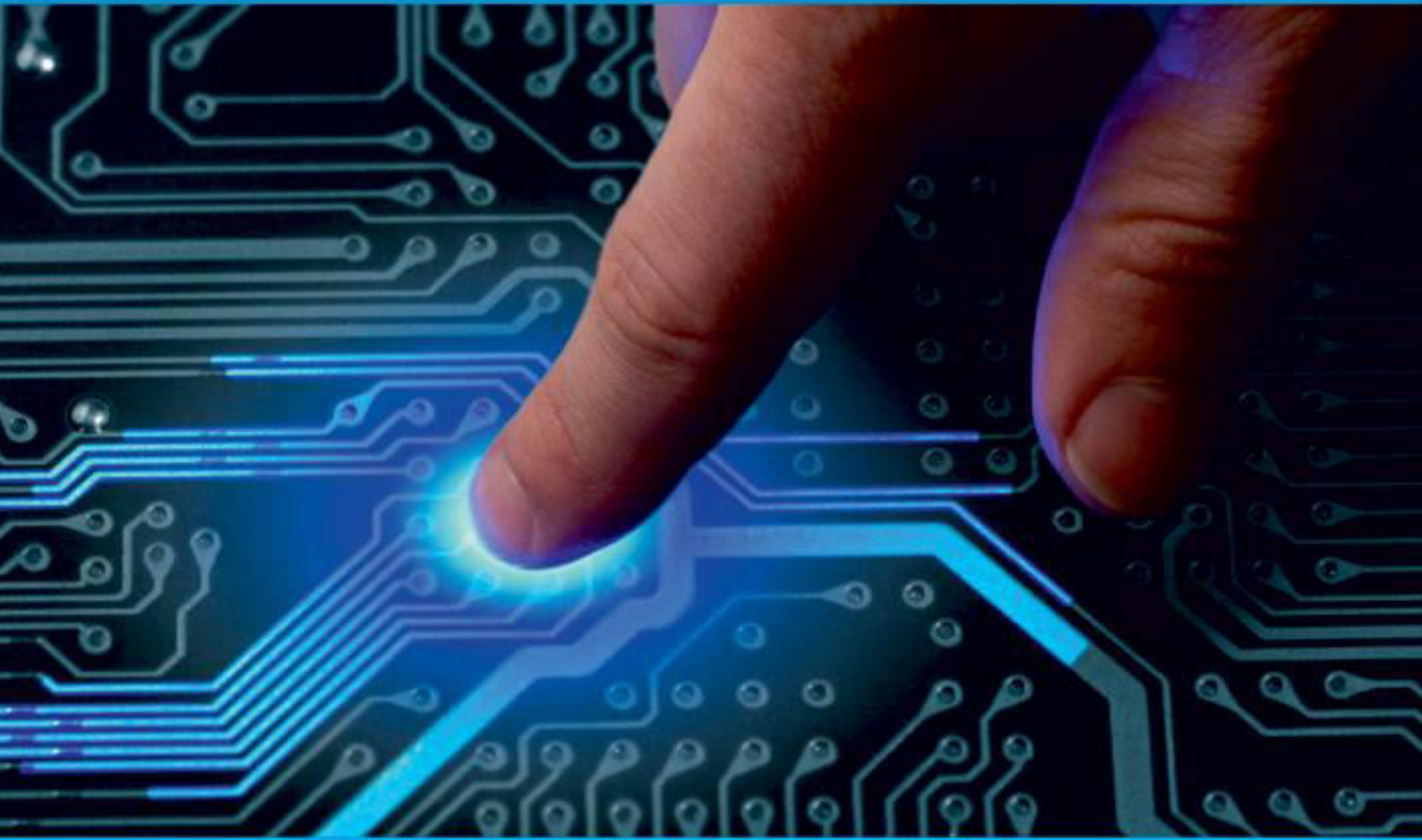




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Wireless voice Controlled Robot Car Using Arduinio

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ABSTRACT: This project demonstrates the creation of a voice-controlled robot car using Arduino, enabling users to control the car's movement and actions through spoken commands. The system integrates an Arduino board, Bluetooth module, motor drivers, and a smartphone application for voice recognition and control. The main components and steps involved in building this robot car include: The result is a robot car that can be controlled using voice commands, offering an engaging and interactive user experience. This project combines aspects of electronics, robotics, voice recognition, and software development, making it an educational and enjoyable endeavor for beginners and enthusiasts. It illustrates the potential of voice-controlled systems in robotics and IoT applications.

