IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 5, May 2023

Voice Controlled Wheelchair

N. Harini [1], D. Neha [2], T. Sabitha[3], V.Pavitra[4], P. Vasavi Sai Suma[5]
Asst. Professor, G. Narayanamma Institute of Technology and Science, Hyderabad[1]
Student, Electronics and Communication Engineering
G. Narayanamma Institute of Technology and Science, Hyderabad[2], [3],[4],[5]

Abstract: *Speech signals are the most important means of communication in human beings. Almost every conversation to interact is done by means of voice signals. Sounds and various speech signals can be converted into electrical form using a microphone. Physical disability can occur due to multiple reasons like injuries from accident, age related & health problems. Wheelchair is used to provide a mode of transportation for such disabled people with impairments in hands and legs. People with such issues like paralytic people find it difficult to operate the wheelchair manually or using a remote assembly. For such people the project is designed to work on voice-based commands so that the paralytic or disabled person can give direction commands by just speaking into the microphone given. The system also includes directional buttons for wheelchair control using remote. The system consists of an Arduino UNO based circuit interfaced with an voice recognition module that takes speech commands from the user converts this speech into digital data which is then debugged by the micro-controller to get directional commands. The entire system consists of 2 circuits i.e., the transmitter circuit and a receiver circuit. Transmitter circuit comprises of the voice recognition module and the receiver circuit consist of the motor and driver assembly. We use a NRF trans-receiver module for the communication. A 16*2 LCD is used to display the command which is given to the wheelchair.*

Keywords: Arduino UNO, Voicemodule, Driver circuit, Microphone.

I. INTRODUCTION

In exploration it is conceived as an idea to ease the lives of those among us who are unfortunate enough to have lost the capability to move their legs due to a significant quantum of palsy, accident or due to old age. Man, else abled people, generally depend on others in their diurnal life especially in moving from one place to another. For the wheelchair druggies, they need continuously someone to help them in getting the wheelchair moving. Their lives are made delicate by the fact that there's lack of an intuitive control system for their wheelchairs that allows moving singly. Using an electrical wheelchair leads to a large quantum of independence for persons with a physical disability who can neither walk nor operate a mechanical wheelchair alone as it requires great trouble and help of other people. The problem is that in some cases the disability causes someone to lose the capability to use his hands, thus in this case, the way of controlling wheelchair can be done using speech commands for hands-free cases leading to an intriguing and promising outgrowth. But still the vacuity of the smart wheelchair resultsis frequently too limited due to the high costs and not-so-friendly operation. By the proposed approach, described in this exploration, the low- cost, simple and friendly result for the voice- controlled platform will be presented that’s stoner friendly, completely customizableaccording to the language spoken by the stoner and will help in improvement of stoner’s independent mobility. This exploration is ground on Voice- controlled Wheelchair design, by means of Bluetooth technology, design and perpetration of wireless remote- control results. The design also incorporates use of android program and notifies the system and stop the wheelchair till farther command. In this work, Smart Wheelchair control using Arduino Uno and Bluetooth Module via android operation is presented.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 5, May 2023

II. BLOCK DIAGRAM

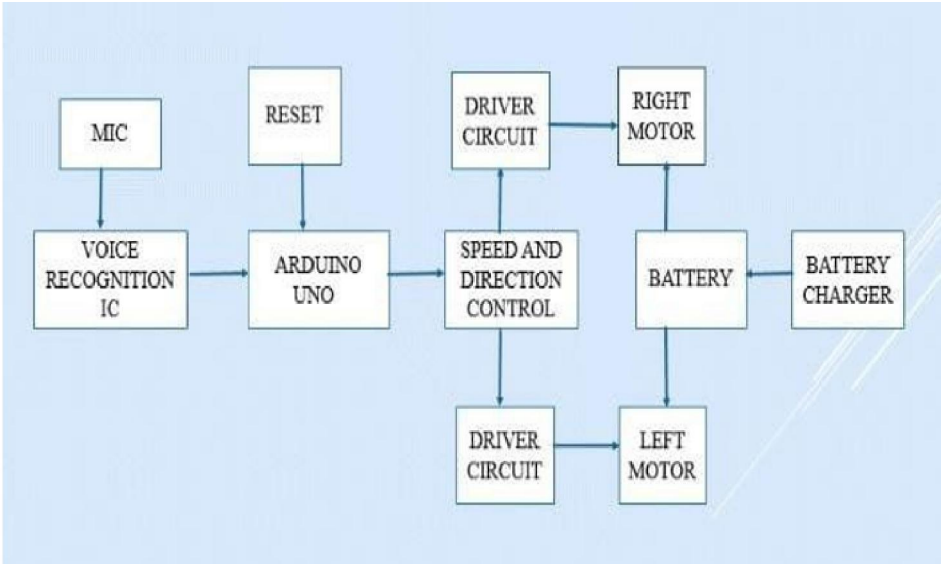

Fig.1. Block Diagram of proposed system

The figure shows the connection between the different blocks involved in the proposed system. The Arduino , motor and thevoice controlled device are the important blocks of the whole system. The inbuilt commands are recognized by the voice module through the microphone and the motor of the wheel chair moves according to the commands. The commands other than which are setup, are considered as invalid, so the motor doesnot respond to them.

