

# **DESIGN & CONSTRUCTION OF VOICE CONTROLLED ROBOT**

**A Project and Thesis proposed in some achievement of the  
Requirements for the Award of Degree of  
Bachelor of Science in Electrical and Electronic Engineering**

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**DEPARTMENT OF ELECTRICAL AND ELECTRONIC  
ENGINEERING  
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DAFFODIL INTERNATIONAL UNIVERSITY**

***TO  
OUR BELOVED PARENTS  
&  
HONOURABLE SUPERVISER***

# Declaration

We hereby declare that this thesis paper is based on the results found by our research work and other researchers are mentioned by reference. This thesis has not been submitted before for any degree.

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December 2018

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Date

# Certificate of Approval

This is to certify that this project and thesis entitled “Construction of Voice Control Robot System” is committed under the following students by my direct review and this action has been rowed out under them in the Department of Electrical and Electronic Engineering below the Faculty of Engineering of Daffodil International University in some fruition of the requirements for the degree of Bachelor of Science in Electrical and Electronic Engineering. The presentation which was held on December 2018.

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| <b>ABBREVIATIONS</b> |    |   |
|----------------------|----|---|
| CPU                  | -- | Central Processing Unit                         |
| SRC                  | -- | Speech-recognition Circuit                      |
| APP                  | -- | Application                                     |
| RAM                  | -- | Random Access Memory                            |
| ROM                  | -- | Read only Memory                                |
| DSP                  | -- | Digital Signal Processor                        |
| CMOS                 | -- | Complementary Metal Oxide Semiconductor         |
| RPS                  | -- | Regulated Power Supply                          |
| AC                   | -- | Alternate Current                               |
| DC                   | -- | Direct Current                                  |
| USB                  | -- | Universal Serial Bus                            |
| LED                  | -- | Light Emitting Diode                            |
| LCD                  | -- | Liquid Crystal Display                          |
| IC                   | -- | Integrated Circuit                              |
| ISP                  | -- | In-System Programmable                          |
| UART                 | -- | Universal Asynchronous Receiver and Transmitter |
| GND                  | -- | Ground  |
| TTL                  | -- | Transistor Logic                                |
| RST                  | -- | Reset   |
| ALE                  | -- | Address Latch Enable                            |
| PC                   | -- | Program Counter                                 |
| SFR                  | -- | Special Function Registers                      |
| PAN                  | -- | Personal Area Networks                          |
| GFSK                 | -- | Gaussian frequency shift keying                 |
| SIG                  | -- | Special Interest Group                          |
| ISM                  | -- | Industrial, scientific and medical Band         |
| EDR                  | -- | - Enhanced Data Rate                            |
| AMR                  | -- | Android meets robot                             |

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# ABSTRACT

Most of simulated Intelligence will eventually command to robotics. Most neural networking, physical language processing, idol recognition, oratory recognition/synthesis research goal at eventually league their technology into the summary of robotics - the source of a fully humanoid robot. The field of artificial intelligence has been around nearly as long as AI - however the sector has created very little progress. This is often solely natural, since the sector not solely makes an attempt to beat intelligence, however additionally the body that embodies it is a formidable task. It's solely comparatively recently that robots have begun to use a degree of computing in their work - several robots needed human operators, or precise steering throughout their missions. Slowly, robots have become additional and additional autonomous. Artificial intelligence is Associate in nursing fully fascinating field that interests most of the people. Robot should have Sensing, Movement, Energy and Intelligence characteristics. This project deals with one of the application of vehicles. In this project, one moving object is developed such it's stirred as per commands area unit given by the voice recognition app which command is received by the microcontroller mistreatment wireless communication. This project is provided with DC motor, Voice Recognition module, Microcontroller at the side of the facility offer unit. Vehicle finds it applications within the time period.







# CHAPTER 1

## INTRODUCTION

### 1.1 INTRODUCTION

Mainly it behaves to been a fancy soul to raise about machine which believe like as humans. Recognizing the speech and respondent consequently may be a crucial a part of this fancy. Including the enhancements of the terminology and exploration on spurious rational, this fancy turn real comparatively. This project aim get an important role for contribute the fancy. Dominant the device and atmosphere including oration create mortal life easiest and lightest. The project may be an easy shaping of this refuge. Those voice is received by the arm which processes and send to the robot for final output. Basically speech used to way of the people. Under the developments of communicate technologies within the last period, that the speech begin to be an important for many ways. More than used raised finally several interfaces, speech is simply to communication with computers.

### 1.2 AIM OF THE PROJECT

Robots are Fundamental in different manufacturing industries. Because is that cost per hour to control a robot is a fracture of the cost of the human labor needed to perform the identical deed. Over this, at one time programmed, robots often acts as duty including a sublime validity that conquer which the foremost knowledgeable mortal operator. Nowadays maximum moving robots can forced be “dinosaurs. “The robots are in the infancy stage to their evolution, that the robot they are going to be a lots of versatile, emulating the human capability and abilities to exchange jobs task easily. Whatever the owner computer has been create an indelible mark on society. Robots

need a mix of components to be effective. While not risking human life or limb, robots will exchange mortal.

Whatever dangerous labor work. Robots will perform in every kinds of impure environments, chemical likewise as nuclear. They also perform so dangerous which a bounded mortal will be soon died.

### **1.3 SCOPES**

1. Robot used in industry system project to make easy daily life works through robot.
2. It can be used commercially in industries.
3. Portable android application to use it frequently in hand.
4. Nowadays Bluetooth technologies that's can be used in without wire connection for cellular phones and used in this project technology. This technology gives us in different efficient for controlled robot simply

### **1.4 METHODOLOGY**

This system is used to control all the robot hardware that connected to the microcontroller. The methodology of the proposed system is mainly divided into the three steps. In the initial step an android application interfaces with the Bluetooth module. After that in second step microcontroller receives the signal which has been send by the Bluetooth module. Then microcontroller sends the activation signal to the motor driver module. In the last step driver module switches the devices that connected to the robot

### **1.5 ORGANIZATION OF THE REPORT**

This project report has seven chapters in total. The first chapter describes an idea about our project “Bluetooth Control Home Automation”, Brief description of the project, scopes and methodology.

The second chapter about history, block diagram, circuit diagram, list of components. The chapter third about component description, cost analysis of our system. The chapter fourth software analysis & program explanation. The chapter five hardware implementation. Then chapter six describes result & discussion properly. Finally, chapter seven gives the concluding remarks, limitation of our system and suggestion for the future works.

# CHAPTER 2

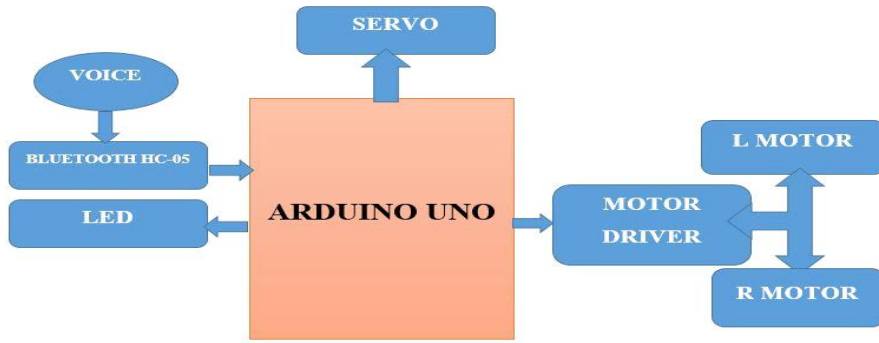
## SYSTEM REVIEW

### 2.1 INTRODUCTION

The voice control robot system allows people to control robot by using a smart phone application. It is necessary to look on hardware and user's smart phone software for developing a voice control robot. The can deal with many application such as industry, automation house, restaurant security, and toy for kids etc. In this chapter we will discuss about Bluetooth module (HC-05), and Arduino UNO, 'voice control robot system' apps, Arduino compiler, Block diagram & circuit diagram of our System.

### 2.2 BLOCK DIAGRAM

The block diagram is a way in which the principle parts are presented under blocks connect with the lines which showed the relationship of these ways. These are deeply used in engineering whole world its hardware graph, electronic design, software digraph and diagram. The block diagrams rely on the ethics of the black box which the article are mystic from sight either to eliminate being distracted by the details are not well known. Also know that which goes inland goes out but we cannot see how it works.



**Fig 2.1: Block diagram of voice control robot**

## **2.3 MICROPROCESSORS vs MICROCONTROLLERS:**

- Microprocessor which contains ALU (Arithmetic Logic Unit).
- Other hand Microcontroller contains ALU (Arithmetic Logic Unit), CU (Central Unit) and registers.
- Microprocessor has no internal memory otherwise microcontroller contains internal memory.
- Microprocessors used for purpose applications but Microcontroller used for specific purpose applications.
- Microprocessor which no circuits, timer and counters but Microcontroller which contains interfacing circuits, timer and counters.

## 2.4 BASIC DESCRIPTION OF CONTROLLER UNIT:

In using controller unit we used Arduino hardware board with the AVR microcontroller. Basically it will be a single chip of microcontroller which include all components of microcontroller. Across the aiding of Arduino 1.6.8 software chip form we performance freely ordered for AVR-IC. Arduino which is an open-source electronics prototyping stage based on supple, glib-to-conduct hardware and software. It's intended for mechanic, planner, hobbyists, and anyone loving in forming interactive purpose or environments. Using The microcontroller on these board is programmed behave the Arduino programming language (based on Wiring) and the Arduino development environment (based on Processing). It stands the requirements instruments which needed in a microcontroller, usually it will be connect to computer USB cable with AC-DC adapter or battery to get started.

## 2.6 BLOCK DIAGRAM DESCRIPTION:

The block diagram of voice control robot system as shown in fig.2.1, using the Arduino UNO, we can operate the Bluetooth module, motor driver. When the dedicated command is available, then Bluetooth module (HC-05) sends a digital output to control unit. At this time the control units (Arduino UNO) will send commands to motor driver to move robot with desire programming.

