

# **VOICE AUTOMATED LOCKING SYSTEM**

## **A PROJECT REPORT**

*Submitted by*

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*In Partial fulfillment for the Award of*

**Diploma IN  
INFORMATION TECHNOLOGY**



**DEPARTMENT OF INFORMATION TECHNOLOGY**

**GOVERNMENT POLYTECHNIC MUMBAI**

**JUNE 2021**

# **GOVERNMENT POLYTECHNIC MUMBAI**

## **DEPARTMENT OF INFORMATION TECHNOLOGY**

### **CERTIFICATE**

**This is to certify that the project entitled “VOICE AUTOMATED LOCKING SYSTEM” is the bonafide work of “Omkar Gavade (FS17IF015) , Ritesh Bhanse (FS18IF010)” , submitted in partial fulfillment of the requirements for the award of Diploma in Information Technology of Government Polytechnic Mumbai.**

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## **DECLARATION**

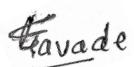
We hereby declare that the project entitled "**“VOICE AUTOMATED LOCKING SYSTEM”**" being submitted by us towards the partial fulfillment of the requirements for the award of Diploma in Information Technology is a project work carried by us under the supervision of Prof. Mrs. Gosavi and have not been submitted anywhere else.

We will be solely responsible if any kind of plagiarism is found.

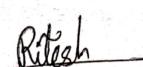
**Date:- 26/6/2021**

Name of the Students,    Enrollment No,    Signature

**1. Omkar Gavade**              **FS17IF015**



**2. Ritesh Bhanse**              **FS18IF010**



## **Acknowledgement**

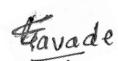
We pleased to present “Voice Automated Locking System” project and take this opportunity to express our profound gratitude to all those people who helped us in completion of this project

We thank our college for providing us with excellent facilities that helped us to complete and present this project. We would also like to express our gratitude to principal Prof. Swati D. Deshpande and Dr. Rajesh A. Patil Head of Department of IT department, the staff members and Lab assistance for permitting us to use computers in the lab as and when required.

We express our deepest gratitude towards our project guider Prof. Mrs. Gosavi for valuable And timely advice during the varius phases in our project We would also like to thank her for providing us with all proper facilities and support as the project co-ordinator. We would like to thank her for support, patience and faith in our capabillities and for giving us flexibility in terms of working and reporting schedules.

Finally, we would like to thank everyone who has helped us directly or indirectly in our project.

## **Signature Of Students**



**Mr. Omkar Gavade (FS17IF015)**



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# **CHAPTER 1**

## **1.1. INTORDUCTION**

In today's technologically advanced world, technology is playing a vital role which in return gave rise for the popularity of latest automatic door locking system, where security is the main issue for everyone.

Due to recent trends in various methods of security for home, building, companies and vehicle, we have come up with voice automated locking system where there is no need to worry about the security any longer, as our above discussed system is here to deal with it.

Recently proposed door lock systems based on Biometrics Techniques and Password Based Systems are studied and their problems are discussed further. As per the requirements, authors developed the systems. And as per our knowledge, not a single system is suitable for all types of applications. Day by day technologies are developing and techniques of robbery are also developing. So, all we need is to develop a new smart and unbreakable technique in further studies. The previous techniques like Face Recognition System needs improve reliability and robustness, Iris Scanner System requires more memory to store data. Some other techniques related to password based systems like One Time Password faces issues of timeout in few seconds and multiple uses means multiple lockouts.

## **1.2 ABSTRACT**

The voice acknowledgment can be utilized in making it simpler for individuals with inability to get to entryway frameworks and give better security to lives and properties. We are using the advancement of the technology to get modified for the future use of systems to function in a way that the voice automated should be used for opening any type locking system in the present scenario. We are implementing this type of module where it can be of low cost and even a physically disable persons can open the door without any assistance.

## **1.3. METHODOLOGY**

Various electronic instruments are used to prepare this module to demonstrate in a complete system. The essential hardware used in this implementation are Arduino Uno, DC motor, battery, relay and voice recognition module.

Input signals where accepted through associate in nursing humanoid Smartphone to the mobile app. Speech to text algorithms are accustomed to extract text from the speech. The extracted text is shipped to the server where the process will be completed. If the text

matches the predefined unlock phrase, the server sends associate in Nursing block signal to the Arduino that then sends the signal to the relay where it waits for a while and the signal is given to dc motor to unlock the door. The relay module provides electricity to the DC motor. The whole process lies in the wireless communication between the system to the mobile app where it can be monitored and be recorded.

## 1.4. FUTURE SCOPE

- This system is capable of monitoring all types of natural languages to identify the base, it tracks, records the speech and executes the given input to get a required output.
- Domestic language: Vernacular languages in INDIA or any other part of the world don't have a prescribed letter format or may be functionally as we can say that the main
- Google search engine even can't translate the INDIA's oldest language Sanskrit currently it won't support the Google assistant in its systems. The potential of using voice recognition module is to recognize or to identify any different languages in the universal of speech voices.
- Reliability: Swapping information to knowledge of statistics between the varied parts of the hardware and software executed through a system should be done with a high end secured unit where it should not be hacked to get secured information in it.

## CHAPTER 2

### 2.1 LITERATURE REVIEW

- Access control system is a system which provides a selective restriction of access to a place or resource.
- A door can serve as a physical means using a lock for restricting certain people who do not meet the particular access requirements such as a key, keycard, fingerprint, voice password, Radio Frequency Identification (RFID) card, security token or coin. The earliest known key and lock devices were discovered in the ruins of Nineveh, the capital of ancient Assyria [3]. Technology has evolved since then with the introduction of computers which provides access control using computer programs and software.
- Voice recognition, as one of the new forms of restricting access, deals with decoding the human voice and identifying the speaker. It is divided into speaker recognition and speech recognition. Speaker recognition is the identification of a person from properties or characteristics of voices. Speech recognition is the recognition of what is been said by the speaker.
- The first successful speech recognition technologies were introduced in the 1990s era. The earliest products were Dragon Dictate released in 1990 and a recognizer from Kurzweil Applied Intelligence released in 1987. AT&T deployed a voice recognition call processing service in 1992 to route telephone calls without the use of a human operator. The technology was developed by Lawrence Rabiner and others at Bell Labs [10].
- Lernout & Hauspie, a Belgium-based speech recognition company, acquired several companies, including Kurzweil Applied Intelligence in 1997 and Dragon Systems in 2000. The L&H speech technology company was ended in 2001 because of an accounting scandal. The speech technology from L&H was bought by ScanSoft which became Nuance in 2005. Apple originally licensed software from Nuance to provide speech recognition capability to its digital assistant [11].
- Many aspects of speech recognition have been taken over by a deep learning method called Long short-term memory (LSTM), a recurrent neural network published by Sepp Hochreiter and Jürgen Schmidhuber in 1997. Google speech recognition experienced a dramatic performance jump of 49% through Connectionist Temporal Classification (CTC) trained LSTM, which is now available through Google Voice to all smartphone users

## **CHAPTER 3**

### **3.1 REQUIREMENT AND ANALYSIS**

#### **3.1 PROBLEM DEFINITION**

Voice automated locking system is a smart system which can be controlled by the users by giving specific voice commands. The command is received by the microphone and processed by a voice module using that particular command. Simultaneously we can control various home appliances and systems. The project works as locking automation system.

It also provide hands free and hassle free operation of a door (opening/closing) in a home, office and vehicle as you don't have to carry keys everywhere with you

Other electronic devices can easily be adapted to work with the voice recognition system as well

#### **3.2 REQUIREMENT SPECIFICATION**

1. Smart phone/Android device -which should have the android application (Arduino voice control) installed in it.
2. Bluetooth receiver module- Our project will be connected to the smart phone using Bluetooth technology.
3. Controller or the main processing circuit- In this project, Arduino Uno is the main controlling / processing unit. Also, this project can be developed using PIC18F4550, AVR ATmega32 and 8051 series.
4. Output devices- For the demo purpose, we connected a DC devices to a relay. We can connect any DC/AC devices to the remaining relays.