III. HARDWARE REQUIREMENTS

- ArduinoUNO: It's a microcontroller board grounded on ATmega- 328P. It's used for uniting tackle and software.
- Bluetooth Module: This module can be used in a master or slave configuration.
- DC Motor: It is a device which transforms the electrical energy into mechanical energy.
- Voice Recognition IC hm2007The HM2007: It is a CMOS voice recognition LSI circuit. The chip contains an analog frontal end, voice analysis, regulation, and system control functions. The chip provides the options of feting either the.96 alternate word length or the1.92 alternate word length.
- Motor motorist circuits are current amplifiers They act as a ground between the regulator and the motor in a motor drive.Motor motorists are made up of separate factors that are integrated inside an intertwined circuit.
- Battery: An electric battery is a source of electric power conforming of one or further electrochemical cells with external connections for powering electrical bias.

IV. SOFTWARE REQUIREMENTS

Arduino IDE

Arduino IDE (Integrated Development Environment) is the software for Arduino. It is an open-source Software which makes it easy to write code and upload it to the board. It is a cross-platform software which is availableforeveryOperatingSystemlikeWindows,Linux,macOS.

It's used for writing law, collecting the law to check if any crimes are there and uploadingthecode to theArduino. Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the textbook editor and are saved with the train extension in. The editor has features for cutting or pasting and for searching or replacing textbook. The press displays textbook affair by the Arduino Software (IDE), including complete error communication. Source law can be uploaded into Arduino UNO by the following procedures and other information.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 5, May 2023

The nethermost right- hand corner of the window displays the configured board and periodicalport. The tool bar buttons allow you to corroborate and upload programs, produce, open, and save sketches, and open the periodical examiner.

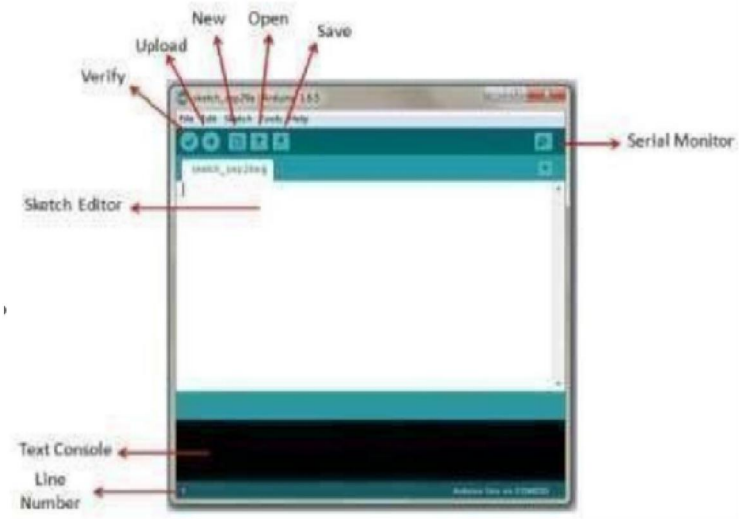

Fig.2. Arduino IDE

1. Download and install Arduino IDE2.0.
2. Open ArduinoIDE2.0.
3. Click on the corroborate tool(checkmark). After many seconds, we can see the result of the action in the press.
4. Now the law is collected, and that it's working. Now, before the law is uploaded to our board, the board which is to be used need to be named. It can be achieved by navigating to Tools> Port>{Board}. The board(s) that are connected to your computer should appear then, and we need to elect it by clicking it
5. In this case, our board is displayed as COM44 (Arduino UNO).

