Vivekanand College, Kolhapur (Autonomous)			
Department of Electronics			
Student Project/field project/research project and Internships 2022-23			
B.Sc. III			
Sr. No.	Student Name	Project Title	Name of the Project Guide
1	Bidre Prajakta Sunil Maurya Muskan Krupashankar Yadav Bhagyashri Bharat	IoT Based Smart Irrigation System	Mr. N. P Mote & Dr. M. S. Patil
2	Khot Ankita Balaso Todkar Shivani Dipak	Fingerprint Door Lock Using ARDUINO	Dr. M. S. Patil
3	Patil Sandip Jayshing Kamble Ketan Ashok	Voice Controlled Robotic Car	Dr. M. S. Patil
4	Shirke Prerana Pradeep Bhopale Sakshi Tushar Jadhav Pradnya Prashant	Automatic Noise Level Monitor & Warning System	Dr. M. S. Patil
5	Kondekar Asmita Tanaji Shinde Akanksha Santosh Ropalkar Vrushali Umesh	Smart Dustbin Using Arduino	Mr. N. P Mote
6	Suryavanshi Ajay Mohan Patil Nikhil Sunil	Smart Chair Using Arduino	Mr. P. R. Bagade
7	Jadhav Siddhesh Vishnu Koigade Sourabh Sanjay Kadwade Ganesh Narayan	Blind Stick Using Arduino	Dr. M. S. Patil
B.Sc. II			
Sr. No.	Student Name	Project Title	Name of the Project Guide
8	Berad Rohit Kadam Prem Patil Omkar Bhosale Asleshiya Dhanawant Rathod Snehal Ramesh Chougule Siddhesh Suresh Bhosake Aditya Patil Shubham Kagude Darshan	Fire Alert System	Dr. C. B. Patil & Mr. N. P. Mote
9	Jadhav Rajdeep Savaratkar Onkar Bhapkar Sai Panhalkar Sanket	Wireless Electronic Notice Board	Dr. C. B. Patil & Mr. N. P. Mote
10	Pawar Shubham Sudhir Patil Sudarshan Rajaram	Operating Multiple LEDs Using 8051 Microcontroller	Dr. C. B. Patil
11	Patil Vaishnavi Krishnat Patil Sakshi Rangrao	Password Based Door Lock System	Dr. C. B. Patil & Mr. N. P. Mote
12	Jadhav Rutuja Anil Pawar Vaishnavi Subhash Waware Shivajali Sanjay	Traffic Light Control Signal	Dr. C. B. Patil & Mr. N. P. Mote
13	Sutar Shraddha Nagesh Patil Sanika Aananda Shinde Aarya Anil	Speed Contronl of DC Motor Using 8051 Microcontroller	Dr. C. B. Patil & Mr. N. P. Mote
14	Patil Shakti Prakash Patil Atharv Shahaji Patil Pratik Suresh	Temperature display on 16x2 LCD By Using 8051 Microcontroller	Dr. C. B. Patil & Mr. N. P. Mote
15	Jadhav Ananya N Kumbhar trupti A	Plant Irrigation System	Dr. M. S. Patil
16	Patil Sayali Sampat Patil Akshata Ashok	Password Based Door Lock System In 8051	Dr. C. B. Patil & Mr. N. P. Mote
17	Desai Sejal Anil Terani Akshata Sanjay	Temperature Controlled Fan Speed	Dr. C. B. Patil
18	Patil Dipti Dilip Chavan Snehal Bhikaji	Visitors Counter/ Object Counter	Dr. C. B. Patil

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HEAD
DEPARTMENT OF ELECTRONICS
VIVEKANAND COLLEGE, KOLHAPUR
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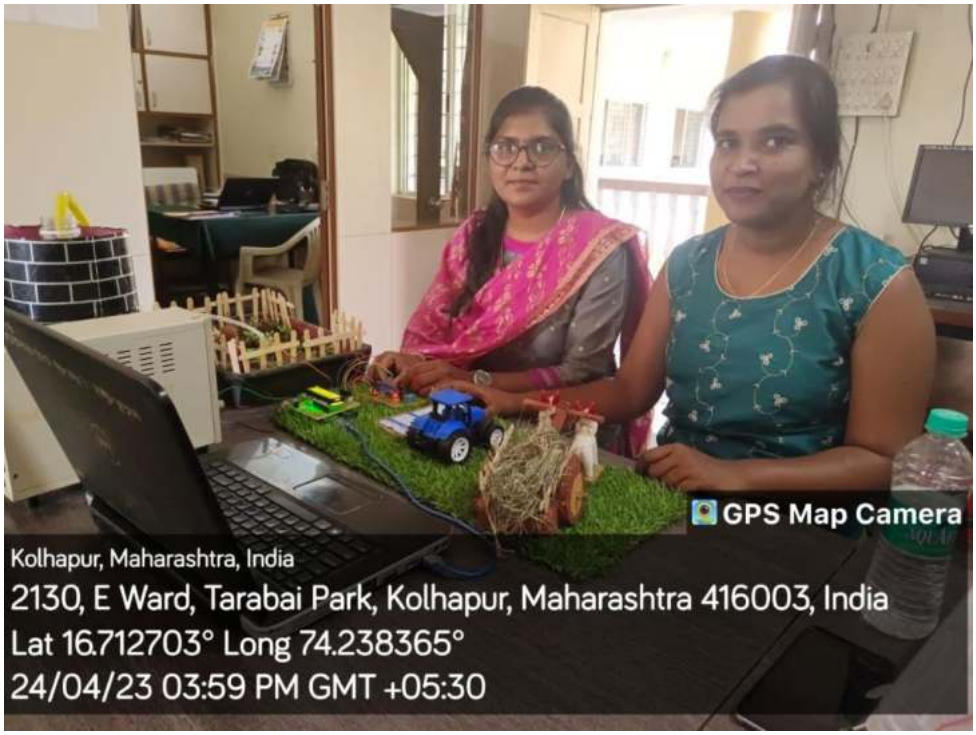
Project work by B.Sc. III students of Academic year 2022-23



IoT Based Smart Irrigation System

Voice Controlled Robotic Car

VIVEKANAND COLLEGE
ESTD JUNE 1964
KOLHAPUR-416003

Smart Dustbin Using Arduino

Fingerprint Door Lock Using ARDUINO

PROJECT WORK

entitled

"IoT BASED SMART IRRIGATION SYSTEM"

Submitted to

DEPARTMENT OF ELECTRONICS

VIVEKANAND COLLEGE, KOLHAPUR
(AUTONOMOUS)

