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Vehicle Control by using Human Voice for Physically Disabled and Aged People

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ABSTRACT: **The most crucial form of human communication is speech signals. Almost all encounters use speech signals in conversations. With a microphone, sounds and different speech signals can be transformed into electrical form. Physical disability can result from a variety of causes, such as age-related issues, health issues, and accident-related injuries. For these challenged individuals who suffer from impairments in their hands and legs, vehicles are used as a means of transportation. It might be challenging for anyone with certain conditions, such as paralysis, to manually push a wheelchair or use a remote assembly. For these individuals, the project is made to work with voice-based commands, enabling the paralyzed or impaired person to offer directions simply by speaking into the provided microphone. Additionally, the device has directional buttons for remote vehicle control. An Atmega328-based circuit interfaced with a voice recognition module builds up the system. The voice recognition module receives user commands and translates them into digital data, which the micro-controller analyzes to obtain directional orders. The transmitter circuit and the receiver circuit make up the whole system. The voice recognition module is part of the transmitter circuit, and the motor and driver assembly are part of the one that receives circuit. For communication, an NRF trans-receiver module is used. The command issued to the vehicle is shown on a 16*2 LCD.**

Keywords: Bluetooth module, Arduino, wireless night vision camera, robotic arm.

1.INTRODUCTION

Our objective is to make a robot car that a individual can work utilizing voice commands. These frameworks are regularly alluded to as Discourse Controlled Mechanization Frameworks (SCAS).A model of the previously mentioned framework is what we have outlined. Basically, voice commands will be utilized to work a robot of sorts. Various articles illustrate how a robot and shrewd phone can communicate. The robot is worked remotely utilizing a portable device[7],[8]. A shrewd phone makes an fabulous farther robotization interface for robots. It has a parcel of highlights that are valuable. In this approach, the essential errand is performed by an Android application utilizing a microcontroller. Encouraging communication between the robot and the application. Here, the framework require to be conditioned on complements some time recently the gadget can start to comprehend the informational that are given; codes have been included to the commands[9]. The essential objective of making a VCRV is to recognize human discourse and react to preprogrammed orders. fundamental commands are to move the robot forward, in reverse, right, cleared out, and to halt it. The car will be worked through Bluetooth from an Android smartphone; our objective is to make a mechanical car utilizing cutting-edge smartphone innovation in a exceptionally simple and reasonable way. In the current circumstance, all vehicle controls are manual and are worked by the driver[9]. Human exertion is required for each the flight, counting braking, moving gears, beginning and halting, and quickening. all things considered unused innovations are as of now being created that can be combined with conventional vehicles to make totally unused vehicle shapes. The rise of the motion idea in the time of innovation has obscured the line between the genuine and the virtual universes. We select innovation over individuals for any perilous endeavor[3]. In spite of the fact that these robots were to begin with worked physically, they may presently be controlled by voice commands and gestures. The interaction between the computer and human body dialect can be utilized for characterizing

motion and voice acknowledgment systems[6]. This makes the communication course between people. The point of this exertion is to speed up the controlling instrument and move forward the robot's by and large security. An exquisite versatile phone is utilized for controlling voice directions.The human right hand robot was made on a littler measure utilizing a controller-based stage, and it is competent of recognizing where it is right now. Through numerous tests, the reasonability of voice control sent over a partition is estimated.After considering the discoveries of the basic examinations, the execution assessment is finished[3].

The improvements that require to be expected may have to do with how they are connected in natural research facility, therapeutic clinics, and wanders. Around the world, the biggest issue is guaranteeing the accessibility of human labor. They can presently effortlessly oversee a wheelchair by basically talking commands by means of Bluetooth much appreciated to this contraption. Whereas in movement, it prompts the client to any threats and swings to a stop[1]. The robot's mechanical plan, an suitable choose of engines, and the electrical parts required to work the robot joints accurately make up the equipment portion. The computer program component incorporates control calculations that at long last cause the robot to move in agreement with the headings as well as tall level calculations that decipher the craved word into a arrangement of target focuses. In this case, discourse acknowledgment hardware acts like the composing process[7].

