

# Voice Control Armed Robot Assistant Using Arduino Uno

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**Abstract:-** In this paper we implement intelligent system that follow voice commands and controlling using Arduino UNO. The proposed system will perform several tasks through voice commands. Also, it will interact with user by answering the questions asked by user. In proposed system Arduino uno is used to read voice commands and response them. The aim of this system is to assist user physically and also virtually. The system is helpful for students, Tech enthusiasts, and physically disabled people to do their daily work and help in problems. This Voice Control Assistant will be helpful for elderly and physically disabled also. The armed Voice Assistant can pick up and place things over voice commands. This feature enhances capabilities of assistant.

**Keywords:-** Arduino, Bluetooth, Ultrasonic Sensor, Voice Control, Armed Robot, Voice Assistant.

## I. INTRODUCTION

In an era marked by rapid technological of advancements, the integration of voice-controlled assistant robots represents a significant breakthrough in human-computer interaction. These intelligent systems, equipped with sophisticated speech recognition capabilities, offer users a seamless and intuitive means of controlling various devices, accessing information, and performing tasks through voice commands.

The emergence of voice-controlled assistant robots has revolutionized the way we interact with technology, transcending voice input methods and enabling more natural and efficient communication. Whether it's managing smart home devices, retrieving information from the internet, or even providing entertainment, these robots serve as versatile companions that augment our daily lives with unparalleled convenience and functionality.

The main motive of the Voice Control Assistant is to listen human commands and provide intended service or task.

## II. EASE OF USE

- Information Retrieval: The voice control Assistant can input voice and retrieves information from web such as history, entertainment, sports and much more.
- Command Follow: The voice control assistant can perform several tasks such as forward, backward, left, right, pickup things, drop things, etc. through voice commands.
- Virtual and Physical Assistant: The voice control assistant works on two modes. The voice control Assistant assists us Virtually and also Physically.
- Hands - Free Control: The voice control assistant allow the user to be hands free while using robot. The robot is accessible by voice commands, no need to use hands.

## III. LITERATURE REVIEW

Numerous studies and advancements have been done in the field of Robotics and as digital networks continue to grow quickly and become more widely used, the demand for timely and always-available services has intensified. One well-liked and rapidly growing method of service providers is the Voice assistance. Here are a few research studies that we have consulted in order to comprehend and develop our concept.

In 2020, P. S. Reddy worked on Personal assistant's robot which helps to reduce the manual efforts of humans in their day-to-day tasks. In design of a personal assistant robot, which is controlled by voice commands to pick long/short distance objects. Voice communication between the robot and android smartphone is done via Bluetooth. The proposed four-wheeled robot consists of a camera and robotic arm. The camera is used for object detection, distance measurement, and a robotic arm to perform pick and place actions.

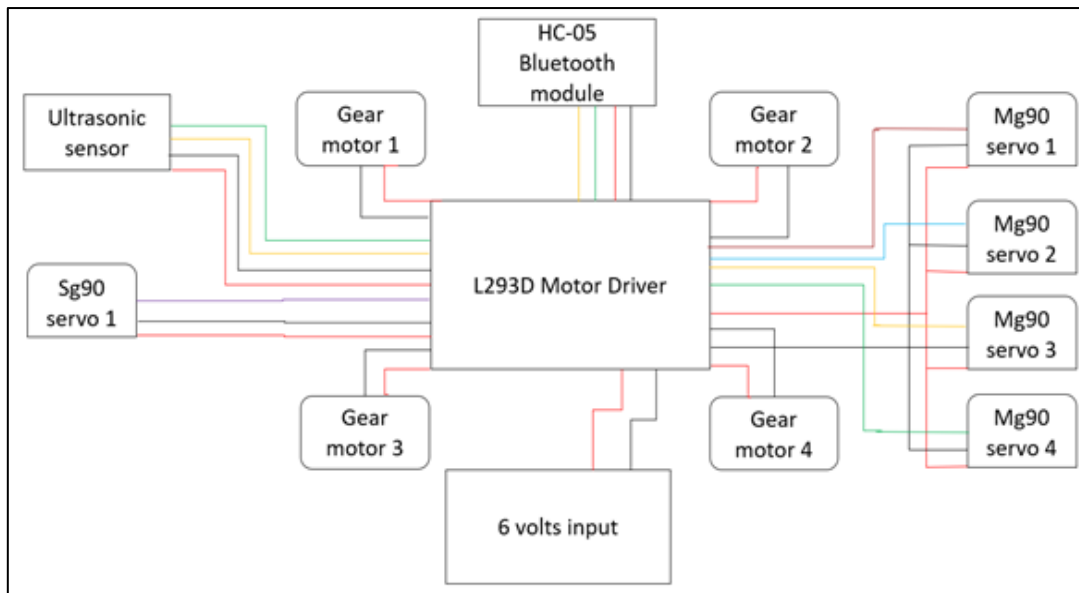
In 2015, A. Mishra Personal robotic assistants help reducing the manual efforts being put by humans in their day-to-day tasks. In this develop a voice-controlled personal assistant robot. The human voice commands are given to the robotic assistant remotely, by using a smart mobile phone. The robot can perform different movements, turns, start/stop operations and relocate an object from one place to another. The voice commands are processed in real-time, using an online cloud server.

