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Android Based Fire Fighter Robot

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Abstract
The undertaking is to increase a robotic automobile capable of detecting the presence of hearth and extinguishing it robotically. It is a movable robotic that consists of gas sensor for detecting the fire, gear motor and motor driving force for the motion of the robotic, relay motive force for pump manipulate and a Bluetooth module that are used for the detecting and extinguishing the hearth. Usually, the robotic movements at a constant pace. When the fuel sensor detects the fire inside the environment, the sign indicating the presence of hearth can be sent to the Arduino via which the extinguishing is accomplished. In the extinguishing method, every time the detection of fireplace is fine the robot will stop on the vicinity of fireplace befell and starts the pump and sprinkle water thru a sprinkler until the smoke is positioned off. The whole control is done the use of Arduino that is interfaced with the android cellular via Bluetooth module, in order that the manipulate of the robot may be made from an android mobile as well.

Keywords: *Arduino UNO , PC with Arduino Software, DC Motor and Driver Circuit, Single Channel Relay Driver Circuit, Pump and Sprinkler.*

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I. INTRODUCTION

As the robotic discipline is evolved a lot, human interaction is made much less and the robots are broadly used for the cause of safety. Fire accidents have end up commonplace in our every day lifestyles and sometimes it may result in risky issues in order to be harder for the firemen for protective the human life. In order to avoid those instances, this robot is used to protect human lives, environment and wealth from the fire injuries. For engineering college students, who're interested in robotics, this firefighting robot challenge is a complicated challenge. The Bluetooth era for faraway operation and Arduino UNO R3 are integrated on this mission.

II. Purpose:

The cause of research is to provide the robotic's easy hardware architecture but with having effective computational abilities and systems in order that robot's clothier can recognition on their research and checks in place of Bluetooth connection infrastructure. Motivate to work on robot architecture and work on the Microcontroller chip which is integrated with the various device on a single chip by the usage of modern sensors we can embed the artificial intelligence into the microcontroller chip to carry out the favored operation in their respective fields. This simple architecture is likewise beneficial for academic robotics because students can construct their own robots with low price and use them as a platform for experiments in several courses.The objective of our project is to replace complicated hardware structure networks with less difficult connectivity circuits in order that clothier can give most important significance to build more than one, chance stopping skills on his/her robot.

III. Constructional details

1. Microcontroller:

The 8051 microcontroller Programmed to perform diverse task based totally on the Necessities of the circuit operation. It is a smaller Pc which has on-chip RAM, ROM, I/O ports. This is The principle part of this mission .The motor motive force circuit is Connected to the 8051 microcontroller .Receiver ship Acquired signal to microcontroller which generates output Signals which is then fed to motor driver IC. The automobiles Trade course primarily based on signals acquired from motor Driving force IC.

2. Geared Motors:

The Geared motor is used to the carry Heavy load and it's miles a12V DC rating motor which gives60mA Max current on no-load and 300mA max modern on load. Here, 10 RPM motor is used for higher overall performance. There Are the four Geared automobiles are used for motion of robot in Left, proper, forward and backward path. The weight of Each geared motors is 125 gm.

3.Bluetooth module:

Usually, HC-05 is used to connect small devices like mobile phones using a short-range wireless connection to exchange files. It uses the 2.45GHz frequency band. The transfer rate of the data can vary up to 1Mbps and is in range of 10 meters.The HC-05 module can be operated within 4-6V of power supply.

4. DC water pump:

The foremost reason of DC water pump Is extinguishing fire with high pace water glide. It pumps Out water stored in a water tank related with pipe. This DC water pump is operated on a 12V electricity deliver for high Pressure water pumping system. It is positioned at the hearth Fighting robot and stuck as like to provide movement in upward And downward course.

5. Motor Drive IC:

Motor controller is used power the Geared automobiles which give better reliability and velocity, much less Noise and right electricity intake. Here, the L293D Motor driver circuit is used for the higher overall performance. Motor driver IC is find to force automobiles in any course. Basically motor motive force IC acts as an interface between Microcontroller and automobiles. It gives the blessings like current Sense for every motor to provide better performance.

6. Robot Body:

The robot body consists of wheels which are to drive the robot and extinguishing components like water tank, pump, and sprinkler. A water tank with pump is placed on the robot body and its operation is carried out from the Arduino o/p through the proper signal from the transmitting end. The entire operation is controlled by a Arduino. A motor driver IC is interfaced to the Arduino through which the controller drives the gear motors for the movement of the robotic vehicle.

IV. Working

In this project we are using arduino UNO as a microcontroller and brain of this project with different components such as hc-05 Bluetooth module l293d motor AC servo motors and DC 9 volt operated pump. Once we have power on the system microcontroller is started and execute the program burned in hex file a project so we need to to connect Android mobile application with bluetooth module by going Android settings connect new devices select hc05 module what's the system is connected LED on hc05 is blinked slowly continuously. Now when we press button f system start moving forward direction and when we press the button left or right system turn itself respectively e as predefined code in it. To stop the system we need to press S .

When system is staff we have facility to to manually control pump by pressing button P in the Android application. Give command to 27 motors so it will rotate 0 to 180 degree continuously and DC motor pump is started which pump the water filled in a bucket and throw it on fire.