Either an Android application or a amplifier can be utilized to convey this voice acknowledgment. With the help of individual automated collaborators, individuals can handle day by day assignments with a lesser sum of manual labor[12]. Creating a voice-controlled framework as an Brilliantly Individual Partner (IPA) that can handle an combination of obligations or administrations for a individual is the goal[6]. This golem's primary work is to help a wiped out or hampered individual, consequently it was made particularly for this bunch of individuals. This venture clarifies how to make confront, protest, and discourse acknowledgment utilizing clear equipment. with a cloud server that is reachable online. The robot gets the text-formatted discourse flag orders by means of a Bluetooth network.The reason of voice-controlled mechanical frameworks is to give successful observation in regions where human interaction is profoundly hazardous, such as in hot or cold circumstances, war zones, disaster-affected zones, etc. Moreover, it endeavors to total the errand that the client is relegated through numerous commands[2].

Via an Android mobile device and Bluetooth, the robotic system receives communicated directives. The robotic system obtains these commands through a fitted Bluetooth module. A wireless camera that's got night vision and mounted on a servo motor to see 180 degrees is used to continue the surveillance[4][8]. The system's front is equipped with an LCD screen that presents commands that are being received and a robotic arm that can be used to modify the environment around it. The robotic system's speed is managed by the motor driver circuit. Using an ultrasonic sensor, a blockages detector is added to safeguard the system from possible threats[1].

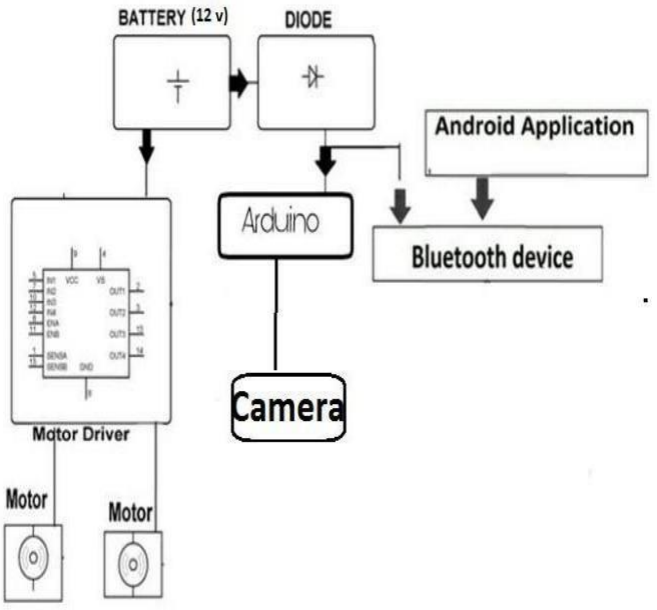


Fig 1. BLOCK DIAGRAM

2.RELATED WORK

Offer a speech-activated technology which enables people with mobility issues to drive a car by articulating vocal commands. It is impossible to move vehicle without a driver. Accidents occurs when driving even when the driver is engaged. The task at hand is to recognize an object form a minimum distance while advancing, taking safer directions, or using voice commands for steering the car. By establishing a robotic sensor-based system that may recognize obstructions closer and assist in steering in a safer direction. spoken orders including Motion: Left, Right, Stop, Forward, Backward, and Rotate are given by the end user. The speech commands are retained in the Speech Recognition Module v3.1 to train the kit, and the recorded voice is stored in the Record Unit. The module decides if the processed voice and the recorded voice match, and the car react immediately[5].

• Compact vocabulary systems with a maximum word recognition capacity of 100.
• Systems with a medium vocabulary that can recognize between 100 and 1000 words.
• Vast vocabulary systems that can recognize more than a thousand words.

The vehicle can be commanded from faraway locations or using an Android application. The app on a smartphone obtains commands using a microphone that is Bluetooth-connected to the car. The signal that the Android phone imposed was received by the Bluetooth module. The car then behaves suitably to the orders it has been given[9]. This system's primary flaw is that it can only be administered by an Android application.study into the use of spoken instructions to wheelchair control, permitting those with limited abilities to freely move through the area they are in.