### 3.3 PLANNING AND SCHEDULING

#### 3.3.1 Gantt Chart:-

Task\Week	Jun-19				Jul-19				Aug-19				Sep-19				Oct-19				Nov-19				Dec-19				Jan-20				Feb-20				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Proposal																																					
Synopsis & Approval																																					
Requirements																																					
System Design																																					
Detail Design																																					
Coding																																					
Testing																																					
Debugging																																					
Project Buffer																																					
Implementation																																					
Documentation																																					

## **3.4 SOFTWARE & HARDWARE REQUIREMENTS**

### **3.4.1 Hardware Requirements:-**

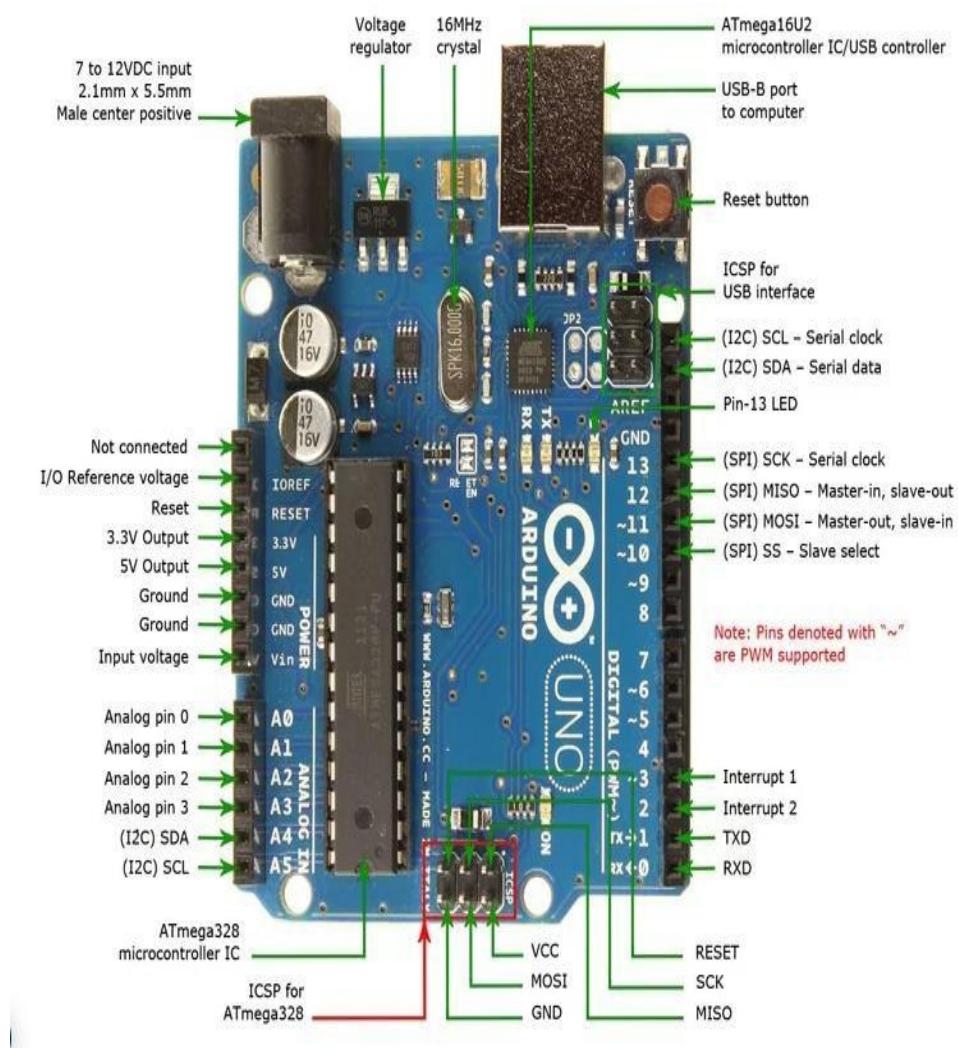
<b>SR.NO</b>	<b>Hardware requirements</b>	<b>Minimum requirements</b>
1.	Arduino board	1
2.	A 9v Battery	1
3.	resistors (3.3k ohm, 1k ohm)	1
4.	2' x 3' General purpose PCB	1
5.	Jumper wires	13
6.	HC-05 Bluetooth module	1
7.	Servo motor	1
8.	Male and female header pins	5
9.	Breadboard	1

### **3.4.2 Software Requirements:-**

<b>SR.NO</b>	<b>software requirements</b>	<b>Types</b>
1.	Operating System	Any OS
2.	Language	C
3.	Database	Not required
4.	IDE	Arduino IDE
5.	Compiler	avr-gcc and avr-g++
6.	Documentation tools	Microsoft word
7.	Android OS.	Android 2.3 and above
8.	Required application	Arduino voice control

### 3.5 PRELIMINARY PRODUCT DESCRIPTION

#### Arduino UNO Board:-

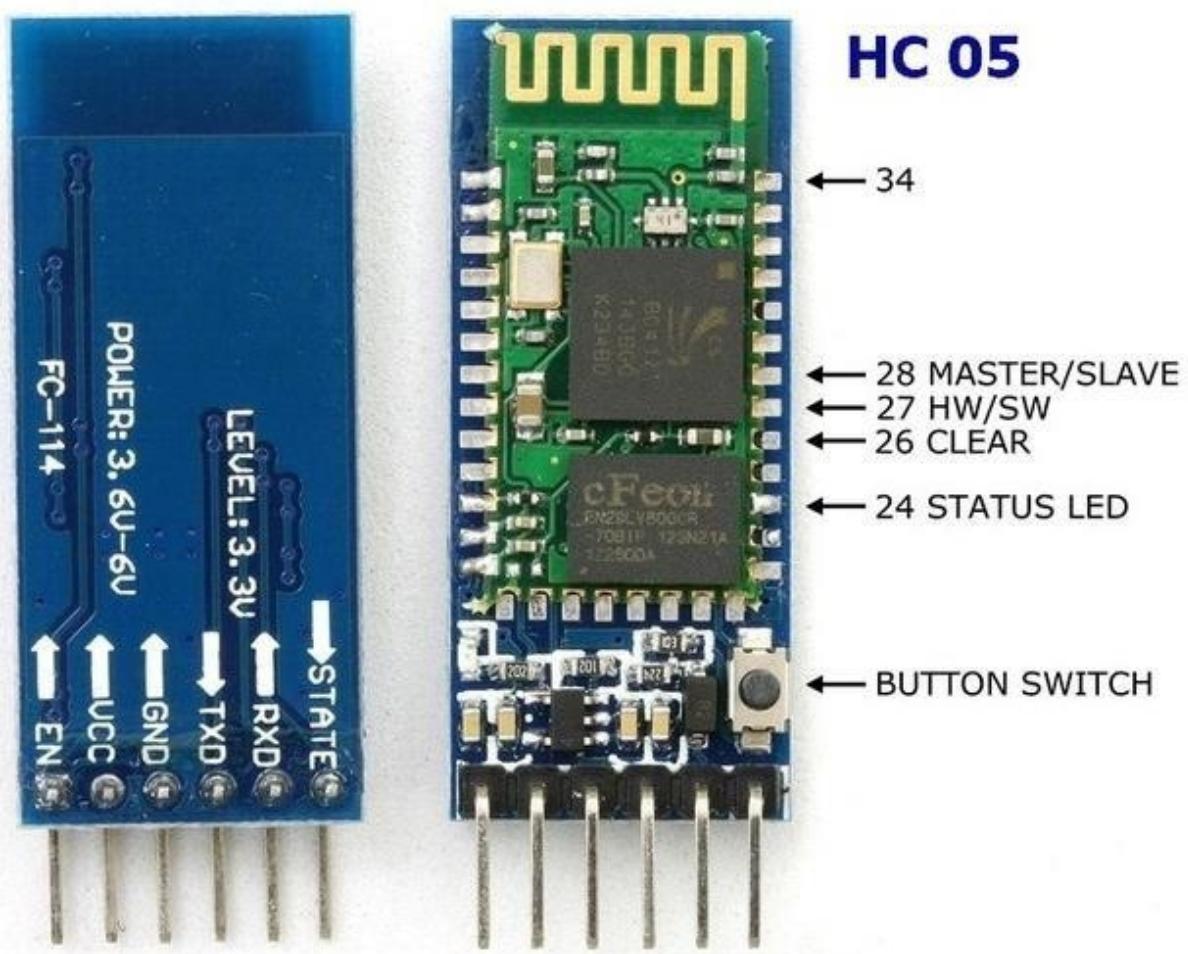


- **Pin Description:-**

Category	Pin Name	Details
Power	Vin, 3.3V, 5V, GND	<p>Vin: Input voltage to Arduino when using an external power source.</p> <p>5V: Regulated power supply used to power microcontroller and other components on the board.</p> <p>3.3V: 3.3V supply generated by onboard voltage regulator. Maximum current draw is 50mA.</p> <p>GND: ground pins.</p>
Reset	Reset	Resets the microcontroller.
Analog Pins	A0 – A5	Used to provide analog input in the range of 0-5V
Input/Output Pins	Digital Pins 0 - 13	Can be used as input or output pins.
Serial	0(Rx), 1(Tx)	Used to receive and transmit TTL serial data.
External Interrupts	2, 3	To trigger an interrupt.
PWM	3, 5, 6, 9, 11	Provides 8-bit PWM output.