## 2.7 CIRCUIT DIAGRAM

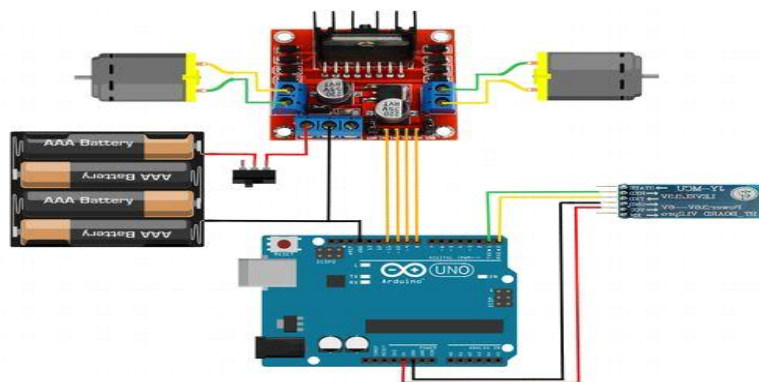


Fig.2.3: Circuit diagram

## 2.8 WORKING PROCESSOF OUR CIRCUIT:



This project the Bluetooth control voice activated robot project which called voice controlled robot. These application mainly controls the specific commands to prepare to our robot. In time when toggle buttons are pressed these specific commands are passed by the voice apps and that's command we get a execute output for robot. The software Arduino which finds out the signal was sent and compares it to the predefined for signal assigned for all application. Then it looking for active the motor from identifies that signal which passing by 5v. Then the motor driver is on and from specific command the motor driver is turned to move the robot.

## 2.9 LIST OF COMPONENTS USED IN CIRCUIT:

| No | Component Name                            | Quantity | Used                     |
|----|---|----------|--------------------------|
| 01 | Bluetooth Module (HC-05)                  | 01       | To direct communication. |
| 02 | Microcontroller:- ATmega328P(Arduino UNO) | 01       | To Control the System.   |
| 03 | Motor driver                              | 01       | To run robot             |
| 04 | Arduino compiler                          |          | To compile code.         |
| 04 | Amr voice Apps                            | 01       | To giving command.       |
| 06 | 12v battery                               | 02       | Power Supply             |
| 07 | Wires                                     | 19       | To connection.           |
| 09 | Led                                       | 03       | Fabrication              |
| 10 | Servo & sonar sensor                      | 1+1      | Rotate head              |
| 11 | Sonar sensor                              | 1        | Giving eye shape         |

## 2.10 CONCLUSION:

The voice control robot which used in many applications because of its desirable properties like homes, hostels, industries, vehicles, toy for children, playing device for mature kids. Open source robot practice and many more

# CHAPTER 3

## COMPONENT DESCRIPTION

### 3.1 INTRODUCTION

System hardware design composed of Arduino Uno, L298N motor driver module, Servo motor sg90, ultrasonic sensor for fabrication, 16x2 lcd, display, DC motor Bluetooth Module (HC-05), Some Wires, Arduino compiler, Android apps and obviously with power supply. In this chapter we will discuss about component description, features, working procedure and cost analysis of our all component.

### 3.2 DESCRIPTION OF BLUETOOTH MODULE (HC-05)

Recently everything goes to wireless such as phones computers, game controller, consoles and many other. Without wire technologies has allowed us to use electronic device with unbounded freedom to use without many others problem. Nowadays there are many types of wireless connectivity like as Wi-Fi, cellular information, ZigBee and the most well –liked and wide used wireless pools using Bluetooth. The 5 standard Bluetooth was announced the year in 2016 and looking the Bluetooth 4.2 standard is commonly used this moment.

In our project using HC-05 model of Bluetooth module which is easy to use and setup. The HC-05 which is used in a master of of slave configuration to do great solution and grat a smooth output for a great communication.



**Fig. 3.1.1: Bluetooth Module (HC-05)**

### **3.2.1 FEATURES OF BLUETOOTH MODULE (HC-05):**

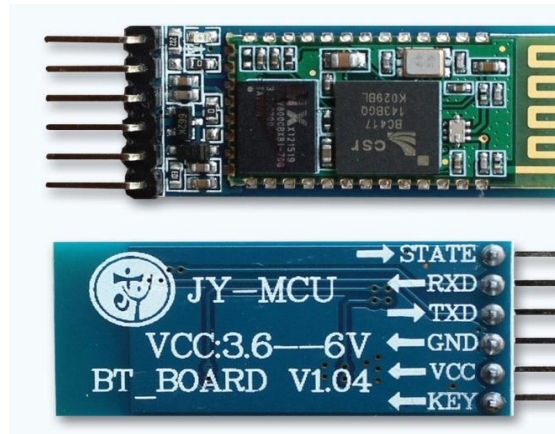
#### **Hardware Features**

- Typical 80dBm sensitivity.
- Up to +4dBm RF transmit power.
- 3.3 To 5v I-O.
- PIO that's means Programmable I-O Control.
- With integrated antenna.
- With edge connector.

#### **Software Features**

- Slave default Baud rate: 9600, Data bits: 8, Stop bit: 1, Parity: No parity.
- Auto-connect to the last device on power as default.
- Permit pairing device to connect as default.

### 3.2.2 PIN DESCRIPTION OF HC-05:



**Fig 3.1.2: Pins of HC-05**

| Sl. | Pin Name    | Description   |
|-----|-------------|---|
| 1.  | +5V or 3.3V | +5V supply or Power Pin.  |
| 2.  | TX          | The Data/Command to be transmitted is sent through this pin.                  |
| 3.  | RX          | The Received data is read from this pin.                                      |
| 4.  | KEY/EN      | Input pin, which alters module between the Data mode and the AT Command mode. |
| 5.  | STATE       | Output pin, the state of the module is indicated through this pin.            |
| 6.  | GROUND      | 0V / GND or Power Pin   |

**Table: 3.1.3: HC-05 pin description**

### **3.2.3 SUMMARY:**

In the end this is a very good device to use in home or industry. This is a low cost project so that it is very cost effective and efficient. In short term uses of communication it is better than other wireless communication.

### **3.3 BASIC DESCRIPTION OF ANDROID APPLICATION:**

An associate degree droid app may be a code application running on the robot platform. As a result of the robot platform is constructed for mobile devices, a typical robot app is meant for a smartphone or a pill laptop running on the robot OS. Though associate degree robot app square measure usually created on the market by developers through their websites, most robot apps square measure uploaded and printed on the robot Market, an online store dedicated to those applications. The robot Market options every free and priced apps. Robot apps square measure written within the Java programing language and use Java core libraries. They're first compiled to Dalvi possible to run on the Dalvi virtual machine, which can be a virtual machine specially designed for mobile devices.

### 3.3.1 VOICE APPLICATION:



**Fig 3.2: Arm voice Android Apps.**

### 3.4 BASIC DESCRIPTION OF CONTROLLER UNIT:

The controlled we are used in radio hardware board with AVR microcontroller. This time with the help of Arduino 1.6.8 plate from we can easily create a programmer IC, Arduino is an open source electronic platform based on flexible which to easy hardware software. The Arduino UNO is mainly a microcontroller single chip which has 14 digital input output pin that's contains 6 PWM and 6 are analog pins, All are requirements instruments are involved the Arduino which are controlled a microcontroller. There are also a USB connector and a reset button and 6 MHz oscillator a power jacket all are include it.

#### 3.4.1 TECHNICALSPECIFICATION ARDUINOUNO



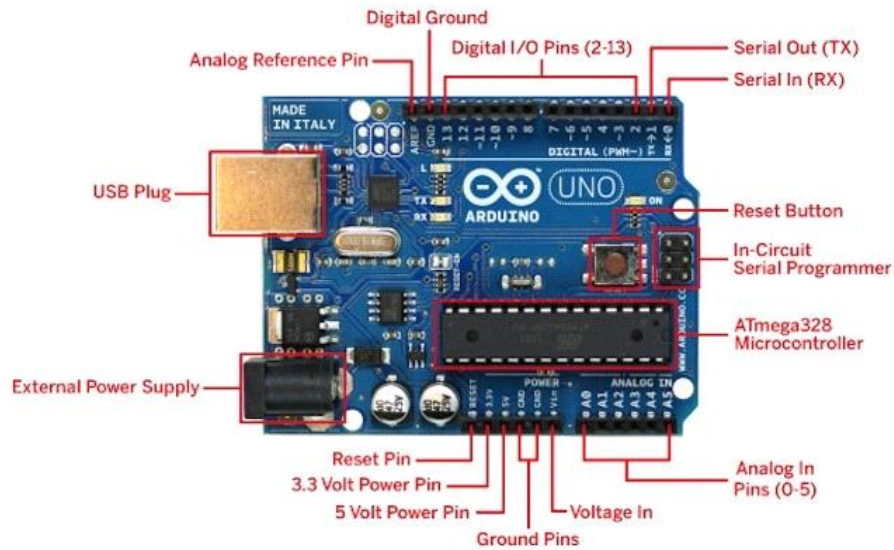
**Fig 3.3: Arduino UNO.**

|                              |                  |
|------------------------------|------------------|
| Microcontroller              | ATmega328        |
| Operating Voltage            | 5V               |
| Supply Voltage (recommended) | 7-12V            |
| Analog Input Pins            | 6                |
| DC Current per I/O Pin       | 40 Ma            |
| DC Current for 3.3V Pin      | 50 mA            |
| SRAM                         | 2 KB (ATmega328) |

