

IOT Enhanced Car Control System with Voice Commands Using Arduino

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Abstract – Bluetooth controlled car is a arduino based project developed to control a car through mobile phone. Here we present a phone controlled robot that can be controlled through an android app on your mobile. The control commands are sent via Bluetooth. And also using some type of sensors like to change the path when it detects the obstacle in the moving path . we are connecting all the modules through arduino . The car is programmed with auto obstacle detection and prevention algorithm based on ultrasonic ranging sensor .For monitoring purpose we have considered including humidity and temperature sensors . In addition to this the car is capable of transmitting live streaming video through an ip based web cam.

Index Terms – Arduino, Auto obstacle detection, Ultrasonic ranging sensor ,Temperature sensors, Ip based web cam.

1. INTRODUCTION

Android smart phones are undoubtedly the most popular gadgets these days. We will find various Android apps on the Internet that exploits inbuilt hardware in mobile phones, like Bluetooth and Wi-Fi, to control other devices. Here we present a phone controlled robot that can be controlled through an android app on your mobile. The control instructions are sent through Bluetooth and it has feature that can be controlled from smart phones by touch or through voice commands. The car is programmed with auto obstacle detection and prevention algorithm based on ultrasonic ranging sensor .For monitoring purpose we have considered including humidity and temperature sensors . In addition to this the car is capable of transmitting live streaming video through an ip based web cam.

2. EXISTING SYSTEM

The existing systems are like line follower robot, edge avoiding robot, DTMF robot, gesture controlled robot. These type of robots are not efficient .they required more power to run . cost is very high .They are not equipped with sensors like to detect a obstacle ,humidity ,temperature and also ip based web cam .In the existing system they don't use voice commands ,total distance covered ,Ip based web camera.

3. PROPOSED SYSTEM

The idea that we have proposed in this paper is here is a phone controlled robot that can be controlled via an app on your mobile. The control commands are sent through Bluetooth.

And also using some type of sensors like to change the path when it detects the obstacle in the moving path . we are connecting all the modules through Arduino. The car is programmed with auto obstacle detection and prevention algorithm based on ultrasonic ranging sensor .For monitoring purpose we have considered including humidity and temperature sensors . In addition to this the car is capable of transmitting live streaming video through an ip based web cam. . The car is

3.1 Advantages :

1. It can be controlled through smart phones by touch or through voice commands
2. The speed of the car can be controlled through smart phones.
3. It will also send information about the direction in which it is moving.
4. It senses the humidity and temperature of the environment and sends the information to the user.
5. Its easy to monitor and change the direction through ip based web cam.
6. Cost is very less.

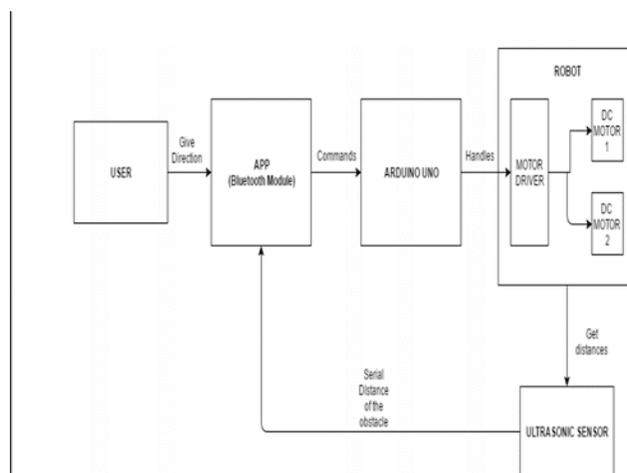


Fig 1:Architecture Diagram

The architecture diagram contains the User ,Bluetooth module ,Arduino, Robot car ,sensors. user is for giving the directions to control a robot car based on the situations .bluetooth module is for communication purpose through this user can give commands to the car. Arduino Uno board is for connecting all the bluetooth module , robot car ,and other sensors. Robot consists of one motor driver and two dc motors ,these two dc motors are connected to the wheels of the car .through the dc motors only possible to change the car directions . we are providing charge to motors by 9v batteries.

It also consists of different type of sensors like ultrasonic sensor to detect the obstacle, temperature sensor and humidity sensor used to sense the temperature and humidity of the outside environment respective

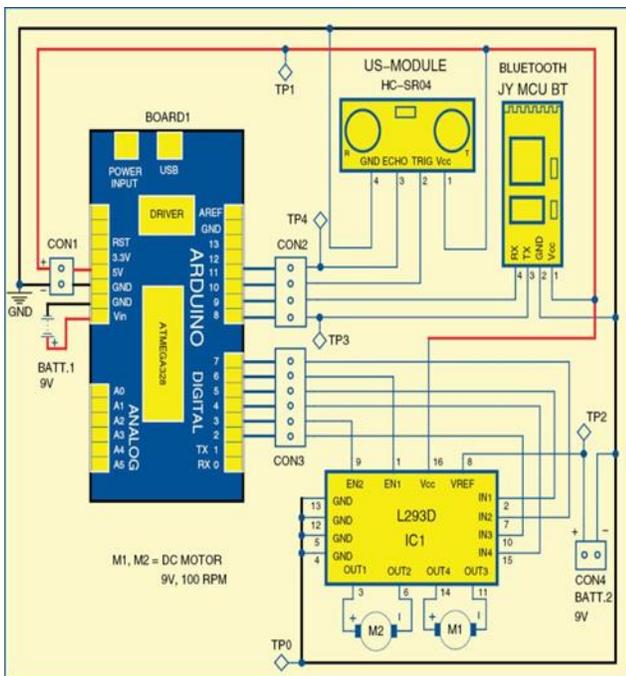


Fig 2:Pin diagram

Fig .2 shows circuit diagram of the Android phone-controlled robot. This prototype is constructed using an Arduino UNO board , ultrasonic transceiver HC-SR04, Bluetooth module, motor driver L293D , Direct current motors M1 and M2, and a small number of components .The prototype uses two 9V batteries one battery to power the Arduino board and the another to power the motors respectively, as shown in Fig. 3. Regulated 5V supply for the remaining circuit is feeded by the Arduino board itself. LED on the board indicates presence of power supply.