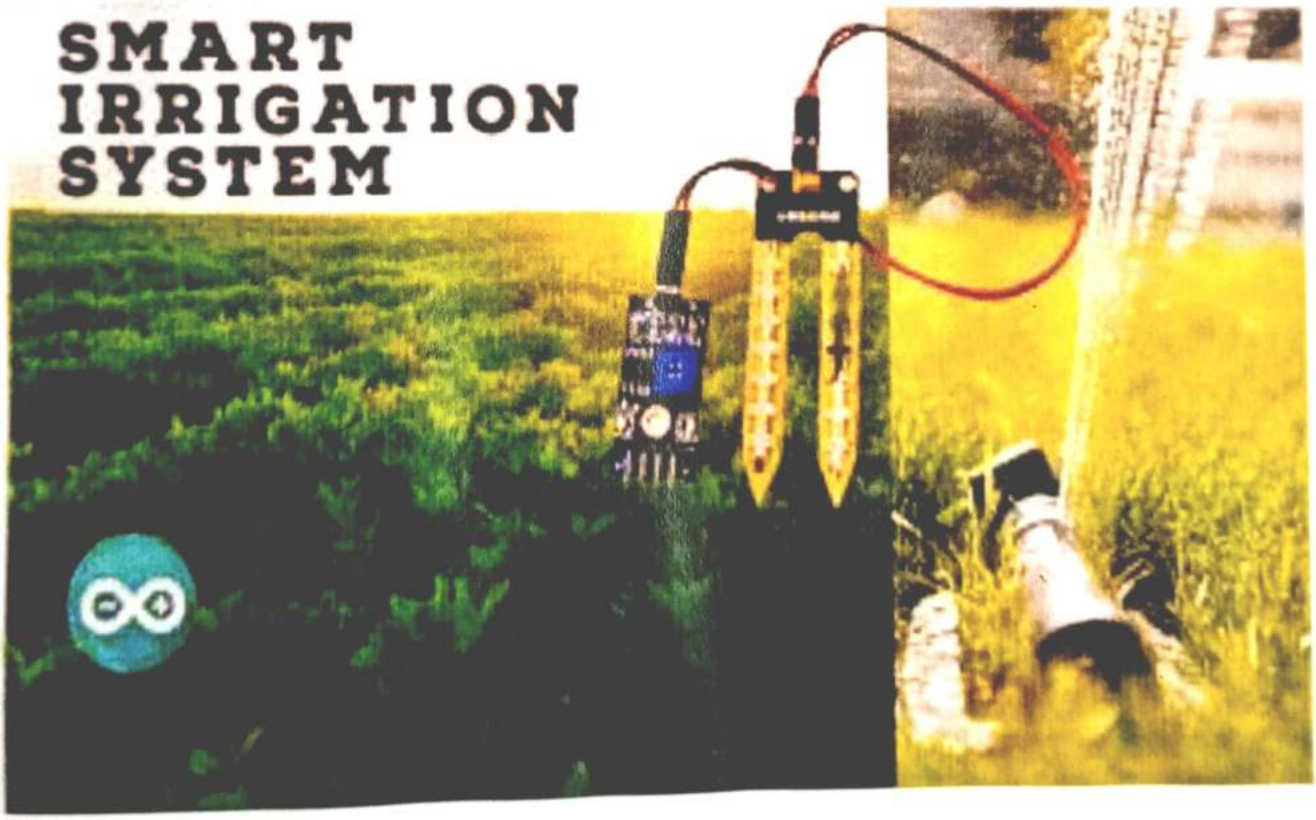
By

Miss. Prajakta Sunil Bidre

Miss. Muskan Kripashankar Maurya

Miss. Bhagyashri Bharat Yadav

IoT BASED SMART IRRIGATION SYSTEM



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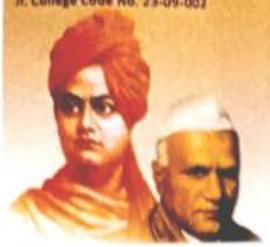

" ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार "
- शिक्षणमहर्षी डॉ. बापुजी साळुंखे

Estd., 7 June 1964

Shri Swami Vivekanand Shikshan Sanstha's
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(Affiliated to Shivaji University, Kolhapur)
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ISO 9001-2015

PROJECT WORK

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By

Miss. Prajakta Sunil Bidre

Miss. Muskan Kripashankar Maurya

Miss. Bhagyashri Bharat Yadav

PROJECT GUIDE

Dr. Milind S. Patil

Mr. .N.P.Mote

YEAR BY:

2022-23

Exam Seat No. :

Date:-

CERTIFICATE

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

Department of Electronics

This is to certify that Miss. Bhagyashri Bharat Yadav, Miss. Muskan Kripashankar Maurya & Miss. Prajakta Sunil Bidre students of B.Sc III (Electronics) class has satisfactorily completed the project entitled "IoT based Smart Irrigation System" as a partial fulfilment of Electronics practical examination conducted by the college during the year 2022-23.

Teacher in charge
(Dr. Milind S. Patil)

Examiner

Head of Department
(Dr. C. B. Patil)
Head
Department of Electronics
Vivekanand College, Kolhapur

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Also we express our sincere thanks to Mr. P. R. Bagade, Mr. N. P. Mote, Dr. P. S. Jadhav, and Mr. G. B. Jirage for their moral support and helpful suggestions during our project work.

Lastly but not least our sincere credit goes to our family for their key support since we begin our education and also to our group members.

Date:

Miss. Muskan Kripashankar Maurya

Miss. Prajakta Sunil Bidre

Miss. Bhagyashri Bharat Yadav

INDEX

Chapter 1:
Introduction

Agriculture plays a important role in all part of the India. Due to sudden change in climate and lower rainfall in all over India, the scope of agriculture become down. Without wasting the water, cultivation should yield maximum. In traditional method, the land gets irrigated with excess amount of water than the crop needs. The wastage of excess water can be overcome by modern irrigation system such as drip irrigation, sprinkle irrigation etc. But this smart irrigation system can overcome the wastage of excess water through manual operation i.e., offers a flawless operation in irrigating the land. The design and implementation of a clever irrigation gadget were broadly settled in different situations and most reliable price performance on the electric gadget. In reality, the clever irrigation device has extra benefits than the conventional techniques of irrigation. It uses helpful technology and assists the farmers, to irrigate and feed the crops with correct quantity of water and needed fertilizers to the crops. The implementation of a sensible irrigation system in a very land is simple and therefore the value to put in is additionally less.

In this system we need of soil sensors, according to the size of the agriculture land. With the soil sensors reading, the land can be irrigated equally by avoiding the problems like wastage of water and unequal irrigation. Equally irrigated land are monitored and controlled by remote operating system. The various modes of operations can be achieved through the android mobile application. It has microcontroller, and a bi-directional communication link. IoT plays a important role for the communicating the system and farmers. The user interface is provided to them by the utilization of Android Mobile Application. The most contribution of this paper is to develop hardware and software for the farmer's irrigation system.The Proposed system of this paper is to eliminate the manual operation and to implement an entire automatic irrigation system. This system requires additional sensors with respect to the size of the farmer's land.

By the implementation of this system, the farmers can able to know about their crops health in all seasons by login with their respective user id into the mobile

app to check the status of their irrigation system. In case of power cut, the system can connect to a mini up because the system consumes only less power or once the power reconnects; the system will automatically connects to the Wi-Fi and starts operating automatically. The values from the sensors are sent to the microcontroller. The microcontroller will send this information to the cloud which is connected to the mobile app. various soil sensors reading, the land can be irrigated equally by avoiding equally by soil sensors reading, the land can be irrigated equally by avoiding the problems like wastage of water and unequal irrigation. Equally irrigated land are monitored and controlled by remote operating system.

The various modes of operations can be achieved through the android mobile application. It has microcontroller, and a bi-directional communication link. IoT plays an important role for the communicating the system and farmers. The user interface is provided to them by the utilization of Android Mobile Application. The most contribution of this paper is to develop hardware and software for the farmer's irrigation system. The Proposed system of this paper is to eliminate the manual operation and to implement an entire automatic irrigation system. This system is requires to additional sensors with respect to size of farmers land.

Components:

Hardware components:

16×2 LCD Display

Arduino UNO

Soil moisture Sensor

Relay

Wi-Fi Module esp8266

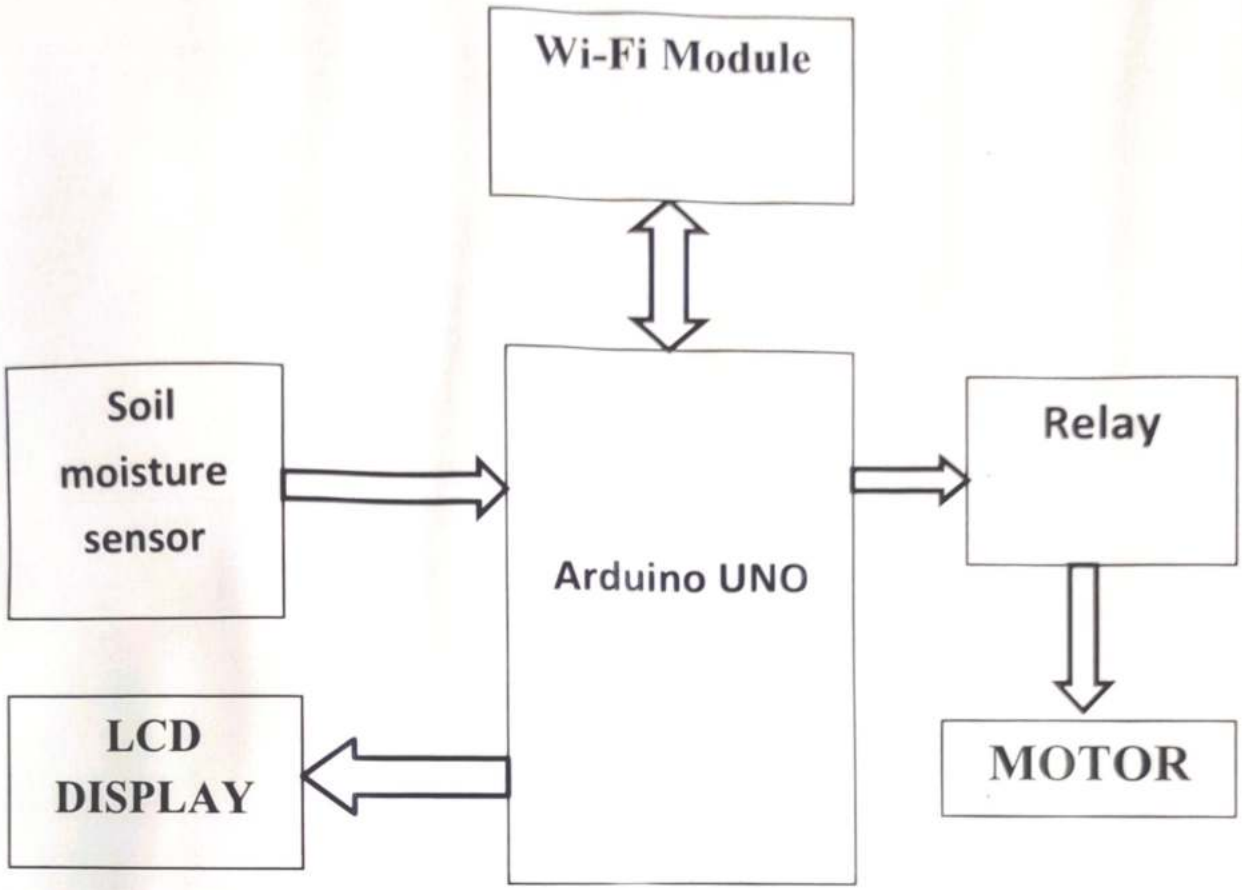
Motor Pump

Power Supply

Software component:

