

ARDUINO BASED AUTOMATIC PLANT IRRIGATION SYSTEM WITH MESSAGE ALERT

by

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A comprehensive project report has been submitted in partial fulfillment of the requirements for the degree of

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in

ELECTRONICS & COMMUNICATION ENGINEERING

Under the supervision of

Asst.Prof. Srijibendu Bagchi



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May , 2018

CERTIFICATE OF APPROVAL



This is to certify that the project titled “**ARDUINO BASED AUTOMATIC PLANT IRRIGATION SYSTEM WITH MESSAGE ALERT**” carried out by

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DECLARATION



“We Do hereby declare that this submission is our own work conformed to the norms and guidelines given in the Ethical Code of Conduct of the Institute and that, to the best of our knowledge and belief, it contains no material previously written by another neither person nor material (data, theoretical analysis, figures, and text) which has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgement has been made in the text.”

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ABSTRACT


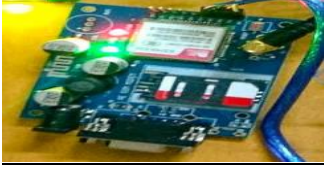
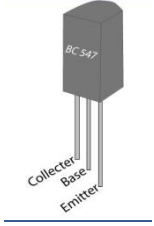



Designing An Embedded System Which Can Completely Help A Farmer To Supply Water To The Crops By Sending Messages In Irrigation Field.




- **This Project Deals With Irrigation Application.**
- **Physical Effort And Inconvenience**
- **Loss/ Frequent Damage Of Irrigation Equipment**
- **Wastage Of Water And Electricity**

CONTENTS

CERTIFICATE.....	E
rror! Bookmark not defined.	1
DECLARATION.....	2
DECLARATION.....	Error! Bookmark not defined.
CERTIFICATE	of
ACCEPTANCE.....	3
ABSTRACT.....	4
LIST OF COMPONENTS.....	Error! Bookmark not defined.
LIST OF ABBREVIATIONS	7
LIST OF FIGURES	8-9
LIST OF DIAGRAM.....	10-12
Introduction	Error! Bookmark not defined.
1.1 problem defination.....	Error! Bookmark not defined.
1.2 component statement	Error! Bookmark not defined.
1.3 code analysis	21-27
1.4 outcome.....	Error! Bookmark not defined.
1.5 advntages & disadvantages.....	29
1.6 aplication.....	30-32
REFERENCE	

COMPONENT REQUIRED

<u>ITEM</u>	<u>SPECIFICATION</u>	<u>QUANTITY</u>
Arduino Uno		1
GSM Module		1
Transistor	<p style="text-align: center;">BC547</p> 	1
Connecting wires		
LCD	<p style="text-align: center;">16x2</p> 	1
Power supply	<p style="text-align: center;">12v 1A</p> 	1
Relay	<p style="text-align: center;">12v</p>	1

<u>ITEM</u>	<u>SPECIFICATION</u>	<u>QUANTITY</u>
Water cooler pump		1
Soil Moisture Sensor		1
Terminal connector		