**Table 3.2 Arduino Short Description**



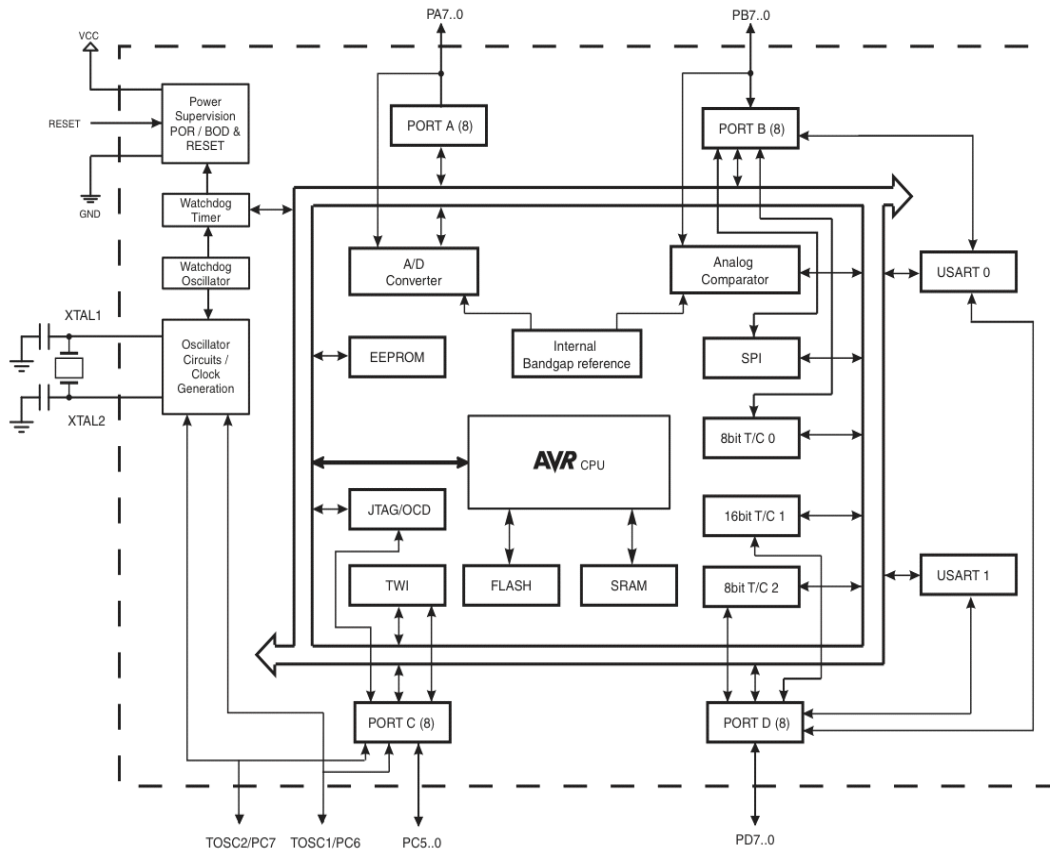
### 3.4.2 DESCRIPTION OF MICROCONTROLLER: ATMEGA328:



**Fig 3.3(b): Arduino UNO**

The Arduino Uno may be a microcontroller board supported the ATmega328 (datasheet). it's fourteen digital input/output pins (of that half dozen will be used as PWM outputs), half dozen analog inputs, a sixteen megahertz oscillator, a USB association, an influence jack, Associate in Nursing ICSP header, and a push. It contains everything required to support the microcontroller; merely connect it to a laptop with a USB cable or power it with Associate in Nursing AC-to-DC adapter or battery to urge started.

### 3.4.3 BLOCK DIAGRAM OF MICROCONTROLLER – (ATMEGA328):



**Fig. 3.3.1: Block Diagram of Microcontroller – (Atmega328)**

### 3.4.4 PIN CONFIGURATIONS OF MICROCONTROLLER – (ATMEGA328):

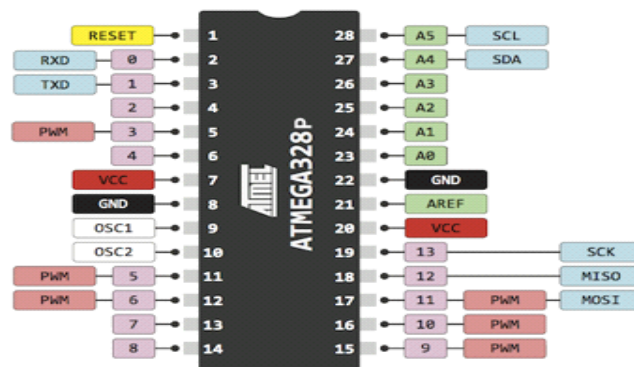


Fig. 3.3.2: Pin Configurations of Microcontroller – (Atmega328)

### 3.4.5 PIN DESCRIPTIONS:

The below gives a description for each of the pins, along with their function:-

**These pins are as follows:**

- **VIN:** This pin basically input voltage to the Arduino board when it is using an external power source.
- **5V:** This time used power supply to the microcontroller and other components in these board.
- **3V3:** The 3.3 voltage supplies generate under the on-board regulator. This time maximum 50mA current flowed.
- **GND:** Ground pins generated.

**There are a couple of other pins on the board:**

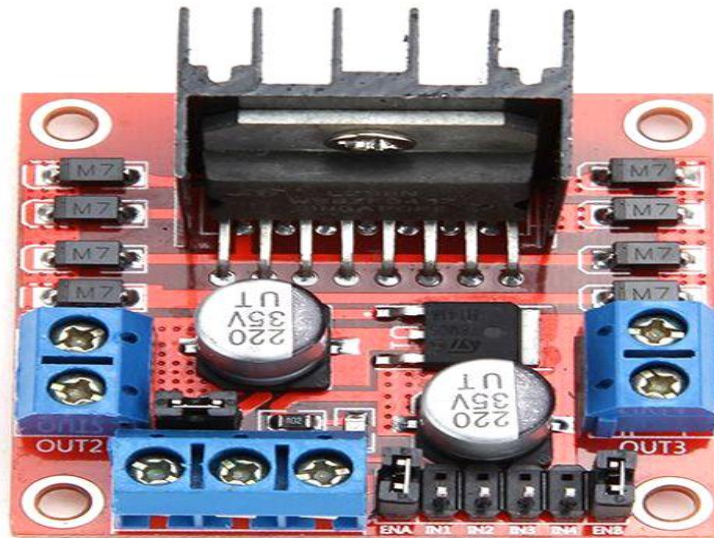
- **AREF:** Reference voltage for the analog inputs. Used with analog Reference.

- **Reset:** Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

**Memory:** The At mega 328 has 32 Kb of flash memory for storing code which 0.5 KB is used for the bootloader and 2 KB of SRAM and 1 KB of EEPROM which also be read and written with the EEPROM library.

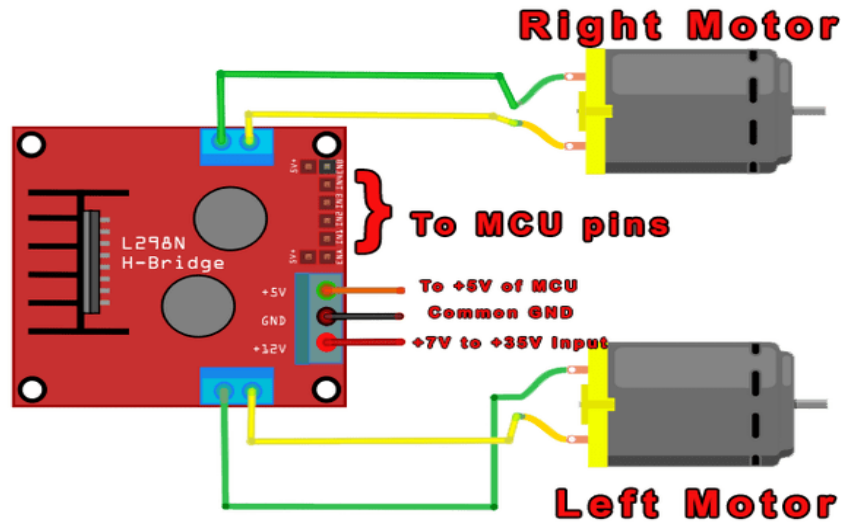
### 3.5 L298N MOTOR DRIVER

L298N is a dual H-bridge motor driver. Motor drivers act as current amplifiers since they take a low-current control signal and supply a higher-current signal. This higher current signal is employed to drive the motors. L2938 contains 2 inherent H-bridge driver circuits. In its common mode of operation, 2 DC motors can be driven at the same time, each in forward and reverse direction. The motor operations of two motors can be controlled by input logic at pins 2 & 7 and 10 & 15. Input logic 00 or 11 will stop the corresponding motor. Logic 01 and 10 will rotate it in clockwise and anticlockwise directions, respectively.



**Fig 3.4: L298N Motor Driver**

Enable pins ENA and ENB (corresponding to the two motors) must be high for motors to start operating. A simple schematic for interfacing a DC motor using L298N is shown below.



**Fig 3.5: Schematic Interfacing of the L298N.**

### 3.5.1 L298N CONNECTIONS

The circuit shown to the right is the most basic implementation of L298N motor driver. If we see the L298N motor driver pins and we have to understand the functionality of each pin before implementing this in a circuit.

| MW.15  | PowerSO    | Name               | Function   |
|--------|------------|--------------------|--|
| 1;15   | 2;19       | Sense A; Sense B   | Between this pin and ground is connected the sense resistor to control the current of the load.                            |
| 2;3    | 4;5        | Out 1; Out 2       | Outputs of the Bridge A; the current that flows through the load connected between these two pins is monitored at pin 1.   |
| 4      | 6          | V <sub>S</sub>     | Supply Voltage for the Power Output Stages. A non-inductive 100nF capacitor must be connected between this pin and ground. |
| 5;7    | 7;9        | Input 1; Input 2   | TTL Compatible Inputs of the Bridge A.   |
| 6;11   | 8;14       | Enable A; Enable B | TTL Compatible Enable Input: the L state disables the bridge A (enable A) and/or the bridge B (enable B).                  |
| 8      | 1,10,11,20 | GND                | Ground.  |
| 9      | 12         | VSS                | Supply Voltage for the Logic Blocks. A100nF capacitor must be connected between this pin and ground.                       |
| 10; 12 | 13;15      | Input 3; Input 4   | TTL Compatible Inputs of the Bridge B.   |
| 13; 14 | 16;17      | Out 3; Out 4       | Outputs of the Bridge B. The current that flows through the load connected between these two pins is monitored at pin 15.  |
| -      | 3;18       | N.C.               | Not Connected  |