SPI	10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK)	Used for SPI communication.
Inbuilt LED	13	To turn on the inbuilt LED.
TWI	A4 (SDA), A5 (SCA)	Used for TWI communication.
AREF	AREF	To provide reference voltage for input voltage.

- **HC-05 Bluetooth Module:-**



[Fig. 3.5.2 Pin Diagram of HC-05 BT module]

HC-05 is a Bluetooth module which is designed for wireless communication. This module can be used in a master 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. Otherwise by default it is in data mode. The default baud rate of HC-05 in command mode is 38400bps and 9600 in data mode.

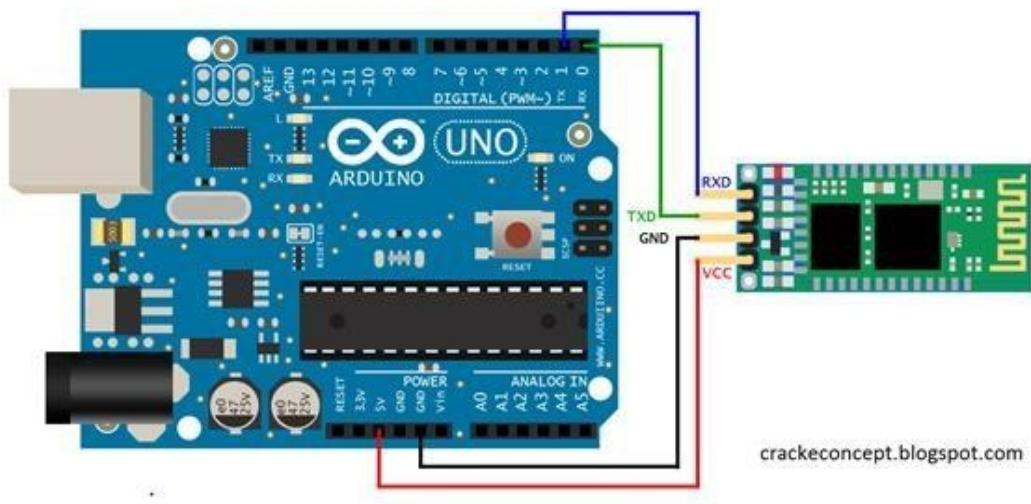
HC-05 module has two modes,

1. **Data mode:** Exchange of data between devices.
2. **Command mode:** It uses AT commands which are used to change setting of HC-05. To send these commands to module serial (USART) port is used.

3. **VCC:** Connect 5 V or 3.3 V to this Pin.
4. **GND:** Ground Pin of module.
5. **TXD:** Transmit Serial data (wirelessly received data by Bluetooth module transmitted out serially on TXD pin)
6. **RXD:** Receive data serially (received data will be transmitted wirelessly by Bluetooth module).
7. **State:** It tells whether module is connected or not.

### 3.6 CONCEPTUAL MODEL

#### Circuit Diagram:-

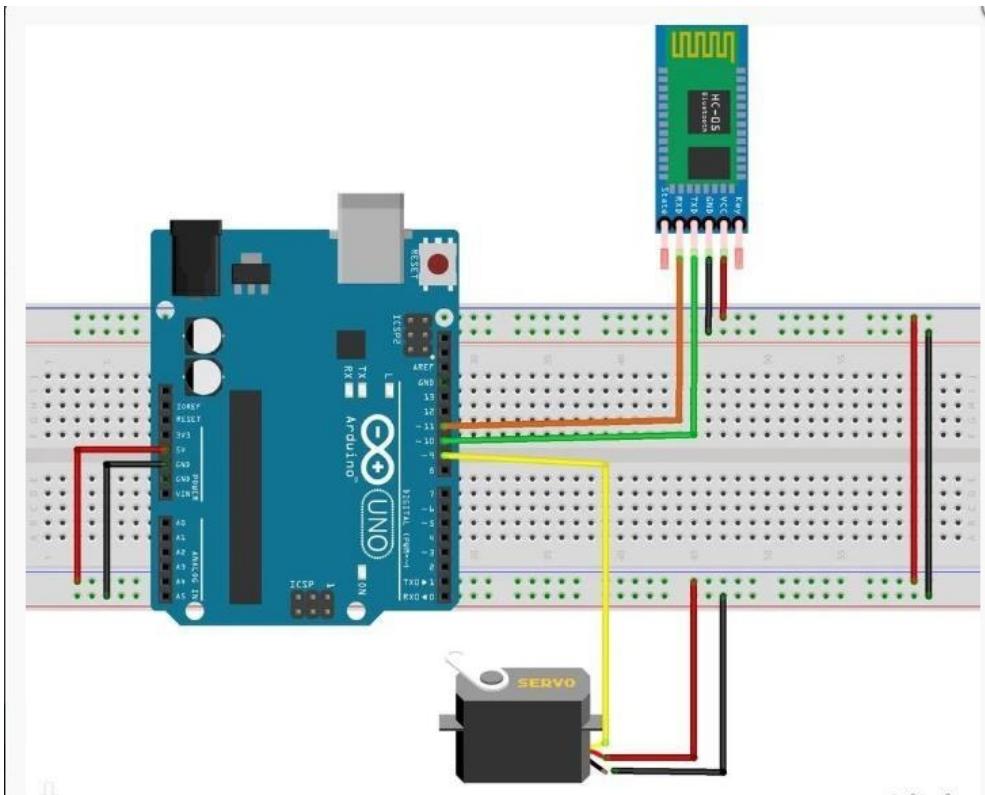


[Fig. 3.6.1 Interfacing BT module with Arduino Board]

#### • Connection:

1. Connect VCC with 3.3V of Arduino, please do not connect it with 5V as that can cook the module
2. Connect GND with any GND of Arduino
3. Connect Rx pin with Tx of Arduino
4. Connect Tx pin with Rx of Arduino

### Servo motor :-



[Fig. 3.6.2 Interfacing servo motor with Arduino Board]



[Fig. 3.6.3 Interfacing servo motor with android device]

Tower pro Sg-90 has 3 pinout (Vcc, ground and signal).connection as shownThe signal pin must be connect to PWM pin. A servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors.

Servomotors are not a specific class of motor, although the term *servomotor* is often used to refer to a motor suitable for use in a closed-loop control system. Servomotors are used in applications such as robotics, CNC machinery or automated manufacturing.

