



# Voice Controlled Robot Car Using Arduino

Nikhil G. Dhangar<sup>1</sup>, Dhiraj H. Wadile<sup>2</sup>, Tushar R. More<sup>3</sup>, Rahul V. Pimple<sup>4</sup>,  
Sachin R. Jadhav<sup>5</sup>

Diploma Student, Department of Electrical Engineering, Ahinsa Polytechnic Dondaicha, Dhule Maharashtra, India<sup>1,2,3</sup>

Lecturer & HOD, Department of Electrical Engineering, Ahinsa Polytechnic, Dondaicha, Dhule, Maharashtra, India<sup>4</sup>

Lecturer, Department of Electrical Engineering, Ahinsa Polytechnic, Dondaicha, Dhule, Maharashtra, India<sup>5</sup>

**ABSTRACT:** The aim of our project is to make a Voice Control Robot Car. The working is based on Arduino micro-controller, motor drivers, a Bluetooth module. Arduino is an open-source hardware (single-board microcontrollers and kits) used for building digital devices. The idea is to first design the Hardware of the Robot Car and then code the entire working using our previous knowledge of programming. The code will then be simulated on software (IDE) and later be interfaced with the hardware. The coordination of control unit with Bluetooth gadget is accomplished utilizing a Bluetooth module to catch and read the voice orders. The controlling remote is a smart android device with Bluetooth Application. We picked this as our project as robotics has become a major part of our everyday lifestyle and also have a wide scope in the engineering field. It plays a vital role in the development of new technology.

**KEYWORDS:** Arduino, Android, Bluetooth, Robot, Wi-Fi

## I. INTRODUCTION

Robotics is an evolving technology. There are Various approaches to build robots, and no one is sure which method or technology will be used 100 years from now. Robotics is evolving like the Darwinian evolutionary theory of survival of the fittest.

The framework equipment comprises of a controller outfitted with Bluetooth communication module. It'll be connected to the motors and other alternative components of car. When the Bluetooth app is turned on and is connected with the current system via Bluetooth, one will operate the car by giving wireless commands from the app using the functions already programmed in the app. The vehicle will motion in four directions: Forward, Backward, Right and Left. In forward movement, all four motors will motion in the same direction and for backward motion; movement of the motors will be in opposite direction. For left and right movements, either of the motors will rotate and to stop the motors will stop. Instructions are given to the motors through the Bluetooth app of Android Smartphone by the user.

In this project, we will deliberate how to control robot- controlled car using Bluetooth module through Bluetooth application of an android mobile phone. The benefit of using robot-controlled car is it can be used to reduce manual work. This project can be modified quite easily to include a camera well that can stream the videos to the user over Wi-Fi using WiFi module.

## II. LITERATURE REVIEW

In 2003, Worldwide speculation in modern robots up 19%. In 2004, orders for robots were up another 18% to the highest level ever recorded. Overall development in the period 2004-2007 conjecture at a normal yearly pace of about 7%. More than 600,000 family unit robots being used- several millions in the next few years. Various researches have been made by different researchers in developing this project. Be that as it may, they serve an alternate application and have various innovations actualized. Some of those papers are mentioned below stating their technology and application.

Robot Control Design Using Android Smartphone

Authors: Mrumal K Pathak, Javed Khan, Aarushi Koul, Reshma Kalane Raunak Varshney

The motivation behind this paper is to furnish amazing computational android stages with less difficult robot equipment design. This paper depicts how to control a robot utilizing portable through Bluetooth communication, a few highlights about Bluetooth innovation, segments of the versatile and robot. It present an audit of robots constrained by smart phone



by means of moving the robot upward, reverse, left and right side by the android application, for example, Arduino, Bluetooth Smart Phone Controlled Robot Using ATMEGA328 Microcontroller.

Authors : Aniket R. Yeole, Sapana M. Bramhankar, Monali D. Wani, Mukesh P. Mahajan.

In this paper have structured a robot that can be controlled using an application running on an android smartphone. It sends control order by means of Bluetooth which has certain highlights like controlling the speed of the engine, detecting and sharing the data with telephone about the bearing and separation of the robot from the closest hindrance.

Android Controlled Bluetooth Robot Using 8051 Microcontroller.

Authors : Ritika Pahuja, Narender Kumar.