**Table 3.3 L298N driver pin specification**

### 3.5.2 VOLTAGE SPECIFICATION

| Symbol                            | Parameter  | Value         | Unit        |
|-----------------------------------|--|---------------|-------------|
| V <sub>S</sub>                    | Power Supply   | 50            | V           |
| V <sub>SS</sub>                   | Logic Supply Voltage   | 7             | V           |
| V <sub>i</sub> ,V <sub>en</sub>   | Input and Enable Voltage   | -0.3 to 7     | V           |
| I <sub>o</sub>                    | Peak Output Current (each Channel)<br>– Non Repetitive (t = 100µs)<br>– Repetitive (80% on –20% off; t <sub>on</sub> = 10ms)<br>– DC Operation | 3<br>2.5<br>2 | A<br>A<br>A |
| V <sub>sens</sub>                 | Sensing Voltage  | -1 to 2.3     | V           |
| P <sub>tot</sub>                  | Total Power Dissipation (T <sub>case</sub> = 75°C)   | 25            | W           |
| T <sub>op</sub>                   | Junction Operating Temperature   | -25 to 130    | °C          |
| T <sub>stg</sub> , T <sub>j</sub> | Storage and Junction Temperature   | -40 to 150    | °C          |

**Table 3.4 L298N driver voltage specification**

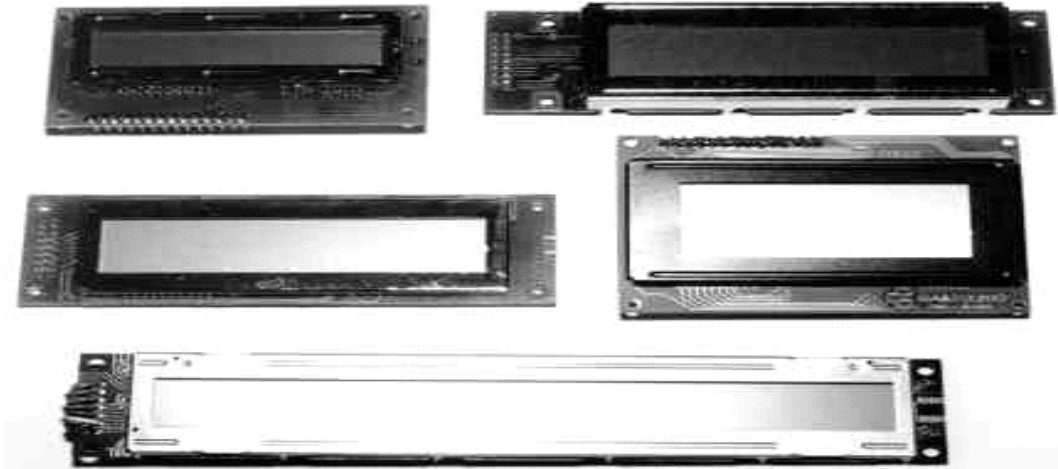
### 3.6: DESCRIPTION OF LCD DISPLAY 16x2

Using the LCD (Liquid Crystal Display) is a thin which is flat and made of any number of color or monochrome pixels in front of a source of light or reflector. Every pixel consists of a column of liquid crystal molecules suspended between two transparent electrodes, and two polarizing filters, the axes of polarity of which are perpendicular to each other. For 16×1 LCD, the address locations are:

| POSITION |        | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|----------|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| ADDRESS  | LINE 1 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 |
|          |        |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|          |        |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|          |        |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

**Table 3.5: Address locations for a 1x16 line LCD**

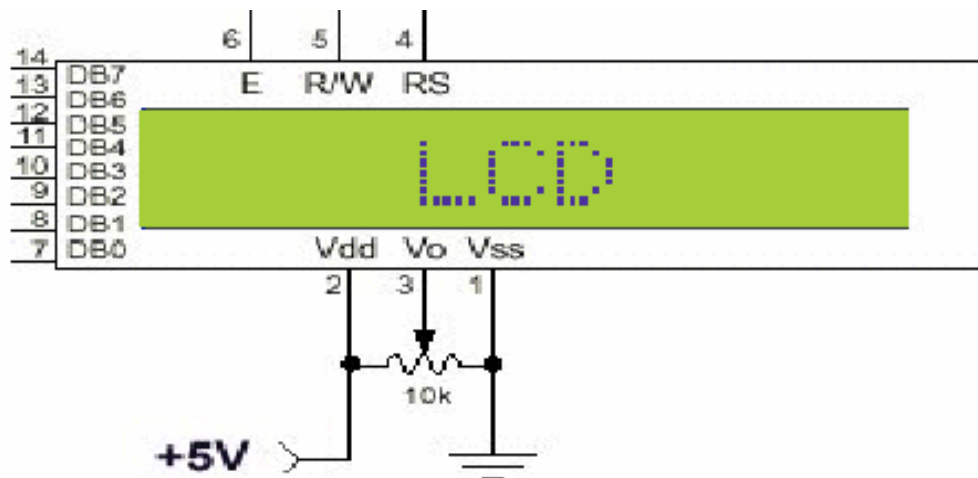
#### 3.6.1 SHAPES AND SIZES:



**Fig 3.6: LCD Different Models.**

### 3.6.2 PIN DESCRIPTION:

Most LCDs with 1 controller has 14 Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections).

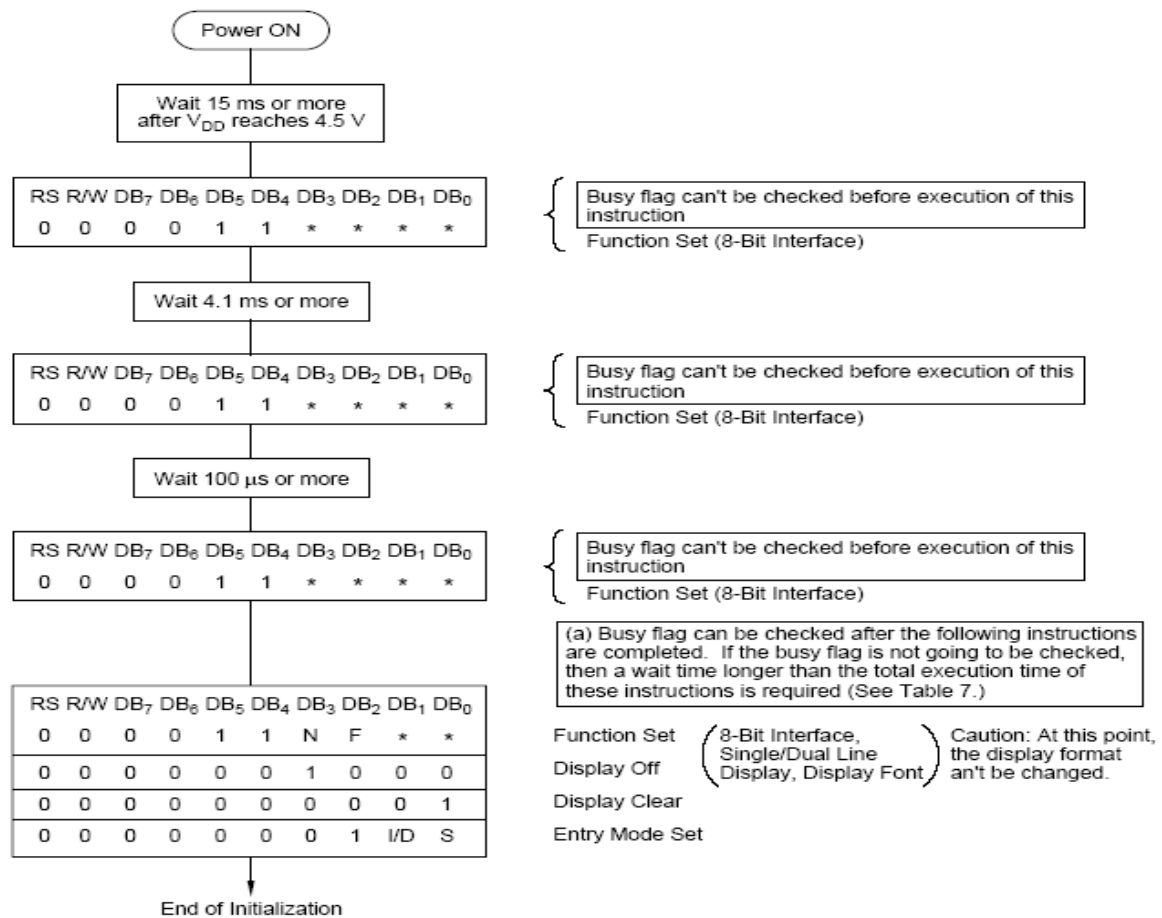


**Fig 3.7: Pin Diagram of 1x16 lines LCD**

| PIN  | SYMBOL  | FUNCTION                         |
|------|---------|----------------------------------|
| 1    | Vss     | Power Supply(GND)                |
| 2    | Vdd     | Power Supply(+5V)                |
| 3    | Vo      | Contrast Adjust                  |
| 4    | RS      | Instruction/Data Register Select |
| 5    | R/W     | Data Bus Line                    |
| 6    | E       | Enable Signal                    |
| 7-14 | DB0-DB7 | Data Bus Line                    |
| 15   | A       | Power Supply for LED B/L(+)      |
| 16   | K       | Power Supply for LED B/L(-)      |

**Table 3.6: Pin Description of LCD**

### 3.6.4. INITIALIZATION BY INSTRUCTIONS:



**Fig 3.8.: Flow Chart of Installation**



## 3.7 DC MOTOR

A DC motor is intended to run on DC wattage. 2 samples of pure DC styles square measure archangel Faraday's homoploid motor (which is uncommon), and also the ball bear in motor, that is (so far) a novelty. far and away the foremost common DC motor sports square measure the brushed and brushless sorts, that use internal associate degreed external commutation severally to make an periodic AC current from the DC supply -- so that they don't seem to be strictly DC machines during a strict sense.