Fig. 1:Fire Fighter Robot Model

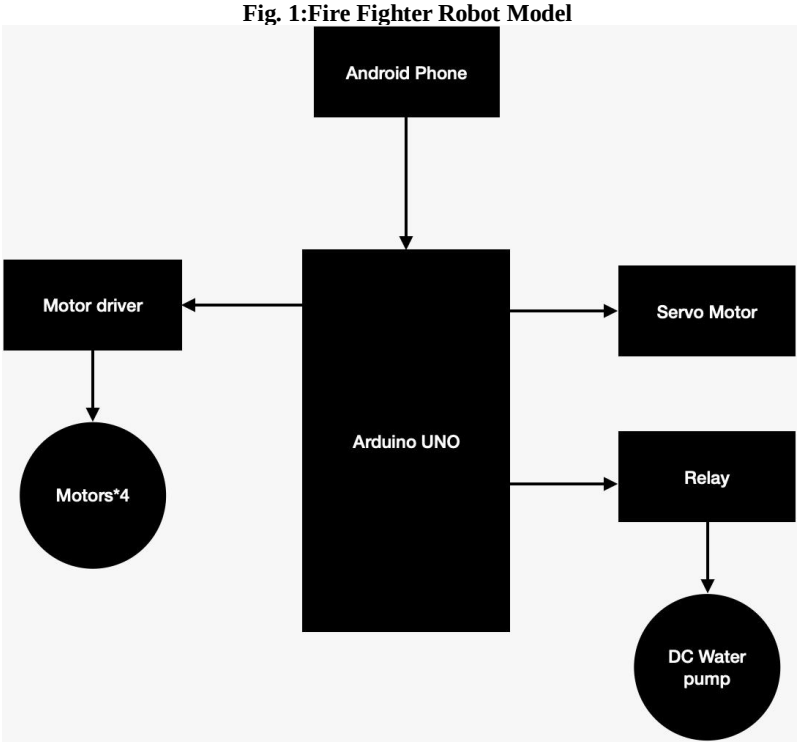

Fig. 2: Block diagram

II. Circuit Diagram:

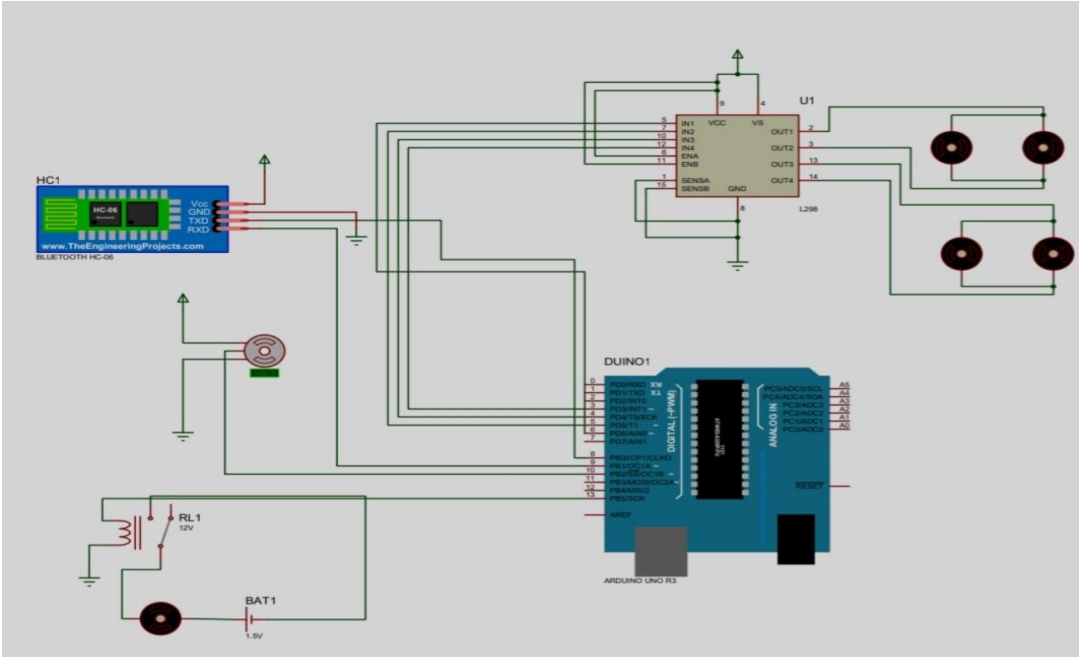

Fig 3: Circuit Diagram

III. FUTURE WORK:

The information is ever increasing and so are the troubles which the mankind try to clear up. In this spirit, it's far was hoping that the present day activity will result in similarly enhancements. Further amendment may be performed by using replacing the sensors with the Camera to provide the accuracy and conquer the troubles suffered by using the sensors.

For instance: Work on destiny for the Military purpose via the robot. Fire Fighting Robot may be made by means of allowing a robot arm.

IV. CONCLUSION

This undertaking describes about the actual time firefighting robotic which movements in a regular velocity, discover the fireplace and then extinguish it with the assist of pumping mechanism. The detection and extinguishing was done with the help of Arduino in which the fuel sensor, tools motor and its driver, relay driving force and so forth. Are interfaced. The robot is hooked up with cellular cellphone through the Bluetooth module and processes the analog and digital statistics received from the sensors within the Arduino control decide the fireplace in the environment. Both hardware and software has been realized effectively on this task. The "Android controlled firefighting robotic" may be used without problems in normal life which include in houses, laboratories, parking lots, supermarkets, shops, shops etc. The hearth extinguishing was finished with the help of water via the pumping mechanism. Some alternatives in those elements are blowing wind through fans, hearth extinguisher gel tightening with the help of servo motors and so on. However, on this project, extinguishing of fireplace is done with the water that is most appropriate for each time and material paintings.

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