

Arduino Based Voice Control Robot with Lazer Security

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Abstract- This study presents how a robot responds to voice input. This paper illustrates how a robot interacts with a human by responding to voice commands. This system is quite quick. The first portion of this system is a voice recognition system, followed by a central controller system, and finally a robot. The employment of robots in today's world has spread from industries to everyday life. A healthy interface between people and robotics is critical in such a setting. For both domestic and industrial users, voice commands make controlling a robot much easier. Speech recognition system fundamentally a human-robot interface. As an input signal, it receives the voice, processes it, and then delivers the signal to the central controller, who then sends it to the robot. The document will explain how the entire procedure took place. The use of an Android device to regulate a robot using voice instructions is proposed in this study.

Keywords- Command, Interface, Recognition.

I. INTRODUCTION

This paper represents a Bluetooth-controlled robot car with using an Android application. The project's goal is to use an Android application to control the car. This project primarily makes use of an Arduino UNO (ATMEGA 328P) and a Bluetooth module (HC-05). Attach the Bluetooth module to the system so which can easily regulate and use a smartphone app. In the age of eavesdropping and surveillance, this effort is most important than any other. The motive of this project is to build a robot that can be controlled using an Android device. The Robotics operated wirelessly using Bluetooth-enabled Android smartphone. In this project, the Android smartphone serves as a control for a robot. All microcontroller Bluetooth module and DC motors are attached to the microcontroller. Bluetooth module gets data from an Android phone and passes input to control. The Robot's DC motors are controlled with the help of a controller. A controller is programmed with a software written in the Embedded 'C' language in the order to do the specific task. As previously noted, related reference articles on implementing wireless control of robots have been studied. There is still a need for a cost-effective automation solution that is simple to implement. A cost-effective project example has been given here. The robot motion can be controlled using instructions obtained from an Android device.

II. AIMS AND OBJECTIVE

a) Aim

The basic purpose of the project is to direct a robotic vehicle that is controlled by a mobile device application. The project purpose is to achieve Human

Robotic Interaction by controlling the robot using voice commands. A voice-controller robot's claimed motive is to pay attention to and react to the user's commands. The remotely operated vehicle has been under the control with use of smartphones by using the application. The objectives of working in the drive a robotic vehicle from a distance using voice instructions and physical control.

b) Objective

The idea of this research is to create a voice-controlled robot system that recognizes specific speech commands. Each command vehicle has a certain function, such as forward, reverse, left, and right movement. The voice control robot motor car is just one example of using ordinary speech commands to control the patterns of movement of a robot vehicle.

III. LITERATURE SURVEY

A robot vehicle is a computer-controlled, electrically driven machine that can perform a variety of functions. Industrial robots were designed to decrease human effort and time in order to boost productivity and lower industrial costs. Human-machine interaction is becoming much more and aligned with the external environment today, moving away from the mouse and pen. The Android application is used to regulate the robot movements from a great distance utilizing Bluetooth connection to connect the controller to the android.

Paper1: Arduino based voice controlled robot: The voice-activated robot is only one example as to how to use Arduino to control the motions of a basic robot. Instructions have been used to manage the motions of a crude robot. This Android-based system relays human commands to a

microcontroller. A controller might be connect through a Bluetooth module via the UART interface. The speech is received by the android app, which is then processed by the voice module. The voice is then turned into text. The microcontroller will then analyse this results and put necessary actions to govern the robot. The motive is to create a robotic car that can be commanded by a human voice for basic movements like going forward and turning left or right.

Paper2: Voice controlled robotic system by using FFT:Robotic systems, or robots, are the next step in the evolution of technologies that can be utilised to elevate human life to new heights. In this study, design a robotic system that can recognise and respond to spoken commands in real time. Every letter vibrations at a various frequencies..The signal is transformed from time domain to frequency domain,use a digital signal processing tool like FFT (Fast Fourier Transform) on an input command.

Paper3: Multiple Motion Control System of Robotic Car Based on IOT to Produce Cloud Service:Multiple motion control system is an interesting field that has burst with new technologies, bringing the Internet of Things (IoT) concept to life. A multiple movement control is present in this study method for a robotic car that uses the Raspberry Pi as the master and the Arduino UNO as the slave. The controlling software uniquely identifies each

device, which is the essential principle of IoT.