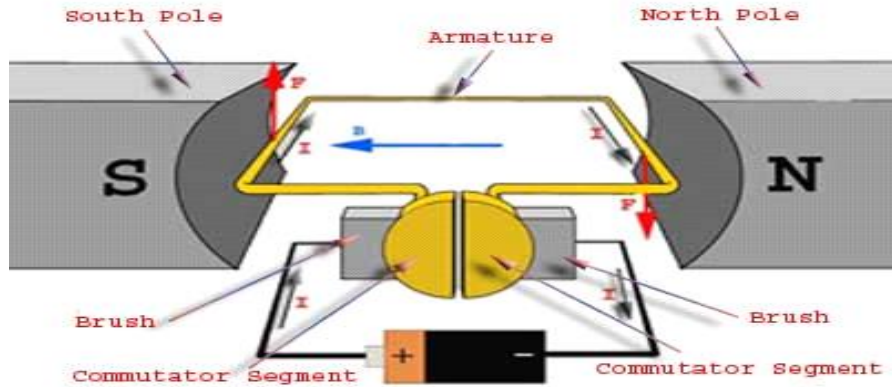
**Fig 3.9: DC Motor.**

### 3.7.1 TYPES OF DCMOTORS

- Brushed DC Motors
- Brushless DC motors
- Coreless DC motors

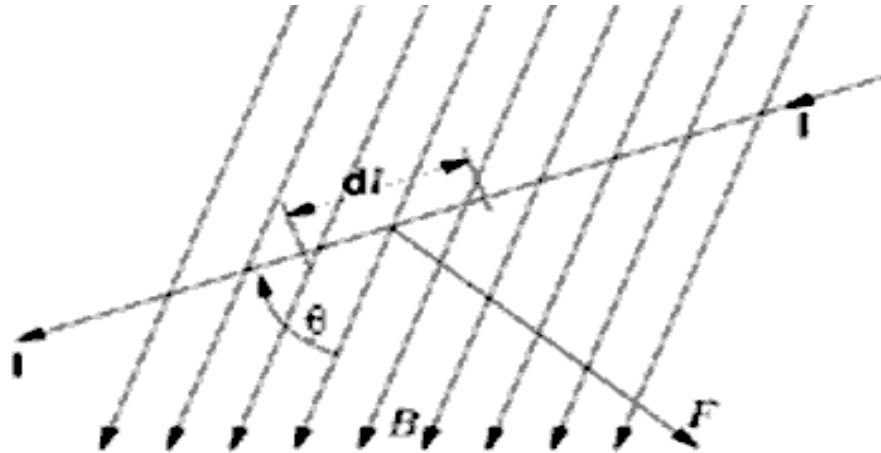
### 3.7.2 WORKING OR OPERATING PRINCIPLE OF DC MOTOR

A dc motor simple words is a device that converts direct current (electrical energy) into mechanical energy. The very basic construction contains a current carrying armature which is connected to the supply end through commutator segments and brushes and placed within the north south poles of a permanent or an electro-magnet as shown in the diagram below.



**Fig 3.10: Operation of DC Motor.**

For clear understanding the principle of DC motor we have to determine the magnitude of the force, by considering the diagram below.



**Fig 3.11: Magnitude of the force for DC Motor.**

We know that when an infinitely small charge  $dq$  is made to flow at a velocity 'v' under the influence of an [electric field](#) E, and a [magnetic field](#) B, then the Lorentz Force  $dF$  experienced by the charge

### 3.8 BASIC ARDUINO SOFTWARE:



**Fig 3.11: Arduino Software**

### **3.8.1 FEATURES OF ARDUINO SOFTWARE:**

- File
- Edit
- Sketch
- Tools
- Help

### **3.9 WIRES:**

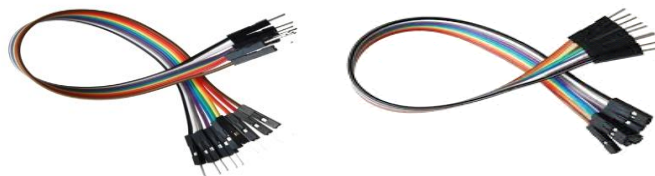


Fig 3.11(a): Female to Male Jumper Wire. Fig 3.11(b): Male to Male jumper

### **3.10 POWER SUPPLY 12V:**

The automaton ar powered from 12v lip battery. The inner electronic equipment of associate external power provide is extremely the same as the look that might be used for a intrinsic or internal provide. External power provides ar used each with instrumentality with no different supply of power and with powered instrumentality



**Fig 3.12: 12v Power supply**

### **3.10.1 SPECIFICATIONS:**

- Capacity: 1100mAh
- Voltage: 11.1V (3S)
- Discharge Rating: 30C
- Charge Rate: 2C
- Dimensions: 138x46x35.5mm
- Weight: 300g

### **3.11 COST ANALYSIS**

In this section we will show cost of our project that means cost sheet representation of our project.

#### **3.11.1 COST SHEET:**

| <b>No</b> | <b>Component Name</b>   | <b>Quantity</b> | <b>Purchase Price (TK)</b> |
|-----------|-------------------------|-----------------|----------------------------|
| <b>01</b> | Bluetooth Module(HC-05) | 1               | 350.00                     |
| <b>02</b> | Arduino UNO             | 1               | 450.00                     |
| <b>03</b> | L298N motor driver      | 1               | 400.00                     |
| <b>06</b> | Amr voice app           | 1               | Free                       |
| <b>07</b> | Battery and charger     | 1               | 1900.00                    |
| <b>08</b> | Arduino Software        | 1               | Free                       |
| <b>09</b> | Wires                   | 8               | 100.00                     |
| <b>10</b> | Pvc board               | 1               | 200                        |
| <b>11</b> | Servo motor             | 1               | 180                        |
| <b>12</b> | Others                  |                 | 500                        |
|           | <b>Total Cost</b>       |                 | <b>=4080.00</b>            |

### **Comparison:-**

Our all components are available in market. We get all components are very reasonable price. So that we make this project more cost efficient.

### **3.12 CONCLUSION**

Five main Component & some tools are used in this system to makes it .This Project is used to control the house appliances. Our all component are very simple &available in our country market.

# CHAPTER 4

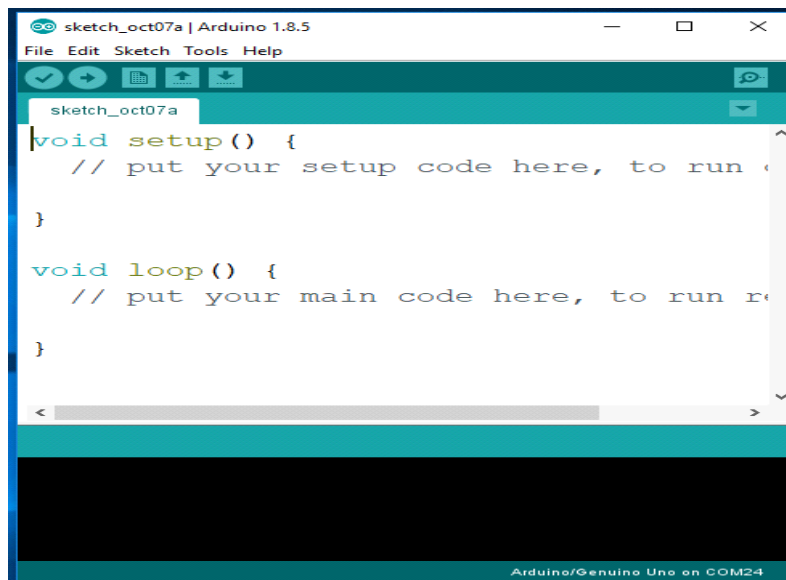
## SOFTWARE ANALYSIS

### 4.1 INTRODUCTION

In this chapter the software system used and therefore the language within which the program code is outlined is mentioned and therefore the program code selling tools square measure explained. The chapter additionally documents the event of the program for the applying.

### 4.2 DESCRIPTION OF OUR SOFTWARE

The open-source Arduino environment makes it easy to write code and upload it to the I/O board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing, avr-gcc, and other open source software. The screen shot of Arduino 1.6.8 is shown below.



