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Voice-Controlled Robot Using Arduino

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Abstract

Voice-controlled robots are emerging as a revolutionary tool in human-machine interaction. This paper discusses the development and design of a voice-controlled robot built using the Arduino platform. By employing voice recognition modules and motor drivers, the robot can perform motion-based commands such as forward, backward, left, right, and stop. The system utilizes Bluetooth communication between a smartphone and the Arduino board, providing an intuitive and wireless way of control. The study highlights the components, circuit design, algorithm, and advantages of this low-cost system with potential applications in assistance for physically challenged individuals and automation.

Keywords: *Voice Recognition, Arduino UNO, Bluetooth Module, Motor Driver, Embedded Systems, Automation*

INTRODUCTION

Overview of Voice Control Technology

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SYSTEM ARCHITECTURE

Components and Connectivity

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WORKING METHODOLOGY

Speech Recognition and Signal Flow

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ALGORITHM AND PROGRAMMING

Logic Flow and Code Structure

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APPLICATIONS

Use Cases and Future Potential

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ADVANTAGES AND LIMITATIONS

Pros and Cons of the System

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HARDWARE COMPONENTS TABLE

Component Description Purpose

Table: Description of hardware components used in building the voice-controlled robot.

Component	Description	Purpose
Arduino UNO	Microcontroller board based on ATmega328P	Controls the robot's functions
HC-05 Bluetooth Module	Wireless module for serial communication	Receives voice commands
L293D Motor Driver	H-bridge motor driver IC	Drives the DC motors
DC Motors	Electrical motors for movement	Provides motion to wheels
Battery	Power supply (9V or 12V)	Powers the whole system
Chassis	Robot structure	Holds all components together

CONCLUSION

Voice-controlled robots provide an intelligent and flexible means for automating tasks in real-time. This paper detailed a practical implementation using Arduino and Bluetooth technology to construct a voice-driven robotic platform. The system was found to be cost-effective, user-friendly, and capable of supporting physically impaired individuals or performing repetitive

industrial tasks. With enhancements in speech recognition accuracy and integration with IoT, such robots can become an integral part of smart homes and modern industrial automation.

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