MICROPROCESSOR AND MICROCONTROLLER

MINI PROJECT

VOICE-CONTROLLED CAR USING ARDUINO

- A Report

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Abstract

The aim of our project is to make a Voice Control Robot Car. The working is based on an Arduino microcontroller, motor drivers, and a Bluetooth module. Arduino is open-source hardware (single-board microcontrollers and kits) used for building digital devices. The idea is to first design the Hardware of the Robot Car and then code the entire work using our previous knowledge of programming. The code will then be simulated on software (IDE) and later be interfaced with the hardware. The coordination of the control unit with a Bluetooth gadget is accomplished by utilizing a Bluetooth module to catch and read the voice orders. The controlling remote is an intelligent android device with Bluetooth Application. We picked this as our project as robotics has become a significant part of our everyday lifestyle and also has a broad scope in the engineering field. It plays a vital role in the development of new technology.

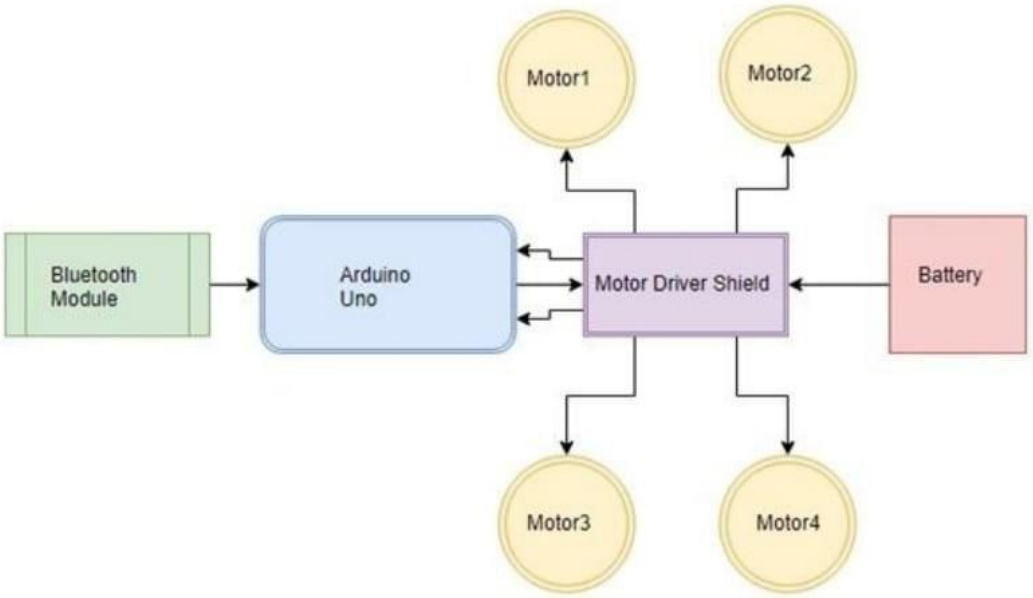
INTRODUCTION

Robotics is an evolving technology. There are various approaches to building robots, and no one is sure which method or technology will be used 100 years from now. Robotics is evolving like the Darwinian evolutionary theory of survival of the fittest. The framework equipment comprises a controller outfitted with a Bluetooth communication module. It’ll be connected to the motors and other alternative components of car. When the Bluetooth app is turned on and is connected with the current system via Bluetooth,

one will operate the car by giving wireless commands from the app using the functions already programmed in the app. The vehicle will move in four directions: Forward, Backward, Right, and Left. In forward movement, all four motors will motion in the same direction, and for backward motion; the movement of the motors will be in opposite direction. For left and right movements, either of the motors will rotate, and to stop the motors will stop. Instructions are given to the motors through the Bluetooth app of the Android Smartphone by the user. In this project, we will deliberate on how to control a robot-controlled car using a Bluetooth module through the Bluetooth application of an android mobile phone. The benefit of using a robot-controlled car is it can be used to reduce manual work. This project can be modified quite easily to include a camera well that can stream the videos to the user over Wi-Fi using a WiFi module.