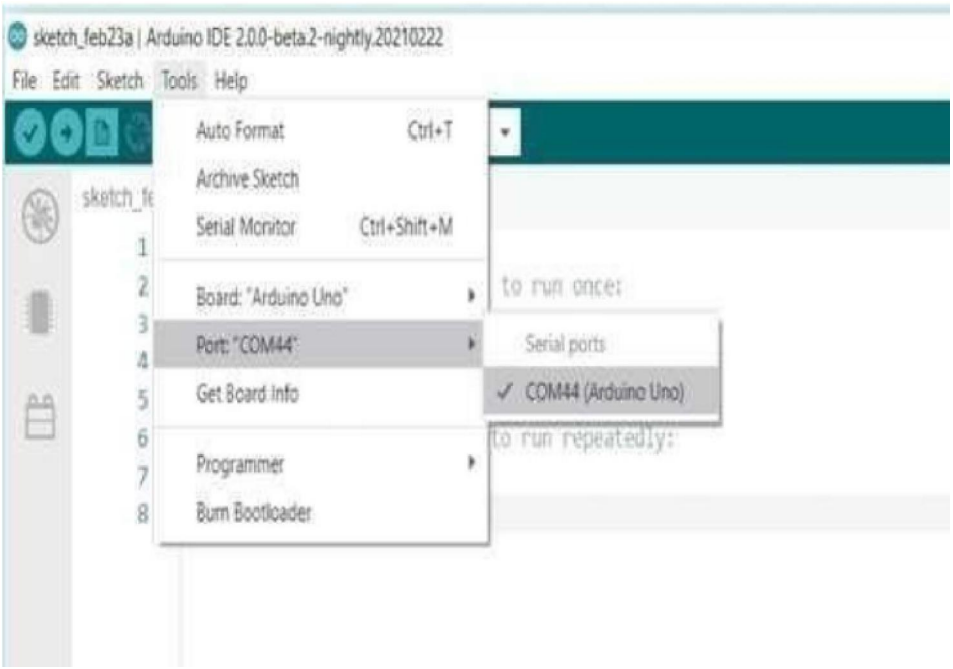

Fig.3. Uploading program

6. After the board named, click on the upload button and it'll start uploading the sketch to the board.
7. When it's finished, it'll notify in the press log

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 5, May 2023

Serial Bluetooth Terminal:

Bluetooth is a standardized protocol for sending and receiving data via a 2.4GHz wireless link. It's a secure protocol, and it's perfect for short-range, low-power, low-cost, wireless transmissions between electronic devices.

Serial Bluetooth Terminal' is a line-oriented terminal/console app for microcontrollers, Arduino, and other devices with a serial / UART interface connected with a BT-to-serial converter to your android device.

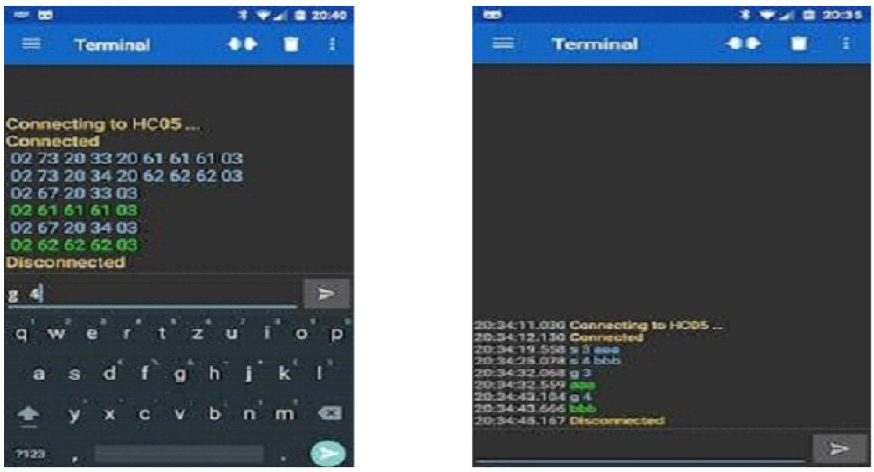

Fig.4. Serial Bluetooth terminal setup

V. RESULTS

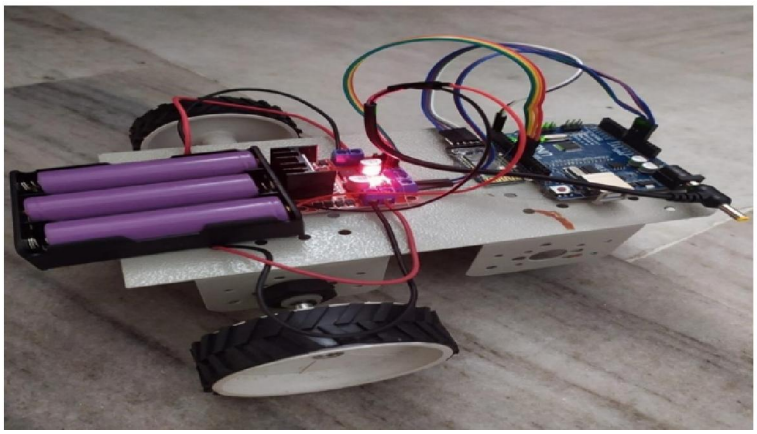

Fig.5. Proposed system output.

