Minor Project Report

On

"SMART IRRIGATION SYSTEM"

Submitted in the partial fulfilment for the award of degree of

Bachelor of Technology

In

Electronics and Communication Engineering

By

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B. Tech, VIIth Semester

Under the guidance of

Miss. Bhavna Shukla

DEPARTMENT OF ELECTRONICS AND COMMUNICATIONENGINEERING

SCHOOL OF STUDIES IN ENGINEERING AND TECHNOLOGY

GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)

SESSION: 2021-22

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DECLARATION

We the undersigned solemnly declare that this report of the minor project work, entitled "**Smart Irrigation System**" is carried out during the course of our study during VIIth semester under the guidance of **Miss Bhawna Shukla**, Assistant Professor, Department of Electronics and Communication Engineering, School of Studies in Engineering & Technology, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.).We further declare that this minor project work is presented for the partial fulfilment of the requirement of degree of Bachelor of Technology in Electronics & Communication Engineering, School of Studies in Engineering & Technology, Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)

Akshat Singh Paleshwar

Atul Kumar Gupta

APPROVAL SHEET

This minor project report entitled "**Smart Irrigation System**" by **Akshat Singh Paleshwar** and **Atul Kumar Gupta** is approved for the partial fulfilment of the requirement of degree of Bachelor of Technology in Electronics and Communication Engineering.

Signature

Miss Bhawna Shukla
(Assistant Professor and Guide)

Signature

Dr. Soma Das
(Head of Department)

Date: .....

Place: Bilaspur

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SCHOOL OF STUDIES IN ENGINEERING AND TECHNOLOGY

GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)

(A Central University established by the Central University Act 2009 No. 25 of 2009)

CERTIFICATE

It is certified that the minor project entitled **"Smart Irrigation System"** submitted by **Akshat Singh Palehwar** and **Atul Kumar Gupta** in partial fulfilment of the requirements of the award of degree of Bachelor of Technology in Electronics and communication Engineering, School of studies in Engineering and Technology, Guru Ghasidas Vishwavidyalaya, Bilaspur, is carried out by them in the Department of Electronics and communication Engineering during session 2019-20 under supervision and guidance of **Miss. Bhavna Shukla**, Assistant Professor, Department of Electronics & Communication Engineering, School of Studies in Engineering & Technology, Guru Ghasidas Vishwavidyalaya, Bilaspur CG.

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ABSTRACT

Agriculture is the major source of income for the largest population in India and is major contributor to Indian economy. The Internet of Things (IoT) is a technology where in a mobile device can be used to monitor the function of a device. Internet of Things (IoT) is a type of network technology, which senses the information from different sensors and makes anything to join the Internet to exchange information. This will be done employing a higher communication device like a Wi-Fi module. The data processed by the sensors is converted to meaningful data and relayed to the user. The user can view the data with the help of a handheld device such as a mobile phone or a tablet. This project helps the farmers to irrigate the farmland in an efficient manner with automated irrigation system based on soil moisture. The proposed system has been designed to overcome the unnecessary water flow into the agricultural lands. Temperature, moisture and humidity numerical values are always being continuously monitored by using temperature, moisture and humidity sensor and send these values to the assigned mobile. Android application continuously collects the data from that assigned IP address. In this proposed system we are using various sensors like temperature, humidity, soil moisture sensors which senses the various parameters of the soil and based on soil moisture value land gets automatically irrigated by ON/OFF of the motor.

TABLE OF CONTENT:

1. INTRODUCTION

IOT was at first created by Kevin Ashton in mid-2000‟s. It was created by connecting RFID data to Internet, which was utilized for business reason. This was bolstered by Proctor and Gamble organization for their business. The idea was basic yet incredible. On the off chance that all articles in day by day life were furnished with identifiers and remote network, these items could speak with one another and be overseen by PCs. IOT portrays about interfacing the physical gadgets with the sensors to the Internet, through wired or remote systems. These sensors can utilize different sorts of neighbourhood like RFID, NFC, Wi-Fi, Bluetooth, and ZigBee. Sensors can likewise have wide zone availability, for example, GSM, GPRS, 3G, and LTE. The three C's of IOT Communication: The principle of IOT is to give a corresponding among the all physical gadgets, frameworks and etc. Every single space has to be trading of data in a single manner or the other. For instance, the medicinal area the data about the patients, at times the basic data must be sent, with the goal that a quick move could be made. The basic data as circulatory strain or the beat rate could be estimated with the help of sensors. If there should arise an occurrence of transport area a vehicle can be followed, which requires the empowering of the area of the gadget. In every one of these cases the correspondence assumes a significant job. Control and Automation: In the associated world, the business and the client have a choice to control the gadgets, to be straightforwardly . For instance, a customer can utilize an IoT to open their vehicle or start the clothes washer. Likewise, IOT can be utilized to verify the development of each individuals in a specific territory. It very well may be finished by designing a sensor which can recognize the developments and this should be done as possible remotely i.e. consequently, by sitting in some other spot. Cost of an IOT is refreshing for computerizing the things and this would lessen the expense of the general task. With new sensor data, IOT can enable an organization to set aside cash by limiting gear disappointment and enabling the business to perform arranged support. Sensors can likewise quantify the driving conduct, way of life parameters, which can be utilized to lessen the expense of fuel use and propose for a superior living. Structure of IOT In this quickly paced of world, that requires for security based frameworks has been expand within time. Shrewd frameworks works consequently without human obstruction have discovered appeal. Such savvy frameworks can be made within the help of an IOT innovation.