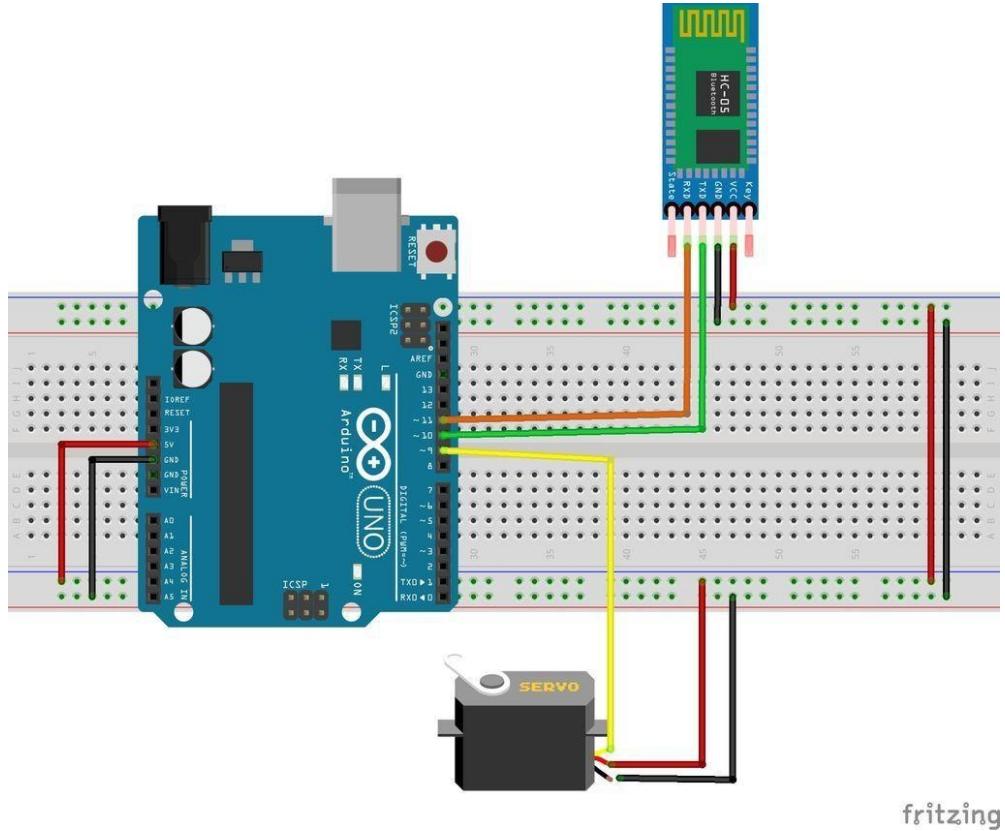
A servomotor is a closed-loop servomechanism that uses position feedback to control its motion and final position. The input to its control is a signal (either analogue or digital) representing the position commanded for the output shaft.

The motor is paired with some type of encoder to provide position and speed feedback. In the simplest case, only the position is measured. The measured position of the output is compared to the command position, the external input to the controller. If the output position differs from that required, an error signal is generated which then causes the motor to rotate in either direction, as needed to bring the output shaft to the appropriate position. As the positions approach, the error signal reduces to zero and the motor stops.

### **Breadboard:-**

A breadboard is a construction base for prototyping of electronics. Originally the word referred to a literal bread board, a polished piece of wood used for slicing bread In the 1970s the solderless breadboard (a.k.a. plugboard, a terminal array board) became available and nowadays the term "breadboard" is commonly used to refer to these.

### Interfacing all the Components with Arduino UNO Board:-



[Fig. 3.6.4 Interfacing all the components with Arduino Uno Board]

## CHAPTER 4

### 4.1 SYSTEM DESIGN

#### 4.1 BASIC MODULES

- **Smart phone/Android device:-** which should have the android application (Arduino voice control) installed in it. Arduino is a simple integrated development environment (IDE) which runs on a pc and allows user to write programs for Arduino in c or c++ language. The entire programs are installed in Arduino controller. The Arduino can control functions i.e. automation control. Arduino is an open source electronics platform based on easy-to-use hardware and software.
- **Bluetooth receiver module:-**

Our project will be connected to the smart phone using Bluetooth technology.

Function of this component is to interpret the flag got from Voice application on Android portable. It offers yield to microcontroller.

HC-05 is a Bluetooth module which is designed for wireless communication. This module can be used in a master or slave configuration.

Bluetooth serial modules allow all serial enabled devices to communicate with each other using Bluetooth.

- **Servo motor :**

Tower pro SG-90 has 3 pinout (Vcc, ground and signal). connection as shown. The signal pin must be connect to PWM pin. Servomotors are not a specific class of motor, although the term *servomotor* is often used to refer to a motor suitable for use in a closed-loop control system.

- **Breadboard**

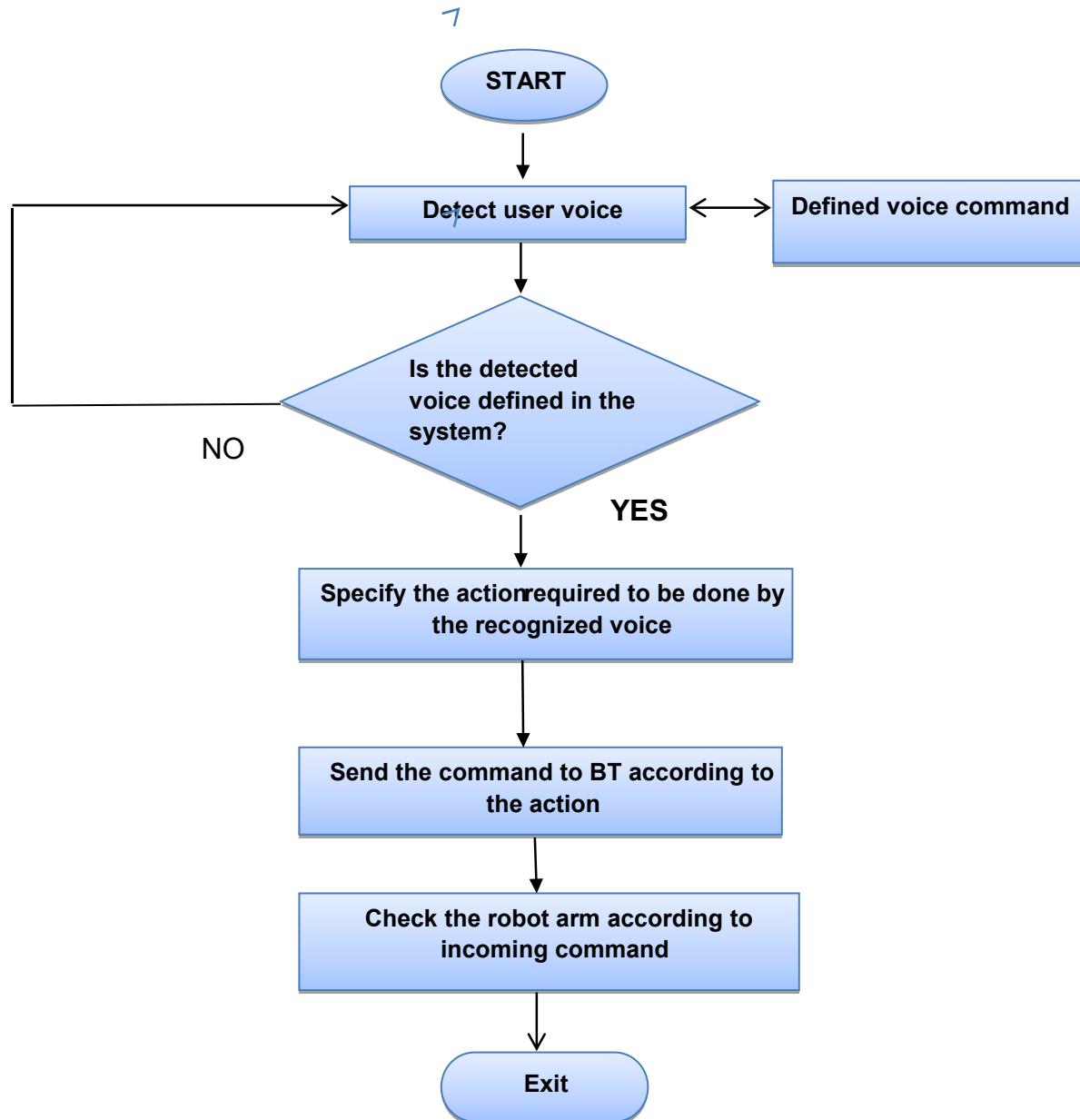
A breadboard is a construction base for prototyping of electronics. Originally the word referred to a literal bread board, a polished piece of wood used for slicing bread In the 1970s the solderless breadboard (a.k.a. plugboard, a terminal array board) became available and nowadays the term "breadboard" is commonly used to refer to these.

**Output devices :**

For the demo purpose, we connected servo motor.

## 4.2 PROCEDURAL DESIGN

### 4.2.1 Logical Diagram-



#### **4.2.2 Algorithm Design**

##### **Steps for the Algorithm:**

**STEP1:** Turn on the Arduino Arduino controller: Arduino is a simple integrated development environment (IDE) which runs on a pc and allows user to write programs for Arduino in c or c++ language. The entire programs are installed in Arduino controller.

**STEP2:** voice commands are save in Arduino controller. Arduino controller compares and matches voice commands if the commands are match then perform the task.