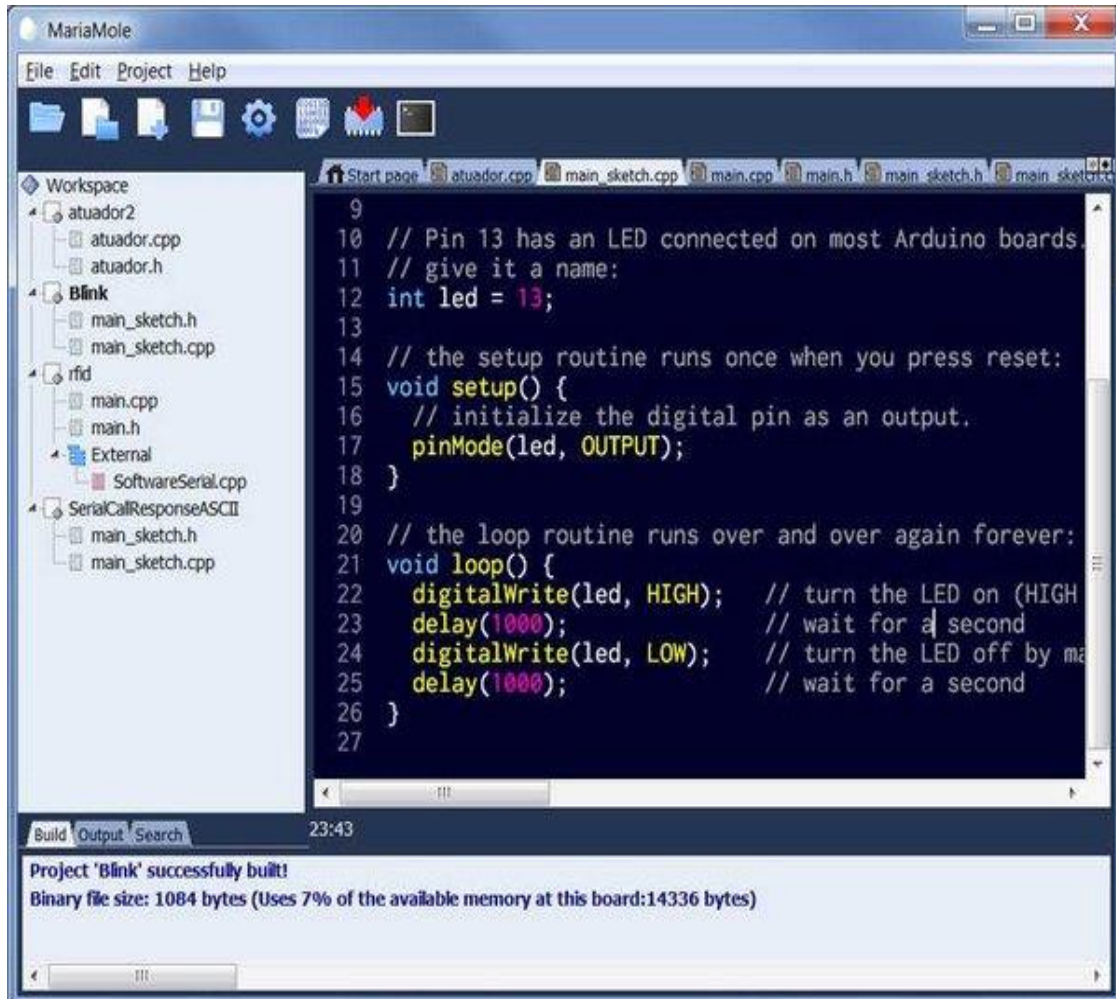
**Fig. 4.1: Software Platform**

The Arduino IDE comes with a C/C++ library called "Wiring" (from the project of the same name), which makes many common input/output operations much easier. Arduino programs are written in C/C++, although users only need define two functions to make a runnable program:

setup() – a function run once at the start of a program that can initialize settings

loop() – a function called repeatedly until the board powers off

**The compiled window of our code is shown below.**



**Fig. 4.2: Compiling window**

## 4.3 Flow Chart Diagram

POWER ON

**ARDUNIO UNO...OK**

**BLUETOOTH MODLE.OK**

**NO**

**BLUETOOTH MODULE = LOW**

**NO**

**Yes**

**Fig. 4.3: Flow chart of our system**

## **4.4 CONCLUSION**

The system software developed in Embedded C, C++ language which has the ability of receiving the data from sensor and transmitting the data, and controls all the Robot that connected. Because of its low power consumption, easy usage, reliability it is used in other fields. Software analysis is a very important part of our system. A Software analysis makes sure good design. A proper Software analysis and its burn into Arduino Uno the project to a smooth end.



# CHAPTER 5

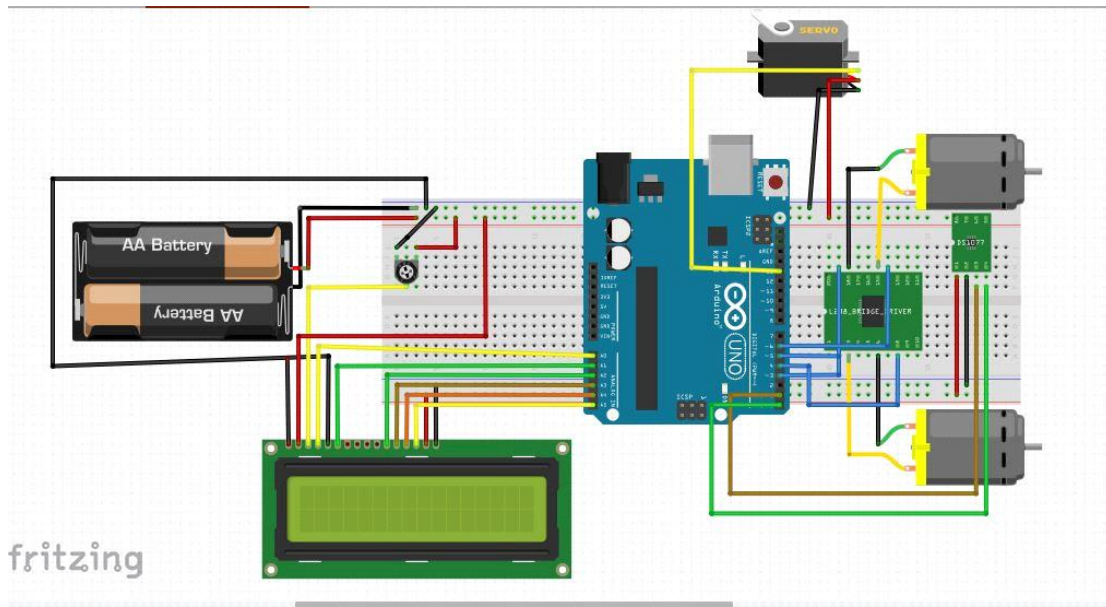
## SCHEMATIC REPRESENTATION

### 5.1 INTRODUCTION

A schematic, or schematic diagram, is an abstract illustration of the structure of a system using simplified, graphic symbols rather than realistic photos. A schematic typically omits all details that are not relevant to the data the schematic is meant to convey, and can add elements that aid comprehension. As an example, a subway map meant for riders might represent a terminal with a dot; the dot does not fit the particular station in any respect however offers the viewer data while not unnecessary visual clutter. A schematic diagram of a system uses symbols to represent the vessels, piping, valves, pumps, and different instrumentation of the system, and their interconnection methods and suppressing physical details.

### 5.2 SCHEMATIC DIAGRAM

In the previous chapters we got an idea about project block diagram and functions of each block in detail. In this chapter we see schematic representation of the project and various components what are involved in this project. The below figure shows the schematic representation of the project.



**Fig 5.1: Circuit Diagram**

After seen the above diagram we have an idea about each and every pin connection of microcontroller involves in the project. The wire connections in the project are very important.

**The various components involved in this project are:**

- CRYSTAL OSCILATOR
- RESISTORS
- SWITCHES
- MOTORS
- WHEELS
- PVC BOARD
- SONAR
- SERVO
- LCD
- MICROCONTROLLER

- DRIVER MODULE
- REGULATOR
- CONNECTING WIRES
- BATTERY AND CHARGER
- 

### 5.2.1 CRYSTAL OSCILLATOR

It is an electronic circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to make an electrical signal with an awfully precise frequency. This frequency is often accustomed keep track of your time (as in quartz wristwatches). In this project crystal oscillator frequency is 11.0592 MHz. The below figure shows the crystal oscillator.



**Fig 5.2: Crystal Oscillator**

### 5.2.2 RESISTOR

The resistor is a passive electrical component which create resistance for flowing electric current .Almost all are electrical networks and electronic circuits which can be found .The resistance in measure in ohms, an ohms is the resistance tat occurs when a current of one ampere passes through a resistor within one voltage drop across it's terminals.Basically resistor are used in many purpose ssuch as current ,voltage division heat generation, matching and loading circuits.

### **5.2.3 SWITCHES**

In engineering switch plays a important role that can break an electrical circuit delivering one conductor to another conductor. The most identical to manually controlled to electromechanical device eith one or more sets of electrical external circuits. Each contacts can be two states one is open and another is closed. Open means contacts are separate and switch is no conducting and closed means contacts are touching and electricity flow between them. Switches are the depends upon the closed conduct and open conduct

### **5.2.4 MOTORS**

A DC motor is an electric motor which runs that an direct electric power. Mainly any electric motor operation depends upon the electromagnetism. A current carrying conductor produces a magnetic field and torque when it is placed in an external magnetic field. Examples of pure DC are Michael Faraday's homo polar motor (which is uncommon), and the ball bear in motor, By far the most common DC motor types are the brushed and brushless types. In any electric motor, operation is based on simple electromagnetism. Mainly it converts electrical energy to mechanical energy.

### **5.2.5 LCD**

LCD means liquid crystal display is a flat display made up of color or pixels front of a light source .It's the common that an LCD display controlled an attached device. Every pixels consist of a column of liquid crystal display between two transparent electrodes. The LCD which connected to the controller 16X1 and two polarizing filters. The specific given commands output will show the display. It depends upon the execute program.

### **5.2.6 MICROCONTROLLER**

The true computer on a chip is nothing but a microcontroller. The design incorporates all of the features found in a microprocessor CPU, ALU, PC, SP and registers.

## **5.2.7 DRIVER MODULE**

L298N is a dual H-bridge motor driver module. Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors. L298N is a dual H-Bridge motor driver.

## **5.2.8 CHARGED BATTERIES**

Batteries are used to give a electric supply to run the electronic devices, machines, to run the vehicles. Batteries are also helpful in storage purpose. When power supply is not available then we will follow the storage batteries or batteries. Batteries are low cost, can be rechargeable. No expensive.

## **5.2.9 REGULATOR**

A transformer is AN electrical regulator designed to mechanically maintain a continuing voltage level. Electronic voltage regulators square measure found in devices like laptop power provides wherever they stabilize the DC voltages utilized by the processor and alternative components.

## **5.3 CONCLUSION**

From this chapter we conclude that Fig 6.1 shows the schematic diagram of voice control robot through android. This fig shows the overall project representation of the project and we are able to know in which way every pin of the microcontroller involves in this project. And also we are discussed about each component in this project. Fig 6.1 shows the schematic diagram of voice control robot through android. This fig shows the overall project representation of the project and we are able to know in which way every pin of the microcontroller involves in this project. And also we are discussed about each component in this project.