Arduino IDE

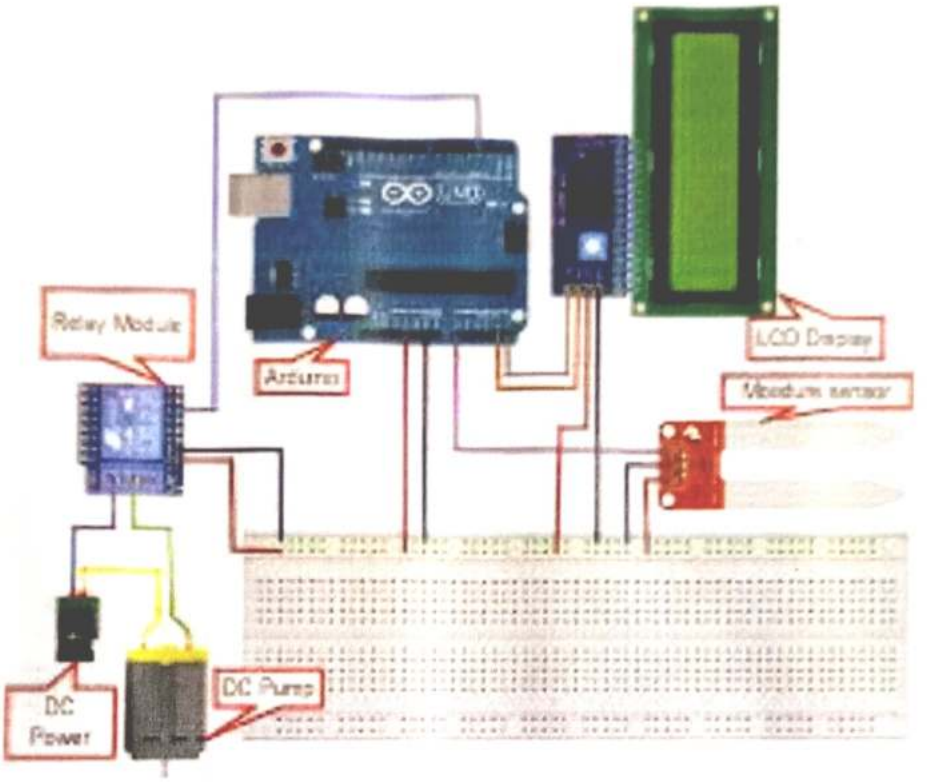
Block Diagram



Block diagram of IoT based smart irrigation system

Chapter 2:
Hardware Implementation

Implementation Diagram:



First step is the connecting LCD to Arduino board.

To wire your LCD screen to your board, connect the following pins:

LCD RS pin to digital pin 12

LCD Enable pin to digital pin 11

LCD D4 pin to digital pin 5

LCD D5 pin to digital pin 4

LCD D6 pin to digital pin

CD D7 pin to digital pin 2

LCD R/W pin to GND

LCD VSS pin to GND

LCD VCC pin to 5V

LCD LED+ to 5V through a 220 ohm resistor

LCD LED- to GND

Additionally, wire a 10k potentiometer to +5V and GND, with its wiper (output) to LCD screens VO pin (pin3). The LCD interfacing is completed here. After that weinterface the soil moisture sensor. The design of the circuit is very simple. Connect the probe to the board and provide power supply to the board. Take the analog out pin from the board and connect it to Analog IN pinA0 of the Arduino. After interfacing LCD and soil moisture sensor we interface relay for on off water pump.

GND: goes to ground.IN1: controls the first relay (it will be connected to an Arduino digital pin) IN2: controls the second relay (it should be connected to an Arduino digital pin if you are using this second relay. VCC: goes to 5V.

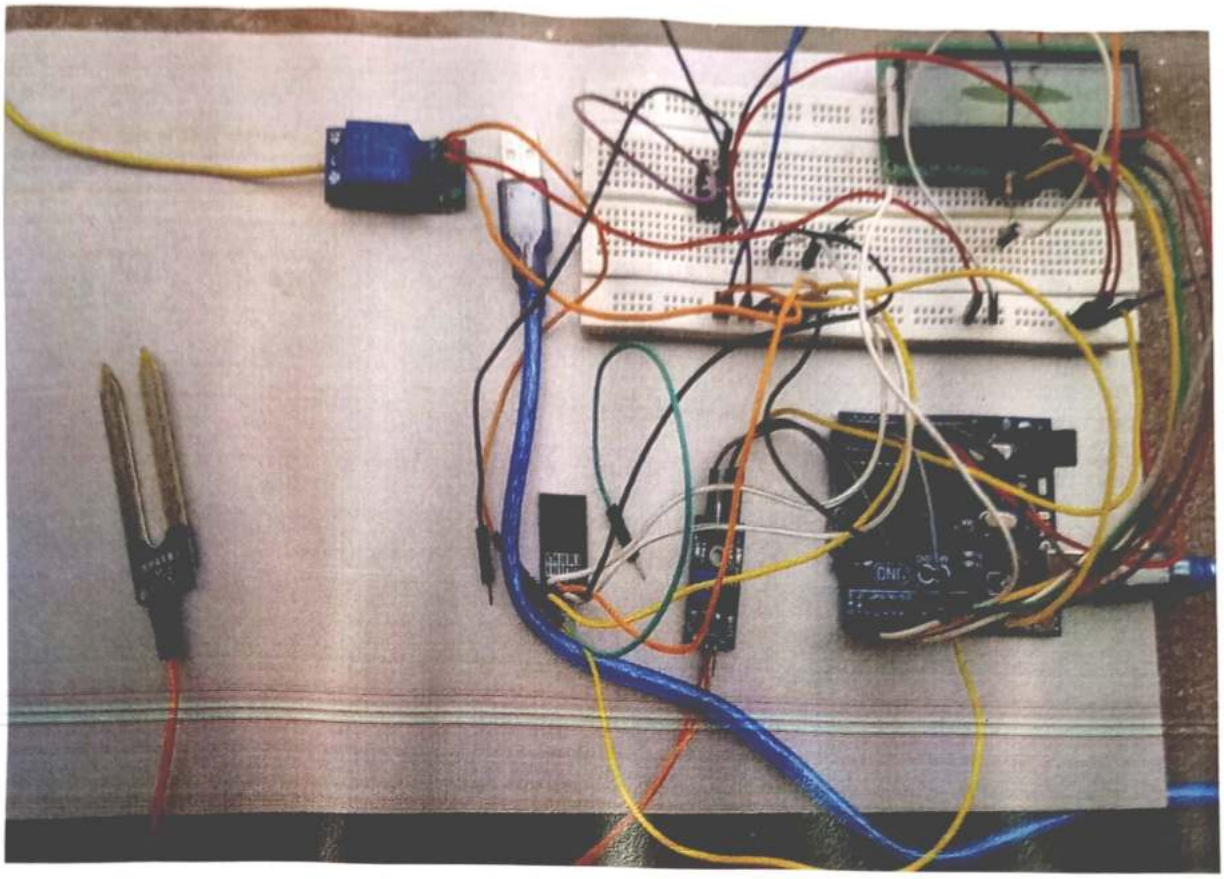
Then connecting Wi-Fi module ESP8266.connect the red wire to VIN(3.3V) to the +3.3V power from the Arduino UNO. Connect the black wire to the ground.

Connect the green wire to the TX of theWi-Fi module and Arduino UNO. Connect the yellow write to the RX of the Wi-Fi module and Arduino UNO. We completed our circuit and after that the program uploads on the Arduino IDE.

Working:

This project uses Arduino Uno to control the motor. The Arduino Board is programmed using the Arduino IDE software. Soil moisture sensors measure the level of moisture in the soil and calculate the average moisture value and send the signal to the Arduino if watering is required. The water pump supplies water to the plants until the desired moisture level is reached. The rechargeable battery that supplies required power source is recharged via Solar panel. A moisture sensor is used for sensing the soil condition –to know whether the soil is wet or dry, and the input signals are then sent to the microcontroller, which controls the whole circuit. Whenever the soil condition is dry, the microcontroller sends command to relay and the motor gets switched on and supplies water to the field. And if the soil gets wet, motor gets switched off.