LIST OF ABBREVIATION

GSM

**Global System for Mobile
Communications**

TTL

Transistor Transistor Logic

CDMA

Code Division Multiple Access

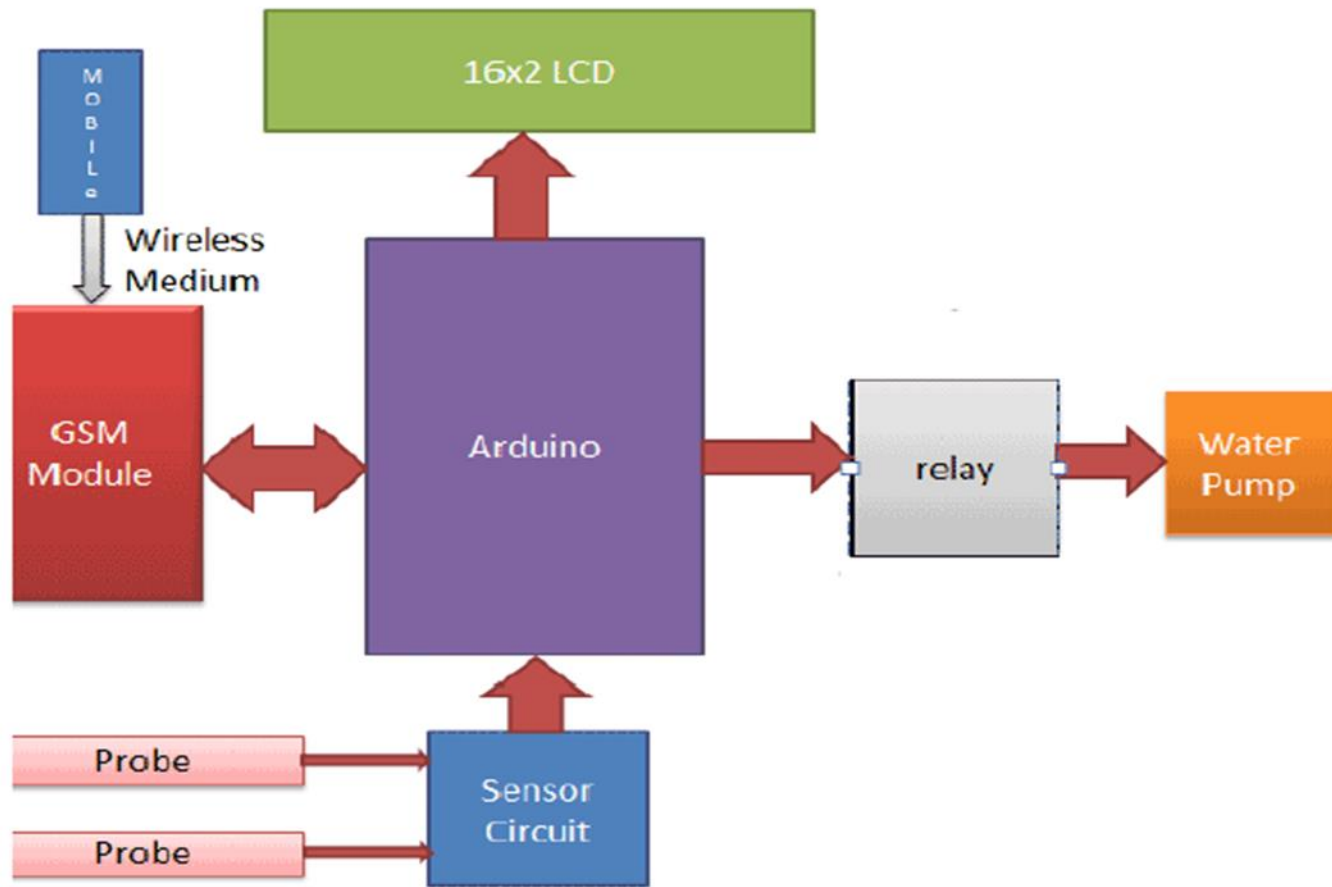
SIM

Subscriber Identity Module

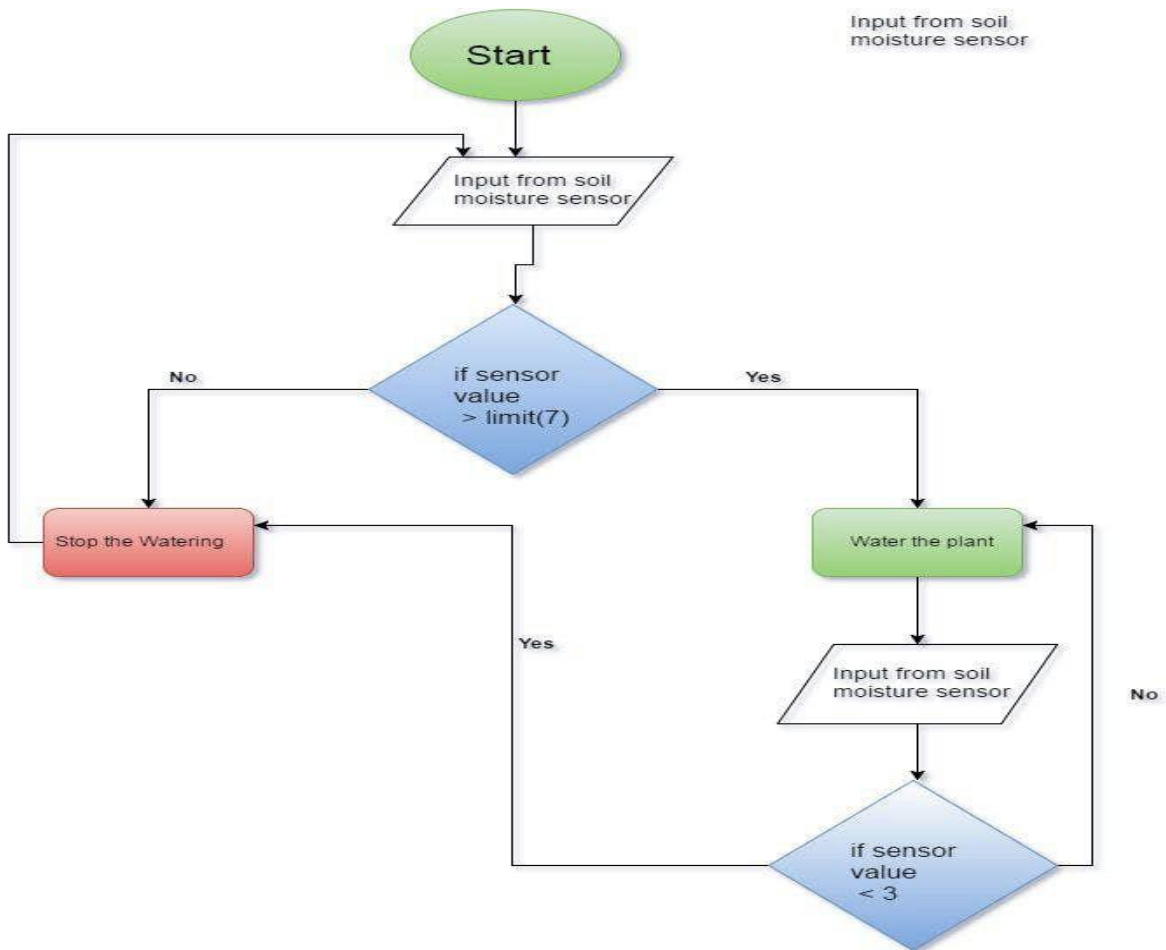
LCD

Liquid Crystal Display

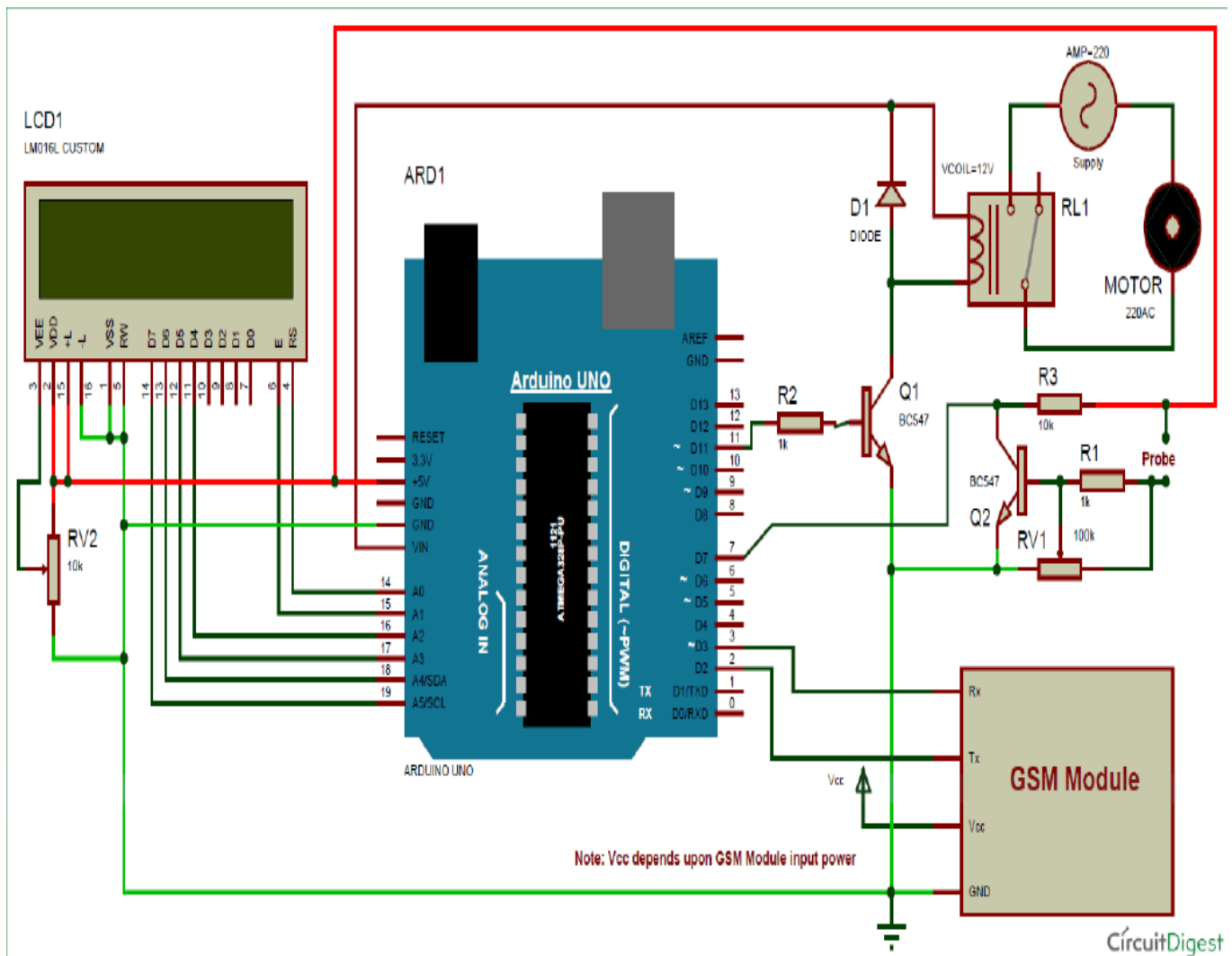
WORKING BLOCK DIAGRAM



FLOW DIAGRAM



CIRCUIT DIAGRAM



INTRODUCTION

Whenever we go out of town for few days, we always used to worry about our plants as they need water on regular basis. So here we are making Automatic Plant Irrigation System using Arduino, which automatically provides water to your plants and keep you updated by sending message to your cell phone. In This Plant Watering System, Soil Moisture Sensor checks the moisture level in the soil and if moisture level is low then Arduino switches On a water pump to provide water to the plant. Water pump gets automatically off when system finds enough moisture in the soil. Whenever system switched On or off the pump, a message is sent to the user via GSM module, updating the status of water pump and soil moisture. This system is very useful in Farms, gardens, home etc. This system is completely automated and there is no need for any human intervention. The main concept behind the project is receiving the sent sms and Processing it further as required to perform several operations. The type of the operation to be performed depends on the nature of the SMS sent.

WORKING PRINCEPLE