1.Voice-Controlled Wheelchair Systems*: Investigations on leveraging spoken instructions to operate wheelchairs so that people with limited ability can go around on their own.

2. *Voice-Activated Vehicle Interfaces*: the establishment of interfaces in automobiles that react to voice commands for functions including steering, braking, speeds, and calling up features like entertainment systems

3. *Adaptive Voice Recognition Systems*: Study on voice recognition devices that can recognize and react to a wide range of accents, speech patterns, and vocal traits is being done to make that the equipment is useable for an extensive range of users.

4.*User-Centric Design*: Investigation concentrating on user-centered design concepts to personalize voice control interfaces particularly for the demands and preferences of elderly and physically pressed people, considering accessibility and straightforwardness of use into.

3.DESIGN AND METHODOLOGY

3.1 Design:

Voice Recognition System: Construct an effective speech recognition system that is able to understanding A broad spectrum of purchases regarding driving, comprising"start," "stop," "turn left," "turn right," "accelerate," "brake,"and so on. Microphone: Install a premium microphone in the auto's within to successfully record user voice commands,especially in noisy environments. Processing Unit[4][5]: To process voice commands, convert them into suitable controlactions, and carry them out properly, use a strong processingunit.Control Interface: Design an intuitive control interfacethat confirms that commands are carried out and exposespertinent information, which involves direction, speed, andvehicle status, to give the user feedback.Safety describes.Verify that the new controls mesh properly with the currentones in the car so that users can readily transition betweenvoice control and manual control modes as needed.Educationand Aid: Assist users with any issues or worries that they mayhave and familiarise them with the voice controls throughproviding thorough training and constant helping hands.A combination of these components into the design of a vehiclecontrol system can provide older and physically pressed people with more mobility and independence, allow them tooperate motorcycles without risk[13].

Modular Design: Create a modular system that can be easily integrated into existing vehicles, allowing for flexibility and compatibility with a wide range of vehicle types and models. This modular design also enables scalability and future upgrades as technology advances.Hands-Free Operation: Prioritize hands-free operation to accommodate users with limited dexterity or mobility. Voice commands should be the primary means of controlling the vehicle, reducing the need for manual interaction with physical controls.Adaptive Voice Recognition: Develop an adaptive voice recognition system capable of learning and adapting to users' speech patterns and preferences over time[11]. This personalized approach enhances accuracy and efficiency, particularly for users with speech impediments or variations. Safety Overrides: To prevent accidental behaviors or errors in voice command interpretation, utilize safety overrides and fail-safes. braking or accelerating.Increase the voice recognition system's perception of contextual cues and its capacity to forecast user intent by additionally taking consideration of the driving environment[11]. decrease the chance of accidents, for for example, consider confirmation prompts necessary for crucial directives like

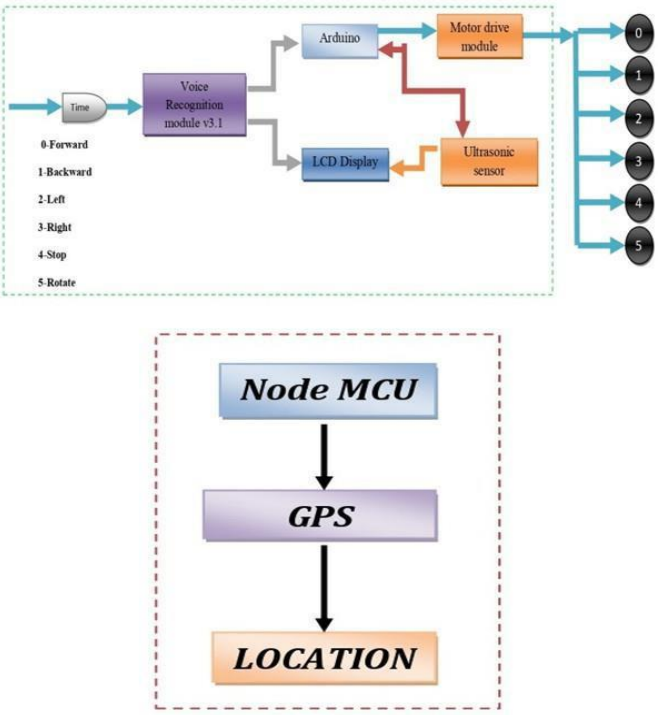


Fig 2. Voice-Activated Vehicle Control via Block Diagram

3.2 METHODOLOGY

The intent example of the voice-controlled design is to give thedisabled person mobility. The Arduino Uno microcontroller is in command of the complete operation. With the mobile application, the user will be in charge of the design[5][6]. The user will be able identify objects by inputting their voice into the smartphone application. They are able to use an assortment of commands that control the design so as to alter its orientation.

