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 ijircce@gmail.com

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Robotic Vehicle Movement Control By using Voice Commands

Ms. Y. Sowmya¹, S. Jithender Reddy^{2*}, S. Krishna Prasad³, V. Ram Reddy⁴

Assistant Professor, Department of Electronics and Communication Engineering, St.Peter's Engineering College, Hyderabad, Telangana, India¹

UG Student, Department of Electronics and Communication Engineering, St.Peter's Engineering College, Hyderabad, Telangana, India^{2,3,4}

ABSTRACT: Today, life without a helping hand is not easy for physically challenged people. So, there should be an alternative way of helping those people. In such situations robotics can be introduced. The main goal of this project is to be a support robot system for user friendly support, hospital operations, and dangerous environments. Today, there is a great demand for computer-based interaction robots because of they are efficient and stable than the human. The robotic vehicle is designed to work based on the voice command/input by the user hand. This desired work can be performed using an Arduino Nano, HC05 Bluetooth module, Motor Driver and Dc Motors. The Arduino processes data and the motor driver assists in motor control. The proposed robot car is a method of moving the robot according to the voice commands given by the user.

KEYWORDS: Robotics, Robotic vehicle, Arduino Nano, HC05, Motor Drivers, Dc motors, Voice commands

I. INTRODUCTION

Robotics is considered as one of the complex technologies which has been extending its branches like forever. There is always something to develop and that is indefinite. Each branch has its own applications where vigorous developments are going on. No matter how far you develop, human conscience is present where ever you go. This paper is about how easily you control any gadget especially any robot. When it comes to the argument on comfort, handy, gestures, easiness, we can incline towards this, the "ROBOTIC VEHICLE MOVEMENT CONTROL USING VOICE COMMANDS". Controlling something like robots and stuff with again machines or switches doesn't make it advanced and also not gives us more options on how one control it. If developing a tech gadget with our Micro-processors and Micro-controllers is one thing, then combining it with voice command and controlling is on whole another level as it makes a real deal in real-time and also "cool".

Although core work is done using all the required sensors and actuators, the main objective of this project is how interactively we are able to control this mechanical object using our senses which God gave us that are undoubtedly the best technology and we can argue that this uses more complex technology .

Search for the Robotic vehicles and unmanned gadgets started since long back mainly for the sake of war, as they say peace can be achieved by violence sorts.

There are many combinations on how we implement this project and with what we implement like there are accelerometer controlled, lay-motion sensor controlled, simple sensor-Arduino controlled etc.; All above-mentioned ones have one common thing is that they are moved by gesturing mechanism. If we move forward, they can also be controlled by voice commands. After, one must think about how fast they set in motion and that thing depends on our voice commands or not, and how. Voice command can also be picked through Bluetooth and infrared signals, Acoustic, Tangible, ophthalmic or motion technological means.

We are inventing nothing but one can say putting together the things or upgrading the already existed versions of this tech. Pin-pointing what exactly a voice command that the robot moves forward, backward, right and left when there is a command from user in same directions respectively is. Voice command technology being used more mostly used in many fields nowadays. It's atrend in the AI, ML, ROBOTICS. The various voice commands from the user are utilized to parent the wheel chair and various high end and top-notch mechanisms have been upgraded to control the intermediary mechanisms by involving the chapter of gesture recognition/detection. Once the robotics able to conceptualize the gesture of human beings, it acts accordingly and makes sure about the requirements of human.

This paper is about making the project considering all the aspects and parameters like application oriented like it still demands more combined attention in critical regions of applications, such as commercial appliances, sewage system applications, etc, feasibility, user-friendly and satisfying the technology criteria with the similar otherpapers.

II. LITERATURE SURVEY

Kathiravan Sekar carriedout a studyentitled"Robot Control by using Human Hand gestures" (2020). This project defines the movement of the robotic vehicle is controlled only by gesture recognition. Bluetooth and voice recognition is not possible.[1]

Zain Mumtaz carriedout a studyentitled"Automated Robot-car system with Hand-Gestures using Arduino" (2019). This project describes a robotic vehicle that moves only in front and back direction. Circular movement is not possible.[2]

Ashwin Scarriedout a studyentitled"Robot Control by using Human Hand gestures" (2019). Here, movement of the robotic vehicle is controlled only by gesture recognition. Bluetooth and voice recognition is not possible.[3] Shuo Hiucarriedout a studyentitled"Automated Robotic Car" (2017). In this, movement of the robot is controlled only by gesture recognition. Bluetooth and voice recognition is not possible.[4] abassum [2] has proposed the use of multiple ultrasonic sensors to have greater precision for the obstacle detection. It increased the efficiency of obstacle avoidance.