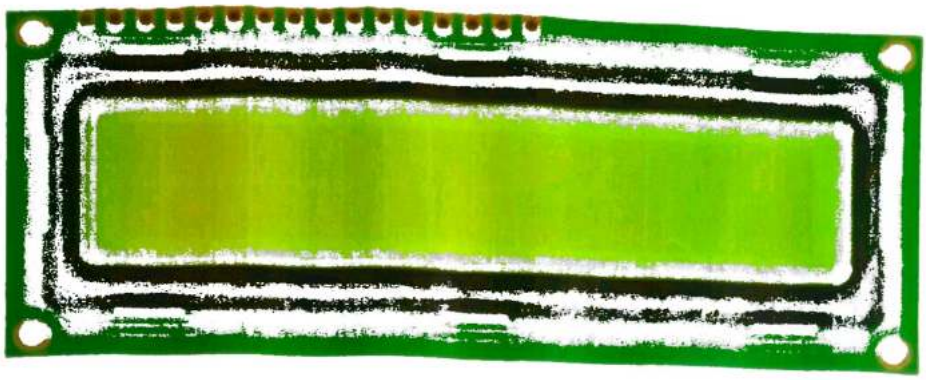
Photographs of designed circuit:



Photographs of designed system:

Hardware Components Information:

LCD (Liquid Crystal Display):-



In LCD 16×2, the term LCD stands for Liquid Crystal Display that uses a plane panel display technology, used in screens of computer monitors & TVs, smartphones, tablets, mobile devices, etc. Both the displays like LCD & CRTs look the same but their operation is different. Instead of electrons diffraction at a glass display, a liquid crystal display has a backlight that provides light to each pixel that is arranged in a rectangular network.

Every pixel includes a blue, red, green sub-pixel that can be switched ON/OFF. Once all these pixels are deactivated, then it will appear black and when all the sub-pixels are activated then it will appear white. By changing the levels of each light, different colour combinations are achievable. This article discusses an overview of LCD 16X2 & it's working with applications.

LCD 16X2 Pin Configuration:- The pin configuration of LCD16X2 is discussed below so that LCD 16X2 connection can be done easily with external devices.

Pin 1 (Ground): This pin connects the ground terminal.

Pin 2 (+5 volt): This pin provides a 5 volt supply to the LCD.

Pin 3(VE): This pin selects the contrast of the LCD.

Pin 4(Register select): This pin connects a data pin of an Arduino UNO& gets either 1 or 0. Here data mode=0 and command mode =1.

Pin5 (Read & Write): This pin is used to read/write data.

Pin6 (Enable): This enables the pin must be high to perform the Read Write procedure. This pin is connected to the data pin of the microcontroller to be held high constantly.

Pin7 (Data Pin): The data pins are from 0-7 which are connected through the microcontroller for data transmission. The LCD module can also work on the 4-bit mode through working on pins 1, 2, 3 & other pins are free.

Pin8 – Data Pin 1

Pin9 – Data Pin 2

Pin10 – Data Pin 3

Pin11 – Data Pin 4

Pin12 – Data Pin 5

Pin13 – Data Pin 6

Pin14 – Data Pin 7

Pin15 (LED Positive): This is a +Ve terminal of the backlight LED of the display & it is connected to +5V to activate the LED backlight.

Pin16 (LED Negative): This is a -Ve terminal of a backlight LED of display & it is connected to the GND terminal to activate the LED backlight.

Arduino UNO:-

The Arduino UNO is a standard board of Arduino. Here UNO means 'one' in Italian. It was named as UNO to label the first release of Arduino Software. It was also the first USB board released by Arduino. It is considered as the powerful board used in various projects. Arduino.cc developed the Arduino UNO board.

Arduino UNO is based on an ATmega328P microcontroller. It is easy to use compared to other boards, such as the Arduino Mega board, etc. The board consists of digital and analog Input/output pins (I/O), shields, and other circuits. The Arduino

UNO includes 6 analog pin inputs, 14 digital pins, a USB connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based on IDE, which stands for Integrated Development Environment. It can run on both online and offline platforms. The IDE is common to all available boards of Ardiuno UNO.

Let's discuss each component in details:-

ATmega328 Microcontroller- It is a single chip Microcontroller of the Atmel family. The processor code inside it is of 8-bit. It combines Memory (SRAM, EEPROM, and Flash), Analog to Digital Converter, SPI serial ports, I/O lines, registers, timer, external and internal interrupts, and oscillator.

ICSP pin- The In-Circuit Serial Programming pin allows the user to program using the firmware of the Arduino board.

Power LED Indicator- the ON status of LED shows the power is activated. When the power is OFF, the LED will not light up.

Digital I/O pins- The digital pins have the value HIGH or LOW. The pins numbered from D0 to D13 are digital pins.

TX and RX LED's- The successful flow of data is represented by the lighting of these LED's.

AREF- the Analog Reference (AREF) pin is used to feed a reference voltage to the Arduino UNO board from the external power supply.

Reset button- It is used to add a Reset button to the connection.

USB- It allows the board to connect to the computer. It is essential for the programming of the Arduino UNO board.

Crystal Oscillator- The Crystal oscillator has a frequency of 16MHz, which makes the Arduino UNO a powerful board.

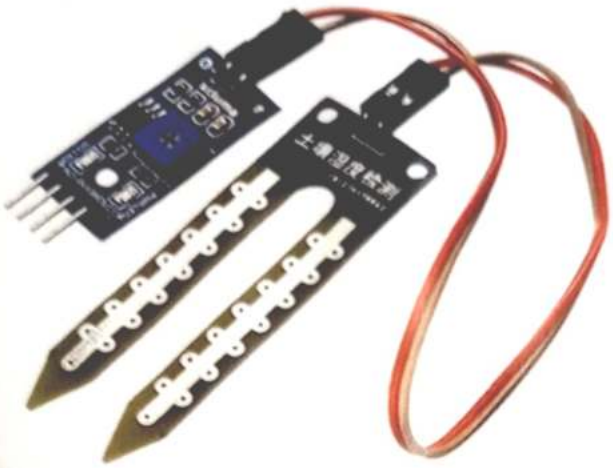
Voltage Regulator- The voltage regulator converts the input voltage to 5V.

GND- Ground pins. The ground pin acts as a pin with zero voltage.

Vin- It is the input voltage.

Analog Pins- The pins numbered from A0 to A5 are analog pins. The function of Analog pins is to read the analog sensor used in the connection. It can also act as GPIO (General-purpose Input Output) pins.

SOIL MOISTURE SENSOR:-



Soil Moisture Sensor Applications

The applications of moisture sensor include the following.

1. Agriculture
2. Landscape irrigation
3. Research
4. Simple sensors for gardeners

This is all about the soil moisture sensor. From the above information, finally, we can conclude that this sensor is used to gauge the soil's volumetric water content, which makes it perfect to make experiments in the science field like agricultural science, soil science, horticulture, environmental science, biology, and botany. Here is a question.

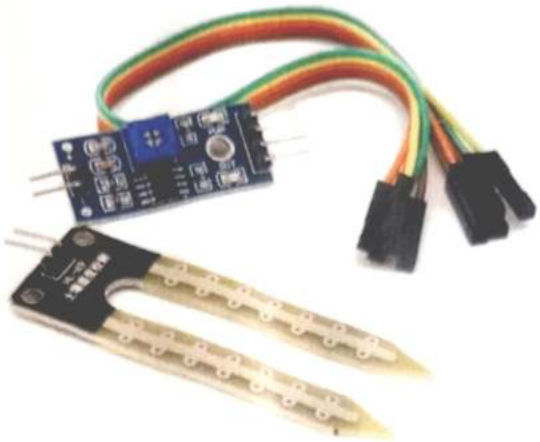
Working Principle Of Soil Moisture Sensor:-

This sensor mainly utilizes capacitance to gauge the water content of the soil (dielectric permittivity). The working of this sensor can be done by inserting this sensor into the earth and the status of the water content in the soil can be reported in the form of a per cent.

This sensor makes it perfect to execute experiments within science courses like environmental science, agricultural science, biology, soil science, botany, and horticulture.

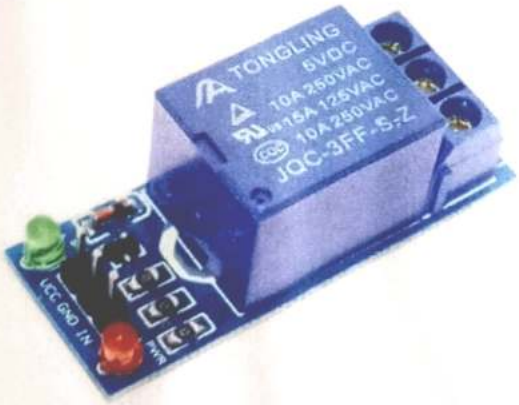
Soil Moisture Sensor Pin Configuration

The FC-28 soil moisture sensor includes 4-pins



- VCC pin is used for power.
- A0 pin is an analog output.
- D0 pin is a digital output.
- GND pin is a Ground.
- This module also includes a potentiometer that will fix the threshold value, & the value can be evaluated by the comparator-LM393. The LED will turn on/off based on the threshold value.

RELAY:-



Part Number: JQC-3FF-S-Z.