# CHAPTER 6

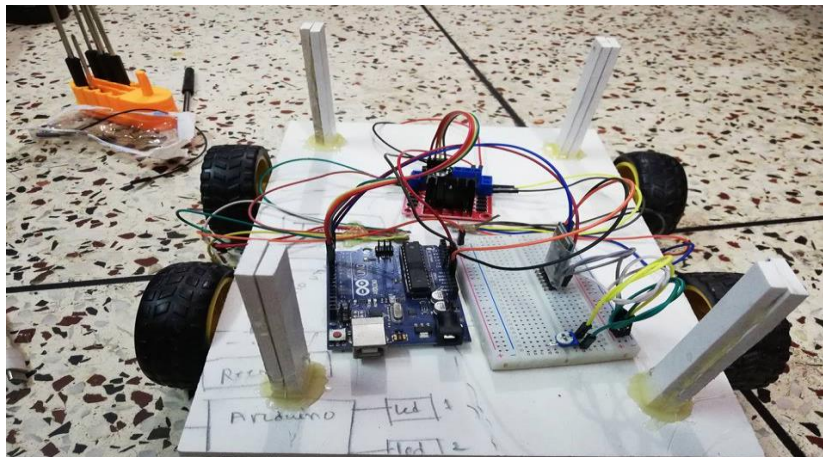
## RESULT AND DISCUSSION

### 6.1 INTRODUCTUION

In this chapter we'll discuss regarding the assembling process of voice control robot through android and assembling method. During this we'll additionally discuss regarding android, android applications. However the humanoid are going to be helpful during this project. That android applications are utilized in this project? Within the android applications however the commands are used to control the robots and additionally during this chapter we'll discuss regarding robot's operating mechanism. They're briefly explained below.

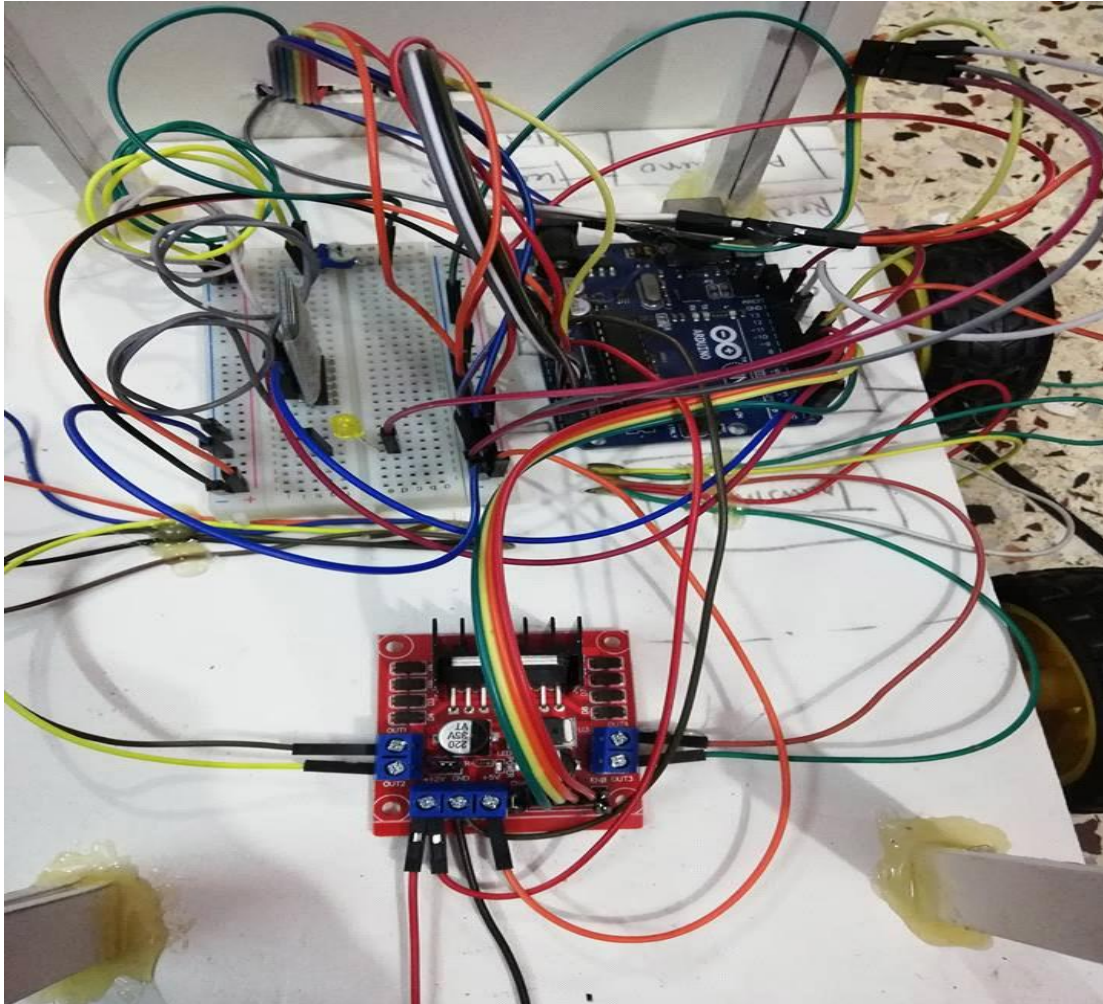
### 6.2 ASSEMBLING THE BOARD

The chassis used for this thesis is hand made in home with pvc board with relatively use in making Chassis, which is widely used for robotics project chases plates and tools. Total assembling process is shown in below chapters.



**Fig 6.1: Hardware board**

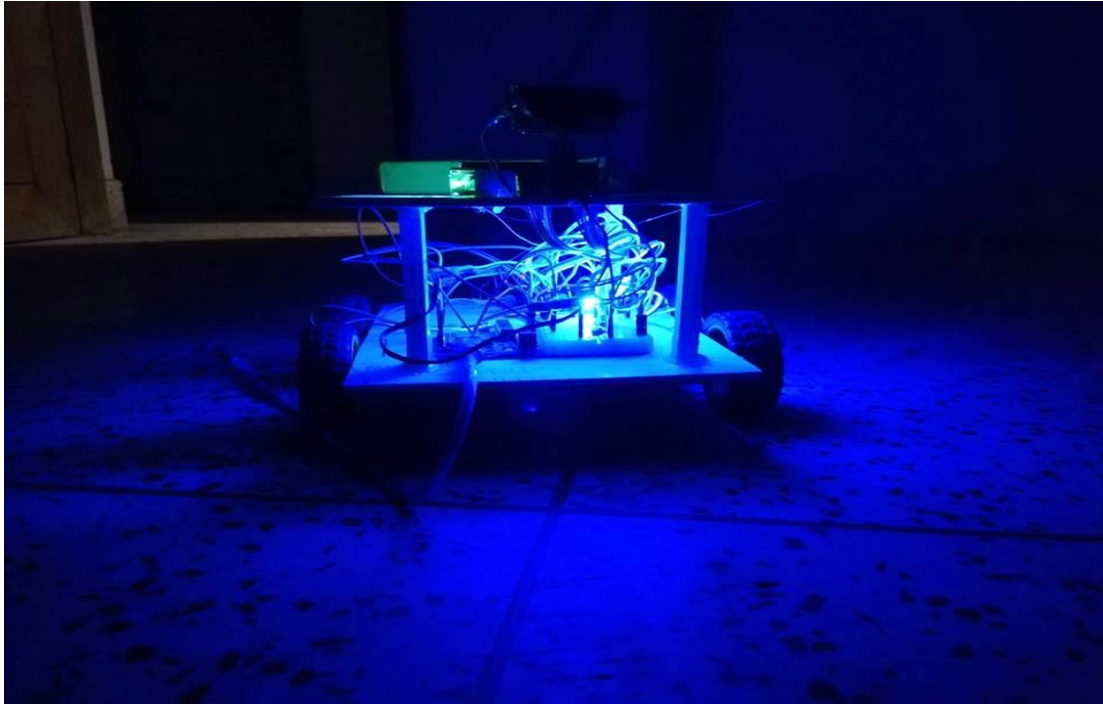
## 6.2.1 ASSEMBLING PROCESS



**Fig 6.2: Circuit Board**



## 6.2.2 COMPLETION OF ASSEMBLING PROCESS



**Fig: 6.2.1 Our Project**

## 6.3 ANDROID APPLICATIONS

These android applications are used to design. They are given as follows

- i) Bluetooth spp test
- ii) Bluetooth AMR (Android meets robot)

### 6.3.1 BLUETOOTH SPP TEST

Bluetooth SPP test is an android application to move robot. It is also available in Google play store. In this applications we will run the robot by using a commands like 2,4,6,8,5.in this application 2 is used to move the robot forward,4 is to move left side,6 is used to move right side,8 is used to move backward.5 is used to STOP. These are the commands used for moving robot.

### 6.3.2 BLUETOOTH AMR (ANDROID MEETS ROBOT).

It is also a android application to move robo.It is also available in Google play store. Inthis application we will run the roboby using a voice commands. By using this applicationwe will give voice commands only. In this application we will not give typing commands.

## 6.4 ROBOT’S WORKING MECHANISM

The working mechanism of the robot is based on the information passed from the android mobile phone via Bluetooth connection to the robot using a Bluetooth modem and vice versa. When will give a commands by android phone that will transmitt and receive the information signals.by giving a commands it will move in the given command direction.here is the power supply is given to robot by ecofriendly solar panel and storage batteries.by using both solar panel and batteries we are capable to run the robo. If there is no power or no light energy then power supply is used as vice versa.

**Fig 6.3: Architecture**

## 6.5 TESTING

From the following commands our robot will be follows. The following commands are same as both android apps. What we given to robot via android whther it is voice command or touch command the following commands are same for the robot movement.

| <b>COMMAND</b> | <b>ROBOT MOVEMENT</b> |
|----------------|-----------------------|
| Go back        | BACKWARD              |
| Turn left      | LEFT                  |
| Stop           | STOP                  |
| Turn right     | RIGHT                 |
| Go ahead       | FORWARD               |

**Table 6.1: Testing Result**

## 6.6 CONCLUSION

In this chapter we were discussed about the assembling process of voice control robot. In this chapter we were discussed about android, android applications. How the android applications are used in this project. In this chapter we will discuss about robot's working mechanism.