IV. EXISTINGSYSTEM

Currently available robots include line follower robots, edge avoiding robots, DTMF robots, and gesture controlled robots. These robots are inefficient since they consume more electricity and have a high cost of operation. The current method does not use voice directions, making driving impossible for physically challenged people. An offline server evaluates the voice commands in real time. At the same time, the commands are sent directly to the server across a wired network. A microcontroller-based platform is often used to create the majority of vehicle robot. Some of the domains that can be improved also include impact of the mouth-microphone range on the robotic, the overall performance (scope) of the robot, and the effect of noise on the translation of speech to textual information. The system would make use of AMR Server, a collection for speech perception and automation synthesis. It was established with the intention of allowing speech to be used on devices with limited processing capacity. Microcontrollers usually lack the storage and processing capacity needed for advanced voice processing and synthesis. BitVoicer Server mitigates the effects of these constraints by doing the heavy lifting for the microcontroller, allowing it to delegate critical functionality to the bulk of its primary sources.

V. COMPARTIVE STUDY

SR NO.	PAPER TITLE	AUTHOR NAME	METHOD	ADVANTAGE	DISADVANTAGE	OUTCOME
1.	Arduino Based Voice Controlled Robot.	Aditya Chaudhry,ManasBatra,PrakharGupta,SahilLamba,Suyash Gupta	UART Protocol is used,use embedded c language.	provide an equipment circuit that enables individuals to use their voice to control robots or other home machinery.	Controlling of robot via Bluetooth range is fixed.	Provide eqquivalent circuit that enables individual to use their voice to control robots.
2.	Voice Controlled Robotic System By Using FFT.	Sairaj L Burewar	FFT for signal Processing PNN for command GSM module is used.	It useful for Handicap People and a Blind People.	Restricted range of waveform data that can be transformed. Difficult to understand.	It requires only FFT for speech recognition. It does not require extra hardware.
3.	Multiple Motion Control System of Robotic Car Based on IOT to Produce Cloud Service.	Maliha Rahman Mishi,RabeyaBibi,Tanveer Ahsan	Raspberry pi for Motion Controlling GPS position.	Controlling Multiple Devices in Multiple ways.	It uses cloud service because of that data loss or theft can be happen.	Controlling multiple devices in multiple ways make causes more convenience in handling a system.

VI. PROBLEM STATEMENT

Create a project using Arduino voice control robot solving various problem Like Work according to the command . Robot will execute given Command Instantly and it Will Follow Instruction Properly . The Robot Reach The Place Where Humans Cannot Reach . In present era, no company can afford to create a specific mistake. Because every blunder costs both time and money. Thus by using this golem this mistake can be avoided. The main motive of the project is to control the robotic vehicle in a desired position. The project's main aim is to manage the robot using audio signals or push buttons. Human-Robot Interaction is now possible. The purpose of an audio robot is to respond to and execute on the user's commands. To use this software, users could use a mobile application to operate a robotic vehicle. The project is designed to control a robotic vehicle by voice commands and manual control for remote operation.

VII. PROPOSED SYSTEM

In this proposed device perform a variety of research about robotic style variations. It demonstrates that using only speech (human voice) as a control method, it is possible to analyse and successfully operate genuine objects. It is particularly advantageous for academic robotics since humans can build their own robots at a reasonable cost. A microphone on the smartphone is utilised to recognise user voice instructions while the app is running in the system. The programme interprets commands and uses Google's speech-recognition technologies to convert voice to text within the app. The digital Arduino I / O pins are programmed as output pins in this design. For serial communication with the Bluetooth unit, pins 0 and 1 of Arduino are used. Text obtained via its use of Wirelessly bluetooth is forwarded to Arduino UNO microcontroller panel by the usage of UART serial conversation protocol.

VIII. ALGORITHM

The general idea of working of proposed system algorithm is given as follow:

Step.1: Start

Step.2: Take Audio Input from User

Step.3: Convert Audio Input to Text Input and Transmit through Bluetooth Module.

Step.4: Now Bluetooth Module Receive Text Input and give Command to Arduino Board.

Step.5: Compare Text Input with Database.

Step 6: Match Command with Database

```
if (voice.length() > 0){
if(voice ← "*go ahead"){
forward_car();
}
else if(voice ← "*go back"){
back_car();
}
```

```
else if(voice← "*right") {
right_car();
}
else if(voice ←"*left") {
left_car();
}
else if(voice ←"*stop") {
stop_car();
}
else if(voice ←"*fire") {
fire_car();
}
else if(voice ←"*stop firing"){
stop_firing();
}
```

Step.7: Give Instruction to Motor Driver.

Step.8: Execute the Command.

Step.9: End

IX. MATHEMATICAL MODEL

In the mathematical model arduino perform operations like turn left ,turn right ,Backward and Forward using the command given by the user .According to command robot work a specific task and this task are complete by arduino use logical AND ,OR operators for processing command and executing the correct command .There are three pieces to this system. The first is a voice recognition system, followed by a central controller system, and last, a robot. The user gives vocal input, which is translated into text and sent through bluetooth module.