In This **Plant Watering System**, **Soil Moisture Sensor** checks the moisture level in the soil and if moisture level is low then Arduino switches On a water pump to provide water to the plant. Water pump gets automatically off when system finds enough moisture in the soil. Whenever system switched On or off the pump, a message is sent to the user via **GSM module**, updating the status of water pump and soil moisture. This system is very useful in Farms, gardens, home etc. This **system is completely automated** and there is no need for any human intervention.

Automatic Plant watering system, Arduino code

```
int in1 = 2;
```

```
int in2 = 3;
```

```
LiquidCrystal lcd(14,15,16,17,18,19);
```

```
int led=13;
```

```
int flag=0;
```

```
motor 11
```

```
sensor 7
```

```
void setup()
```

```
{
```

```
  lcd.begin(16,2);
```

```
  Serial1.begin(9600);
```

```
  pinMode(led, OUTPUT);
```

```
  pinMode(motor, OUTPUT);
```

```
  pinMode(sensor, INPUT_PULLUP);
```

```
  lcd.print("Plant Watering");
```

```
  lcd.setCursor(4,1);
```

```
  delay(2000);
```

```
  lcd.clear();
```

```
lcd.print("RCC INSTITUTE");

lcd.setCursor(0,1);

lcd.print("Starting....");

delay(2000);

gsmInit();

lcd.clear();

lcd.print("System Ready");

}

void loop()

{

  lcd.setCursor(0,0);

  lcd.print("Automatic Mode");

  if(digitalRead(sensor)==1 && flag==0)

  {

    delay(1000);

    if(digitalRead(sensor)==1)

    {

      digitalWrite(led, HIGH);
```



```
sendSMS("Low Soil Moisture detected. Motor turned ON");

lcd.begin(16,2);

lcd.setCursor(0,1);

lcd.print("Motor ON ");

digitalWrite(motor, HIGH);

delay(2000);

flag=1;

}

}

else if(digitalRead(sensor)==0 && flag==1)

{

delay(1000);

if(digitalRead(sensor)==0)

