

# Voice Controlled Robot Using Android Application

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**Abstract:** VCR is a robot whose movements can be controlled by the client by giving particular voice summons utilizing portable. The discourse is gotten by a mouthpiece and handled by the voice module. At the point when an order for the robot is perceived, at that point voice module sends a summon message through Bluetooth to the robot's microcontroller. The microcontroller breaks down the message and takes fitting activities.

The robots of this kind help diminishing the manual endeavours in their everyday errands. The robot can perform distinctive developments, turns, begin/stop operations. The adequacy of the voice control conveyed over a separation is estimated through a few trials. Conceivable upgrades and applications are additionally talked about towards potential applications in home, wheelchairs, clinics and businesses.

**Keywords:** Forward, Backward, Left, Right, Stop

## 1. INTRODUCTION

The motivation behind the undertaking is to plan a robot for the exchange of information from one end to other in firms to make the data development less demanding by only a transmitting voice charge from telephone, with the assistance of an android application on through Bluetooth arrange. The android App will help the robot to move in four ways said beneath. By Bluetooth availability an android application can deal with the developments of a robot and can propel it in and in reverse headings and it turns in clock-wise and hostile to clock-wise bearings.

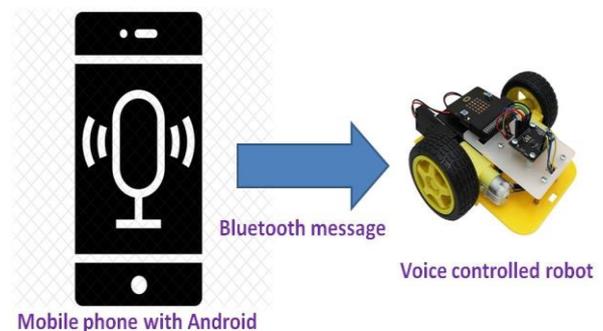
To design an App to control an automated vehicle by voice orders for remote task. A microcontroller (of 8051 arrangement) is utilized together with a Bluetooth gadget interfaced to the control unit for accepting the signs transmitted by the Android App. The microcontroller analyzes the message and takes suitable activities. The Robot utilizes an Android App through which the voice charges are transmitted to advanced bits.

## 2. ARCHITECTURE DIAGRAM

This voice controlled robot is a framework in which it comprise of two sections: one versatile application and Hardware of the Robot alongside its client improvement. The portable application will be utilized to perceive the voice charges from the client. The discourse is gotten by a receiver and prepared by the voice module. At the point when an order for the robot is perceived, at that

point voice module sends a summon message through Bluetooth to the robot's microcontroller. The microcontroller dissects the message and takes suitable activities.

The robots of this kind help lessening the manual endeavors in their everyday undertakings. The robot can perform diverse developments, turns, begin/stop tasks. Conceivable changes and applications are additionally talked about towards potential applications in home, wheelchairs, healing centers and ventures. In this venture another upgrade is done keeping in mind the end goal to build its ease of use i.e keen floor cleaning brush or any of its kind with the goal that it can fill in as a savvy floor cleaning robot.



**Fig-1:** Architecture diagram

To implement this product several electronic hardware components are used, they are Robotic development board, 8051 Microcontroller, DC Motors, USBASP programmer cable along with other components essential for the building of the robot. The schematic diagram of the product functioning as per the user instructions.

## 3. SOFTWARE

Voice controlled robot works under the android application with the assistance of the Bluetooth network.

For the android application improvement android studio is utilized. Keil u vision programming is utilized for the programming the microcontroller. Voice controlled robot works under the android application with the assistance of the Bluetooth network. For the android application development android studio is used. Keil u vision software is used for the programming the microcontroller.

**Android:** Android Platform is effective portable PC and they turn out to be an ever increasing number of famous PDAs utilized around the world. They turn out to be increasingly famous for programming engineers due to its effective capacities and open design; additionally it depends on JAVA programming dialect.

**Keil U vision software:** For converting the C language in HEX file Keil software is used which can easily burn in microcontroller.. The Keil  $\mu$ Vision Integrated Development Environment ( $\mu$ Vision IDE) supports three major microcontroller architectures and sustains the development of a wide range of applications.

