

Voice Controlled Robot Using Bluetooth Module

K.Maheswari¹, B.Bhargavi², B.Kavya³, K.B.Madhu Priya⁴, M.Sushmitha⁵

¹Associate Professor, Dept. of Electronics and Communication Engineering, Sanskrithi School of Engineering, Puttaparthi-515134(A.P), India

^{2,3,4,5}Final Year Students, Dept. of Electronics and Communication Engineering, Sanskrithi School of Engineering, Puttaparthi-515134(A.P), India

Abstract - In this digital technology era for all the risky and dangerous tasks we prefer Robots rather than people. In the early stage of this Robotics the Robes are manually controlled but due advancement in wireless technology now Robes can be controlled via voice .This project was developed in a way that the robot is controlled by voice commands. An android application with a microcontroller is used for required tasks. The connection between the android app and vehicle is facilitated with Bluetooth technology. The robot is controlled by buttons on the application or by spoken commands of the user. The movement of the robot is facilitated by the two dc servo motors connected with microcontroller at the receiver side. The voice commands are converted in to digital signals by the Bluetooth RF transmitter for an appropriate range to the robot. At the receiver end the data gets decoded by the receiver and is fed to the microcontroller which drives the DC motors for the necessary work. This research objective is to design and implement a cost effective but yet flexible, adaptive and secured voice controlled robotic vehicle to perform the required task by listening to the commands of the user. The advantages of using voice as an interfacing medium are many. Firstly there is no need of training of operating technology. Secondly, the simplification of services would give us wider adoption of existing technology and would help people with varied disabilities access the same technology.

Key Words: Android, Arduino, Microcontroller, Bluetooth, Wireless Robot, Voice Recognition, DC motor.

1.INTRODUCTION

The main attraction of any Robotic system is reducing human labor, effort and time. Upcoming technology is natural language processing which enables us to command and control things with our voice. In modern era more importance is put on wireless technology. The wired networks are messy and complicated. These wireless technologies have great impact on human life in a positive manner and human development speed has increased. The robot basically works on human speech commands. The voice control robot is controlled by using voice command which is directly given by the user to the robot. We can say, this is a wireless robot. The android application is installed in smart phone which works as a transmitter. The commands are given by this android application. The application AMR voice is used to recognize the Arduino using Bluetooth link. The Bluetooth module (HC-05) which is connected to the Arduino.

As Arduino is programmable ,So it have to be programmed using C,Java language. Hence it is easy to connect android application (AMR voice) and Bluetooth

module(HC-05) using Bluetooth link. The commands are given by the AMR voice by the user. Voice recognition technique used in a wide range of applications to control gadgets and help the society. The basic idea for this model will be an android smart phone in interaction with the robot using the Bluetooth network. This particular technique can be used for assistance for people with disabilities or in applications of industries like working robots controlled by voice. Each technology has its own merits and demerits. But Bluetooth based voice controlled robe systems have an upper hand. Devices can be connected from a range of 10m to 100m and this range can be increased. Also the frequency used for Bluetooth is 2.4GHz, which is available globally. The speed that can be fetched for Bluetooth services is up to 2.8 Mbps. So these advantages made the way for high development in Bluetooth based speech recognition systems.

2. LITERATURE SURVEY

Worldwide investment in industrial robots up 19% in 2003. In first half of 2004, orders robots were up another 18% to the highest level ever recorded. Worldwide growth in the period 2004-2007 forecast at an average annual rate of about 7%. Over 800,000 household robots in use – several millions in the next few years, its 2004 World Robotics survey. K.Kannan and Dr. J Selvakumar, are defining the modes of speaking Robot. There are generally three modes of speaking 1) Isolated word (or phrase) mode, 2) Connected word mode 3) Continuous speech mode. Prof. Bhuvaneshwari Jolad and Mohnish Arora., define how to recognize voice of Robot. author Rohan Ganu and Chetna Bhatia, defined how Robot communicate • One-way communication: In which each user spoken input is acted upon.