A robot is normally an electro-mechanical machine that is guided by PC and electronic programming. Numerous robots have been worked for producing reason and can be found in production lines around the globe. This paper build up the remote fastens in the android application which control the robot movement with them. What's more, in which Bluetooth communication is use to interface controller and android. Controller is interfaced to the Bluetooth module however UART convention

Robot Controlled Car Using Wi-Fi Module

Authors : S R Madkar, Vipul Mehta, Nitin Bhuwania, Maitri Parida

This paper, deliberate how to control robot controlled vehicle utilizing Wi-Fi module through android application of an android Smart Phone. It is additionally show that the apparatuses can be controlled even without an android telephone by sending an ordinary SMS. This task can be adjusted effectively to incorporate a covert agent camera too that can stream the recordings to the client over Wi-Fi. Sunlight based cells are rather than the customary lithiumion battery for the venture.

### III. DESIGN

#### BLOCK DIAGRAM

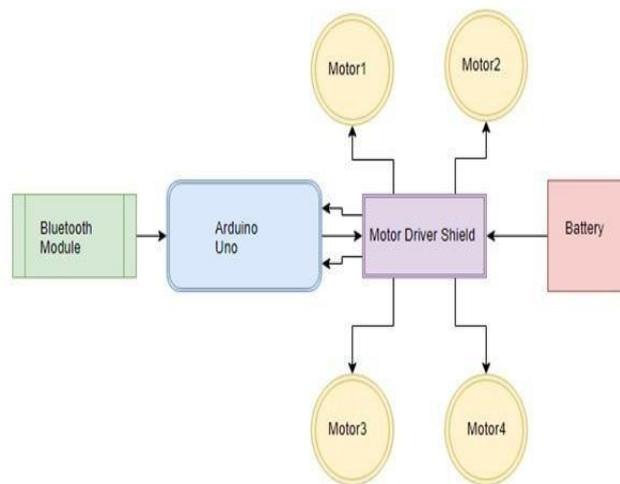
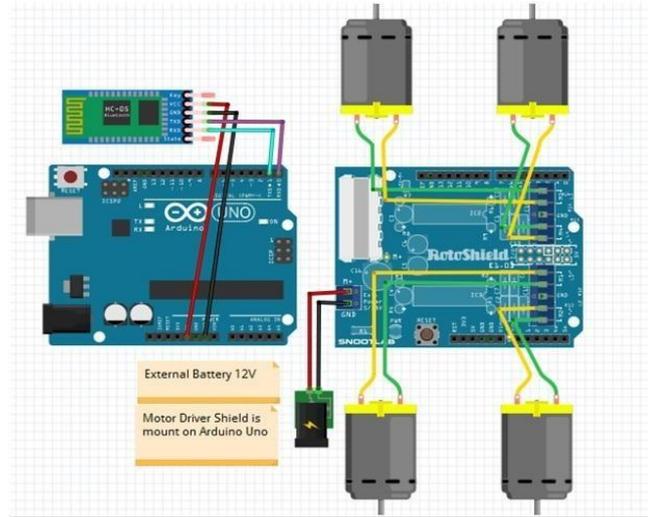


Fig -1: Block Diagram

The Arduino Wireless Voice Controlled Robot comprises of a transmitter and a beneficiary segment. The transmitter end comprises of Smartphone Bluetooth and the Android application introduced on it. Thus, the Receiver area has Arduino board as a processor, HC-05 Bluetooth Module as a remote communication module, L293D for driving engines, and a couple of DC designed as a section for moving robot.



## CIRCUIT DIAGRAM



**Fig -2:** Circuit Diagram

The circuit comprises of Arduino UNO Board, HC-05/HC-06 Bluetooth Module, L293D Motor Driver IC, a couple of DC Geared Motors of 200 RPM and a 9V Battery. The TX, RX pins of Arduino is associated with Rx, Tx pins of Bluetooth Module. The Bluetooth Module is provided with 5V. Essentially, left DC engine is associated with pin no 3 and 6 of L293D and right DC engine to stick no 14 and 11 of L293D. Arduino advanced pins 2,3,4,5 is associated with L293D 2, 7, 10, 15 respectively. The L293D IC Pins 2, 5, 12, 13 is GND pins, and 9, 1, 16 is provided with 5V. Be that as it may, pin 8 of L293D is straightforwardly provided with 9V.