The above result simulation shows the proposed system output. When the user says “forward” android Voice application sends the data in form of string “forward” to Bluetooth module connected to the circuit. When Arduino detects “forward”, the motor attached to the wheelchair moves forward in that particular path. When the user says “backward” android Voice application sends the data in form of string “backward” to Bluetooth module connected to the circuit. When Arduino detects “backward”, the motor attached to the wheelchair moves back. When the user says “left” android Voice application sends the data in form of string “left” for Bluetooth module connected to the circuit. When Arduino detects “left” the moves the motor attached to the wheelchair left side. When the user says “right” android Voice application sends the data in form of string “right” to Bluetooth module connected to the circuit. When Arduino detects “right” the moves the motor attached to the wheelchair right side. When the user says “stop” button which is in the Centre of remote the android Voice application sends the data in form of string “stop” to the Bluetooth module connected to the circuit. When Arduino detects “stop” the wheelchair gets stopped. Serial BT terminal application outputs is shown in the figure.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 5, May 2023

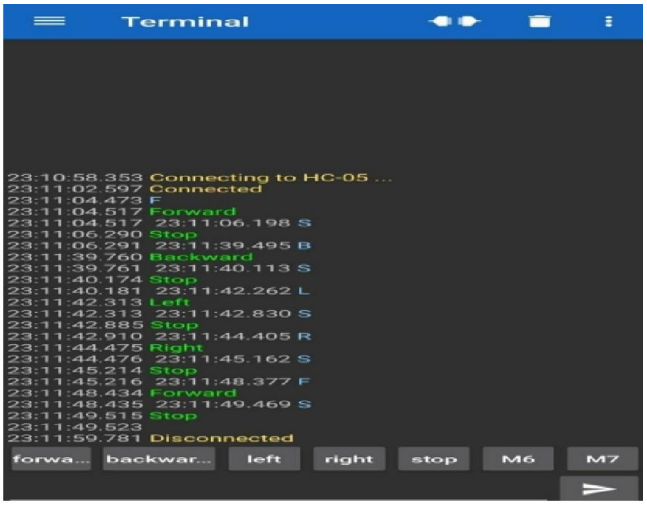

Fig.6. Bluetooth terminal output

VI. CONCLUSION

Voice recognition system for the mobile wheelchair robot control was designed. The core acoustic modeling was achieved by using the HMM method and more than 3 commands are built in the linguist database to improve the accuracy by reading the past recognized words in the buffer and increase or decrease of the possible occurrence of the output words. This model allows certain people to live a life with less dependence on others. This project elaborates the design and construction of Smart ElectronicWheelchair with the help of Bluetooth Module. The circuit works properly to move as the command given by the user. The voice recognition system worked for most of the command.

VII. FUTURE SCOPE

1. Once additional features are configuring, this project could be ready to use by its target-users, i.e., handicapped people and could be sold in market.
2. A faster system with same idea could be used in Trauma Centers at hospitals for emergency cases in scenarios where there is a shortage of staff.

VIII. ACKNOWLEDGMENT

We are thankful to teaching and non-teaching staff members of ECE Department, GNITS for the valuable information provided by them in their respective fields. We are grateful for their cooperation during various stages of the period of our assignment. Many thanks to our parents who have been a great source of strength all through this work and to our friends who support was very valuable in completion of the work.

REFERENCES

[1]. Studio, S. (2017). A cheap soil moisture sensor - Garden Bot.Org. Retrieved 1 March 2017.
[2]. International Conference on Electrical and Computer Engineering, Dhaka, 2012, pp. 228- 231.
[3]. “Landscape Irrigation.” Northern Colorado Water Conservancy District.
[4]. “Smart irrigation System” S. Parthasarathy, T. Arun, S. Hariharan, and D. Lakshmanan, “Smart irrigation system,” Int. J. Innov. Technol. Explor. Eng., 2019, doi: 10.2139/ssrn.3462943.
[5]. I.Primisima, S. A. Sudiro, and B. A. Wardijono, “Automatic plant watering controller component using FPGA device,” 2016.
[6]. I.Al-Bahadly and J. Thompson, “Garden watering system based on moisturesensing,” 2016, doi: 10.11.09/ICSensT.2015.7438404.