**USBASP Cable:** This software can be installed along USBASP zip files for the programming of the microcontroller to perform the instructions received by the microcontroller from the microphone.

**4. HARDWARE**

1. 8051 Microcontroller
2. DC motor -2no's
3. Bluetooth Module HC-05
4. U Clamps - 2 No's
5. Robotics Development Board
6. USBASP Programmer Cable
7. Wheels for Motors - 2 No's.
8. Castor Wheels - 1 No.
9. Chassis - 1 No.

**8051 Microcontroller:**

8051 have following basic components inside it. Although we can connect additional components externally.

- It has 4k bytes of internal ROM
- It has 128 bytes of internal RAM
- It has four 8 bit input/output ports
- One serial communication port
- 8 bit address bus
- 64k bytes external memory for code
- Two 16 bit timers and counters
- Universal Asynchronous Receiver Transceiver (UART) serial communication port
- External and internal Interrupts
- Internal on chip clock
- Microcontroller 8051 has two timers

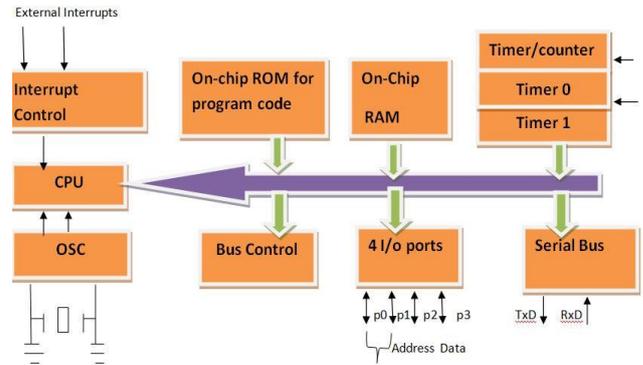


Fig-2 : 8051 microcontroller block diagram

**8051 microcontroller pin configuration:**

8051 comes in various versions or packages like DIP (dual in line package), QFP (quad flat package) and LLC(lead less chip carrier). It is 40 pin microcontroller.

**VCC:** It provides supply voltage to chip. The operating voltage is 5 volt.

**GND :** It connect with ground of voltage supply

**XTAL1 and XTAL2 pin:** Although the 8051 microcontroller have on chip crystal oscillator. But still it requires an external clock oscillator. The External crystal oscillator is connected to XTAL1 and XTAL2 pins. Processing speed of the 8051 microcontroller depends on the crystal oscillator frequency. **RST pin number 9** is a reset pin. It is active high pin. It is used to reset. If we apply active high signal to this pin, 8051 microcontroller will reset and turn off all its functions.

**EA Pin number 33** is used to store program. All family of 8051 microcontrollers comes with the on chip ROM to store programs. EA pin is connected with VCC. EA stands for external access.

**PSEN Pin number 29** is an output pin. It is stands for "Program store enable". It is also used for programming.

Input/output ports P0, P1, P2 and P3 use to interface 8051 microcontroller with external devices.

**DC MOTOR:** The DC engine is a machine that changes electric energy into mechanical energy in type of turn. Its development is created by the physical conduct of electromagnetism. DC engines have inductors inside, which deliver the attractive field used to produce development. Be that as it may, how does this attractive field changes if DC current is being utilized?

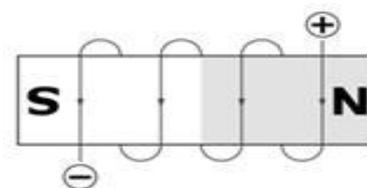


Fig-3 : Architecture of DC motor

As it can be seen, the commentator has two fragments which are associated with every terminal of the electromagnet, other than the two bolts are the brushes which apply electric current to the turning electromagnet. In genuine DC engines it can be discovered three slots rather than two and two brushes.

T1	T2	Movement	T1	T2	Movement	Final Direction
1	1	stops	1	1	Stops	stops
0	0	stops	0	0	stops	stops
0	1	Clockwise	0	1	Clockwise	Forward
1	0	Anticlockwise	1	0	Anticlockwise	Backward
0	0	stop	1	0	Anticlockwise	Left
0	1	Clockwise	0	0	Stop	Right

**Table 1 : Movements of Motors**

**BLUETOOTH HC-05 MODULE:** HC-05 is a Bluetooth module which is intended for remote correspondence. This module can be utilized as a part of an ace or slave configuration.

