SPEED AND SPEAK: NAVIGATE THE ROADS WITH VOICE-ACTIVATED ROBO CAR

[1]Divya M V, [2]Lavanya G, [3]Lavanya R, [4]M Nishmita Karanth
[1]Assistant Professor, [2,3,4]students
Department of CSE
East West Institute of Technology
Bengaluru, India

Abstract— In this research, a system based on how using human voice a robot will be restrained is proposed. Voice identification is a technology used to convert the speech signals of human beings into computer text format and has become an important aspect of human life. This project helps us control a robot by utilizing voice commands received through an application built using MIT App Inventor. The control unit integrates with Bluetooth devices to obtain and interpret speech instructions in form of instructions. The device then works corresponding to the instructions received through the Android app.

For this, a microcontroller is fused into the system, which allows the vehicle to be controlled through an Android app. The control device can be any cell phones with an operating system of Android that gives a great responsive GUI that provides the user with easier control of the vehicle.

Keywords – Android application, Bluetooth, Robot, Voice Recognition.

I. INTRODUCTION

Speech signals are important medium of communication in humans. Almost every conversation to interact is done using voice signals. Sounds and various speech signals will be converted to an electrical form using a microphone. Voice recognition is a technology used to convert speech signals into computer text format. This voice recognition technology is used to control buildings and generate speech confirmation using some external server.

This robot has the potential to understand thousands of voice commands and perform the required actions. As everyone will have their own and unique accent, speech recognition becomes a bit tricky. This robot assistant works for molding, manufacturing and tooling purposes in various areas such as construction, defense, etc. In hospitals, these robotic assistants are accustomed to perform surgeries and operations with high precision. In this project, we develop an assistant robot that works with voice instructions.

The studies regarding speech shows that this is the most rapid form of communication in many fields of applications.

• In-car systems.

• Health Care.

• Military.

• Education.

• Intelligent.

The device is handled by a mobile phone and communication between the user and the machine is done through a smart phone. A cell phone becomes a great terminal to automate a robot.

II. LITERATURE SURVEY

In 2003, global estimates for modern robots increased by 19%. In 2004, orders for robots rose 18% again to the peak. Between 2004 and 2007, the overall growth was about 7%. More than 600,000 household robots is utilized in the next few years. Many researches have been made by different researchers in developing this project. They serve alternative programs and implement some innovations.

The analysis conducted for this survey is summarized in a tabular format that provides a complete overview of relevant research. There are important details in the table like research title, authors, year of publication, research objectives, and the main strengths and weaknesses identified in each study.

Title	Authors	Year	Objectives	Advantages	Disadvantages
Voice Controlled Robot using Arduino and Bluetooth	Deeksha Pal, Nimrat Kaur, Richa Motwani, Anand D Mane, Pragati Pal	2023	This paper proposes a voice-controlled robotic system that uses Bluetooth to follow human commands and UART Protocol. [1]	Voice operated robot system that takes less time to execute each commands.	Power optimization techniques are not incorporated
An Effective Design of Wireless Android based Robotic Operation Control with 8051 Microcontroller	V Mohanavel, S.Diwakaran, Maheshwaran U, Anitha G, S. Ramesh	2022	The main motto of this paper is to develop a robot with powerful motion controls using DC Motors and advanced Arduino Microcontroller with Android Smart Phone. [2]	Simplified hardware designs for robot.	Does not contain voice assistance.
Voice Controlled Robotic car using Mobile Application	Shiropa Chakraborty, Nilotpal De, Divine Marak, Mithu Borah, Sudip Paul, Vinayak Majhi	2021	This car's prototype is designed using Human Robot Interaction (HRI), which is manipulated by user-specific commands.[3]	Movement is based on Infrared sensors (IR) and Low power consumption	Short range of communication between two device is due to use of Bluetooth.
Implementation of Human Voice Controlled Robotic Car	Rubina Liyakat Khan, Deepa Priyanshu, Fatmah Saleh Alsulaiman,	2021	This study's objective is to ascertain out more about a system that recognizes human voice instructions to operate a voice controlled car. [4]	Beneficial for monitoring and assisting disabled persons. Operates with basic voice commands	There is no security as it lacks web cam
Implementation of Low-Cost Voice Command Robot Using Arduino Uno Platform	Aaron Brandonic Andrew, Suraj A Rajiv, Nuami Jusat, Ahmad Anwar Zainuddin, Krishna Subramaniam	2021	The Speech Control Robot uses the interaction necessary for it to function autonomously to a voice command via a smartphone app. [5]	Can be implemented on low cost platform.	Does not work properly with background noise disturbances.

III. METHODOLOGY

In this proposed system, the voice recognition module is not required for human voice recognition to handle the operation of the machine. It uses an application of android to recognize and process human voice which is then converted into text (using google output to text converter). This text is then transmitted to robot using Bluetooth. This script is analysed by the microcontroller to operate the robot accordingly.

The objective of the proposal is providing a simple robotic hardware architecture, but with a powerful computing platform, so that robot designers can focus on their research and testing instead of Bluetooth connectivity infrastructure.

This simple architecture is also useful for educational robots, as they can make their own robots at minimal cost and use them as a platform for experiments in various courses.

A typical robot controller architecture includes the AT89S52. The AT89S52 is a poor-power, high-geared 8-bit CMOS microcontroller with 8k bytes of flash memory. The device is produced using Atmel's high-density non-volatile memory technology and conforms to the manufacturing standard 80C51 instruction set and is issued. Atmel AT89S52 is powerful microcontrollers that offer high flexibility and cost effectiveness solutions for various monitoring applications. The AT89S52 is planned with static logic for zero-frequency operation and backs two software-selectable power saving modes. Powering down saves the content of RAM, but freezes the oscillator, disabling other chip functions until the next interruption or device reset.

The HC Serial Bluetooth product consists of a Bluetooth serial interface module and a Bluetooth adapter. A Bluetooth serial module is used to convert the serial port to Bluetooth. This module has two modes: master and slave device. Even a device whose number is set as master or slave when it leaves the factory and cannot be changed to another mode. [1]
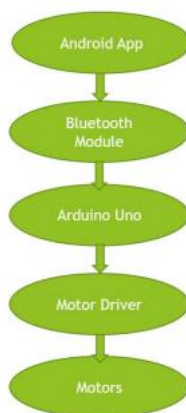

Fig 3.1: Methodology of the proposed system

IV. CONCLUSION

A voice-controlled robotic device is an easy-to-program software and hardware project. This project will work on human speech command and application of android. The execution of this project is not difficult and useful for human beings. Voice control robots are useful for guiding people with disabilities. This operates on uncomplicated commands and is handy. We can do image processing on this robot to perceive the colour of the target object or system. This machine is diminutive in size and hence it is utilized.

This is a robot for indoor use. For security purposes, we can include a web camera in this robot. Voice understanding software has 76% accuracy for voice command recognition and is very sensitive to ambient noise.

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