Step 1: A transmitter and receiver are needed in order to operate the vehicle utilizing words.

Step 2: We govern the automobile to move and stop using an application for our smartphones. In the present scenario, the vehicle will serve as the receiver and the mobile application as the transmitter.

Step 3: The voice commands [Forward, Right, Left, Backward, and Stop] are presented by the end user.

Step 4: The machine has been fitted with a third capability called obstacle avoidance, which eliminates fatalities in the unlikely circumstance that the human voice signals fail while the vehicle is moving.

Step 5: In the event that step 4 is failed, please flip the switch to cut off the vehicle's power.

Step 6: For the connection between the device and mobile application, we use the device's Bluetooth module.

Step 7: A normal mic can be utilised outside of a mobile application that behaves as a translator or signal transmitter if one is not requested. The entirety of the signal conversion process operates exclusively in one direction.

4. ALGORITHM

1.Beginning with the Hardware:

- Attach the DC motors to the motor driver module.
- Attach the motor driver module to the Arduino.
- Plug the Arduino to the Bluetooth module.

2. Install Necessary Libraries:
Build out the libraries required for Bluetooth connectivity. You can utilize the "Software Serial" library, for one.

3. Write Arduino Code:
Launch your computer's Arduino IDE.
Generate code to define pin configurations, initialize the Bluetooth module, and the motor driver.Setup the Bluetooth module through the use of the "Software Serial" library to create communication.Provides components that let the car to move in answer to voice commands that are received over Bluetooth[14].

```
 #include<SoftwareSerial.h>
SoftwareBluetooth serialSerial(10,
11); void setup();
int motor1A = 2;
int motor1B = 3;
int motor2A = 4;
 int motor2B = 5 {
pinMode(motor2A, OUTPUT);
 pinMode(motor2B, OUTPUT);
pinMode(motor1A, OUTPUT); bluetooth~Serial.start(9600);
}
void loop()
 If (bluetooth> 0 for Serial.available()
Bluetooth is the char command.read() via Serial; switch
(command) {
 case 'F': moveForward();
 break;
case 'B': moveBackward();
break;
case 'L': turnLeft();
break;
case 'R': turnRight();
break;
case 'S': stopMovement();
 break;}}}
void moveForward()
 {
// Utilize motor control to implement basic logic for forward
movement
}
void moveBackward()
{
//  Utilize motor control to implement basic logic for backward
movement
}
void turnLeft()
{
// Utilize motor control to implement left turn logic
}
void turnRight()
{
// Utilize motor control to implement right turn logic
}
void stopMovement()
{
 // Turn off all of the motors to cease the vehicle
}
```

4. Transfer Data to Arduino: Sync your computer to the Arduino board.In the Arduino IDE, pick a suitable board and port. To control the Arduino board, upload the code.

5. Switch on the Vehicle: Utilizing the right power source, flip on the Arduino and the motor driver circuit.

6. Create a Bluetooth relationship: Connecting your computer or mobile device to the Arduino's Bluetooth module.

7. Control the Vehicle: To control the movement of the Arduino-based vehicle, use a voice recognition program on the phone to send spokencommands(F,B,L,R,andS).

Now, voice commands passed on by Bluetooth should be received by your Arduino-based language-activated car[12]. Guarantee that the code and connections are adjusted in accordance with your unique hardware layout and needs[8].