**STEP3:** Bluetooth module: The communication media between the user is provided by the Bluetooth module through the android phone and the system i.e. by giving voice command to the android phone. The user will send the command to the BT voice control for Arduino voice the software application installed in the android phone i.e. connected via BT module.

#### **4.3 SECURITY ISSUES**

We understood the easy access towards our system because of this technology. We get to know several different security measures keeping the security in mind. User's transparency towards system is achieved. We see increased reliability as a result. In case Voice recognition systems are not yet able to filter out specific voices/commands in the presence of noise or cross talk. In future these systems will be able to filter out certain voice when many voices are present and heard all at once, As our system can perform many function based on the given command so we can access the password by manually entering it .

## CHAPTER 5

### 5.1CODE

```
#include <SoftwareSerial.h>
SoftwareSerial mySerial(11, 10); // Rx Tx

#include <Servo.h>

Servo myservo;

String IN; int pos
= 0;

void setup() {      Serial.begin(9600);
mySerial.begin(9600);
myservo.attach(6);
}

void loop()
{
  if (mySerial.available())
  {
    IN = mySerial.readString();
    Serial.print(IN);
  }

  if (IN == "open")
  {
    for (pos = 0; pos <= 180; pos += 1)
    {
      myservo.write(pos);    delay(15);
    }
    IN = "";
  }
  if (IN == "close")
  {
    for (pos = 180; pos >= 0; pos -= 1)
    {
      myservo.write(pos);
    }
  }
}
```

```
    delay(15);
}
IN = "";
}
}
```

### 5.1.2 CODE:-

```
#include <SoftwareSerial.h>
SoftwareSerial mySerial(11, 10); // Rx Tx

#include <Servo.h>
Servo myservo;
String IN;
int pos = 0;

void setup() {
  Serial.begin(9600);
  mySerial.begin(9600);
  myservo.attach(6);
  pinMode(8, OUTPUT);
}

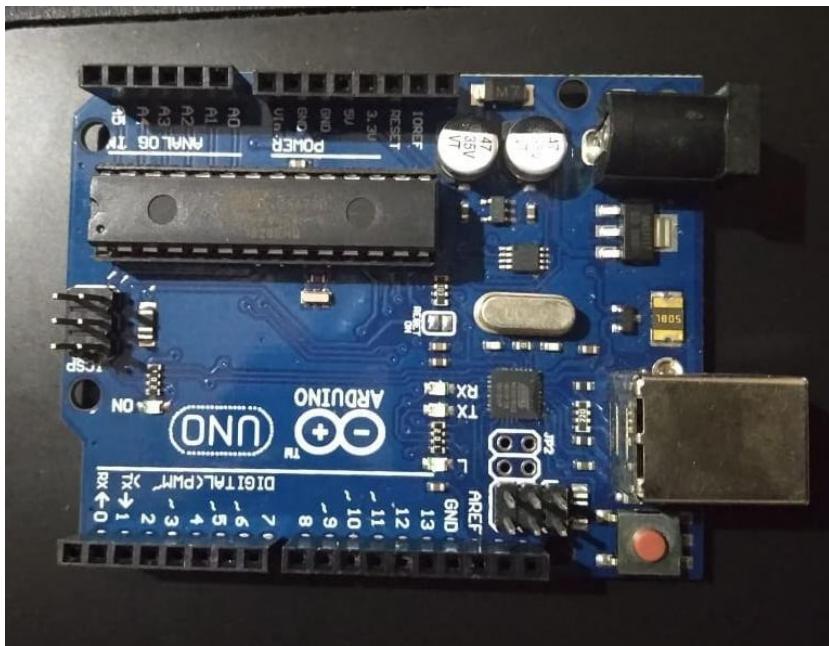
void loop()
{
  if (mySerial.available())
  {
    IN = mySerial.readString();
    Serial.print(IN);
  }

  if (IN == "open")
  {
    digitalWrite(8, HIGH);
    for (pos = 0; pos <= 180; pos += 1)
    {
      myservo.write(pos);
      delay(15);
    }
    IN = "";
  }
  if (IN == "close")
  {
    digitalWrite(8, LOW);
    for (pos = 180; pos >= 0; pos -= 1)
    {
      myservo.write(pos);
      delay(15);
    }
  }
}
```