KEYWORDS: Voice Control , Arduinio , Human voice Controller, HC05 Bluetooth, Electric motor, TT Gear motor.

I. INTRODUCTION

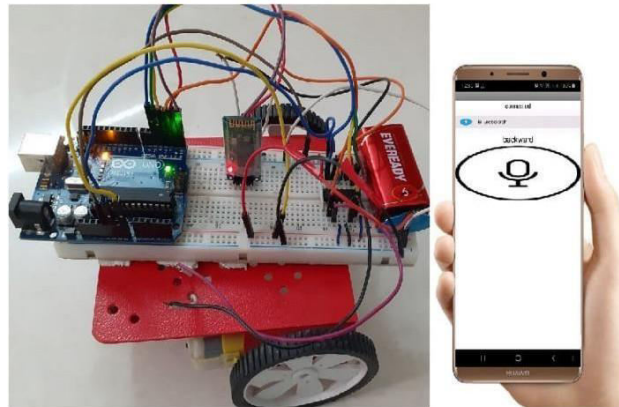
The primary goal of this project is to create a robot car that can be maneuvered and directed using spoken commands. By integrating Arduino, a versatile and accessible microcontroller platform, we enable the robot to interpret and respond to voice commands received wirelessly. This technology showcases the convergence of hardware, software, and communication protocols in a tangible, hands-on manner. Voice-controlled robots have a wide range of applications, from home automation to industrial automation, and are commonly used in scenarios where manual control can be cumbersome or impractical. This project not only provides an engaging platform for learning about robotics but also showcases the potential of voice-controlled interfaces in the field of automation and human-computer interaction.

II. PROBLEM STATEMENT

Wireless Voice-Controlled Robot Car Using Arduino" to explore and develop a solution for the following challenges
Hands-Free Control: Many scenarios require hands-free interaction with machines, such as in industrial automation or for people with mobility impairments
Accessibility and Affordability: While voice recognition technology has advanced, it is essential to create projects that are accessible and affordable for a broad audience.
Integrating Voice Recognition: Integrating voice recognition into a robot presents the challenge of developing a system that accurately understands and responds to voice commands. This project aims to address the complexities of voice recognition and its implementation in a real-world context.

III. ROBOT OVERVIEW

Robot will simply look like a toy car the assumed Measurements of robot are it will 15 to 20 cm in height Approximately width would of 10 to 15 cm and Weight would be of 5 to 10 kg Robot will consist of different components along With the Arduinio-Uno ,Server motor, Motor driverShield & TT Gear motor.



IV. BLOCK DIAGRAM

Block diagram is basically explaining the working Of the robot with the components and its functionality The following figure shows the working of the hot the diagram explains, firstly the human will be defied by the sensors then the sensors will nsify the Anduino chipin which the code is written and bere the Ardeina chip will decide what to do, based on the situation the resultwill be asper that

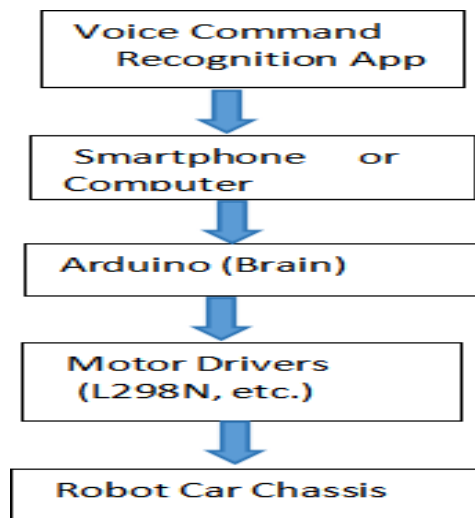


Fig1. Block Diagram

V. METHODOLOGIES

1. Define Project Goals:

Clearly define the objectives of your voice- controlled robot car project. What should the robot do? What kind of voice commands will itaccept?