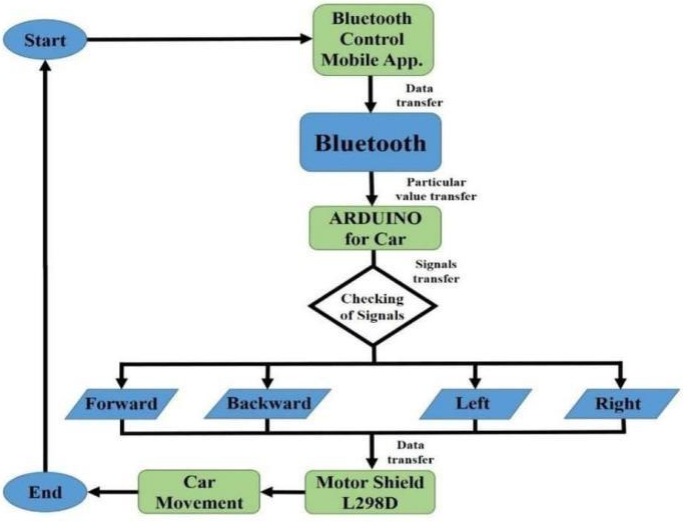


Fig 3: Flow Diagram**.**

5.REQUIREMENTS

5.1 HARDWARE CONSTRAINTS

1. Arduino Uno Board: The Arduino Uno microcontroller board is built on top of the ATmega328P. It has fourteen digital input/output

pins. besides that, it has a 16 MHz quartz crystal, six analog inputs, a power jack, a reset button, and a USB connection[9].

2. Ultrasonic Sensor: An ultrasonic detector is an appliance which gauges the distance to an object using ultrasonic sound waves. An ultrasonic sensor incorporates a transducer to produce and receive ultrasonic pulses in order to detect the proximity a target is.

3. Bluetooth module: According to its intended use, the Bluetooth module can be further separated into Bluetooth voice module and Bluetooth module for immediate wireless communication.

4. Motor Diver L293D: The 16-pin Motor Driver IC can simultaneously regulate two DC motors in any direction.

5. Servo Motor: To control the rotational or linear speed and position, a servo motor utilizes positional feedback as an element of a closed-loop mechanism.

6. Gear motor and wheels: An electric motor and a gearbox that contains multiple gears comprise a gear motor, which is a mechanical system.

7. 12 V Battery: Via an electrochemical oxidation-reduction (redox) process, a battery converts the chemical energy found in its active elements directly into electric energy.

8. Switch: To rapidly or utterly alter, especially from one item to another, or to swap out by putting someone or something in their stead.

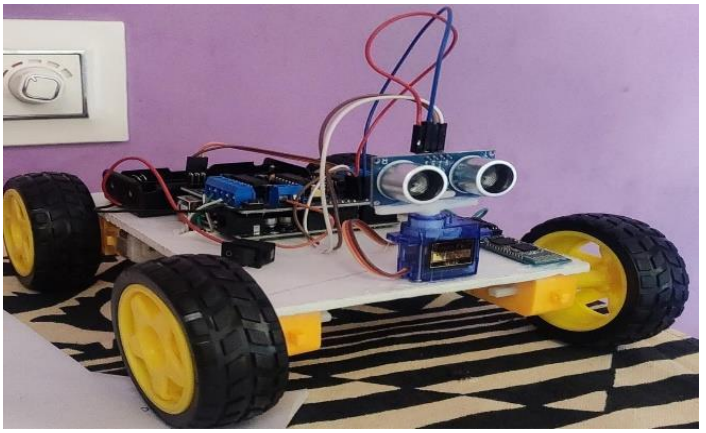
5.2 SOFTWARE CONSTRAINTS

1. Arduino IDE: The computer code is created and transferred to the physical board with the Arduino IDE (Integrated Development Environment). One of the main reasons Arduino got so popular was undoubtedly its very straightforward Arduino IDE.

2. C++ is a scripting language:
The object-oriented programming language C++ reduces development costs by supplying programs with a logical arrangement and promoting code reuse. While C++ is portable, it can be used to create apps that are platform-neutral. Mastering C++ is easy and fun[9].