{

digitalWrite(led, LOW);

sendSMS("Soil Moisture is Normal. Motor turned OFF");
```

```
digitalWrite(motor, LOW);
```

```
    lcd.begin(16,2);
```

```
    lcd.print("Motor OFF");
```

```
    lcd.setCursor(0,1);
```

```
    lcd.print("Motor OFF");
```

```
    delay(2000);
```

```
    flag=0;
```

```
    }
```

```
    }
```

```
}
```

```
void sendSMS(String msg)
```

```
{
```

```
    lcd.clear();
```

```
    lcd.print("Sending SMS");
```

```
    Serial1.println("AT+CMGF=1");
```

```
    delay(500);
```

```
Serial1.print("AT+CMGS=");

Serial1.print("");

Serial1.print("+918981650265"); // number

Serial1.print("");

Serial1.println();

delay(500);

Serial1.println(msg);

delay(500);

Serial1.write(26);

delay(1000);

lcd.clear();

lcd.print("SMS Sent");

delay(1000);

lcd.begin(16,2);

}

void gsmInit()

{
```

```
lcd.clear();

lcd.print("Finding Module..");

boolean at_flag=1;

while(at_flag)

{

    Serial1.println("AT");

    while(Serial1.available()>0)

    {

        if(Serial1.find("OK"))

            at_flag=0;

    }

    delay(1000);

}

Serial1.println("ATE0");

lcd.clear();

lcd.print("Finding Network..");

boolean net_flag=1;

while(net_flag)
```

```
{  
  
  Serial1.println("AT+CPIN?");  
  
  while(Serial1.available()>0)  
  
  {  
  
    if(Serial1.find("READY"))  
  
    net_flag=0;  
  
    break;  
  
  }  
  
  delay(1000);  
  
}  
  
Serial1.println("AT+CNMI=2,2,0,0,0");  
  
delay(1000);  
  
Serial1.println("AT+CMGF=1");  
  
delay(1000);  
  
Serial1.println("AT+CSMP=17,167,0,0");  
  
lcd.clear();  
  
Serial1.flush();  
  
}
```