Bluetooth module :

Bluetooth module JY MCU BT is used in this project, so that it can connect to any device, through built-in UART(Universal Asynchronous Receiver/Transmitter)interface, to communicate

with other Bluetooth-enabled device such as smartphones, handheld computers and laptops. The module runs on a 3.6V to 6V supply.

Ultrasonic transceiver module:

Ultrasonic transceiver module HC-SR04 uses sonar, like bats and dolphins, to determine distance to an object. It offers excellent non-contact range-detection of 2cm to 400cm with high accuracy and stable readings in an easy-to-use package. It comes with an ultrasonic receiver and a transmitter module.

4. IMPLEMENTATION

4.1 Working principle :

The prototype is simple to use as the user simply to connect it to a PC with a USB cable, or supply it with an AC-to-DC adaptor or battery to get started. The microcontroller(mc) on the prototype is arranged using Arduino programming language. To begin the determination of the distance, pin 2 (TRIG) of the module will receive a high pulse for minimum of ten microseconds. The pulse will start the module to transmit eight cycles of ultrasonic signal at 40 kHz and wait for the reflected ultrasonic signal .When the sensor senses the reflected ultrasonic signal, it sets pin 3 (ECHO) to 'high 'state. Duration of the reflected pulse depends on the distance from the obstacle, which can be easily calculated as: Distance(in centimetres) =T/58 where, T = Width of pulse at ECHO pin in microseconds . Arduino Uno is a board based on ATmega328 microcontroller. It has 14 digital input/output pins, six analogue inputs, a USB connection for programming the on-board microcontroller, power jack, an ICSP header and a reset button. It is operated with a 16MHz crystal oscillator and contains everything needed to support the microcontroller .Arduino is an open source electronics prototyping platform based on flexible, easy-to-use hardware and software. It is proposed for artists, designers and anyone interested in creating interactive objects or environments.

The control commands for the robot are sent through the smart phone using the app. You can give the instructions either by touching on various options on the user screen or through voice commands. Similar to control commands you select the user interface which is displayed in smart phone, the related data is sent through Bluetooth of the phone. Data transmitted by the phone is received by Bluetooth module at the robot end. The received data is fed to pin 8 of BOARD1. The microcontroller(mc) on BOARD1 processes the received data and drives motors accordingly. The robot also sends back the status. In the android application you can see current car Status,' below which you can see the direction in which car is moving. The car gives the information of the distance from the closest obstacle to the smart phone, and if it reaches too close to an obstacle the car stops by tapping on stop button .It can be controlled from Android smart phones by touch or voice commands. The speed of the robot can also be controlled. The

robot will sense and inform to the phone its distance from the nearest obstacle. It will also send information about the direction in which it is moving

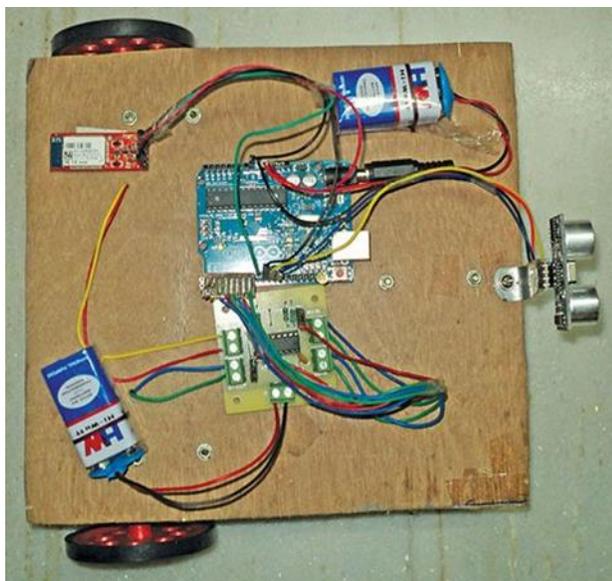
5. RESULTS & DISCUSSION

5.1 Screen shot:



This is a user interface of the android application. The above part of the diagram will represent the movement of the robot car and the arrows will direct the robot car. The centre button is used to stop the robot car. In the status of the robot we can control the speed of the robot car and in speech recognition we can give instructions to control the robot car through voice commands. It will also show us the speed of the car and the distance covered in the button "press here for details".

5.2 Prototype :



This is the prototype model of the working project. In this all the parts are connected to the Arduino.

6. CONCLUSION

So, by this project we can directly control the robot by our mobile phone using touch and voice commands. It is very efficient because the Bluetooth transmitter accurately sends the signals to the Bluetooth module JY MCU BT.

7. FUTURE ENHANCEMENT

We can invoke the technology, so that the communication with Arduino can even be made from miles. The robot can further be invoked with Artificial intelligence. We can invoke a technology so that we can rotate a camera from the application itself. We can add different sensors.

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