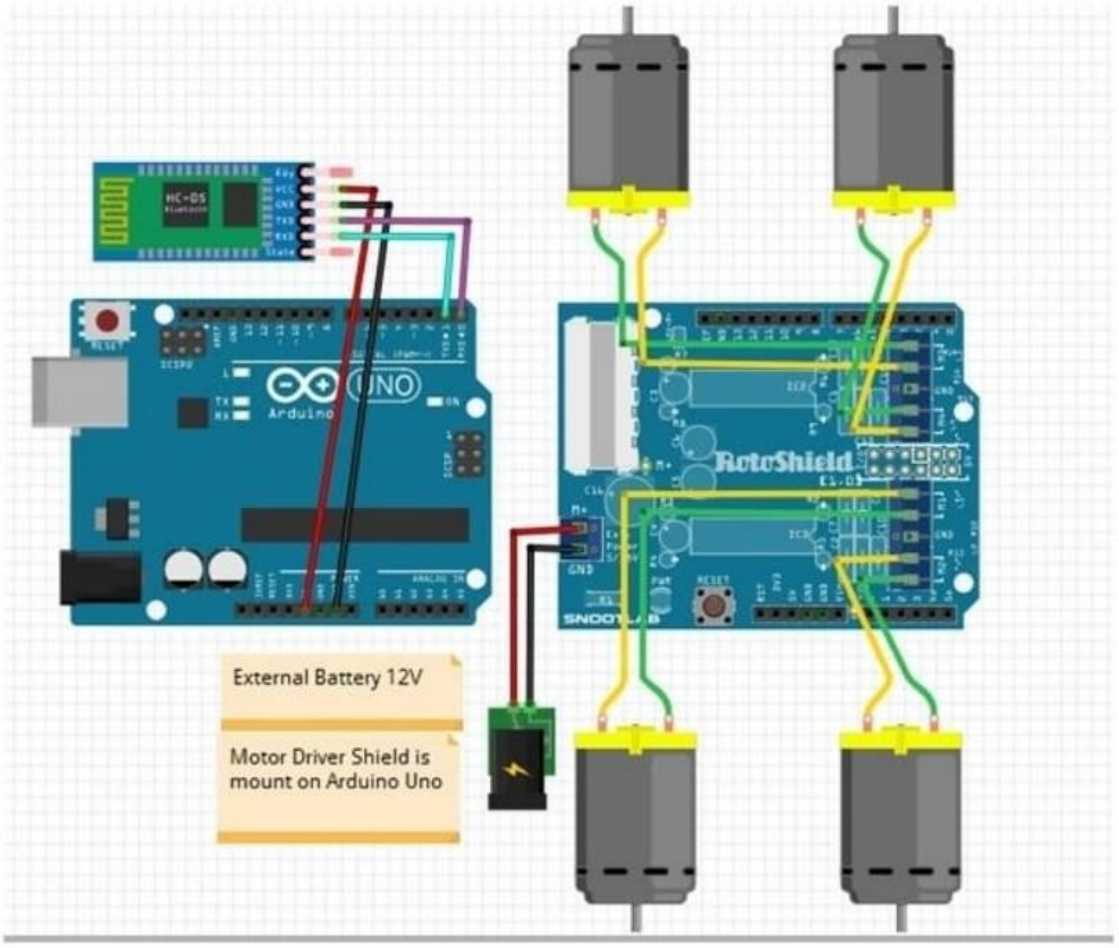
BLOCK DIAGRAM

The Arduino Wireless Voice Controlled Robot comprises a transmitter and a beneficiary segment. The transmitter end comprises Smartphone Bluetooth and the Android application introduced on it. Thus, the Receiver area has an Arduino board as a processor, an HC-05 Bluetooth Module as a remote communication module, L293D for driving engines, and a couple of DC designed as a section for moving robots.