## IV. HARDWARE REQUIREMENTS

1. **Arduino Uno:** The Arduino Uno is an open-source microcontroller board dependent on the Microchip ATmega328P microcontroller and created by Arduino.cc. It is programmable with the Arduino IDE through a kind B USB cable. It can be controlled by the USB link or by an outside 9-volt battery, however it acknowledges voltages between 7 and 20 volts.
2. **Motor Driver:** This L298N Based Motor Driver Module is a powerful engine driver ideal for driving DC Motors and Stepper Motors. It utilizes the well-known L298 engine driver IC and has the locally available 5V controller which it can gracefully to an outside circuit. It can control up to 4 DC engines, or 2 DC engines with directional and speed control.
3. **Bluetooth Module:** HC-05 module is simple to use Bluetooth SPP (Serial Port Protocol) module, designed for clear wireless serial association setup. The HC-05 Bluetooth Module is utilized in a Master or Slave configuration, creating it a good resolution for wireless communication.
4. **Ultrasonic Sensor:** A ultrasonic sensor is an instrument that gauges the separation to an object utilizing ultrasonic sound waves. An ultrasonic sensor utilizes a transducer to send and get ultrasonic heartbeats that hand-off back data about an item's nearness. High-recurrence sound waves reflect from limits to create unmistakable reverberation designs.
5. **Servo Motor:** A servomotor is a rotating actuator or straight actuator that takes into account exact control of angular or linear position, speed and acceleration. It comprises of a reasonable engine coupled to a sensor for position input. It likewise requires a moderately refined controller, frequently a committed module structured explicitly for use with servomotors.
6. **BO Motor with Tires:** DC engine (BO) changes over electrical vitality into mechanical vitality. DC MOTOR idea is the place gears decrease the speed of the vehicle yet increment its torque is known as gear decrease



7. **Wireless Camera:** The wireless camera has a night vision which enables no light or low light usage. It performs high-quality picture transmitting and receiving.

### V. SOFTWARE REQUIREMENTS

1. **Arduino IDE:** The Arduino Integrated Development Environment (IDE) is a cross-stage application (for Windows, macOS, Linux) that is written in capacities from C and C++. It is utilized to compose and transfer projects to Arduino perfect sheets.
2. **The Android App:** Android smartphone with an application is the transmitter end. At first, there should combine of Bluetooth HC-05/HC-06. When matching is done, at that point it should be associated. When the application is running in the smartphone, the client's voice orders are distinguished by the phone microphone

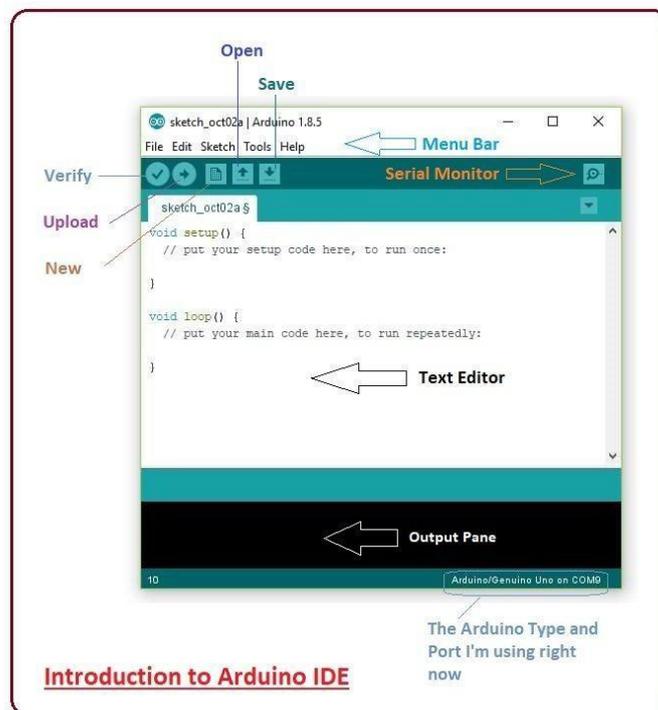


Fig -3: Arduino IDE

### VI. WORKING

The block diagram of the simple voice controlled robotic vehicle is given it consists of the smartphone that recognizes the voice commands and are being wirelessly transferred to the Bluetooth module HC05. The module at that point changes over the order to content and the series of characters are sent to the Arduino for additional handling. The Arduino microcontroller decodes the string got and correspondingly performs further capacities. The signals are sent to the motor that hence powers and drives the motors connected to it. On the Transmitter area, commands are given to the Mobile Application through the mic. This portable handset is associated with the moving vehicle by means of Bluetooth module. The portable application utilized, is modified so that the voice orders given to the handset are received by the mic and these simple voice orders are changed over to advanced word successions (A to D transformation). These stored sequences are than transmitted to the robotic vehicle via Bluetooth transceiver module and are sent to the transceiver controller. Android application transceiver is used to decode the received signal with the Bluetooth module. The controller contrasts these signals and the put away program orders in it and convert them into voice strings. The voice strings are then used to run the servo engines for the ideal interval of time. The microcontroller, sends directions, which when executed, helps in working of the engine driver. The yield of the Arduino goes to the engine driver IC and it controls the specific engine. A DC power supply is required to run the system. The DC power supply feeds the Microcontroller and the Bluetooth module.