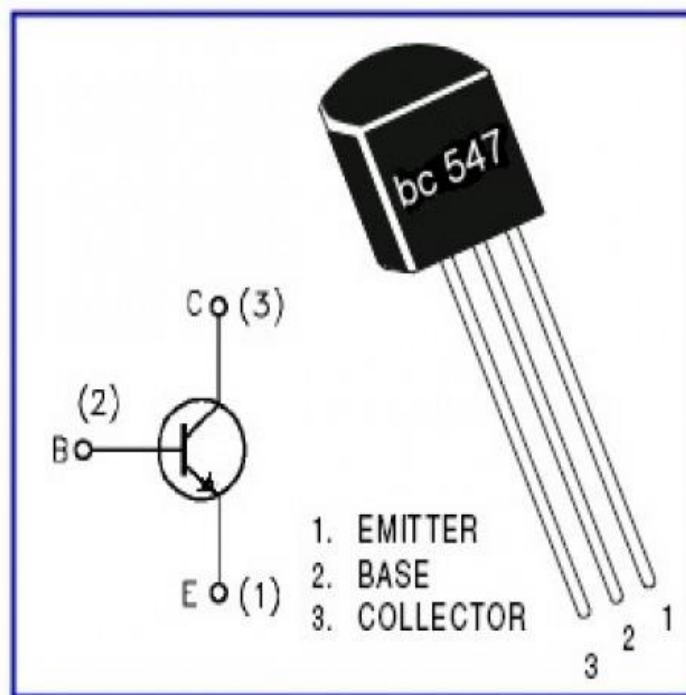

GSM MODULE

TTL SIM 900 is a complete Quad-band GSM/GPRS GSM module is used for sending SMS to the user. Here we have used TTL SIM900 GSM module, which gives and takes TTL logic directly (user may use any GSM module). It is very sensitive to voltage rating and it is recommended to read its datasheet before use. Its operating voltage rating is 3.8v to 4.2v.