The existing system ,which is mainly used with Wi-Fi as a medium for communication between software and hardware component. The main drawback of Wi-Fi range was limited hence the user has to be within the range. An android based automation was then developed. It used internet in the place of Wi-Fi and its disadvantage was Unavailability of Internet.

Embedded smart Robo management scheme was developed. It was based on use of Ethernet network. The system also had GSM support for the issue of unavailability of network. It was thus costly and hence was the only disadvantage. Some researchers worked on Bluetooth based ,arm processor (ARM9 and ARM7), and so the system has a complex architecture.

3 PRAPOSED METHOD

In this model, designing of the VCR(Voice Control Robot) was done by the following parts available in the market and

also programming of the Arduino was done and the app was developed by using app inverter on the internet. Human voice is mainly focused here, because we most naturally and most frequently use our voices to communicate our thoughts to. These human voices are converted into signals by application.

3.1 BLOCK DIAGRAM

First the given command or data is converted into text form through AMR voice control. When it received at the Bluetooth module, the data or command is converted into digital form. Hence the Arduino perform the operation according to the received command or data.

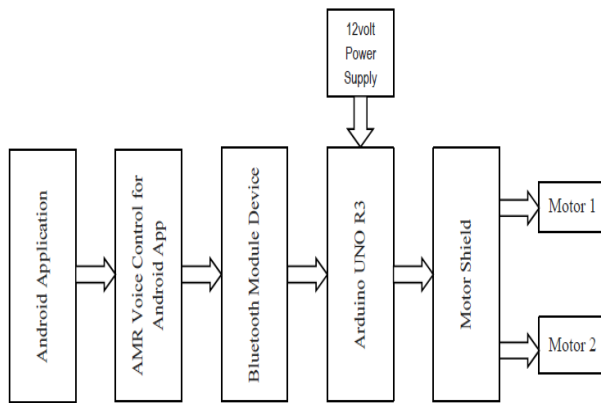


Fig.1 Block Diagram of Voice Control Robot

FEATURES

3.2 CHASSIS

A chassis is the internal framework of the artificial object which support in its construction and use direct inclusion in abstracting services.



Fig -2: Chasis

3.2 GEAR MOTOR

A DC motor is a class of rotatory electrical machine that converts direct current in to mechanical energy. All types of DC motors have same kind of internal mechanism either electronic or electro mechanical, so it can change the direction of flow of current in path of motor periodically.



Fig -3: Gear Motor

3.3 WHEELS

A wheel is circular block of durable and hard material which is placed in axil about which the wheel rotates when a moment is applied by the torque or gravity, thereby making one of the simple machines. When placed under a load baring platform, the wheel turning on the horizontal axil makes it possible to transport heavy loads.



Fig -4: Wheels

3.4 ARDUINO UNO BOARD

Arduino uno is an open-source microcontroller board placed on microchip ATmega328p microcontroller and developed by Arduino.cc. the board has 6 analog pins, 14 digital pins programmable with Arduino IDE via type B USB cable.

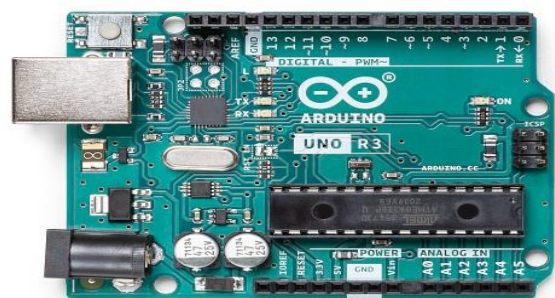


Fig -5: Arduino Uno Board

3.5 HC-05 BLUETOOTH MODULE

HC-05 module is a simple Bluetooth serial port module designed for wireless serial connection setup. It has a footprint as small as 12.7mm x27mm. it will simplify the overall design cycle. Bluetooth Sub-modules work well with Arduino and other Microcomputers.HC-05 is a more capable module that can be set to be either Master or Slave. HC-05 is small (3 cm long) and run on 3.3V power with 3.3V signal levels, they have no pins and usually solder to a larger board. The module has two modes of operation, Command Mode

where we can send AT commands to it and Data Mode where it transmits and receives data to another Bluetooth module. "Breakout" Boards that make these easy to use are available and recommended. These mount the sub-module like that shown on the right on a slightly larger board.