CIRCUIT DIAGRAM

The circuit comprises of Arduino UNO Board, HC-05/HC-06 Bluetooth Module, L293D Motor Driver IC, a couple of DC Geared Motors of 200 RPM, and a 9V Battery. The TX and RX pins of Arduino are associated with Rx and Tx pins of the Bluetooth Module. The Bluetooth Module is provided with 5V. Essentially, the left DC engine is associated with pins no 3 and 6 of L293D and the right DC engine to stick no 14 and 11 of L293D. Arduino advanced pins 2,3,4,5 is associated with L293D 2, 7, 10, and 15 respectively. The L293D IC Pins 2, 5, 12, and 13 are GND pins, and 9, 1, and 16 are provided with 5V. Be that as it may, pin 8 of L293D is straightforwardly provided with 9V.



HARDWARE REQUIREMENTS

1. Arduino Uno: The Arduino Uno is an open-source microcontroller board dependent on the Microchip ATmega328P microcontroller and created by Arduino. cc. It is programmable with the Arduino IDE through a kind B USB cable. It can be controlled by the USB link or by an outside 9-volt battery, however, it acknowledges voltages between 7 and 20 volts.

2. Motor Driver: This L298N Based Motor Driver Module is a powerful engine driver ideal for driving DC Motors and Stepper Motors. It utilizes the well-known L298 engine driver IC and has the locally available 5V controller which it can gracefully to an outside

circuit. It can control up to 4 DC engines, or 2 DC engines with directional and speed control.

3. Bluetooth Module: HC-05 module is simple to use Bluetooth SPP (Serial Port Protocol) module, designed for clear wireless serial association setup. The HC-05 Bluetooth Module is utilized in a Master or Slave configuration, creating it a good resolution for wireless communication.

4. Ultrasonic Sensor: A ultrasonic sensor is an instrument that gauges the separation to an object utilizing ultrasonic sound waves. An ultrasonic sensor utilizes a transducer to send and get ultrasonic heartbeats that hand-off back data about an item's nearness. High-recurrence sound waves reflect from limits to create unmistakable reverberation designs.

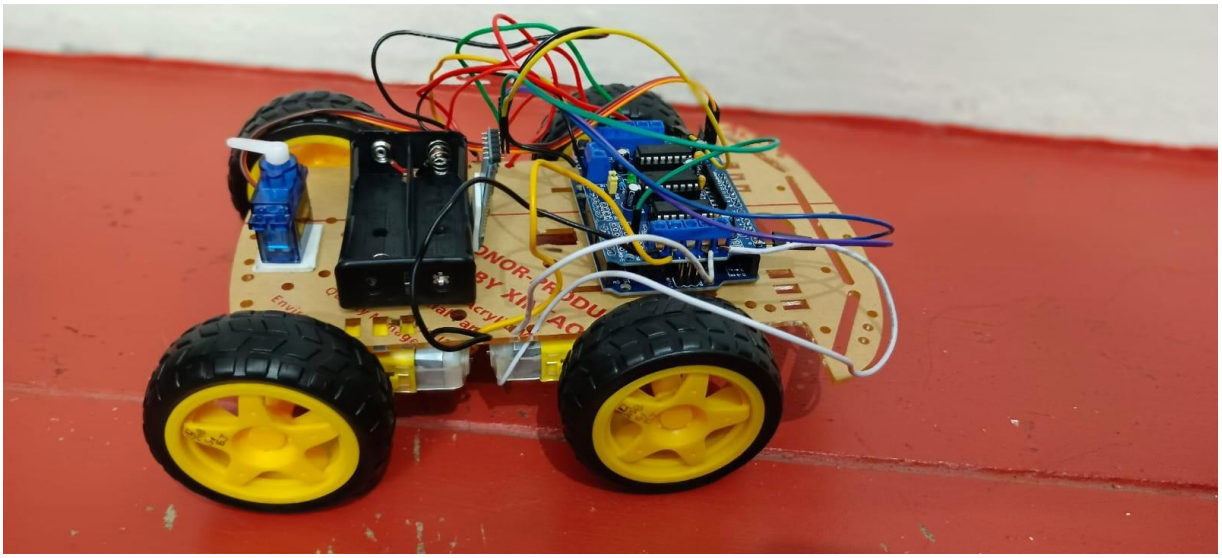
5. Servo Motor: A servo motor is a rotating actuator or straight actuator that takes into account exact control of angular or linear position, speed and acceleration. It comprises of a reasonable engine coupled to a sensor for position input. It likewise requires a moderately refined controller, frequently a committed module structured explicitly for use with servomotors.