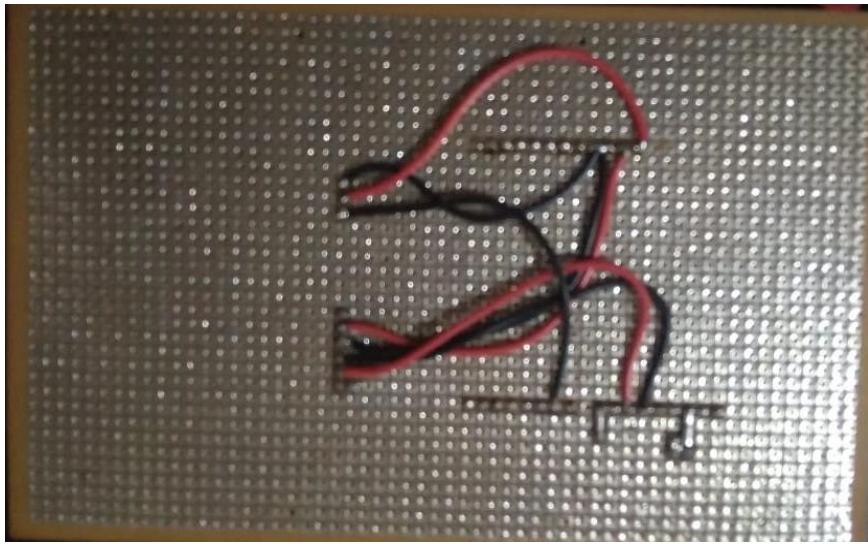
$\mathbb{N} = \{\dots, 3, 2, 1\}$

## 5.2. Result

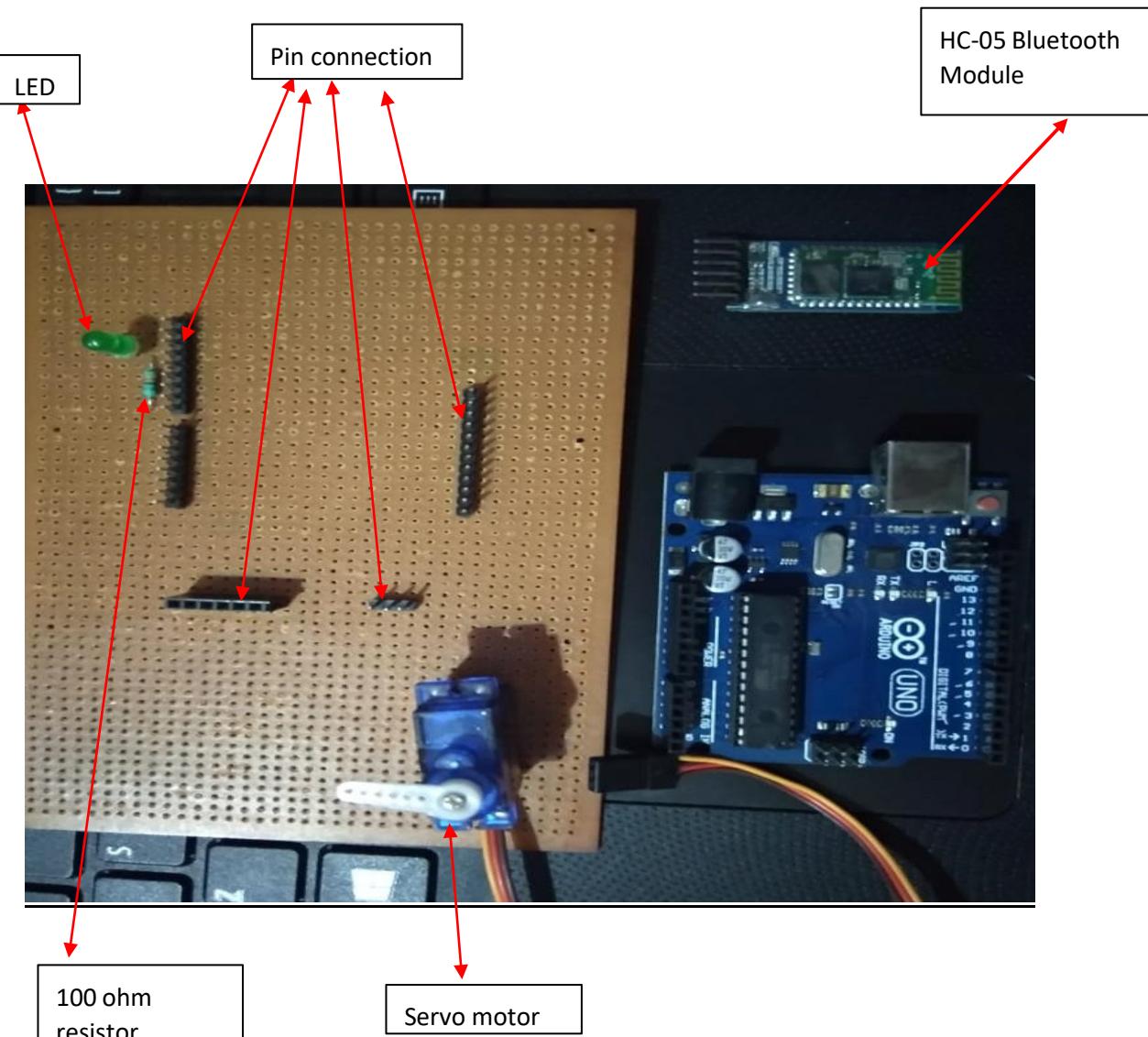
### 5.2.1 BEFORE CONNECTION



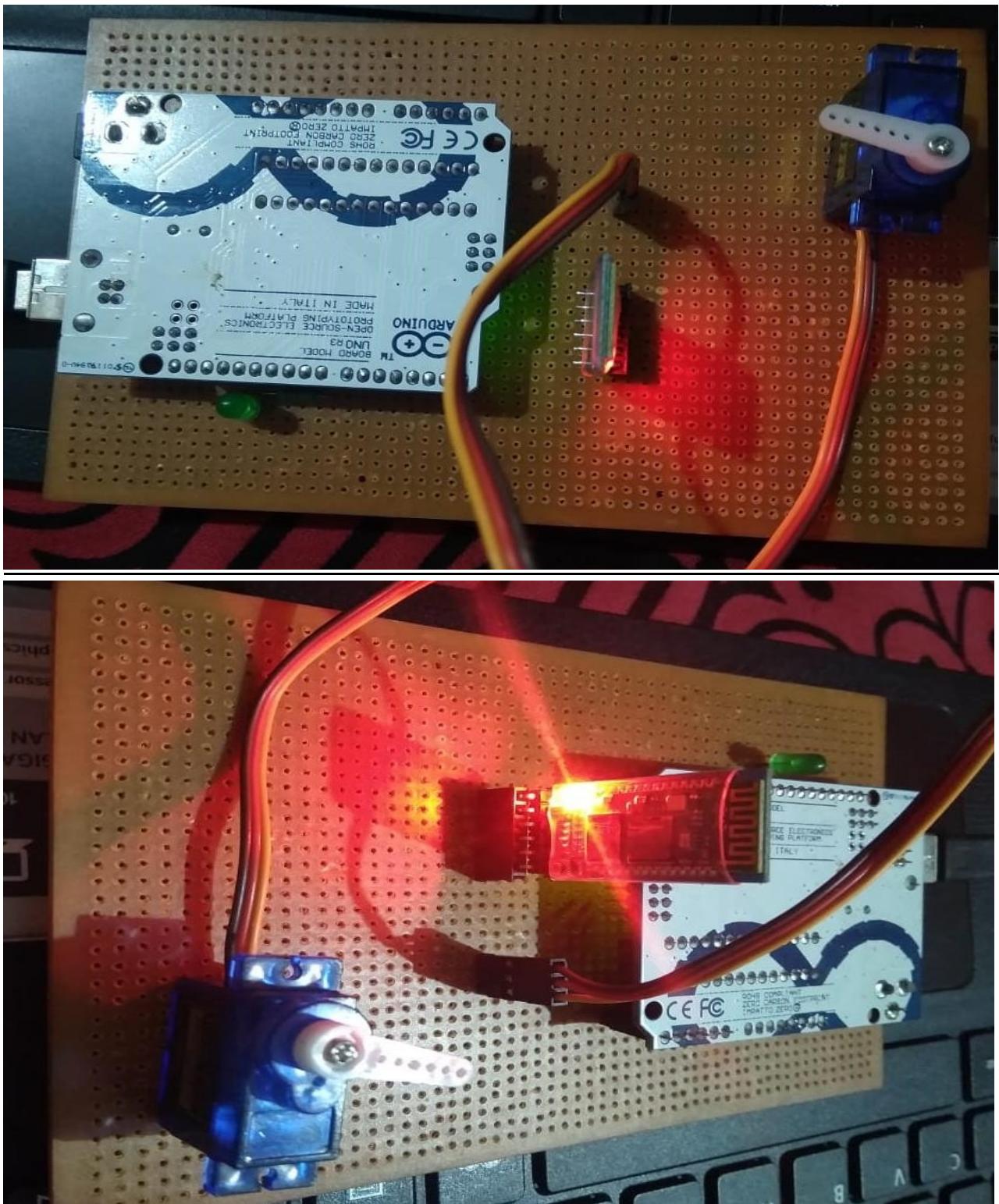
1.1.1Arduino Board



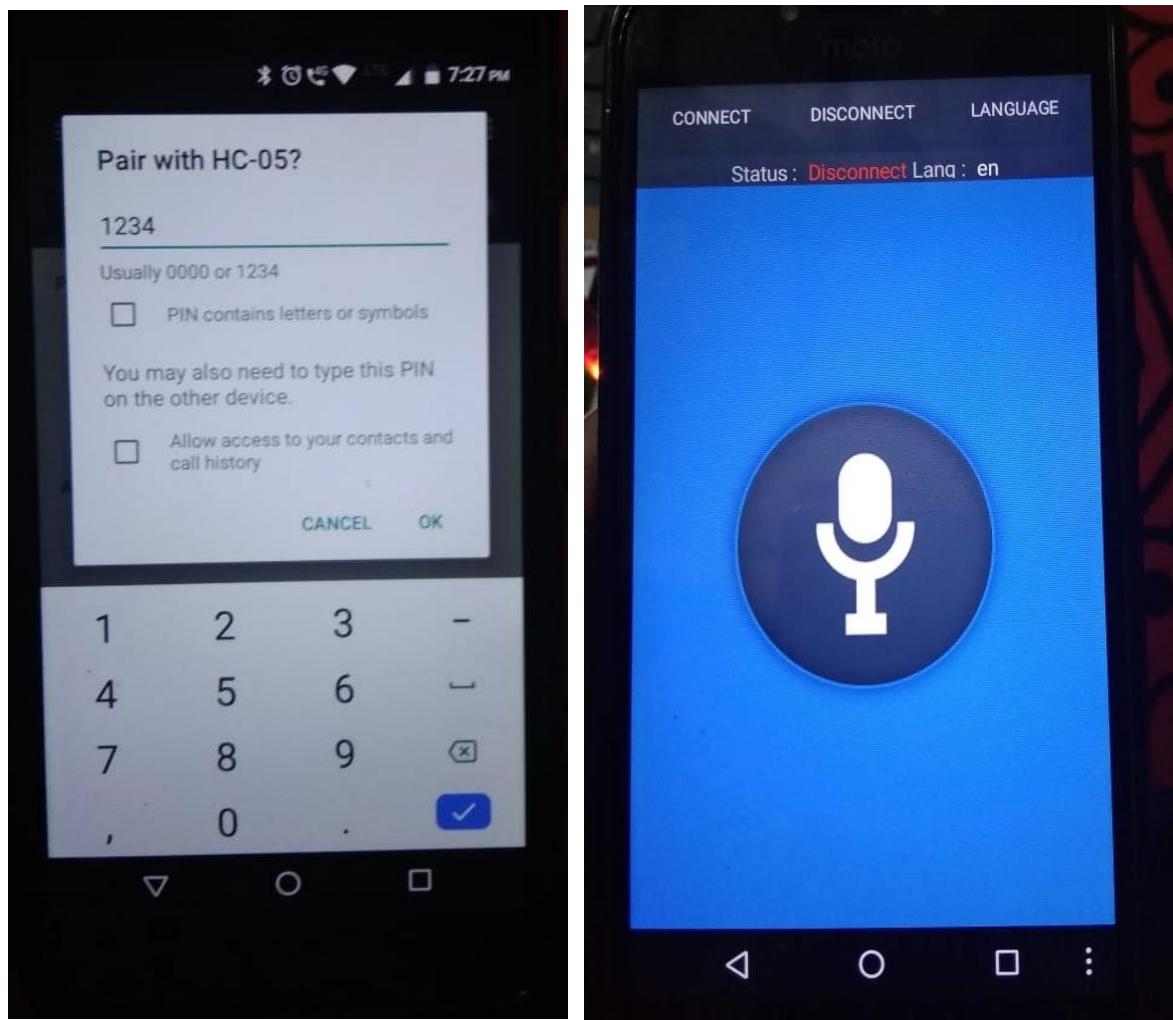
### 1.1.2 Strip-board Solder Protoboard

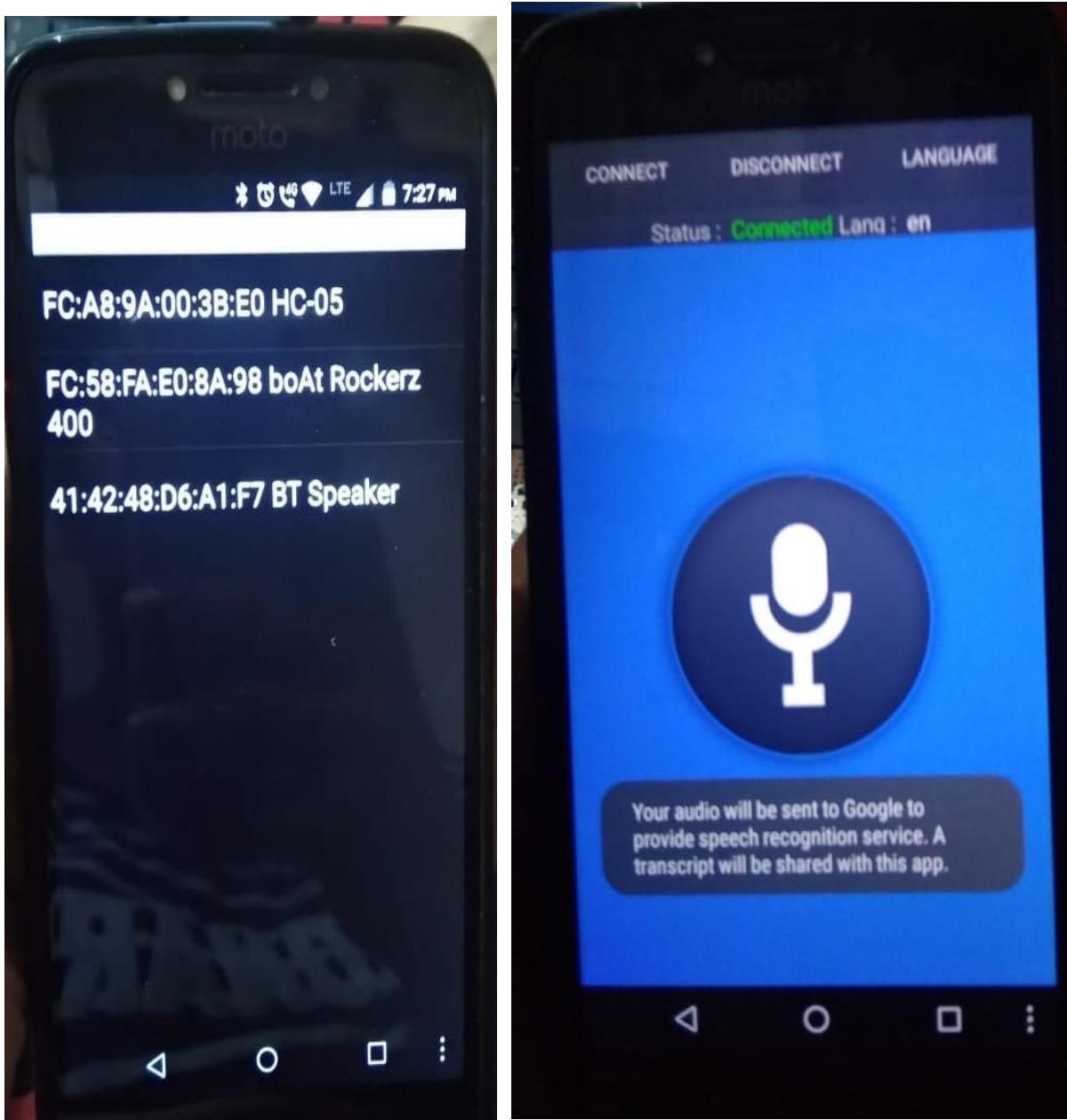