The arduino takes the command and checks the database, matching it with previously stored commands, and then sends an instruction to the moter driver, which executes the command. The physical layer of Bluetooth is based on frequency hopping, thus hosting will not join until its frequencies hopping pattern are coordinated and they've discovered each other. This also signifies that only synchronize nodes inside of the personal area network will overhear a signal, though all nodes are all within direct communication range. To provide any-to-any communication, nodes must establish personal area networks (or piconets in Bluetooth lexicon) or maybe scatternets. The inquiry procedure delay is made up of a first FS delay, an RB delay, and a second FS delay that occurs when the receiver wakes up and waits for the second IAC packet.

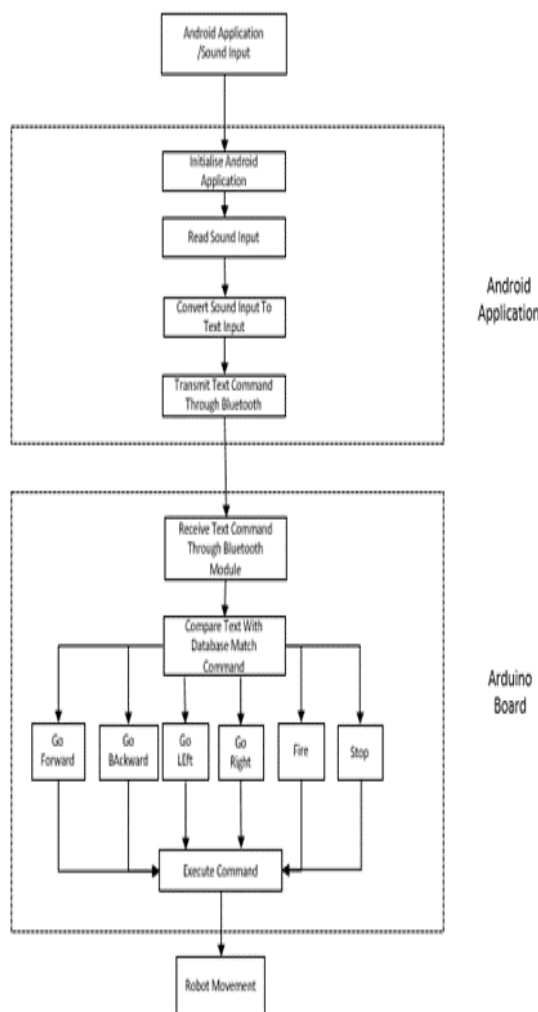
The inquiry process delay is mainly composed of a first FS delay, an RB delay, and a secondary FS delay that arises when the receiver wakes up and waiting for the second IAC packet. Thus can approximate the inquiry delay R using the following equation:

$$R = 2 * FS + RB$$

where FS and RB are uniform random variables in [0, Tcoverage] and [0, rmax] respectively. According to

equation 1, the link formation delay can be at most $2T_{coverage} + r_{max} = 40ms + 639.375ms = 679.375p$. Given FS and RB both are uniform random variables, the random variable expressing their addition does have the sum of their means as in its mean. Define the term Successful Inquiry Attempt as an event where an inquiring node has successfully attempted to discover a scanning node. The paper is used as a component in this paper's mathematics analysis and simulation results for the Bluetooth detection (inquiry) period in a fully connected context. Main goal is to robot React in less time.

X. SYSTEM ARCHITECTURE



FigX: System Architecture

Description:

The Arduino computer software, that is very simple to use, can also be used to programme it. system take input from the user and converted into text command. Mobile application transfer the command with the help of Bluetooth. Arduino board receives command and execute the command and take action. system follows instructions like go forward, go backward, go left, go right, stop and fire. The Arduino has a sizable fan base, making it a simple way to be get starting using embedded electronics. The

third and most recent edition of such Arduino Board is the Uno R3. The Arduino software is used to run a program with commands for all the system's capabilities. Here use programming language "Embedded C for coding. The program for executing this project has been written in C language. The programming is burned onto the microcontroller that use the Bumer program. The programming is saved in the EEPROM of both the microcontroller, which is placed on the Arduino board. Used software to load data or orders for the device's forward, backward, left, and right operations. When press a button in an Android application, a signal has been sent over Wirelessly to the Arduino board's Wireless to Bluetooth module (HC-05). A microcontroller is the overall system's controlling device. The Microcontroller is connected to a Bluetooth module and DC motors. The Bluetooth module receives data from an Android phone and feeds it to the controller as input. The Robot's DC motors are controlled by the controller. The controller is loaded with a software written in the Embedded 'C' language in order to do the task. Related reference articles Implementing wireless control of robots have been studied as mentioned.

XI. ADVANATGES

1. The Robot Model is small in size, so space required for it is less.
2. Access the Robot from Distance of Meters through Bluetooth.
3. Use smart phone for monitor robot which is nearly available to everyone.
4. System Follows User Friendly Approach.
5. Cost of system is low.