6. BO Motor with Tires: DC engine (BO) changes over electrical vitality into mechanical vitality. DC MOTOR idea is the place gears decrease the speed of the vehicle yet increment its torque is known as gear decrease 7. Wireless Camera: The wireless camera has a night vision which enables no light or low light usage. It performs high-quality picture transmitting and receiving.

SOFTWARE REQUIREMENTS

1. Arduino IDE: The Arduino Integrated Development Environment (IDE) is a cross-stage application (for Windows, macOS, Linux) that is written in capacities of C and C++. It is utilized to compose and transfer projects to Arduino perfect sheets.
2. The Android App: Android smartphone with an application is the transmitter end. At first, there should combine of Bluetooth HC-05/HC-06. When matching is done, at that point it should be associated. When the application is running in the smartphone, the client's voice orders are distinguished by the phone microphone

WORKING



The block diagram of the simple voice-controlled robotic vehicle is given it consists of the smartphone that recognizes the voice commands and are being wirelessly transferred to the Bluetooth module HC05. The module at that point changes over the order to content and the series of characters are sent to the Arduino for additional handling. The Arduino microcontroller decodes the string got and correspondingly performs further capacities. The signals are sent to the motor which hence powers and drives the motors

connected to it. On the Transmitter area, commands are given to the Mobile Application through the mic. This portable handset is associated with the moving vehicle by means of a Bluetooth module. The portable application utilized is modified so that the voice orders given to the handset are received by the mic and these simple voice orders are changed over to advanced word successions (A to D transformation). These stored sequences are then transmitted to the robotic vehicle via the Bluetooth transceiver module and are sent to the transceiver controller. Android application transceiver is used to decode the received signal with the Bluetooth module. The controller contrasts these signals and put away program orders in it and converts them into voice strings. The voice strings are then used to run the servo engines for the ideal interval of time. The microcontroller sends directions, which when executed, help in working the engine driver. The yield of the Arduino goes to the engine driver IC and it controls the specific engine. A DC power supply is required to run the system. The DC power supply feeds the Microcontroller and the Bluetooth module.

ADVANTAGES

1. The Robot is small in size, therefore less space is required.
2. We can access the robot vehicle from a distance of meters as we are using WIFI for the connection between the robot and the server PC.
3. As we are camera which is attached to the robot so it will capture video which will be used for security.
4. Low power consumption.

5. No accident is done by improper driving of people and also available for elderly and disabled people.

FUTURE SCOPE

1. This task work has been limited to a short-range Bluetooth module. Utilizing long-range modules and other available gadgets will bring about the network with the robot for significant distances.
2. Picture preparation can be executed in the robot to distinguish the shading and the items.
3. A warm camera can be introduced to detect the warmth produced by bodies valuable in military purposes to distinguish foes on the lines.
4. Programmed Targeting System can be executed in the robot for following the objective.
5. Further upgrades in the venture can be utilized for Home security and military purposes where the orders can be given to robots without a chance by expanding the range and by introducing cameras.
6. The robot is valuable in places where people discover hard to reach however human voice comes. For example, in fire circumstances, in profoundly poisonous zones.
7. It is one of the significant phases of Humanoid robots.
8. Discourse and voice acknowledgment security frameworks.
9. The robot can be used for monitoring or investigation.

CONCLUSION

The proposed framework of our project shows how a robot can be controlled utilizing Bluetooth. The voice controlling orders are effectively transmitted through Bluetooth innovation and the desired activities effectively happen. This task lessens human endeavors at spots or circumstances where human intercessions are troublesome. Such frameworks can be brought into utilization at spots, for example, businesses, military, and guard investigation purposes, and so forth

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