### 5.2.2 AFTER CONNECTION

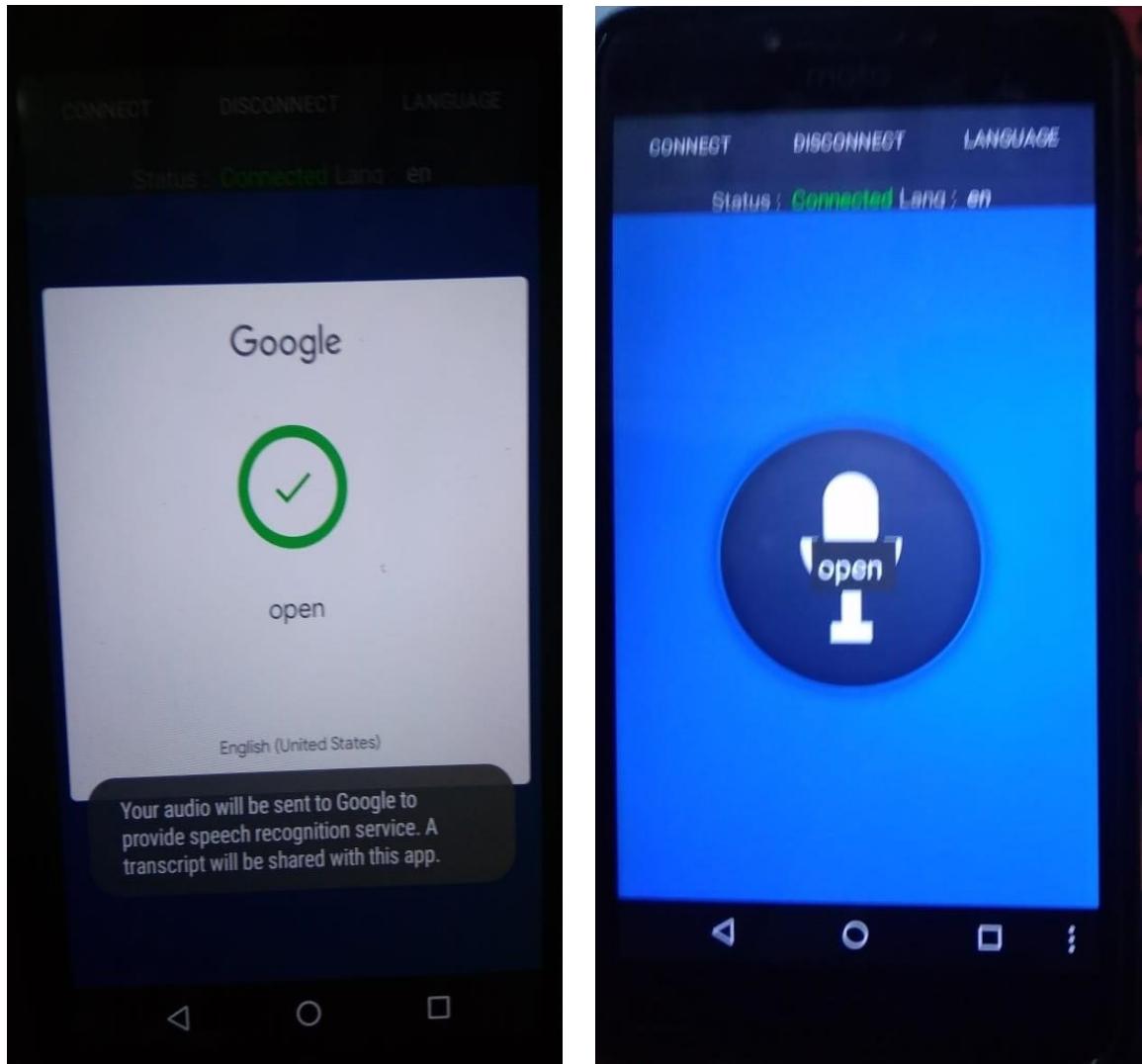


### 5.2.3 HC-05 Bluetooth Module connect with Android

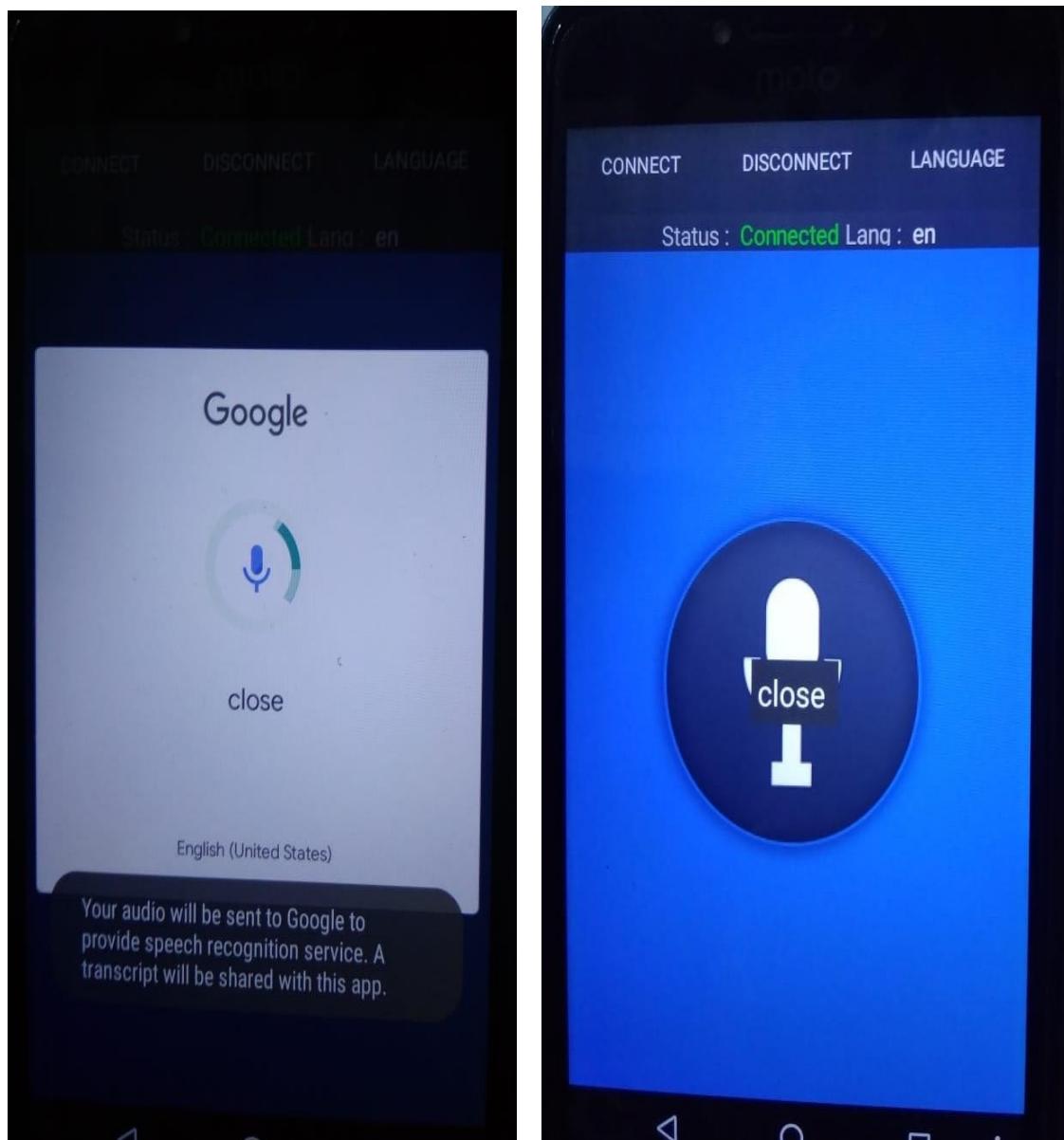




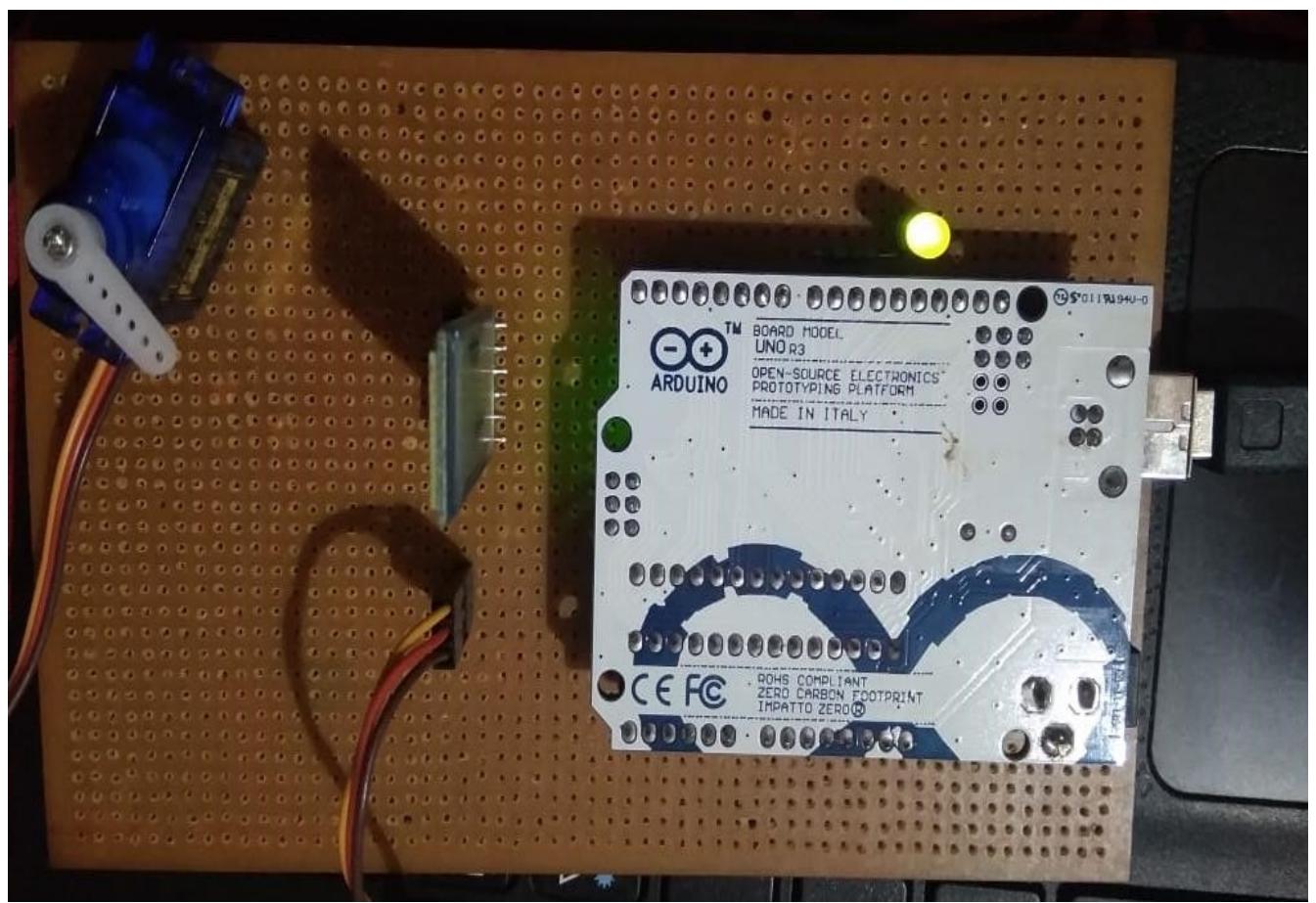
#### 5.2.4 Command To Open The Door



#### 5.2.4 Command To Close The Door



### 5.2.5.5 OUTPUT



### **5.2.3 CONCLUSION**

A security door lock system was developed in this work based on automatic speech recognition. The functionality of developed system was tested using a model door. The effectiveness of the work was determined using the accuracy metric and results show that the developed system is seventy five percent accurate.

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