6.RESULTS AND DISCUSSION

The Android keen phone's mouthpiece serves to identify human voice. Fake Insights computer program and the Android working framework codes are utilized for evaluating this voice and decipher it into English words[3]. The wide range of computational phonetics known as "discourse acknowledgment" gives the approaches and disobedient required by computers to get a handle on talked dialect and change it into content. It bears by names such as discourse to content (STT), computer acknowledgment of voices, and programmed discourse acknowledgment (ASR). It envelops inquire about and information from the areas of electrical building, computer science, and tongues. Concerning innovation, voice acknowledgment has a wealthy past packed with numerous critical improvements over the a long time. The field is profiting most recently from breakthroughs in huge information and profound learning[1]. The increment in the number of mental works in the field and, especially, the far reaching industry assent of differing strategies utilized in the advancement and roll out of voice acknowledgment frameworks serve as declaration to the advance in the field. The expansion of human voice control to work a car has a assortment of benefits and disadvantages, particularly for more seasoned and seriously debilitated drivers[6].The primary openness advantage of voice commands is that they permit individuals with disabilities to work vehicles without the require for conventional manual controls. Other than contributing to rendering driving easier on senior citizens, this strategy diminishes the physical and mental strain that comes with utilizing ordinary interfaces[12][13].



An get together picture for a voice control robot sending the Arduino stage is appeared in the over figure.The venture completed in understanding with the due dates and specs. The voice can be utilized to control basic developments. The voice commands that are gotten through an Android application are utilized for controlling the robot in the proposed framework, which basically depends on vocal Controlled Mechanical Vehicle. The client working the extend gives commands in voice to control the vocal ControlledVehicle[9]. The user's Android cellphone or tablet must have an introduced Android app in arrange to give these enlightening through voice. The voice-controlled robot car gets the fitting command from the Android app after discourse acknowledgment has wrapped up. The building picture for a voice control robot applying Arduino program shows up in the over figure.The venture completed concurring to with the requests and parameters. The voice can be utilized to direct basic developments. The shouts that are gotten through an Android application are utilized to drive the robot in the proposed framework, it basically depends on vocally Controlled Automated Vehicle[14]. The individual who is running the extend can provide voice commands to control the voice-controlled vehicle.The user's Android cellphone has to have an introduced Android app in arrange to execute these talked enlightening. When discourse acknowledgment is completed inside the Android app, the voice-controlled robot car gets the appropriate command. The vehicle's microcontroller translates these commands some time recently sending the suitable command to the engines that have been associated to it[11].

CONCLUSION

The project known as "Voice Controlled Robotic Vehicle" has an extensive number of present and future applications. Future feature additions to the project might boost the project's efficacy[1]. Applications for the project are to be found in numerous domains, include the military, home security, industries, medical support, and rescue efforts. With the instruments at our disposal,we succeeded in efficiently build a basic a voice-activated robotic model vehicle. Since this project is easy to carry out., the robot will make improvements to human lives. The Robot using Voice Control proves useful with both monitoring and disabled individuals. It is simple to use and functions via voice command. It is helpful in places that are unattainable to people. The voice controlling requests

are effectively transmitted over Bluetooth technology, and the anticipated operations have been carried out upon reception. In regions or contexts where human interventions are hard, this project minimizes the require for people to participate[6][7]. These gadgets can be used for studies and development, commerce, military, and other use cases. Employing human voice commands for managing vehicles is an excellent way to boost accessibility, independence, and safety for elderly and physically pushed people. It gives prospects more freedom and convenience of use to navigate the surroundings by enabling them to operate automobiles with basic voice commands[2]. likewise, by eliminating distractions and reducing the need for driver participation with the vehicle's controls, this technology can improve safety. All things thought about, voice control incorporation into car systems utilized by individuals with age- or physical-related challenges is a promising first step toward inclusive and accessible transportation solutions. In conclusion, utilizing human voice commands for vehicle control presents a revolutionary solution for physically disabled and aged individuals, fostering accessibility, independence, and safety[3][4]. By enabling seamless operation through voice prompts, this technology empowers users to navigate their environment with newfound freedom. Moreover, its potential to minimize distractions and streamline interactions with vehicle controls enhances overall safety. Ultimately, integrating voice control into vehicle systems stands as a pivotal advancement towards creating inclusive and accessible transportation options for all individuals, regardless of physical abilities or age[10].

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