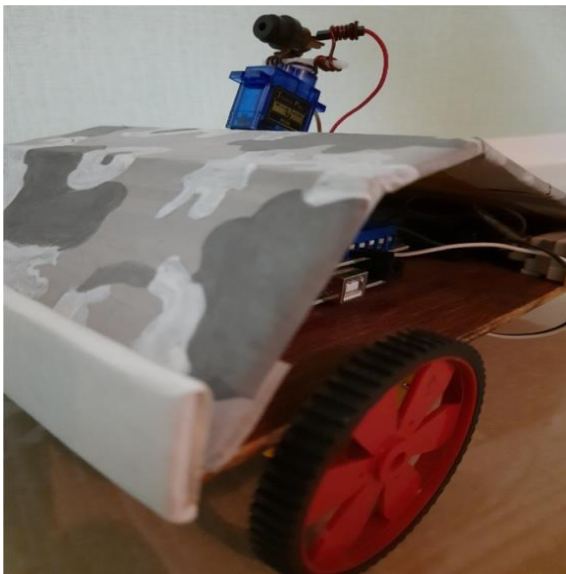
XII. DESIGN DETAILS



FigXII(a) : Android Application

The Bluetooth module on the robot connects with the Android application operated robot through Bluetooth.

Each moment you push a button on the app, the robot receives the relevant orders through Bluetooth. The users can interact well with device via a smart phone in our android application-based Bluetooth controlled robotic automobile. To control the device using this way, the user are within distance (around 15 metres). In future we would try to extend the range using Internet of Things (IoT). The directives that are transmitted are in ASCII code. The Arduino on the robot then compares the command received with its previously specified commands and controls the servo motors to cause it to go forward, backward, left, right, or halt, based on the command received. As a result, we'll be able to build an Android-controlled robot. Setup the hardware connections with the Arduino and the servo motors. Unlike typical servos, continuous rotation servo motors cannot be regulated or set at a certain angle. robot can be controlled through the buttons on the application or voice of the user.



FigXII(b): Robot Model

The arduino model requires hardware which we have to run the command given by the user. For the Hardware we required an Arduino Uno R3 is a microcontroller board based on a removable Arduino has an extensive support community, motor driver L293d the most commonly used driver for Bidirectional motor driving applications, Bluetooth module HC-05 Bluetooth allow all serial enabled devices to communicate with each other using Bluetooth. , 2 x DC motor DC motors normally have just two leads, one positive and one negative., 1 x Servo motor A Servo Motor is a small device that has an output shaft., Chassis, Jumper Wires, Laser A laser weapon is a directed-energy weapon based on lasers. , 3 x Wheels, 3.7 x 2 Battery An 18650 Battery is a lithium-ion rechargeable battery., Battery Holder & Charger Battery holder use for hold the battery. It is the powerhouse that supply the power to the Arduino.

XIII. CONCLUSION

Thus we have tried to implement the paper "Aditya

Chaudhry, Manas Batra, Prakhar Gupta, Sahil Lamba, Suyash Gupta", "Arduino based voice controlled Robot" 2019 IEEE and according to implementation, The conclusion is to study demonstrates how a robot may be controlled using Bluetooth. The desired activities effectively happen and the intended actions are successfully carried out.

REFERENCES

- [1] Aditya Chaudhry, Manas Batra, Prakhar Gupta, Sahil Lamba, Suyash Gupta "Arduino based voice controlled Robot" IEEE 2019.
- [2] Sairaj L Burewar "Voice controlled robotic system by using FFT" 4th International Conference for Convergence in Technology, 2018.
- [3] Maliha Rahman Mishi, Rabeya Bibi, Tanveer Ahsan "Multiple Motion Control System of Robotic Car Based on IoT to Produce Cloud Service" International Conference on Electrical Computer and Communication Engineering, February 2017.
- [4] Gergely V. Záruba, and Vishant Gupta "Simplified Bluetooth Device Discovery- Analysis and Simulation" 37th Hawaii International Conference on System Sciences, 2004.
- [5] Design of a Bluetooth Enabled Android Application for a Microcontroller Driven Robot By Vito M. Guardi, (May 2014).
- [6] Android Controlled Mobile Robot By Jorge Kazacos Winter, July 2013.
- [7] Android Based Robot Implementation For Pick and Retain of Objects By Ranjith Kumar Goud, B. Santhosh Kumar, Oct 2014.
- [8] Smart phone based robotic control for surveillance applications By M. Selvam, IJRET 2014.
- [9] Controlling a Robot using Android Interface and Voice By Kishan Raj KC, 2012.
- [10] Motion Control of Wheeled Mobile Robot By Gyula Mester, SISY 2006.