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A Short Review on Voice Controlled Robotic Vehicle

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ABSTRACT

Todays world is going digital and moving so fast. In this quickly adapting and upgrading world we need people are using IOT for making life easy and comfortable. While driving every time drive needs to operate vehicle with his own hands. At some place's person cannot go in vehicle as it may be at dangerous sites or some difficult sides. So, in order to tackle all these problems and many more we have tried to make a voice controlled robotic vehicle which can solve these problems and may give access to different sites which are difficult to access for human. We have tried to use Bluetooth device for capturing voice commands to vehicle. The android applications give command to the vehicle via android device. The android-based systems provide user friendly interface for user. The android sends these commands and Arduino receives the commands then Arduino drives motors with help of the motor driving IC as per the commands sent by android.

Key words: Voice recognition, Bluetooth module, Android Application, DC Servo motor

INTRODUCTION

A robot is an electromechanical device that can sense its environment and make decisions based on that information (command). In general, a robot must be able to move (via mechanical movement), perceive (by transducer), and make decisions (by remote control or artificial intelligence). A robotic vehicle is a robot manipulator that can perform functions that are comparable to those of a vehicle.

The goal of our proposed project is to create a robotic vehicle that is controlled by human verbal instructions. To accomplish this, the system uses an Android device that transfers voice commands to an 8051 microprocessor.

The transmitter is a Bluetooth gadget for an Android phone. The Bluetooth transmitter is used to communicate the voice commands that the module recognizes. The robotic car detects and decodes these orders in order to move it in left, right, backwards, and forward directions. A Bluetooth receiver positioned on top of the vehicle recognizes and decodes the communicated commands. These commands are decoded and sent to the 805 microcontrollers. The microprocessor then commands the vehicle's motors to move it in the desired direction. This is accomplished by using a driver to regulate the motor movements. The system may be operated remotely within a reasonable range thanks to the Bluetooth technology utilized to transmit and receive data.

"In the suggested concept, we want to employ voice commands from the user to control the vehicle's movements. These commands will be sent using an Android application on the user's phone, which will be connected to the robot through Bluetooth. The commands will then be sent through an RF channel to the Module, which will receive them. The purpose of a Voice Controlled Robotic Vehicle (VCRV) is to listen to and respond to user orders. The user will be required to train the system (for the accent), after which the gadget will begin to recognize the commands given. This is accomplished by using a code to add commands to the controller."

Voice Recognition:

It is the process of enabling a computer to identify and respond to sound produced by human sound. In this system input for the program. In voice recognition system the machine receives voice as input it interprets the voice, dictate it and carry out the spoken command.

Speech recognition and voice recognition are different things. But voice recognition is better than speech recognition. So, for our project we used voice recognition for controlling vehicle.

DESCRIPTION OF ROBOT

Transmitter

In the transmitter area, commands are sent to the mobile application through the microphone of the mobile phone. This mobile phone is connected to a mobile vehicle via a Bluetooth module. The mobile application used is programmed so that the voice commands given to the handset are received by the microphone and these analog voice commands are converted into a digital word sequence (A to D conversion). These stored sequences are sent to the robot via the Bluetooth transceiver module and to the transceiver controller (MAX 232).

Receiver

The MAX 232 transceiver is used to decode the received signal and serially communicate with the Bluetooth module. The controller compares these digital signals to the program commands stored in them and converts them into language strings. The voice string is then used to drive the servomotor at the desired time interval.

Transducers

The MQ6 gas sensor is used to detect gas in the environment. As soon as gas is detected, the buzzer sounds and the LCD shows the gas level. The LM35 is a temperature sensor used to detect the temperature of the desired environment. The sensor detects the temperature and sounds a buzzer when the temperature exceeds 50 ° C. Therefore, it functions as a temperature sensor.

BLOCK DIAGRAM:

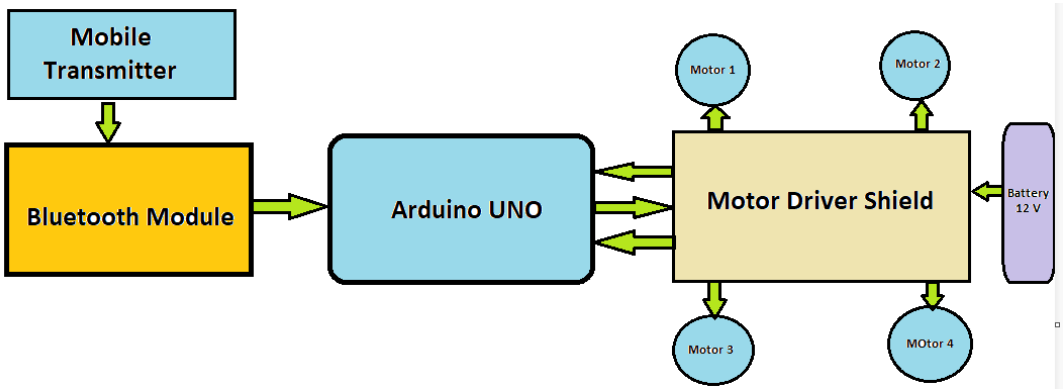

Figure. 1: Block Diagram of project

COMPONENT

- Arduino Uno
- Bluetooth Module HC-05
- DC Motor Driver L293D
- DC Motor

- Power Supply

Arduino UNO:

It is a Microcontroller board. It used ATmega 328p for processing. It has 16 MHz quartz crystal. It has an USB connection and a power jack. It has 14 input output pins and also 6 analog pins. It has a reset button for removing garbage value or restarting whole program. It has 1 kB EEPROM and 2 KB SRAM [5].