Figure : Layout of IOT

As we realize that the rate at which electric vitality is moved by an electric circuit is called control. Power is a significant electrical amount and all things in our present reality relies upon having the ability to keep them running. It is necessary for a power designer to know how a lot of the measure of intensity a power plant creates and furthermore the use by the client over some undefined time frame. It helps in calculation of transmission misfortunes between the age dissemination and conveyance buyer contraption. This estimatef helps in control burglary location and thus lessens the transmission misfortunes. Estimation of electrical power might be done to gauge electrical parameters of a framework. Contingent on the necessity of exactness, and the idea of the circuit there is a decision for technique and instrument to be utilized in some random instance of estimation. In the current power utility set up, customers are given use data just once every month with their bill. The time between refresh about power used is unreasonably long for a shopper to know a changed conduct's impact on control an utilization.

Uses of IOT:

A portion of the uses of IOT can be given as:

- Smart Parking Monitoring of parking spots accessibility in the city.
- Structural wellbeing Monitoring vibrations and material conditions in structures, spans and authentic landmarks.
- Noise Urban Maps Sound observing in bar territories and driven zones progressively. Cell phone Detection Detect iPhone and Android gadgets and when all is said in done any gadget

which works withWi-Fi or Bluetooth interfaces.

- Electromagnetic Field Levels Measurement of the vitality emanated by cell stations and Wi-Fi switches. Traffic Congestion Monitoring of vehicles and passerby levels to advance driving and strolling courses

2. LITERATURE REVIEW

All Essentially examined is done under an accompanying stages, for example, Understanding the present methodologies, by knowing the necessities, starting up a dynamic for the framework. In this project, soil dampness sensor, temperature and stickiness sensors kept in root zone of plant and transmitd information to android application. Edge testing of soil dampness sensor that was a modified into a microcontroller to control water amount. Temperature, mugginess and soil dampness esteems are shown on the android application. This paper on "Programming Irrigation System on Sensing Soil Moisture level Content" is proposed to make a computerized water system instrumentation which turns into the siphoning engine ON and OFF on identifying the soddenness substance of the earth surface. In this project just like soil dampness is considered however proposed task gave augmentation to this existed undertaking by including temperature and moistness esteems.

In this project we are sending information through SMS yet proposed framework sends the quality to use able application. This proposed project is an Arduino based remote water system framework created for the farming manor, which is kept at the remote area and required water accommodates estate when the stickiness of the dirt goes under the set-point esteem. Be that as it may, in this we didn't mindful about the dirt dampness level so to conquer this non use les proposed framework included with additionally element soil dampness worth and temperature detection which showed on the rancher versatile application. "Water system Control System Using Android for Efficient Use of Water and Power" this framework utilized GSM to controller to the framework which may cost all the more so to beat that proposed framework utilized Arduino yun board which as of now comprise of in fabricate Wi-Fi device. "Microcontroller based Controlled Irrigation System for Plantation" In this project old age with low memory microcontroller is utilized to control the framework however proposed framework utilized Arduino yun board which is an easy to understand and it will put the projects easily. "A remote use of trickle water system robotization bolstered by soil dampness sensors" in this smart water system is completed utilizing soil dampness esteems yet stretch out to