2. Select Hardware Components:

Choose the necessary hardware components, including an Arduino board, motor drivers, motors, a voice recognition module, and a wireless communication module (Bluetooth orWi-Fi).

3. Voice Recognition System:

Develop or select a voice recognition system or module for your project. Popular options includeusing pre-trained

models or voice recognition APIs like Google's Speech-to-Text.

4. Design the Mechanical Structure:

Design or select a chassis and mechanical components for your robot car. Ensure it accommodates the motors and other hardware components.

5. Electronics Setup:

Connect the hardware components to the Arduino following the schematics and pin configurations. This includes interfacing the voice recognition module, motor drivers, and wireless communication module.

6. Develop the Arduino Code:

Write the Arduino code to handle voice command reception, interpretation, and motor control. Implement logic for various commands like "move forward," "turn left," "turn right," and "stop."

7. Implement Wireless Communication:

Set up the wireless communication between your smartphone or computer and the Arduino. Establish a reliable connection for sending voice commands to the robot.

8. Mobile App Development (Optional):

If you want a custom mobile app to send voice commands, develop a simple app that captures voice input and sends it to the robot via the wireless module.

9. Mechanical Assembly:

Assemble the robot car, ensuring that all components are securely attached to the chassis. This includes mounting the motors, wheels, and Arduino.

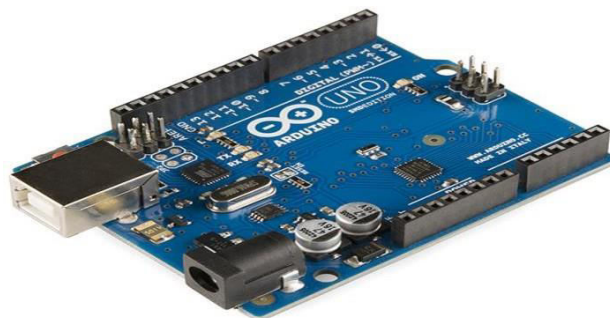
10. Toll & Technology

Following mentions are the Main components used in robot car: -

1. Arduino UNO

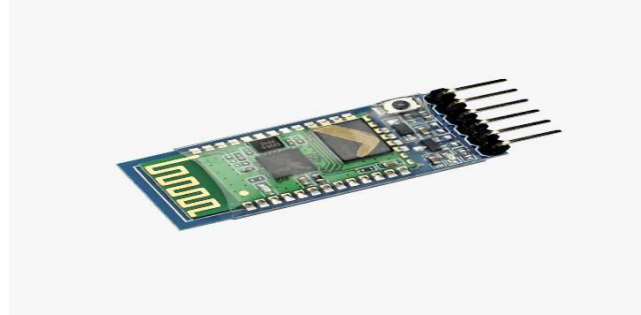
Arduino is widely used in educational settings to teach electronics, programming, and problem-solving. Its simplicity and low cost make it accessible to students and beginners.

Arduino's versatility and accessibility have made it a popular choice for both beginners and experienced makers to bring their electronic and programming ideas to life. It has played a significant role in the Maker Movement and has empowered countless individuals to create innovative and interactive projects.



2. HC05 Bluetooth Module

The HC-05 is a commonly used Bluetooth module that facilitates wireless communication between electronic devices. It is a versatile module that is often integrated into various projects, including those involving Arduino-based wireless communication. Here are some key features and uses of the HC-05 Bluetooth module



3. Gear motor with Wheel

Gear motors with wheels are essential components in robotics and automation, as they provide the mechanical motion required for various applications. These gear motors combine a motor with a gearbox and often include a wheel or wheel attachment. Here are some keypoints to understand about gear motors with wheels



4. L293d motor driver

The L293D is a popular motor driver integrated circuit(IC) that is commonly used to control the direction and speed of DC motors. It's widely used in robotics, automation, and other projects where motor control is necessary. Here are some key features and uses of the L293D motor driver Dual H-Bridge: The L293D is a dual H-bridge motor driver, which means it can control two DC motors independently. Each H-bridge can control the direction(forward or reverse) and speed of a motor.