Function: PCB Type Relay

Size: 19.2mm*15.4mm*15.4mm

Manufacturer: Tongling Electric

Description

This is 10A, PCB Type, Form C Type, Relay.

Features:-

1.10A switching capability 2.Small footprint 3.Sealed type available 4.Class B/F available 5. Conform to RoHs, ELV directive.

Contact Data:-

Contact Form: 1H/1Z.

Contact Material: Silver Alloy.

Load: Resistive load(COSΦ=1)

Contact Readings: 10A 250 vac 15A 125vac

Minimum load: 100mA 5VDC

Max Switching Voltage: 250 VAC/30VDC

Max Switching Current: 15A.

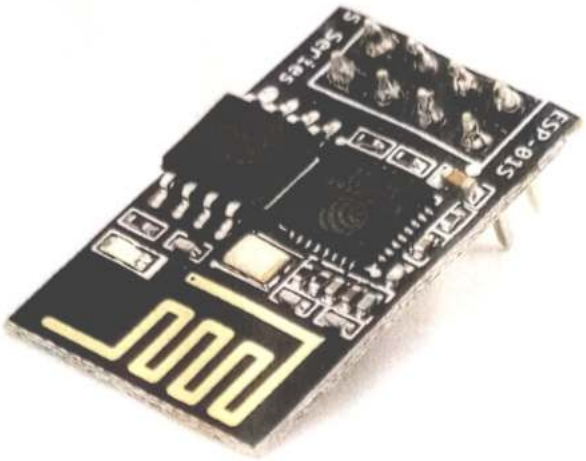
Max Switching Power: 2500VA/240W

Contact Resistant: 100mΩMax at 6VDC 1V

Specification:-

1. Insulation Resistance: 100MΩ Min at 500VDC
2. Dielectric Strength between Open Contacts: 750VAC (50/60Hz for one minute)
3. Between Contacts and coil: 1500VAC (50/60Hz for one minute)
4. Operate Time: 10ms
5. Release Time: 5ms
6. Temperature Range: -40°C to+85°C
7. Vibration Resistance: 10-55Hz, 1.5mm
8. Mechanical: 18,000 operations/hr
9. Electrical: 1,800 operations/hr
10. Humidity: 40-85%
11. Weight: Approx 10g
12. Safety Standard: CQC TUV UL SGS

Wi-Fi module esp8266:-



ESP8266 comes with capabilities of

- 2.4 GHz Wi-Fi (802.11 b/g/n, supporting WPA/WPA2),
- General-purpose input/output (16 GPIO),
- Inter-Integrated Circuit (I^2C) serial communication protocol,
- Analog-to-digital conversion (10-bit ADC)
- Serial Peripheral Interface (SPI) serial communication protocol,
- I^2S (Inter-IC Sound) interfaces with DMA(Direct Memory Access) (sharing pins with GPIO),
- UART (on dedicated pins, plus a transmit-only UART can be enabled on GPIO2), and
- Pulse-width modulation (PWM).

It employs a 32-bit RISC CPU based on the TensilicaXtensa L106 running at 80 MHz (or over clocked to 160 MHz). It has a 64 KB boot ROM, 64 KB instruction RAM and 96 KB data RAM. External flash memory can be accessed through SPI.

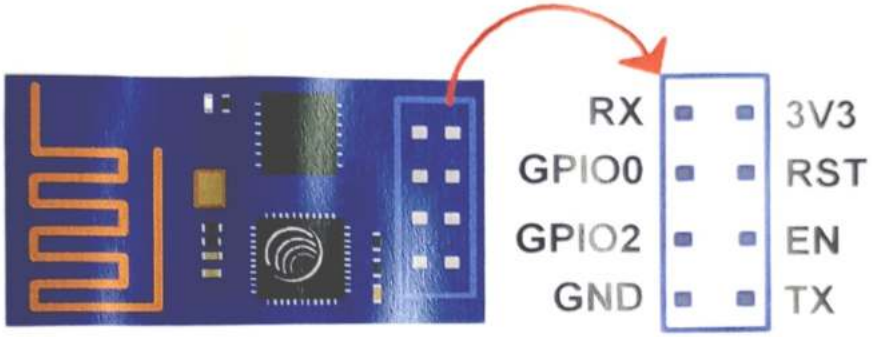
ESP8266 module is low cost standalone wireless transceiver that can be used for end-point IoT developments.

To communicate with the ESP8266 module, microcontroller needs to use set of AT commands. Microcontroller communicates with ESP8266-01 module using UART having specified Baud rate.

There are many third-party manufacturers that produce different modules based on this chip. So, the module comes with different pin availability options like,

- ESP-01 comes with 8 pins (2 GPIO pins) – PCB trace antenna.
- ESP-02 comes with 8 pins, (3 GPIO pins) – U-FL antenna connector.
- ESP-03 comes with 14 pins, (7 GPIO pins) – Ceramic antenna.
- ESP-04 comes with 14 pins, (7 GPIO pins) – No ant. etc.
- For example, below figure shows ESP-01 module pins

ESP8266-01 Module Pin out and Description



3.3V: - 3.3 V Power Pin.

GND: - Ground Pin.

RST: - Active Low Reset Pin.

EN: - Active High Enable Pin.

TX: - Serial Transmit Pin of UART.

RX: - Serial Receive Pin of UART.

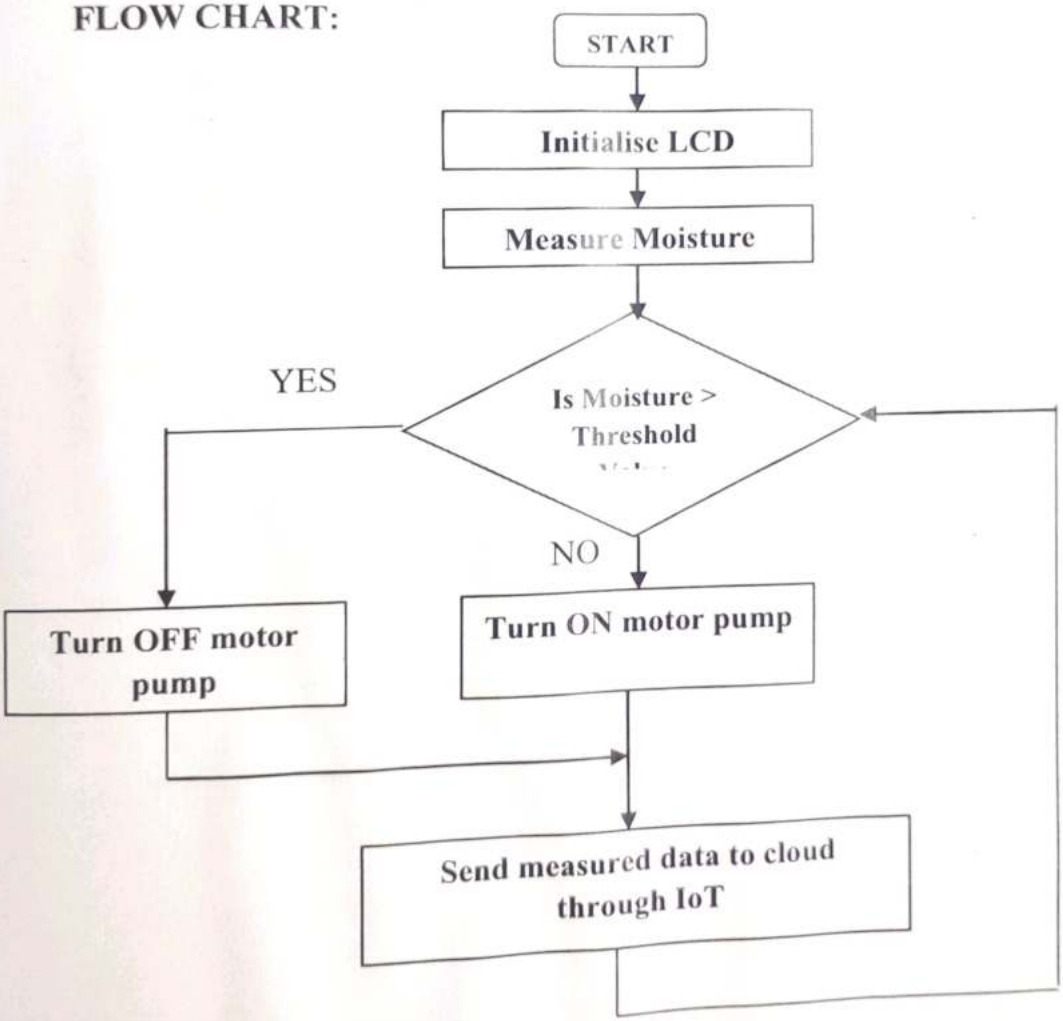
GPIO0 & GPIO2: - General Purpose I/O Pins. These pins decide what mode (boot or normal) the module starts up in. It also decides whether the TX/RX pins are used for Programming the module or for serial I/O purpose.