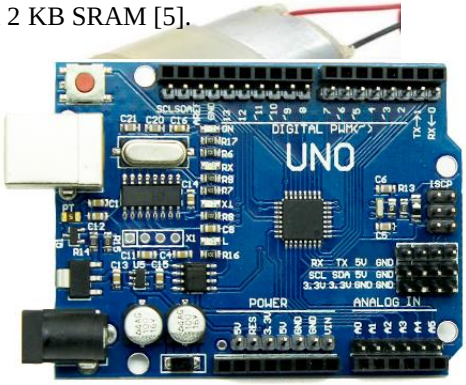

Figure.2: Arduino UNO [3]

Bluetooth Module (HC-05):

HC-05 Bluetooth Module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Its communication is via serial communication which makes an easy way to interface with controller or PC.

Figure. 3: Bluetooth Module (HC-05) [3]

Motor Driver L239D:

Microcontrollers cannot control the motors directly. So, in order to control motors an interfacing device is required. So, this motor driver works as this interfacing device. Each chip in it has 2 H- bridge circuits. These circuits can cause motions and rotate motors [6].

Figure. 4: Motor Driver [6]

Power Supply:

A 12 Volt battery is used to power the vehicle. It is a lead storage battery. It's very cheap compared to other batteries. It's cheap and reliable. It has two electrodes immersed in an electrolyte solution called H2SO4. It is an electrochemical device that stores chemical energy and converts this chemical energy into electrical energy when the battery is connected to an external load. It consists of a container, a plate, an electrode, a vent cap, a cell terminal, and an electrolytic solution.

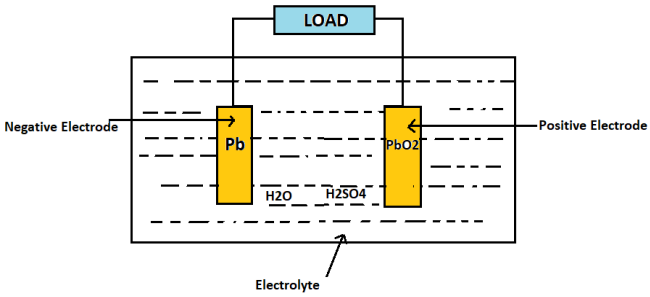

Figure. 5: Power supply

Servo Motor:

The servo motor has good precision. These kinds of motors consist of control circuit which provides feedback on current position of the motor shaft. When we want to rotate or move the system with some specific angle or distance, we use servo motor cause of its precision. If we power it by Dc power supply, we call it Dc servo motor and if we power it by AC power supply, we can call it AC servo motor. It has special gear arrangement which allows it to give more torque with light weight.

Figure. 6: Servo Motor

Ultrasonic Sensor:

It is a kind of sensor which can receive and send ultrasonic signal. These ultrasonic sensors can send pulse at 40KHz.It can detect obstacle and give information to the sensor. It is a HC-SR04 ultrasonic sensor [6].

Figure. 7: Ultrasonic Sensor [6]

Conceptual Model:

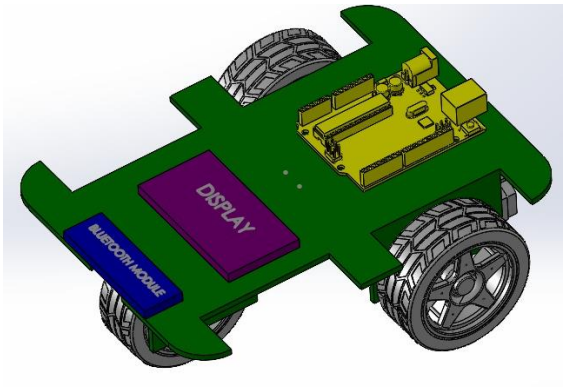

Figure. 8: Conceptual Model

RESULT

This model is tested and found to be working properly. We gave voice commands to it and it has followed all of those commands. So, this fully working model with successful output. Through our android app we gave command to out vehicle. Microcontroller on that robotic vehicle decoded all those commands and with the help of motor driver L239 D it operated all those DC motors and that's how our robotic vehicle moved in given direction.

CONCLUSION

In this paper we have developed an Arduino based voice controlled robotic vehicle. I will make advancement in robotic and automobile field. It will open new path for automobile segment to achieve more success. It can be used for making driving more comfortable and easier. It works on Arduino technology and voice recognition technology. People with physical disabilities can also use this vehicle easily. It can be used in chemical and defense sector. It can be very crucial where human entry is not allowed, it can reach those places without much problem. With some advancement and changes in this can bring revolution for human race.

6. ACKNOWLEDGEMENT

It gives me great pleasure and satisfaction to present the review paper titled "A Short Review on voice controlled robotic vehicle ". We would like to take this opportunity to thank our guide, Assistant professor Akhya Kumar Behera, for giving us all the help and guidance we needed. Which also helped us in doing a lot of research and we came to know about many new things, we really want to thank him. We are really grateful to him for his support through the project. His suggestions were extremely valuable and beneficial to us.

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