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Mrumal. K. Pathak, the purpose of this paper is to provide powerful computational android platforms with simpler robots' hardware architecture. This paper describes howa robot can be controlled using mobile through Bluetooth communication, some features about Bluetooth technology, components of the mobile and robot. It present are view of robots controlled by mobile phone via moving the robot upward, backward, left and right side by the android application such as Arduino, Bluetooth. [5]

Aniket R.Yeole, have designed a robot that can be controlled using an application running on an android phone. It sends voice command via Bluetooth which has certain features like controlling the speed of the motor, sensing and sharing the information with phone about the direction and distance of the robot from the nearest obstacle, etc. [6]

R. M. Narayana, introduced how to interact with robot through voice commands. In this world of loud noises and heavy talkers, He made the robot to adapt with an individual voice command. [7]

III. PROPOSED SYSTEM

In today's world the physically impaired constitute 2% to 3% of the world's total population. The robotics field had been inventing number of applications to make life easy going. These inventions are especially helpful for the physically impaired people as it helps them lead an independent life.Robotics is becoming one of the most advanced in the field of technology. The applications of robotics mainly involve in automobiles, medical, construction, defence and also used as a firefighting robot to help the people from the fire accident and can also include various applications apart from these. But, controlling the robot with a remote or a switch is quite complicated.

Thus, a system that is a voice-controlled robot vehicle is proposed for making it easy for the person without limbs to control a vehicle either it is a wheel chair or a driving vehicle, etc.

The main aim of the project is to help the physically impaired population. The project consists of Arduino, Arduino Nano, HC05 Bluetooth module, Motor Driver and Dc Motors. All the components are equally important in designing the prototype of the project.

Firstly, voice commands are given as an input to the application of Bluetooth module which changes the voice to text. These voice commands are transferred to Bluetooth modules and converted to certain value. These analog values are transferred to the Arduino board thus converting into signals. These signals are cross-checked with the commands defined in the processor such as forward, backward, left, right, start or stop. These signals are the transferred to motor driver. The motor driver decodes the signal and is responsible for the movement of vehicle, passing the signal to the dc motors. Thus, the movement of vehicle is depicted.

IV. BLOCK DIAGRAM

The block diagram of this system consists of:

- Arduino
- Motor Driver L293D
- DC motors (4)
- Battery
- Bluetooth module

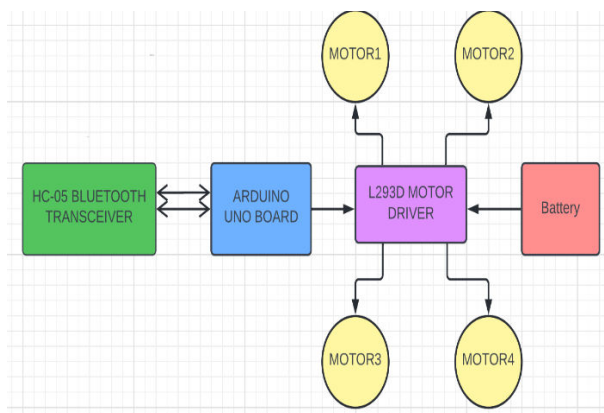


Figure 1: Block diagram of Robotic Vehicle Movement Control By using Voice Commands

V.FLOWCHART

This flowchart shows a short idea of how this project works

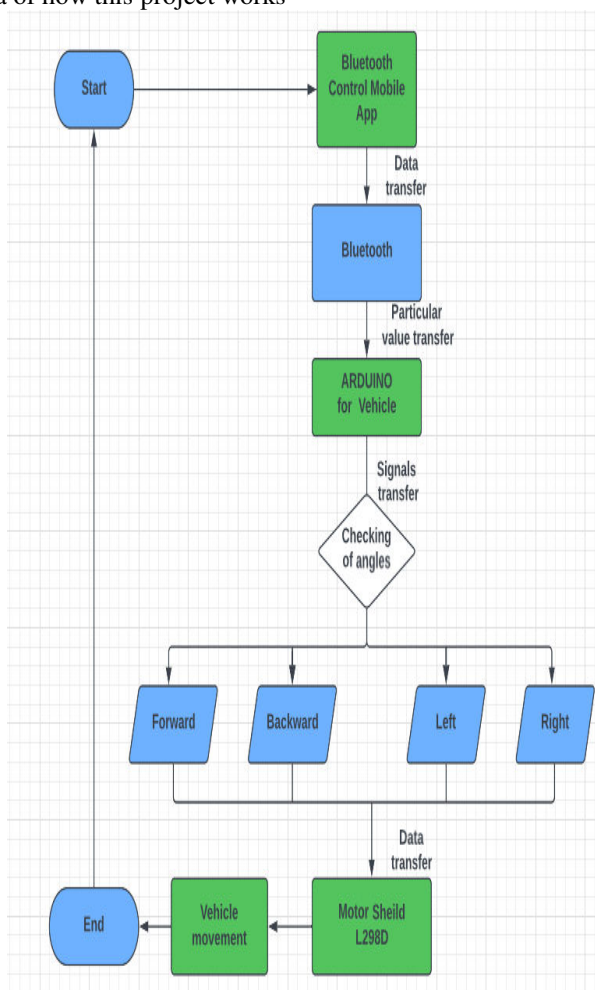


Figure 2: Flowchart of Robotic Vehicle Movement Control By using Voice Commands

Firstly, the required app responsible for the communication must be installed. In the app, the voice converts into text. The data is then transferred to the Bluetooth module. Arduino is placed on the required vehicle, here let us assume car.



