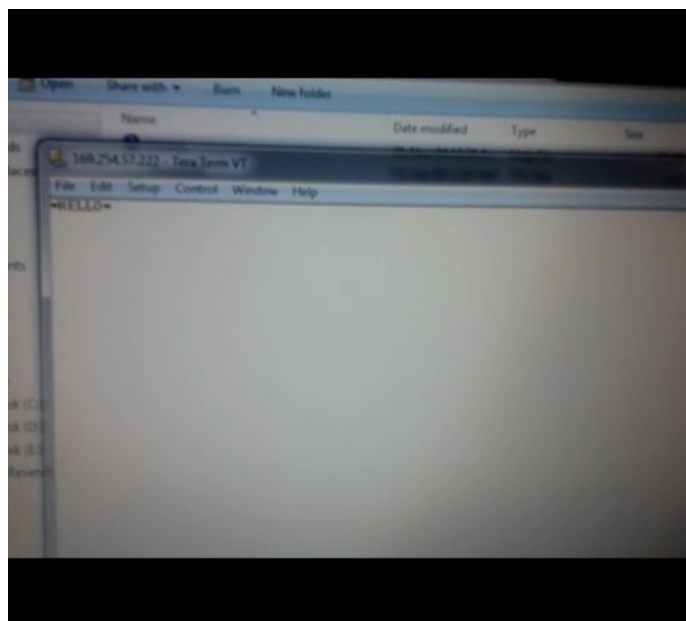
Step 4: when power is supplied wifi module name is displayed in our PC or Laptop as “my_adhoc”.



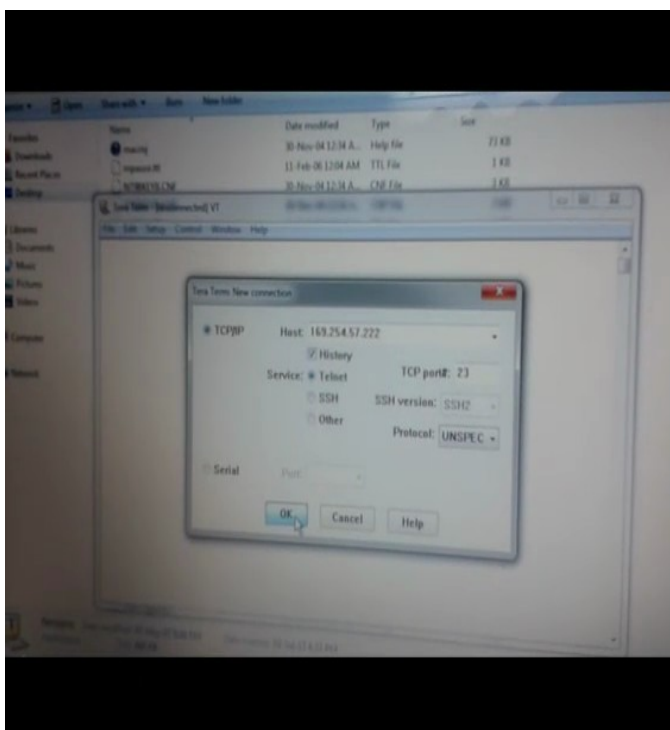
Step 6:An open source software teraterm is used to make wifi module work as a router.



Step 7:In the options select “telnet” and change the port number to “2000” .



Step 9: Then we press “F”, “B”, “L”, “R” for the movement of the robot and to pump the water “W” is pressed and extinguish the fire and to stop pumping the water “S” is pressed.



Step8:Then it displays the message as “Hello”.

10.TESTING:

10.1Testing the robot: While constructing the robot initially only check whether all the connection are set according to the written code and is moved accordingly.

11.CONCLUSION AND FUTURE SCOPE:

11.1 Conclusion:

Finally, after all the connections are done the robot is moved with the help of PC and the fire is extinguished in our nearby area by pumping the water.

11.2 Future scope:

- Robotics is the science that deals with the technology of robots, their design, manufacture, and application. Robotics is synonymous with automation.

- Robots are mainly used for carrying materials including heavy parts to and from inconvenient locations and handling hazardous materials like nuclear waste. The benefit of robot is that they never get tired or exhausted. The mechanization in processing of Robotics is divided into 3 types and they are hard, programmable and flexible.
- In the Hard type, the series of processing operations is fixed by the structure or configuration of the equipment used in. The significant characteristic of the hard type is the high capital investment as in automobile assembly line. In programmable Automation, the same tools can be reprogrammed to suit the requirement of diverse types of products. And in flexible automation, the reprogramming is done offline. The 2 vital elements of robotics are numerical control and tele-operations. The 2 technologies of numerical control of tele-operation are combined in industrial robots.
- It is seen that facilities are found in institutions such as IIT's for research oriented work in this discipline, typically as part of PG programmes.
- you can go for a PCM with computer science if you are interested in robotics... the scope of this field will only increase in the future as humans become more and more dependent on machines..also we are constantly discovering new areas of research where it is humanly impossible to go..for example outer space..so we take the help of robots .after doing a bachelors degree in engineering preferentially mechanical or electrical..you can opt for a wide range of robotics involved fields ..such as mainstream robotics or nanotech etc.

In basic robotics we design machines to do the specified tasks and in the advanced version of it robots are designed to be adaptive, that is, respond according to the changing environment and even autonomous, that is, capable to make decisions on their own. While designing a robot the most important thing to be taken in consideration is, obviously, the function to be performed. Here comes into play the discussion

about the scope of the robot and robotics. Robots have basic levels of complexity and each level has its scope for performing the requisite function

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