#### Steps to control the robotic vehicle.

- Install any Bluetooth Application for Arduino
- Pair HC-05 Bluetooth module with the mobile Default password is “1234” or “0000”
- Click on the “MIC” icon and speak/instruct the robot
- On speaking our speech gets recognized and converted into text. That text is transferred using Bluetooth
- The Bluetooth Module receives the string, decodes it and compares it with the Instructions that are described in the program and moves the robot in forward direction

#### VII. ADVANTAGES

1. The Robot is small in size, therefore less space required.
2. We can access the robot vehicle from the distance of meters as we are using WIFI for the connection between robot and the server PC.
3. As we are using camera which is attached to the robot so it will capture video which will be used for security.
4. Low power consumption.
5. No accident is done by improper driving of people and also available for elderly and disabled people.

#### ADVANTAGES

Some real-world applications of this voice-controlled Robot are:

1. The robot is useful in places where humans find difficult to reach but human voice reach. Such as- in fire situations, in highly toxic areas.
2. The robot can be used for monitoring or investigation.
3. The voice controlled robotic car can be easily drive by unskilled driver by using voice commands with the help of android application in smart phone.

#### VIII. FUTURE SCOPE

1. This task work has been limited to short range Bluetooth module. Utilizing a long range modules and other availability gadgets will bring about network with the robot for significant distances.
2. Picture preparing can be executed in the robot to distinguish the shading and the items.
3. A warm camera can be introduced to detect the warmth produced by bodies valuable in military purposes to distinguish foes on the lines.
4. Programmed Targeting System can be executed in the robot for following the objective.
5. Further upgrade in venture can be utilized for Home security and military purposes where the orders can be given to robot without chance by expanding the range and by introducing cameras.
6. The robot is valuable in places where people discover hard to reach however human voice comes to. For example, in fire circumstances, in profoundly poisonous zones.
7. It is the one of the significant phase of Humanoid robots.
8. Discourse and voice acknowledgment security frameworks.
9. The robot can be used for monitoring or investigation.



### IX. RESULT AND DISCUSSION

Through our Design and implementation of our proposed system, we are able to achieve the following as results:

1. Robot is controlled through voice commands given by the user who is operating the project.
2. These voice command needs to be given through an android app which is installed on the users android mobile.
3. Speech recognition is done within the android app and then a respective command is sent to the voice- controlled robot vehicle.
4. Microcontroller fitted on the Vehicle decodes these commands and gives an appropriate command to the motors connected to the vehicle.

### X. CONCLUSION

The proposed framework of our project shows that how a robot can be control utilizing Bluetooth. The voice controlling orders are effectively transmitted through Bluetooth innovation and the desired activities effectively happen. This task lessens human endeavours at spots or circumstances where human intercessions are troublesome. Such frameworks can be brought into utilization at spots, for example, businesses, military and guard, investigate purposes, and so forth.

### ACKNOWLEDGEMENT

We convey our sincere gratitude to Mr. R. V. Pimple, Professor, Sachin R. Jadhav, Professor Ahinsa Polytechnic Dondaicha, Dhule for his guidance, support, and motivation to undertake and complete this project. His contribution as a guide to this project is invaluable and commendable.

### REFERENCES

1. Design of a Bluetooth Enabled Android Application for a Microcontroller Driven Robot By Vito M. Guardi,(May 2014).
2. Android Controlled Mobile Robot By Jorge Kazacos Winter,(July2013).
3. Android Based Robot Implementation For Pick and Retain of Objects By Ranjith Kumar Goud, B. Santhosh Kumar, (Oct 2014).
4. Smart phone based robotic control for surveillance applications By M.Selvam,(IJRET 2014)
5. Controlling a Robot using Android Interface and Voice By Kishan Raj KC,(2012).
6. Motion Control of Wheeled Mobile Robot By Gyula Mester,(SISY 2006)
7. Design of PI and PID Controllers with Transient Performance Specification By J. C. Basilio and S. R. Matos,(IEEE 2002).
8. Robot Control Design Based On Smartphone by Xiao Lu, Wenjun Liu, Haixia Wang, Qia Sun, IEEE, 978-1-4673-1382, pp-2820-2823, Jun 2013.
9. Android phone controlled robot using Bluetooth by Arpit Sharma, Reetesh Verma, Saurabh Gupta, Sukhdeep kaur bhatia, IJEEE, Vol.7,pp-443-448, Nov- 2014