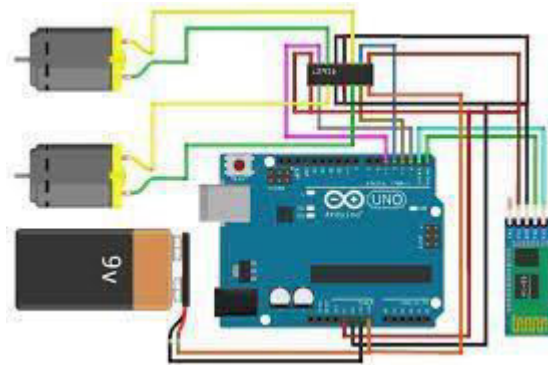
L293D Motor Driver

6. Arduino UNO

The Arduino UNO is one of the most popular and widely used microcontroller boards in the Arduino family. Microcontroller: The Arduino UNO is based on the Atmel ATmega328P microcontroller, which operates at a clock speed of 16 MHz. It has 32KB of flash memory for program storage, 2KB of SRAM, and 1KB of EEPROM.

VI. CIRCUIT DIAGRAM

Creating a complete circuit diagram for a specific project often involves several components, and it can be complex. However, I can provide a simplified example of a circuit diagram for a basic setup using the L293D motor driver to control a single DC motor with an Arduino. Please note that this is a simplified representation, and in a real-world project, additional components such as power supplies, capacitors, and more may be required for proper operation.



VII. ADVANTAGES & DISADVANTAGE, APPLICATIONS

Advantage: -

1. Increase a production
2. More accurate the following command.
3. Reduce Wastages
4. Time saving
5. Can work 24/7

Disadvantage: -

Disadvantage

1. Costly
2. Invalid Command
3. No use objects detection

Applications: -

1. A voice-controlled robot car can be used to control and monitor smart home devices. For example, it can adjust the thermostat, turn light on or off, lock doors, and even check if appliances are switched off.
2. Entertainment: They can be used for entertainment purposes, such as remote-controlled toys, providing a fun and interactive experience for users.
3. Agriculture: In farming, they can be used for crop monitoring, planting, and harvesting with voice-activated commands.

VIII. FUTURE SCOPE

1. As voice recognition technology continues to improve, future robot cars will become more accurate in understanding and responding to voice commands. This will enhance their usability and convenience.

2. **Autonomous Features:** The integration of autonomous features will make these robot cars more capable of performing tasks without constant user input. They can autonomously respond to certain situations and conditions.
3. **Voice Assistants Integration:** Integrating voice-controlled robot cars with popular voice assistants like Siri, Alexa, and Google Assistant can make them more accessible and user-friendly.
4. **Education:** Robot cars will continue to be valuable educational tools, teaching students about robotics, programming, and automation.

IX. CONCLUSION

In conclusion, wireless voice-controlled robot cars represent a cutting-edge and versatile technology with a wide range of practical applications and a promising future. These devices offer a unique combination of mobility, voice recognition, and automation, making them valuable tools in various domains.

Wireless voice-controlled robot cars have already found application in home automation, security, robotics, education, and more. They simplify human-robot interaction by allowing users to control and monitor them through voice commands, making technology more accessible and user-friendly.

The future scope of this technology is highly promising. Advancements in voice recognition, artificial intelligence, and IoT integration will enhance the capabilities and usability of these robot cars. They will continue to find applications in areas such as elderly care, environmental monitoring, education, and industrial automation. Moreover, the potential for more natural and intuitive human-robot interaction will further drive their adoption.

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