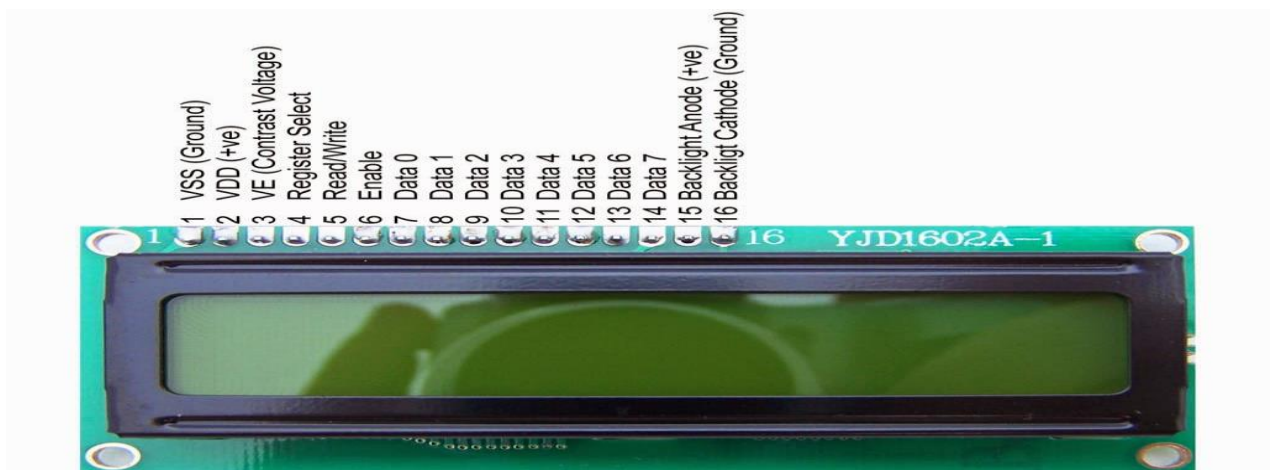
TRANSISTOR BC547

BC547 is an NPN bi-polar junction transistor. A transistor, stands for transfer of resistance, is commonly used to amplify current. A small current at its base controls a larger current at collector & emitter terminals. Its collector terminal connect with diode. BC547 is mainly used for amplification and switching purposes.



LCD 16X2

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. Here we connected 2&15 no. pin in vcc and 1,3,5,16 no. pin connect in ground. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines.



POWER SUPPLY

A power supply is an electrical device that supplies [electric power](#) to an [electrical load](#). The primary function of a power supply is to convert [electric current](#) from a source to the correct [voltage](#), [current](#), and [frequency](#) to power the load. As a result, power supplies are sometimes referred to as [electric power converters](#). Some power supplies are separate standalone pieces of equipment, while others are built into the load appliances that they power. WE also connected a USB data cable. Examples of the latter include power supplies found in [desktop computers](#) and [consumer electronics](#) devices. Other functions that power supplies may perform include limiting the current drawn by the load to safe levels, shutting off the current in the event of an [electrical fault](#), power conditioning to prevent [electronic noise](#) or [voltage surges](#) on the input from reaching the load, [power-factor correction](#), and storing energy so it can continue to power the load in the event of a temporary interruption in the source power ([uninterruptible power supply](#)).



WATER COOLER PUMP



SOIL MOISTURE SENSOR

In this Plant Irrigation System, we have used a Homemade Soil Moisture Sensor Probe to sense the soil moisture level. To make probe, we have [cut and etched a Copper clad Board](#) according to the Picture shown below. One side of the probe is directly connected to Vcc and other probe terminal goes to the vero board which is connected with arduino. It works like not gate. A potentiometer is connected to the base of the transistor to adjust the sensitivity of the sensor.



CELLULAR NETWORK SUPPORT

- Agromate is just like a mobile phone.....
- Will support GSM SIM from any provider
- Users can choose the provider that gives better signal

MOBILE PHONE SUPPORT

- **Agromate can be operated from any mobile phone**
- **Supports GSM, CDMA and Land line**
- **Android application for smart phones**

LIST OF FIGURES

Fig 1.1	Bread board Implementation	8
Fig 1.2	Vero board Implementation	8
Fig 1.3	Sensing mode using dry touch	9
Fig 1.4	Sensing mode using wet touch	9