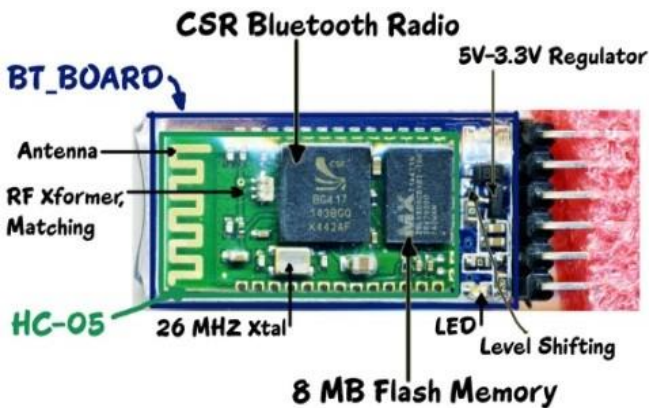


Fig -6: HC-05 Bluetooth Module

3.6 L298D MOTOR DRIVE

The L298 driver is a high voltage high current dual bridge driver designed to accept standard TTL logic levels and drive inductive loads. The emitter of the lower-level transistors of each bridge are connected together to the corresponding external terminal can be used for the connection of an external sensor.

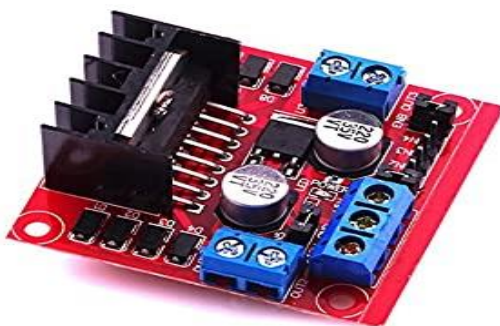


Fig -7: L298D Motor Drive

3.7 APP DEVELOPMENT

The application to control the vehicle was coded and created using app available on the google playstore known as MIT AI2 companion. This app was developed by MIT .

3.8 ANDROID APP DEVELOPMENT

Below figure shows developed android app with the help of the app we developed an app and named it as AMR VOICE. The app contains the option to connect to Bluetooth and across the Bluetooth settings of the phone.

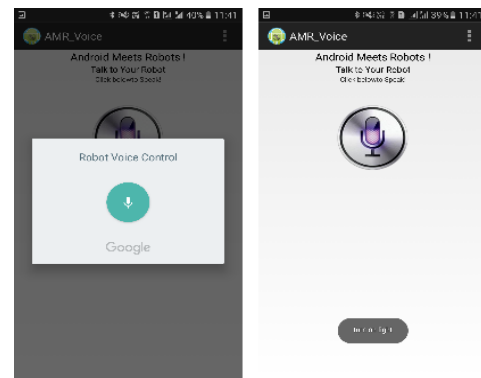


Fig -8: Android APP (AMR)

4. CIRCUIT CONNECTION DIAGRAM

At first the user must connect their android device to Bluetooth using the login credentials given. On authentication the user will be connected to the system. After the connection user has to open the application which will be preinstalled in the android phone. Now the user has an option for voice command in which the user gives their command in the form of audio.