In 2016, Vineeth Teeda, developed system which is based robotic assistants that reduces the manual efforts being put by humans in their day-to-day tasks. In this, we develop a voice-controlled personal assistant robot. The human voice commands are taken by the robot by its own inbuilt microphone. This robot not only takes the commands and execute them, but also gives an acknowledgement through speech output. This robot can perform different movements, turns, wakeup/shutdown operations, relocate an object from one place to another and can also develop a conversation with human. The voice commands are processed in real-time, using an offline server. The speech signal commands are directly communicated to the server using a USB cable.

In 2021 Prof. Heena Patil worked on home automation system the using an Arduino board with Bluetooth being remotely controlled through manner of way of Android smart telecall smartphone. As technology is advancing so houses are also getting smarter. Modern houses are progressively transferring from conventional switches to centralized control system, regarding far-flung controlled switches. Presently, conventional wall switches located in one-of-a-type factors of the house makes it difficult for the client to go near them to perform. Even greater it becomes greater difficult for the elderly or physical handicapped people.

**IV. SYSEM DEVELOPMENT**

In this robot we have attached HC-05 Bluetooth module. After turning on the robot , the bluetooth module starts advertise its SSID. Then we have to open AMR\_Voice application on Smartphone. The AMR\_Voice is Bluetooth development Software. We have to pair our robot to our Smartphone’s bluetooth. After pairing we’ll able to pass voice commands to the robot. The voice command that is passed to the robot is converted into string. Then the Arduino checks for the simmliar string function created in c language in Arduino. Then it calls intended function to perform that specific task.



**Fig 1: Block Diagram of Proposed System**

➤ *For Example-*

If we passed “Move forward” command, then the program will call its forward function. In that function we have specified that which gear motor will run in forward direction and which will run in backward direction. Then the robot will run in forward direction.

Same as, we have created commands like back, left, right, roll, rotate, clean the room, pick up, drop, etc.

**V. SYSEM REQUIREMENTS**

➤ *Arduino UNO*

Arduino UNO is an open-source controller. Arduino boards are able to read inputs, light on a sensor, a finger on a button and turn it into an output such as activating a motor, turning on an LED, publishing something online on web. Arduino has inbuilt analog to digital converter, so we can easily operate with analog signals as well. Arduino can connect to a computer via USB port (Universal Serial Bus) and perform in both analog and digital signal.

➤ *L293D Motor Driver Shield*

The L293D is a popular integrated circuit (IC) used as a motor driver in various electronic projects, especially those involving DC motors and stepper motors. Connect L293D motor driver shield on the Arduino UNO Board.

➤ *Gear Motors*

DC motor is a electrical machine that converts direct current into mechanical energy. All types of DC motors have some kind of mechanism either electronic or electro mechanical, so it can change the direction of flow of current in path of motor periodically. Connect 4 Gear Motors to the m1, m2, m3, m4 port of L293D.

➤ *MG90S Servo Motor*

The MG90S is a popular micro-sized servo motor widely used in robotics, and remote-controlled vehicles. It has metal gears inside it. Operating voltage is 4.8v to 6v. Torque is 2.2kg/cm. Weight is around 13.4 grams. Connect 4 Mg90s servo motor's signal pin to the d4, d5, d6, d7 pins of L293D and common VCC, GND pins of servo to the +5v, GND pins respectively.

➤ *SG90 Servo Motor*

The SG90 servo motor is commonly used for precise control of angular position in various applications such as robotics, remote-controlled vehicles, model airplanes, drones, camera angles, robotic arm and other projects requiring controlled movement. It operates between 0 to 180 degrees. Operating voltage is 4.8v to 6v. Connect SG90 servo motor to the servo1 port of L293D.

➤ *HC-05 Bluetooth Module*

HC05 Bluetooth module is a simple Bluetooth serial port protocol module designed for wireless serial connection setup. It has a footprint as small as 1.2cm X 2.7cm. It will simplify the overall design cycle by connecting it. Connect HC-05 Bluetooth module's VCC and GND pins to the +5v and GND pins of L293D and TX and RX pins of HC-05 to the RX and TX pins of L293D respectively.

➤ *Ultrasonic Sensors*

Ultrasonic sensors are commonly used with Arduino and other microcontroller platforms for distance measurement. It is also used for obstacle detection in various projects. It Uses ultrasonic waves measuring the time it takes for the waves to bounce off an object and return to the sensor. Connect Ultrasonic sensor's VCC and GND pin to the +5v and GND pins of L293D and Trig and Echo pin to the A0, A1 pin of L293D.

➤ *TP4056 Charging Module*

The TP4056 is a lithium-ion battery charging module commonly used in DIY electronics projects, portable devices, and battery-powered applications. It is designed to charge single-cell lithium-ion or lithium polymer rechargeable batteries safely and efficiently from a DC power source, such as a USB port or a DC adapter or a mobile battery charger.

## VI. CONCLUSION

The voice-controlled assistant represents a significant advancement in human-computer interaction, offering users a convenient, hands-free way to access information, control devices, and perform tasks and services through natural language or voice commands. Throughout the course of this project, we have explored various aspects of voice recognition and integration with hardware and software components to develop a functional and user-friendly assistant.

As voice-controlled assistants become increasingly integrated into our daily lives and routine environments, it is essential to prioritize considerations such as security, privacy, and accessibility to ensure that users can trust and benefit from the assistant safely and inclusively.

The voice-controlled assistant project represents a significant milestone in advancing the capabilities of interactive technology, empowering users with intelligent and personalized assistance that enhances their daily experiences and productivity. By embracing innovation, collaboration, and user-centric design principles, we can continue to push the boundaries of what voice-controlled assistants can achieve, shaping the future of human-computer interaction and digital assistance.

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