Bluetooth serial modules allow all serial enabled devices to communicate with each other using Bluetooth. It has 6 pins,

1. **Key/EN:** It is used to bring Bluetooth module in AT commands mode. If Key/EN pin is set to high, then this module will work in command mode..

HC-05 module has two modes,

- **Data mode:** Exchange of data between any two devices.
- **Command mode:** This mode utilizes AT commands which are utilized to change setting of HC-05. To send these commands to module serial (USART) port is used.

2. **VCC:** Connect 5 V or 3.3 V to this Pin.

3. **GND:** Ground Pin of module.

4. **TXD:** Transmit Serial information (remotely got information by Bluetooth module transmitted out serially on TXD pin).

5. **RXD:** Get information serially (got information will be transmitted remotely by Bluetooth module).

6. **State:** It indicates whether module is connected or not.

**USBASP CABLE:** USBASPs are one of the minimum costly alternatives to programming AVR's. wiring associations

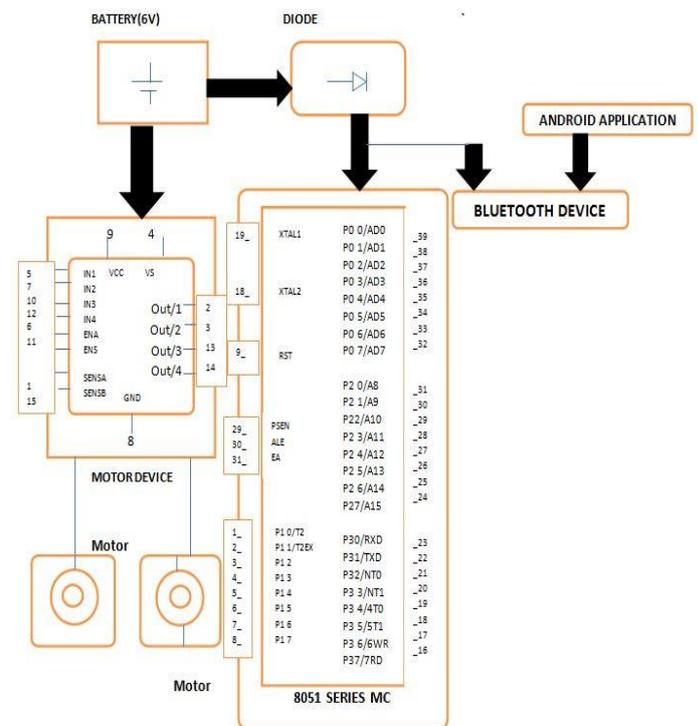
essential for the USBASP to exchange information from a PC to an AVR chip. One end interfaces into the computer. This takes into account us to exchange the compiled program from the computer to the USBASP. The other end of the USBASP regularly gets associated either to a 6-stick or a 10-stick link, which would then be able to get snared effortlessly to a breadboard through header pins. Both 6-pin and 10-pin cables are normal, so knowing the pin out of these is fundamental to interfacing them.

### 5. WORKING

It is aimed to control the robot using following voice commands:

1. Forward
2. Back
3. Right
4. Left
5. Stop ( stops doing the current job )

The above voice commands are given to the android application of the mobile phone in which it transfer the voice commands via Bluetooth network and operated by the 8051 microcontroller for the movements. The operating environment of the VCR is shown as the schematic diagram below.



**Fig-3:** Schematic diagram for the Operating Environment of the voice controlled robot.

The robots of this kind help in decreasing the manual endeavours in their everyday undertakings. Conceivable changes and applications are additionally talked about in up and coming parts towards potential applications in home, wheelchairs, clinics and ventures. The viability of the voice control imparted over a separation of 8 Meters is estimated through a few trials.

## 6. CONCLUSION

A Robot used for household cleaning is designed. The function of the intelligent robot includes obstacle avoidance, sweeping and mopping the floor. The paper shows better and simple approach to provide an overview of design of a simple robotic control design using gadgets.

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