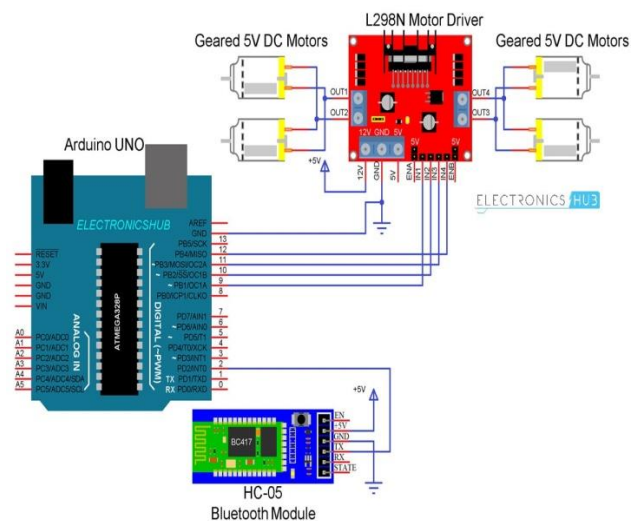


Fig -9 Circuit Connections

The user needs to turn on the Bluetooth in the mobile. The wireless communication techniques used to control the robot is Bluetooth technology. User can use various commands like forward, backward, move left, right, stop, start using these commands which are sent from the android mobile. Robot has Bluetooth receiver unit which receives the commands and give it to the microcontroller circuit to control motors. The microcontroller then transmits the signal to the motor driver IC to operate the motors.

5. RESULTS

Human voice is identified using a microphone in the android smart phone. This voice is analyzed and converted in to English words using the android operating system codes and artificial intelligence software. The voice recognition involves

a Bluetooth application through a mobile-Arduino voice control. This app converts the input voice message to text and transfers it through the Bluetooth device.

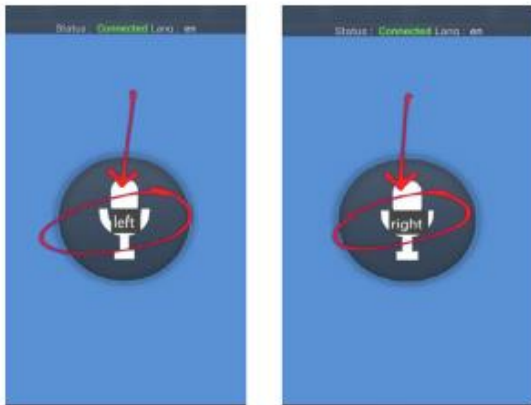


Fig -10 Left, Right Commands

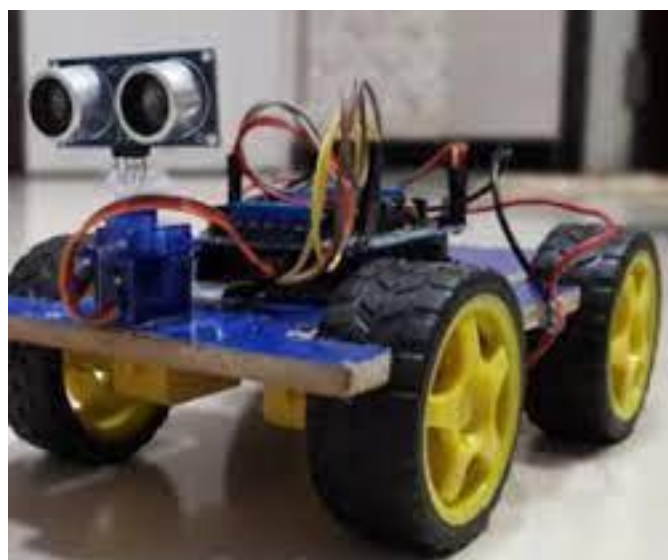


Fig -11 Voice Controlled Robotic Vehical

The VCR is designed according to the specification and needs. Simple movements can be controlled with voice. The proposed system is basically based on voice controlled robotic vehicle helps to control robot through voice commands received via android application. The voice controlled vehicle is controlled through voice commands given by the user who is operating the Robo. These voice commands needs to be given through an android app which is installed on the users android mobile. Speech recognition is done within the android app and then respective commands is sent to the voice controlled robotic vehicle. Microcontroller fitted on the vehicle decodes these commands and gives an appropriate command to the motors connected to the vehicle.

ADVANTAGES AND APPLICATIONS:

It works on simple voice commands, It reduces the man power. Low power consumption, Useful for speech

recognition security system it is Useful for military purpose also.