Chapter 3:
Code Designing

Principle used in this system:

In liquids, current flows due to movement of charged particles (ions), these ions are formed when a voltage is applied to ionic compounds dissolved in water. As a result of this they increase the conductivity of water. If ions are increased then moisture content in the soil increases, which in turn increases the electrical conductivity of the soil. If conductivity increases resistance decreases. As per Ohms law (V=IR), resistance is directly proportional to voltage, if the voltage is less than the conductivity of water is more, more the conductivity the wet soil is. So Wet soil > Lower output voltage And Dry soil > Higher output voltage.

FLOW CHART:



Programme Code

```
#include <LiquidCrystal.h>
Constintrs=7,en=6,d4=5,d5=4,d6=3,d7=2;
LiquidCrystallcd (rs, en, d4, d5, d6, d7);
int j=0;
intprev=0;
intpres=0;
int soil=A0;
int relay=8;
void setup () {
lcd.begin (16, 2);
lcd.setCursor (0,0);
lcd.print ("soil moisture ");
Serial. begin (9600);
pinMode(soil, INPUT);
pinMode(relay, OUTPUT); // put your setup code here, to run once:
}
void loop() {
j=analogRead(A0);
j=map (j, 0, 982, 184, 0);
pres=j;
lcd.setCursor (6, 1);
lcd.print (j);
lcd.print("%");
prev=j;
Serial.println(j);
if (j>100)
{ DigitalWrite (relay, HIGH);}
else
{DigitalWrite (relay, LOW);}
Delay (500); // put your main code here, to run repeatedly:
}
```

Chapter 4:
Advantages and Benefits

ADVANTAGES

1. The main advantage of the smart irrigation system is saving water, sensor data monitoring through mobile.
2. We can control the water pumps through mobile apps.
3. We can regulate water consumption by optimizing the data came from the sensors.
4. This system determines the irrigation need of the landscape.
5. These systems maximize irrigation efficiency by reducing water waste and while maintaining health and quality.

This system will be installed under the ground

Since this system will be installed under the ground so there are no unsightly hoses stretched across the land. Sprinkler heads up in case of water need and then set beck when irrigating is done. Drip irrigation system even is hidden from the view.

Smart irrigation system works as a drip system. It has a soil moisture sensor and is a good replacement for traditional watering methods. It is the best solution to reduce water waste.

This irrigating system will stop when it rains

Smart irrigation system knows when to start the watering, how long it will take and when finish its job. It even knows what days should do watering. This system will consider the soil humidity and will stop the next watering schedule if it rains. So there is no need to worry about your plants and come back of your journey for watering, you can control the position by your smart phone or computer from outside.

Benefits of IoT Based Smart Irrigation System

Save water and money.

Save your customers money.

Make maintaining yard easy and convenient.

Minimize the infrastructure to store and carry water.

Protect the water resources for future generations.

Chapter 5:
Future Scope & Conclusion

FUTURE SCOPE

Irrigation is a process of providing the desire amounts of water to the agricultural land. This process is very beneficial in minimizing runoffs or drought situations for the croup's cultivation.

Due to alarming changes in the climate, farmers cannot rely on natural rainwater. Irrigation is important to yield good quality crops in the seasonable or non-seasonable period.

For modern agriculture, a smart irrigation system is one of the best techniques that give more production in minimum duration. To many extend, this smart irrigation system is designed and fully automated to minimize manual handling in agriculture.

And one of the good things is that it is very comfortable for users (or farmers) to understand the concept of IoT and sensors for smart irrigation.

It can help you to learn how various sensors can be deployed and utilization of their data to generate events and control irrigation systems.

CONCLUSION

Thus the "IOT based smart irrigation using Arduino" has been designed and tested successfully. It has been developed by integrated features of all the hardware components used. The system has been tested to function automatically. The moisture sensors measure the moisture level (water content) of the different plants. If the moisture level goes below the desired and limited level, the moisture sensor sends the signal to the Arduino board which triggers the Water Pump to turn ON and supply the water to respective plant. When the desired moisture level is reached, the system halts on its own and the water Pump is turned OFF. Thus, the functionality of the entire system has been tested thoroughly and it is said to function successfully.

Chapter 6:
References

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PROJECT WORK

"VOICE CONTROLLED ROBOTIC CAR"

SUBMITTED TO

DEPARTMENT OF ELECTRONICS

VIVEKANAND COLLEGE, KOLHAPUR

(AUTONOMOUS)

BY

Mr. SANDEEP JAYSING PATIL

Mr. KETAN ASHOK KAMBLE

PROJECT GUIDE

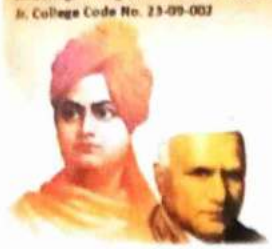
Dr. MILIND PATIL

2022-2023

Jr. College Recog. No. H.S.C./1074/R-1/Dt :8-8-1976
Jr. College Code No. 23-09-003

" ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार "
- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Estd. : June 1964



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College With Potential For Excellence
ISO 9001 :2015

Project Work

"Voice controlled Robotic Car"

Submitted to

DEPARTMENT OF ELECTRONICS

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

By

Mr. Sandeep Jaysing Patil

Mr. Ketan Ashok Kamble

PROJECT GUIDE

Dr. Milind Patil

2022-2023

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Lastly but not least our sincere credit goes to our family for their key support since we begin our education and also to our group members.

Date:

Mr. Sandeep Jysing Patil

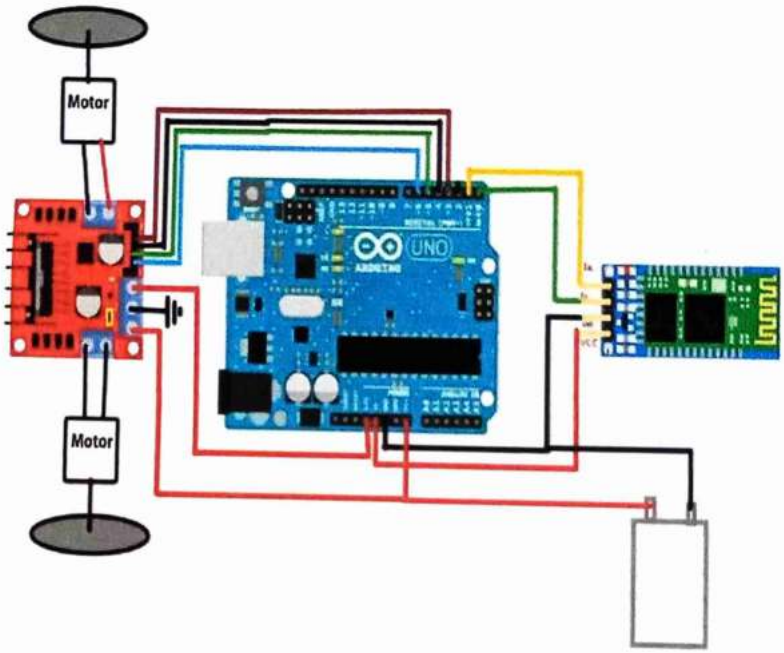
Mr.Ketan Ashok Kamble

INDEX

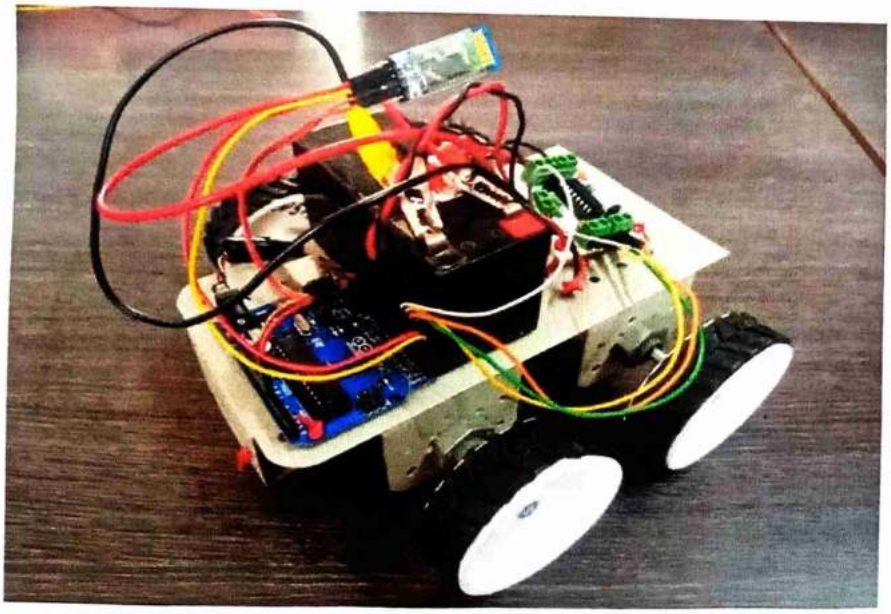
Chapter2: Hardware design & Implementation

Circuit diagram:

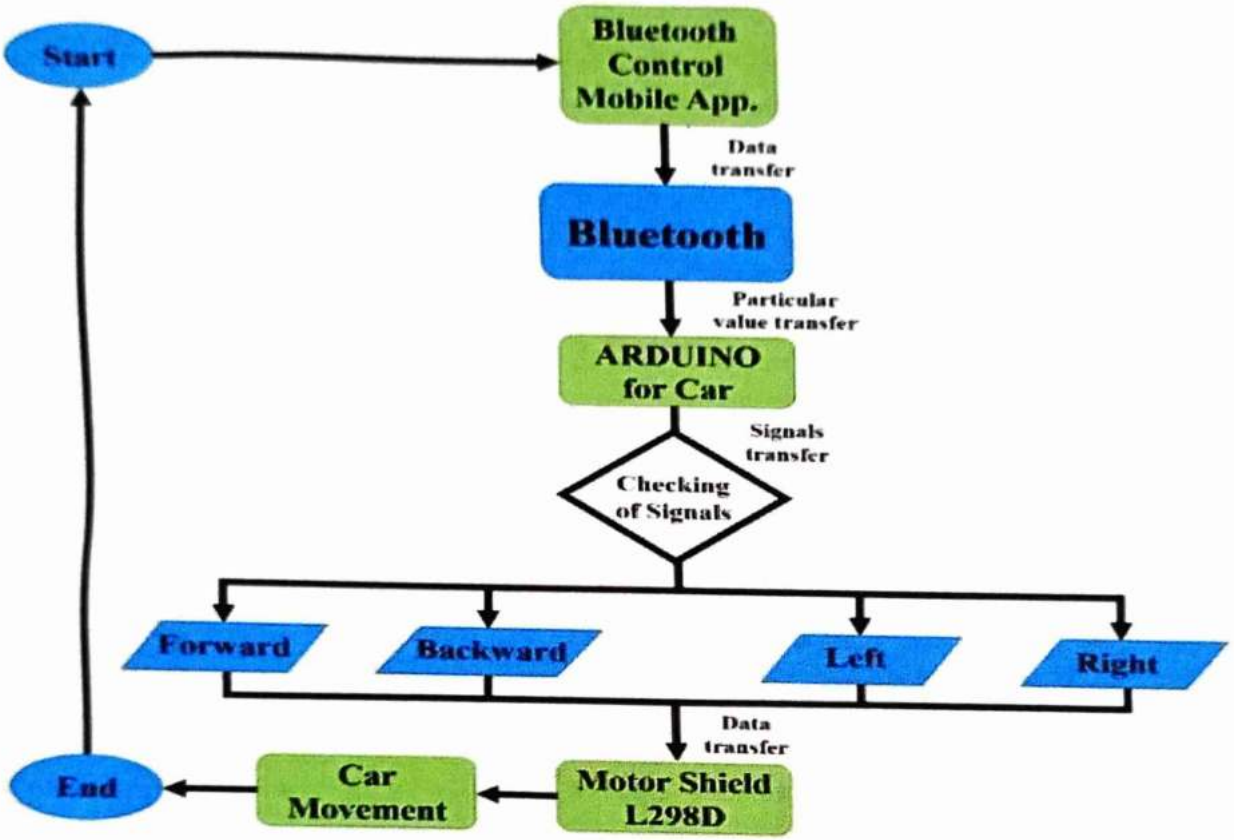
Voice Control Robotic car



Module Photograph:



Flow Chart:


Start
Bluetooth Control Mobile App.
Data transfer
Bluetooth
Particular value transfer
ARDUINO for Car
Signals transfer
Checking of Signals
Forward
Backward
Left
Right
Data transfer
End
Car Movement
Motor Shield L298D

Chapter 3:
Working of project

The Arduino voice-controlled robot car is interfaced with a Bluetooth module HC-05 . We can give specific voice commands to the robot through an Android app installed on the phone. At the receiving side, a Bluetooth transceiver module receives the commands and forwards them to the Arduino and thus the robotic car is controlled.

The Arduino Wireless Voice Controlled Robot consists of a transmitter and a receiver section. The transmitter end consists of Smartphone Bluetooth and the Android app installed on it. Similarly, the Receiver section has Arduino board as a processor, HC-05 Bluetooth Module as a wireless communication module, L293D for driving motors, and a pair of DC geared as a part for moving robot Car.

The TX, RX pins of Arduino is connected to Rx, Tx pins of Bluetooth Module. The Bluetooth Module is supplied with 5V. Similarly, left DC motor is connected to pin no 3 & 6 of L293D and right DC motor to pin no 14 & 11 of L293D. Arduino digital pins 3,4,5,6 are connected to L293D 2, 7, 10, 15 respectively. The L293D IC Pins 2, 5, 12, 13 is GND pins and 9, 1, 16 is supplied with 5V. But pin 8 of L293D is directly supplied with 9V.

Commands are processed, and speech-to-text conversion is done within the app using Google's speech-recognition technology. Text is then sent to the receiver side (that is, robotic car) via Bluetooth.

In this project, digital I/O pins 2, 3, 4 and 5 of Arduino are configured as output pins. Pins 0 and 1 of Arduino are used for serial communication with HC-05 Bluetooth module.

Text received via Bluetooth is forwarded to Arduino Uno board using UART serial communication protocol. Arduino code checks the text received. Whenever the text is a matching string, Arduino controls the movements of the robot accordingly in forward, backward, Turning Right, Turning Left & Stop.

Chapter 3:
Material and methods

Modelling and designing of the VCRV was done by the following part available in the market and also the programming of the arduino was done and the app was developed by using app inventor on the internet.

Chassis:

A chassis is the internal framework of the artificial object which support in its construction and use Direct inclusion in abstracting services. Figure 1.Shows chassis diagram.

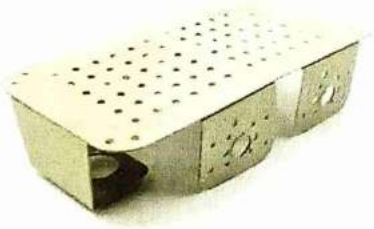


Figure: Chassis

Gear Motor:

A DC motor is a class of rotary electrical machine that converts t\direct current into mechanical energy. All types of DC motors have some kind of internal mechanism either electronic or electro mechanical, so it can change the direction of flow of current in path of motor periodically. The below Figure 2. Shows the Gear Motor

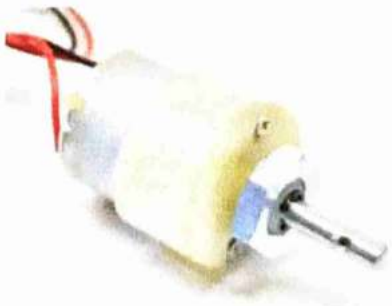


Figure: Gear Motor

Wheels:

A wheel is circular block of durable and hard material which is placed in axil about which the wheel rotates when a moment is applied by torque or gravity, thereby making one of the simple machines. When placed under a load baring platform, the wheel turning on the horizontal axil makes it possible to transport heavy loads Figure 3.Shows the wheel

Figure: Wheels

Arduino UNO Board:

Figure shows Arduino UNO is an open source micro controller board placed on the micro chip ATmega328p micro controller and developed by Adruino.cc. The board has 6 Analog pins, 14 digital pins programmable with Arduino IDE via a Type B USB cable. It can power by external main volt battery.

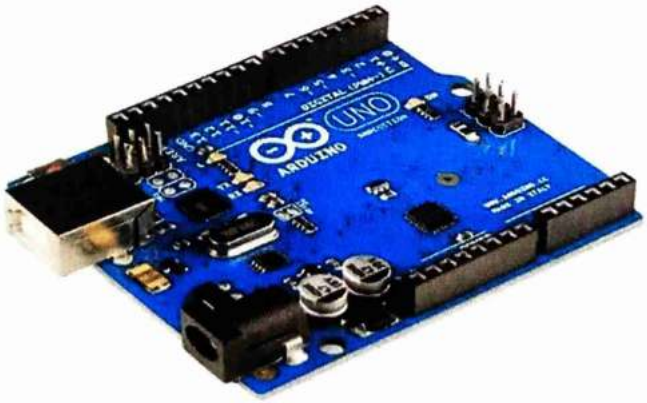
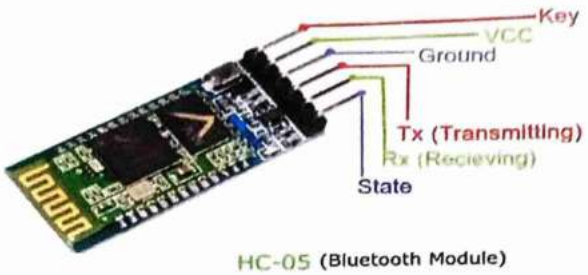


Figure: Arduino UNO

Bluetooth Module HC 05:

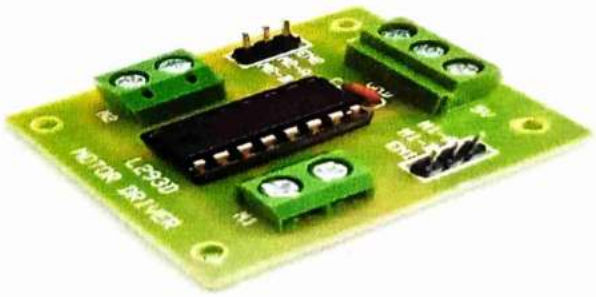
HC-05 is a Bluetooth module which is designed for wireless communication. It is used for many applications like wireless headset, game controllers, wireless mouse, wireless keyboard, and many more consumer applications.