# CHAPTER 7

## CONCLUSION

### 7.1 APPLICATIONS:

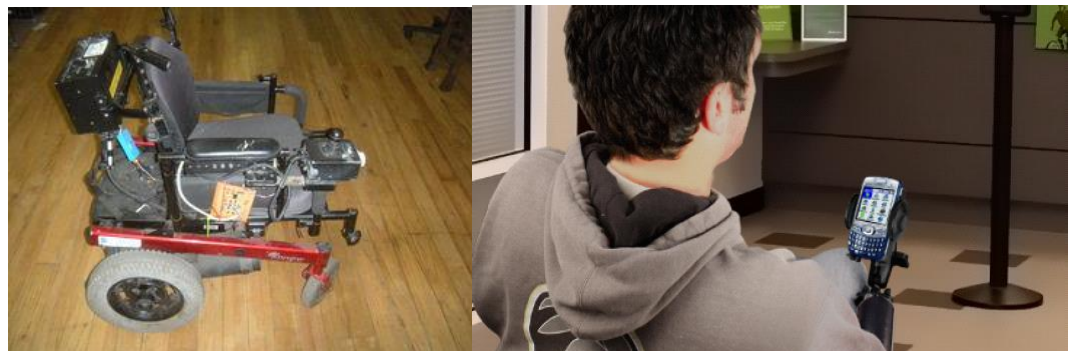
Certainly we believed that a system would be find wide varite of applicable. Many driver systems like as toys specially household applications like as washing machine, microwaven and pagers and mobile many other form which will controlled by voice android apps in next.

#### 7.1.1 HOME AUTOMATION

Nowadays due to much highest affordable and simplicity throughout smartphones and tab connectivity respectively. Recently the popularities of the home automation increasing greatly in recent years.

#### 7.1.2 WHEELCHAIRS:

Mainly to operate our project the robot is controlled by a giving a specific commands in amr voice apps. From giving the commands the robot will be move or stop.



**Fig 7.2: Wheelchair Applications**

### 7.1.3 SURVEILLANCE DEVICE:

It is the monitoring of other changing information, usually of people for the purpose of influencing.

### 7.1.4 MILITARY APPLICATIONS:

Our robot is mobile robot which plays an important role in military matters. With the suitable sensor and smooth camera these robots are operated. All the work will be the firms are getting easily from the mobile robot.



**Fig 7.4: Military Applications**

## 7.2 ADVANTAGES

- Using this robot we can controlled live video feed under giving specific commands.
- It can also be used to known any multiple ways such as clockwise, anticlockwise, forward and backward direction.
- In industries purpose we contolled many oter machine by it.
- This robot is used in hazardous place.
- Execute can program make them to do exactly what I want to do something.

- You can send them to very dangerous places.
- They can do well something for job sectors.
- They can perform task faster than human beings it will be worked any place.
- We send it a dangerous place where are people are not reached.
- They can also use in physically treatment person for helping moving.
- They can reduce the labor work in industry by it portable takes the load from one place to another place. They able to work always 24x7.

- **DISADVANTAGES**

It will be very expensive to do better fabrication.

- For produce it exact material that's the demerit also.
- Execute this project very hard to program.
- You need highly trained people to make them.
- People can lose jobs in factories.
- It needs maintenance to keep it running.

## **7.4 FUTURE SCOPE:**

The main object such robot system is to assist individuals with motor disabilities it controlling completely. In future time we use a secured wireless channel using secret writing and cryptography. There are many scope will be held in future such as AI movements speech to text translation and lots of additional. It also be in agricultural scope to additionally develop under artificial intelligence. In future larger bandwidth system will be developed by this project. There are a number of interfacing applications might be created for home applications

# REFERENCES:

- <https://www.arduino.cc/en/Tutorial/RobotRemoteControl>
- <https://www.instructables.com/id/Voice-Control-Robot-in-7-Minutes/>
- <https://www.robotshop.com/community/robots/show/voice-control-arduino-robot>
- <https://tronixlabs.com.au/news/tutorial-l298n-dual-motor-controller-module-2a-and-arduino/>
- [http://wiki.sunfounder.cc/index.php?title=Motor\\_Driver\\_Module-L298N](http://wiki.sunfounder.cc/index.php?title=Motor_Driver_Module-L298N)
- <https://components101.com/wireless/hc-05-bluetooth-module>
- <https://amr-voice.en.aptoide.com/>
- Scribd.com, the world's largest online library. URL:<http://www.scribd.com>
- Encyclopedia of regulators, capacitors, diodes, resistors
- <http://www.worldtechgossips.com> simple way of understand
- Other websites
- <http://www.elprocus.com/solar-panel-facts/>
- <http://org.ntnu.no/solarcells/pages/introduction.php>
- <http://www.facstaff.bucknell.edu>
- <http://hyperphysics.phy-astr.gsu.edu/hbase/electronic/leds.html>
- [www.national.com](http://www.national.com)
- [www.atmel.com](http://www.atmel.com)
- [www.microsoftsearch.com](http://www.microsoftsearch.com)
- [www.geocities.com](http://www.geocities.com)

# APPENDIX A

```
#include <LiquidCrystal.h>
#include <Servo.h>

String voice;

int

in1 = 2, //MOTORPIN 1 To Pin #2
in2 = 3, //MOTORPIN 2 To Pin #3
in3 = 4, //MOTORPIN 3 To Pin #4
in4 = 5, //MOTORPIN 4 To Pin #5
IN5 = 6, // RED LED
IN6 = 7; // GREEB LED

//-----Call A Function-----//

const int rs = A5, en = A4, d4 = A3, d5 = A2, d6 = A1, d7 = A0;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

int i = 0;

int pos;

Servo myServo;

void setup() {
  Serial.begin(9600);
  lcd.begin(16, 2);
  myServo.attach(10);
  myServo.write(90);
  pinMode(in1, OUTPUT);
  pinMode(in2, OUTPUT);
  pinMode(in3, OUTPUT);
  pinMode(in4, OUTPUT);
```



```

pinMode(IN5, OUTPUT); //A0 is output pin
pinMode(IN6, OUTPUT); //A1 is output pin
///lcd print///
lcd.setCursor(0, 0);
lcd.print(" Welcome to our ");
delay(1000);
lcd.clear();
lcd.setCursor(1, 0);
lcd.print(" Project ");
delay(1000);
lcd.clear();
}
void loop()
{
while (Serial.available()) { //Check if there is an available byte to read
delay(10); //Delay added to make thing stable
char c = Serial.read(); //Conduct a serial read
if (c == '#') {
break; //Exit the loop when the # is detected after the word
}
voice += c; //Shorthand for voice = voice + c
}
if (voice.length() > 0) {
if (voice == "*go ahead") {
forward_car();
}
else if (voice == "*go back") {

```

```

    back_car();
}
else if (voice == "*turn right") {
    right_car();
}
else if (voice == "*turn left") {
    left_car();
}
else if (voice == "*stop") {
    stop_car();
}
voice = ""; //Reset the variable after initiating
}
digitalWrite(IN5, HIGH);
delay(500);
digitalWrite(IN5, LOW);
delay(500);
digitalWrite(IN6, HIGH);
delay(500);
digitalWrite(IN6, LOW);
delay(500);
}
void forward_car()
{
    digitalWrite(in2, LOW);
    digitalWrite(in4, LOW);
    digitalWrite(in1, HIGH);

```

```

digitalWrite(in3, HIGH);
delay(1000);
lcd.setCursor(0, 0);
lcd.print("GOING Forward");
delay(1500);
lcd.setCursor(0, 1);
lcd.print("NeXT COMMAND");
delay(800);
lcd.clear();
digitalWrite(IN5, HIGH);
delay(500);
digitalWrite(IN5, LOW);
delay(500);
digitalWrite(IN6, HIGH);
delay(500);
digitalWrite(IN6, LOW);
delay(500)
}
void back_car()
{
digitalWrite(in1, LOW);
digitalWrite(in3, LOW);
digitalWrite(in2, HIGH);
digitalWrite(in4, HIGH);
delay(1000);
lcd.setCursor(0, 0);
lcd.print("GOING BACKWARD");

```

```
delay(1500);  
lcd.setCursor(0, 1);  
lcd.print("NeXT COMMAND");  
delay(800);  
lcd.clear();  
digitalWrite(IN5, HIGH);  
delay(500);  
digitalWrite(IN5, LOW);  
delay(500);  
digitalWrite(IN6, HIGH);  
delay(500);  
digitalWrite(IN6, LOW);  
delay(500);  
}  
void right_car()  
{  
  myServo.write(0);  
  delay(1000);  
  myServo.write(90);  
  delay(1000);  
  digitalWrite(in1, LOW);  
  digitalWrite(in3, HIGH);  
  digitalWrite(in2, LOW);  
  digitalWrite(in4, LOW);  
  delay(800);  
  lcd.setCursor(0, 0);  
  lcd.print("GOING RIGHT");
```

```
delay(1500);  
lcd.setCursor(0, 1);  
lcd.print("NeXT COMMAND");  
delay(800);  
lcd.clear();  
digitalWrite(IN5, HIGH);  
delay(500);  
digitalWrite(IN5, LOW);  
delay(500);  
digitalWrite(IN6, HIGH);  
delay(500);  
digitalWrite(IN6, LOW);  
delay(500);  
}  
void left_car()  
{  
  myServo.write(180);  
  delay(1000);  
  myServo.write(90);  
  delay(1000);  
  digitalWrite(in2, LOW);  
  digitalWrite(in4, LOW);  
  digitalWrite(in1, HIGH);  
  digitalWrite(in3, LOW);  
  delay(500);  
  lcd.setCursor(0, 0);  
  lcd.print("GOING LEFT");
```

```
    delay(1500);
    lcd.setCursor(0, 1);
    lcd.print("NeXT COMMAND");
    delay(800);
    lcd.clear();
    digitalWrite(IN5, HIGH);
    delay(500);
    digitalWrite(IN5, LOW);
    delay(500);
    digitalWrite(IN6, HIGH);
    delay(500);
    digitalWrite(IN6, LOW);
    delay(500);
}

void stop_car()
{
    digitalWrite(in1, LOW);
    digitalWrite(in3, LOW);
    digitalWrite(in2, LOW);
    digitalWrite(in4, LOW);
    lcd.setCursor(0, 0);
    lcd.print("CAR STOP");
    delay(1500);
    lcd.setCursor(0, 1);
    lcd.print("THANKS");
    delay(800);
    lcd.clear();
}
```

```
digitalWrite(IN5, HIGH);  
delay(500);  
digitalWrite(IN6, HIGH);  
delay(500);  
}
```