6. CONCLUSIONS

The voice controlled robot is a programmable project. This project operated on human voice command with android application. This project is beneficial for human life. The voice control robot is useful for disable people and monitoring purpose. It works on simple voice command so it is easy to use. It is useful for those areas where humans can't reach.

7. FUTURE SCOPE

We can implement image processing in this robot, so that it can detect the color of the object or targeted system. One can also use other technologies like zigbee, GPS, so that they can improve the range of the robot. The size of the robot is small so it is easy to implement webcam for security purposes.

REFERENCES

- [1] M. Meghana et al,2020, Hand gesture recognition and voice controlled robot, Materials Today: Proceedings, 2214-7853.
- [2] M.Bhanu chandu, Kirupa Ganapathy,2020, Voice Controlled Human Assistance Robot, International Conference on Advanced Computing & Communication Systems (ICACCS), 978-1- 7281-5197-7/20.
- [3] P. Mahesh Reddy, Suram Pavan Kalyan Reddy, G R Sai Karthik, Priya B.K,2020, Intuitive Voice Controlled Robot for Obstacle, Smoke and Fire Detection for Physically Challenged People, International Conference on Trends in Electronics and Informatics (ICOEI), ISBN: 978-1-7281- 5518-0.
- [4] Ms. M. Ramjan Begum, Mr. S. Chandramouli, Mr. T. Gowtham,2020, Design And Development Of Dual Axis Control Robot For Writing Robot Through Speech Recognition, International Research Journal of Modernization in Engineering Technology and Science, e- ISSN: 2582-5208.
- [5] Linda John et al,2020, Voice Control Human Assistance Robot, National Conference on Technical Advancements for Social Upliftment, Proceedings of the 2 nd VNC; VNC-2020;
- [6] Anurag Mishra, Pooja Makula, Akshay Kumar, Krit karan, and V.K. Mittal, 2015, A voicecontrolled personal assistant robot, International Conference on Industrial Instrumentation and Control (ICIC).
- [7] Dyah Ayu Anggreini Tuasikal, Hanif Fakhurroja, Carmadi Machbub,2018, Voice Activation Using Speaker Recognition for Controlling Humanoid Robot", International Conference on System Engineering and Technology (ICSET).
- [8] T. Thivagar, A. Sriram,2020, Hand Gesture ,2020,Voice Controlled Smart Vehicle, International Journal of Modern Science and Technology, ISSN: 2456-0235.
- [9] Emad S. Othman, Senior Member IEEE - Region 8, 2017, Voice Controlled Personal Assistant Using Raspberry Pi, International Journal of Scientific & Engineering Research Vol 8, Issue 11, 1611, ISSN 2229-5518,pp1611-1615.

[10] Harshada Rajput, Karuna Sawant, Dipika Shetty, Punit Shukla, Prof. Amit Chougule, 2018, Voice- Based Home Automation System Using Raspberry Pi, International Research Journal of Engineering and Technology (IRJET), pp1154-1156.

[11] Megalingam R.K., Vadivel S.R.R., Yadav P.K., Nigam K., Geesala R.T., Chandra R.(2020), Implementation of Low-Cost Mobile Robot for Rescuing Challenge . In: In Ranganathan G., Chen J., Rocha Á. (eds) Inventive Communication and Computational Technologies. Lecture Notes in Networks and Systems, vol 89. Springer, Singapore.

[12] Svitlana Maksymova, Rami Matarneh, Vyacheslav V. Lyashenko,2017, Software for Voice Control Robot: Example of Implementation, Open Access Library Journal.

[13] Anjali Verma, Deepak Kumar, Hariom Maurya , Anuj Kumar, Mr. Prabhakant Dwivedi,2020, Voice Control Robot Using Arduino, International Research Journal of Modernization in Engineering Technology and Science, Vol 02/Issue:04, e-ISSN: 2582-5208.

[14] Abikshit Timsina, Dev Chandra Sharma, Nirmala Sharma, Allen Bhutia, Sujala Pardhan , 2020, Voice Command Robotics Car, International Research Journal of Modernization in Engineering.