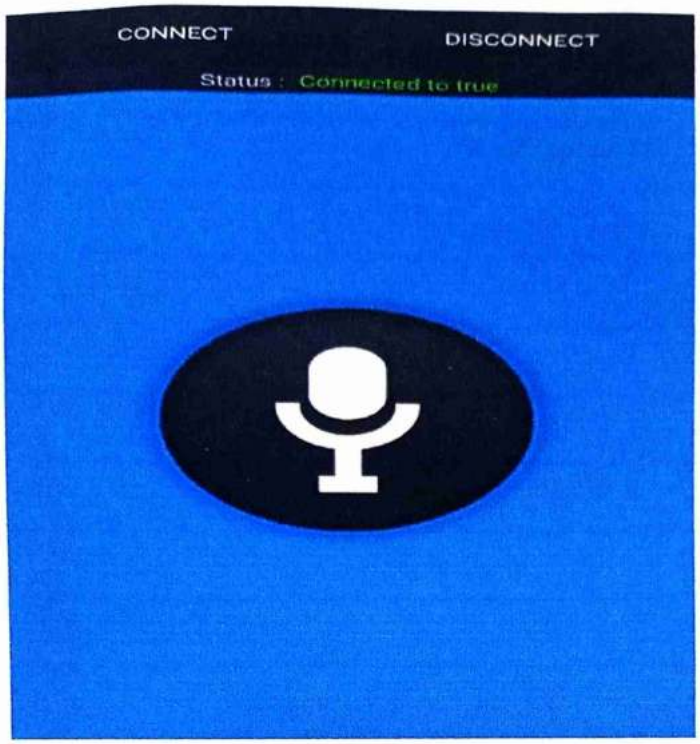
HC-05 (Bluetooth Module)

Motor Driver (L293D):

The L293D is a 16-pin Motor Driver IC which can control a set of two DC motors simultaneously in any direction. The L293D is designed to provide bidirectional drive currents of up to 600 mA (per channel) at voltages from 4.5 V to 36 V (at pin 8!). You can use it to control small dc motors - toy motors



Application for Communication:



Arduino Voice Control Version 1.2

About App:

Send your Arduino via Bluetooth, voice Commands and responds back to finish with Serial port. You will receive your responses alound from your mobile device. Figure Shows Developed Android app with the help of the app we developed an app and named it as Arduino Voice Control. The app contains the option to connect to Bluetooth and access the Bluetooth settings of the phone.

Chapter 4: Software design & Implementation

Program :

```
#include <SoftwareSerial.h>
SoftwareSerial BT(0, 1); //TX, RX respectively
String readvoice;
void setup() {
BT.begin(9600);
Serial.begin(9600);
 pinMode(4, OUTPUT);
 pinMode(3, OUTPUT);
 pinMode(5, OUTPUT);
 pinMode(6, OUTPUT);
}
void loop()
{
 while (BT.available()){  /*Check if there is an available byte to read*/
  delay(10); //Delay added to make thing stable
  char c = BT.read(); //Conduct a serial read
  readvoice += c; //build the string- "forward", "reverse", "left" and "right"
  }
  if (readvoice.length() > 0)
{
   Serial.println(readvoice);
if(readvoice == "forward")
 {
  forward();
  delay(500);
 }
 else if(readvoice == "back")
 {
  backward();
  delay(500);
 }
 else if (readvoice == "left")
 {
  turnleft();
  delay(500);
```

```
 }
else if ( readvoice == "right")
{
  turnright();
  delay(500);
}
else if (readvoice == "stop")
{
  stop();
  delay (100);
}
else if (readvoice == "keep watch in all direction")
{
 digitalWrite (3, HIGH);
 digitalWrite (4, LOW);
 digitalWrite (5, LOW);
 digitalWrite (6, LOW);
 delay (100);
}
 else if (readvoice == "*show me Garba#")
{
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, LOW);
digitalWrite (6, LOW);
delay (400);
digitalWrite(3, HIGH);
digitalWrite (4, HIGH);
digitalWrite(5,LOW);
digitalWrite(6,LOW);
delay(600);
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, HIGH);
digitalWrite (6, LOW);
delay (500);
digitalWrite (3, HIGH);
digitalWrite (4, LOW);
digitalWrite (5, LOW);
digitalWrite (6, HIGH);
delay (500);
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, LOW);
digitalWrite (6, LOW);
```

```
delay (400);
digitalWrite(3, HIGH);
digitalWrite (4, HIGH);
digitalWrite(5,LOW);
digitalWrite(6,LOW);
delay(600);
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, HIGH);
digitalWrite (6, LOW);
delay (500);
digitalWrite (3, HIGH);
digitalWrite (4, LOW);
digitalWrite (5, LOW);
digitalWrite (6, HIGH);
delay (500);
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, LOW);
digitalWrite (6, LOW);
delay (400);
digitalWrite(3, HIGH);
digitalWrite (4, HIGH);
digitalWrite(5,LOW);
digitalWrite(6,LOW);
delay(600);
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, HIGH);
digitalWrite (6, LOW);
delay (500);
digitalWrite (3, HIGH);
digitalWrite (4, LOW);
digitalWrite (5, LOW);
digitalWrite (6, HIGH);
delay (500);
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, LOW);
digitalWrite (6, LOW);
delay (400);
digitalWrite(3, HIGH);
digitalWrite (4, HIGH);
digitalWrite(5,LOW);
digitalWrite(6,LOW);
```

```
delay(600);
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, HIGH);
digitalWrite (6, LOW);
delay (500);
digitalWrite (3, HIGH);
digitalWrite (4, LOW);
digitalWrite (5, LOW);
digitalWrite (6, HIGH);
delay (500);
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, LOW);
digitalWrite (6, LOW);
delay (400);
digitalWrite(3, HIGH);
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digitalWrite(5,LOW);
digitalWrite(6,LOW);
delay(600);
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, HIGH);
digitalWrite (6, LOW);
delay (500);
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digitalWrite (6, HIGH);
delay (500);
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, LOW);
digitalWrite (6, LOW);
delay (400);
digitalWrite(3, HIGH);
digitalWrite (4, HIGH);
digitalWrite(5,LOW);
digitalWrite(6,LOW);
delay(600);
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, HIGH);
digitalWrite (6, LOW);
```

```
delay (500);
digitalWrite (3, HIGH);
digitalWrite (4, LOW);
digitalWrite (5, LOW);
digitalWrite (6, HIGH);
delay (500);
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, LOW);
digitalWrite (6, LOW);
delay (400);
digitalWrite(3, HIGH);
digitalWrite (4, HIGH);
digitalWrite(5,LOW);
digitalWrite(6,LOW);
delay(600);
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digitalWrite (4, HIGH);
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delay (400);
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digitalWrite (4, HIGH);
digitalWrite(5,LOW);
digitalWrite(6,LOW);
delay(600);
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, HIGH);
digitalWrite (6, LOW);
delay (500);
digitalWrite (3, HIGH);
digitalWrite (4, LOW);
digitalWrite (5, LOW);
digitalWrite (6, HIGH);
```

```
delay (500);
}
readvoice="";}} //Reset the variable
void forward()
{
digitalWrite(3, HIGH);
digitalWrite (4, LOW);
digitalWrite(5,HIGH);
digitalWrite(6,LOW);
delay(100);
}
void backward()
{
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, LOW);
digitalWrite (6, HIGH);
delay (100);
}
void turnright()
{
digitalWrite (3, LOW);
digitalWrite (4, HIGH);
digitalWrite (5, LOW);
digitalWrite (6, LOW);
delay (100);
}
void turnleft()
{
digitalWrite (3, LOW);
digitalWrite (4, LOW);
digitalWrite (5, LOW);
digitalWrite (6, HIGH);
delay (100);
}
void stop()
{
digitalWrite (3, LOW);
digitalWrite (4, LOW);
digitalWrite (5, LOW);
digitalWrite (6, LOW);
delay (100);
}
```

Chapter 4:
Result & Conclusion

In this project the voice control was designed for a assistant robot. The order of speech signals is automatically transmitted via a wired network to the server. The car is built primarily on a platform based on a microcontroller. Evaluation of the output of the original tests is carried out with promising implications. Possible developments to feasible technologies in households, schools, vehicle networks and businesses are also addressed. Several areas that may additionally be discussed are the impact of noise on speech to textual content translation. The use of renewable energy sources for robotic operation would not only increase the value of robotic energy, but would also be environmentally friendly.