It takes the value from the Bluetooth module as an input. The Arduino then transfers the signal for check whether it is forward, backward, left or right. After, the required check for the signals is done the resultant data is transferred to the motor driver/motor shield. Here, we are using L293D motor driver. The L293D is a 16 pin IC. It has eight pins on each side. It is purely dedicated to the controlling of a motor. according to the inputs from the Arduino. The motor driver set its motor digital pins respectively and thus responsible for the movement of the vehicle.

VI. RESULTS

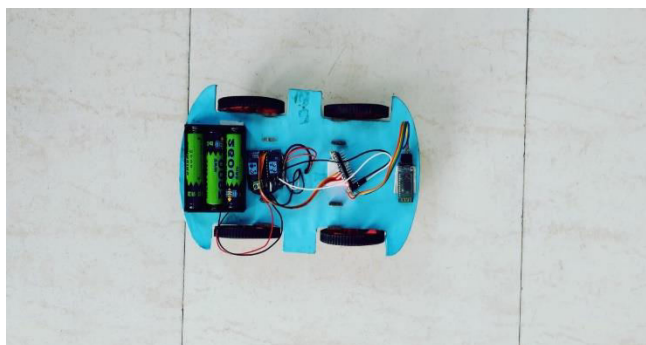


Figure 3: Prototype of the Robotic vehicle

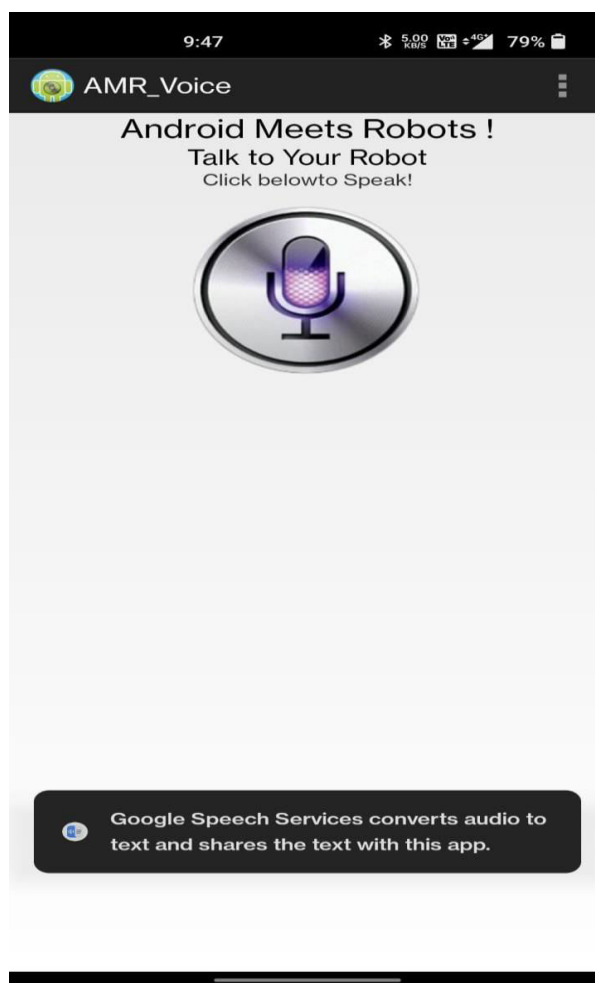


Figure 4: AMR voice detector

VII. CONCLUSION

The main aim of the project is to help the physically impaired population. The robotics field had been inventing number of applications to make life easy going. These inventions are especially helpful for the physically impaired people as it helps them lead an independent life.

This project not only helps the physically impaired people, but also helpful for the young inexperienced drivers too. They can be used for various other applications. In military, as size of the vehicle is not too much it can be used for spying the enemies also. In short, this project reduces the human efforts at places or situations where invention of use of a human for a particular work can be difficult. The proposed system is budget-friendly and has more pros than cons.

VIII. FUTURE SCOPE

- GPS location can be added. By this we easily locate the vehicle (extremely useful in case where elderly or children are travelling alone)
- This can be improved for possible long-range communication.
- A thermal camera can be installed to sense the heat emitted by bodies useful in military purposes to detect enemies on the lines.
- Automatic Target System can be implemented using the robot for tracking the target.

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