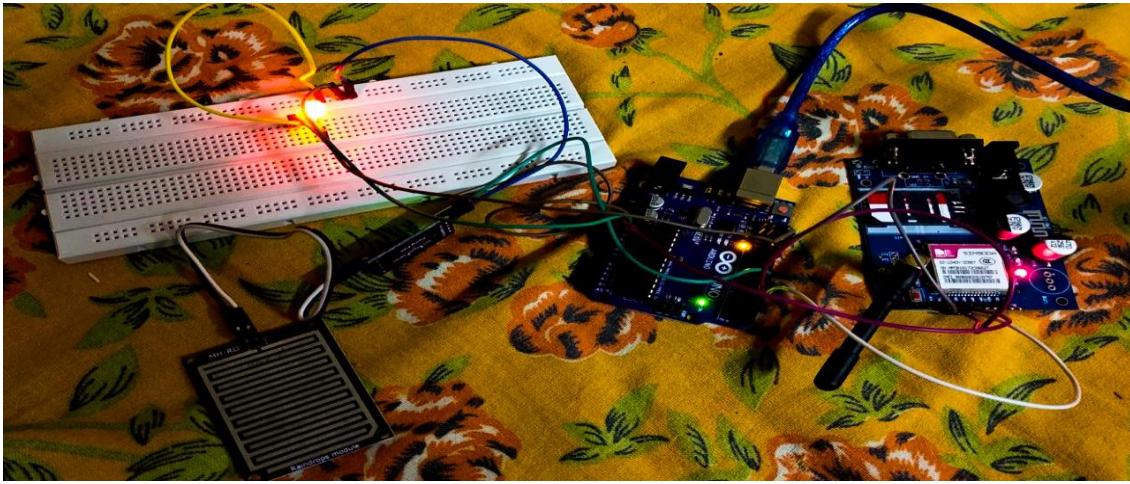


Fig 1.1 Bread board Implementation

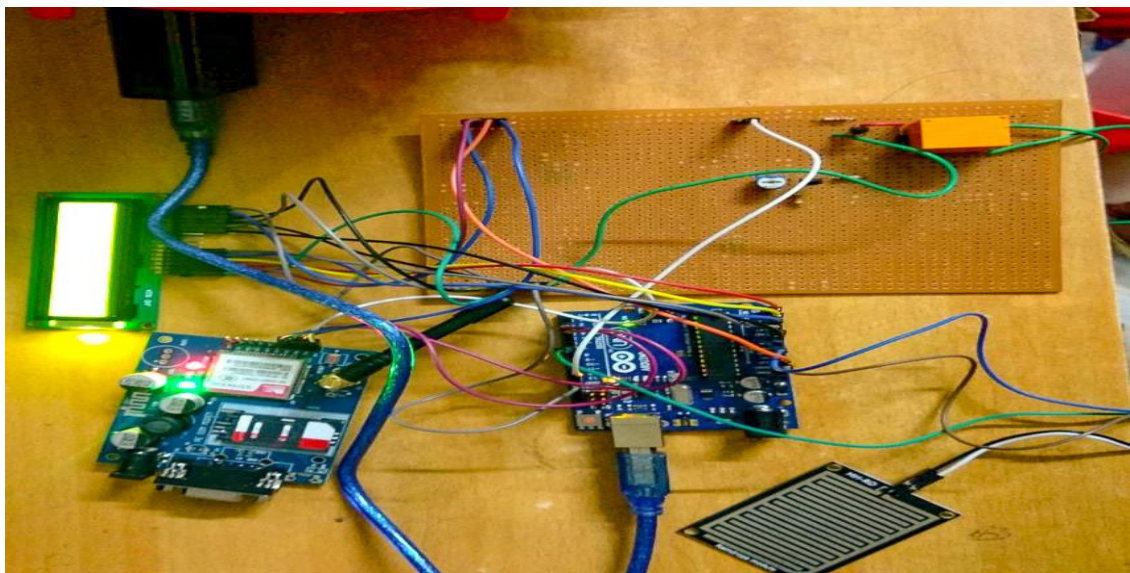


Fig 1.2 Vero board Implementation



+ Fig 1.3 GSM is in finding network position



+ Fig 1.4 Automatic mode i.e MOTOR ON



+ Fig 1.5 MOTOR OFF POSITION

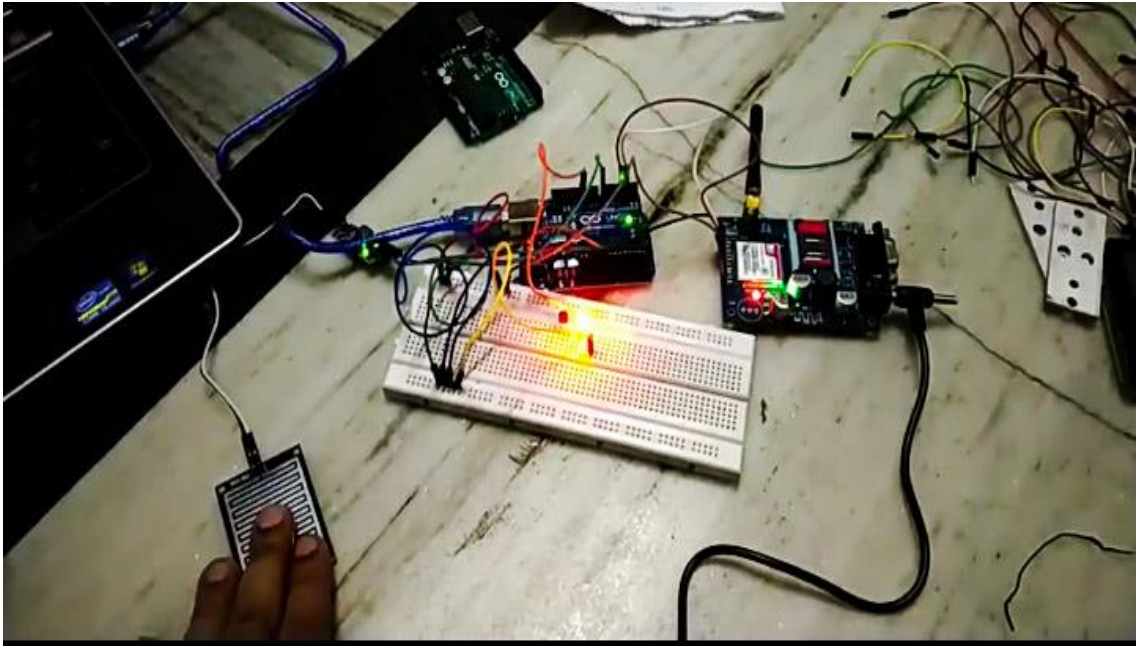


Fig 1.3 Sensing mode using Dry Touch

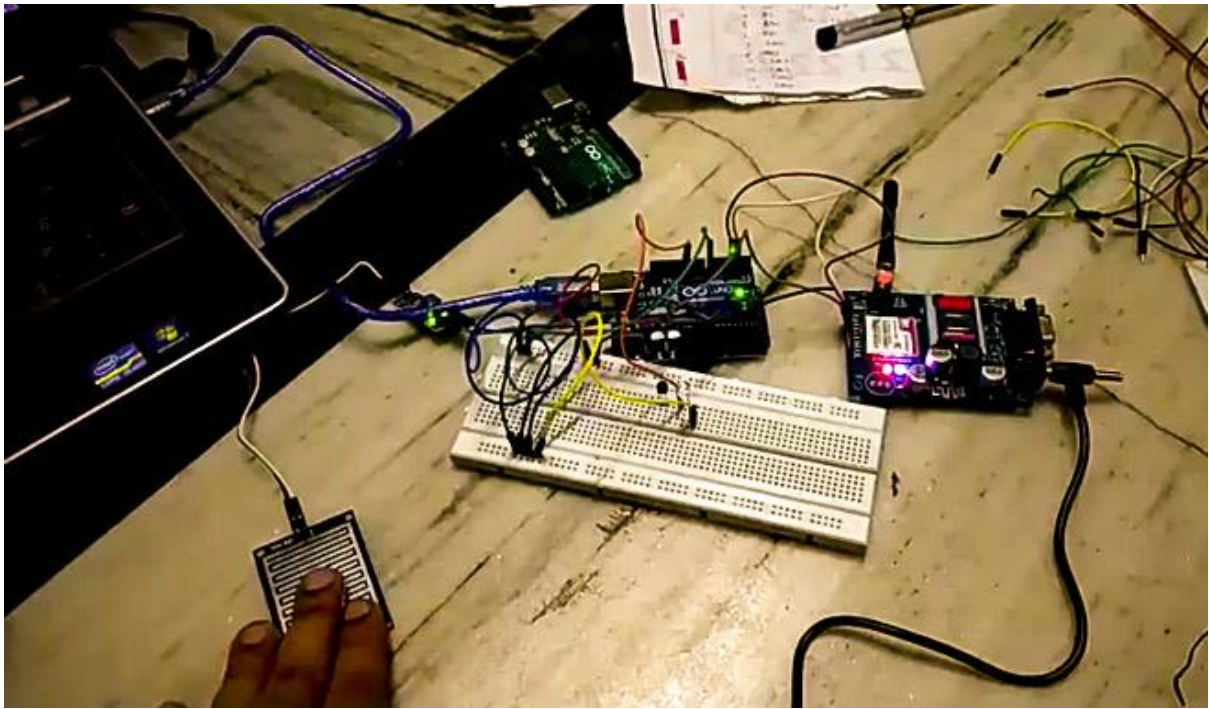


Fig 1.4 Sensing mode using Wet Touch

ADVANTAGES	DIS-ADVANTAGES
<ul style="list-style-type: none"> ➤ Low power consumption 	<ul style="list-style-type: none"> ➤ Communication delays
<ul style="list-style-type: none"> ➤ Global range ➤ Easy to operate 	<ul style="list-style-type: none"> ➤ Not work in remote areas
<ul style="list-style-type: none"> ➤ Flexible to run at specific intervals 	<ul style="list-style-type: none"> ➤ Undetectable internal problems in motor

APPLICATIONS:

- **Electronics applications and consumer devices**
- **Industrial automation and process control software.**
- **Home appliances**
- **Security alerts**

SAVE



BIBLIOGRAPHY

- www.arduino.cc.in
- www.engineeringgarage.com
- www.electradoubt.com
- www.alldatasheet.com
- www.hobbyaudio.com

Integrated Circuits by-R.S Botkar