this proposed framework shows temperature and moistness values. By alluding every above paper it is discovered that no such frameworks are existed with every single incorporated component yet proposed framework incorporates these all highlights, for example, showing temperature, stickiness and soil dampness esteems and furthermore programmed turning on and off of engine by considering soil dampness values. In India, agribusiness assumes a significant job for improvement in nourishment generation. In our nation, farming are relies upon the rainstorm which isn't adequate wellspring of water. So the water system is utilized in farming field In Irrigation framework, contingent on the dirt sort, water is given to plant. In ordinary Automatic water system framework dependent on ARMs and RF module. All the framework will be arrangement utilizing ARM and RF module. The most significant factor of this framework is RF module which is utilized to send and getting the message to the controller. This framework utilized three hubs which convey one another and inundate paddy field naturally. The customary Automatic water system framework is to modernizing horticulture innovation by programming parts and assembled the fundamental segment for the framework. The framework is ongoing based and extricates the careful state of paddy field . There is one focal hub utilized which to control other hub . The primary capacity of RF module is to pass the message to the hub and work the framework. In ARM Based Agricultural Field Monitoring System utilizing GSM is for the most part centered around modernizing the water system innovation in agribusiness and furthermore to give satisfactory water system specifically region . The set up comprises of primarily ARM7TDMI center and GSM. GSM works through SMS and is a connection between ARM processor and brought together unit . ARM7TDMI is a propelled chip and structures the core of the framework. This task targets modernizing the agrarian innovation by programming the parts and building the essential equipment to mechanize cultivating.

This undertaking is mostly used to distinguish the careful field condition just as climate conditions continuously. The data is given on client demand as SMS. GSM modem is controlled with the assistance of standard arrangement of AT (Attention) directions. These directions are utilized to control greater part of the elements of GSM modem. In the structure of a model a water system framework dependent on remote sensor organize (WSN). The client controller gave data from the collector board (ace) that transmits the detected information (as present parameter of the plant) through the transmitter board (slave). The recipient board AT89C51 used to a PC screen by means of sequential association and framing a database for future employments. Mat lab/Simulink and Neural Network utilized for the control framework to improve the presentation. In the model structure of

microcontroller based programmed water system framework which will enable water system to the in areas ,where watering is requirements, while by passing areas where satisfactory soil wetness it is shown. In it was proposed for home nursery robotization framework utilizing raspberry pi, Arduino and xbee modules.

3. METHODOLOGY

The Methodology of this project is to provide a water delivering schedule to the crops to make sure all the crops have enough water for his or her healthy growth, to scale back the quantity of water wasted in irrigation, and to attenuate the economic cost for the users. The main objective of this project is to provide an automatic irrigation system thereby saving time, money & power of the farmer. The traditional farm-land irrigation techniques require manual intervention. With the automated technology of irrigation the human intervention can be minimized.

4. COMPONENT SPECIFICATION

4.1 1N4007 Diode

A diode is a basic PN junction semiconductor device well-known in the microelectronics world. Because it is constructed with P and N-type materials. It acts as a one-way switch that allows the current to flow in one direction and halts in the other direction.

1N4007 belongs to the silicon family of1N400X series. It is a general-purpose rectifying diode that serves its purpose of converting alternating current signals(AC) to direct current signals (DC) in electronic products. It has two terminals, i.e., Anode(positively-charged) and Cathode(negatively-charged). The diode has two states based on the connection of anode and cathode.

For the current to flow from anode to cathode, the anode should be connected to a higher potential than the cathode(forward biasing). The current which flows from anode to a cathode terminal is known as a forward current.

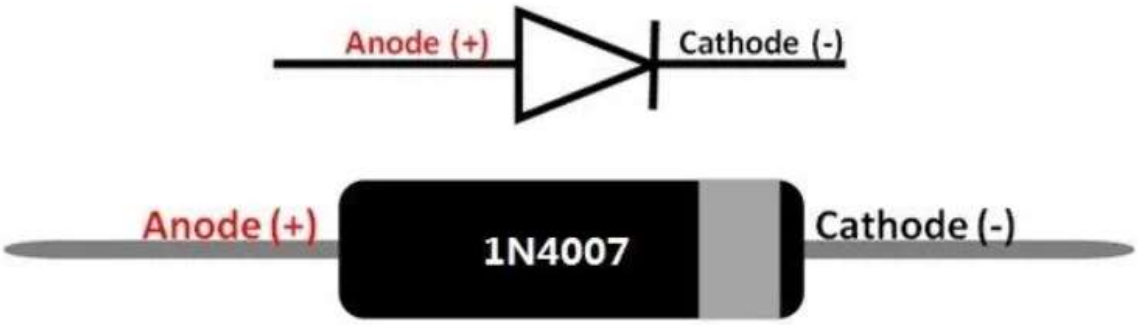


Fig : 1N4007 Diode

Reverse biasing will restrict the flow of current and can damage the device if voltage applied is greater than reverse breakdown voltage. During reverse biasing a leakage current flows through a diode which is negligible compared to forward current.

4.2 2N2222

The 2N2222 is a common NPN bipolar junction transistor (BJT) used for general purpose low-power amplifying or switching applications. It is designed for low to medium current, low power, medium voltage, and can operate at moderately high speeds. The 2N2222 is considered a very common transistor, and is used as an exemplar of an NPN transistor. It is frequently used as a small-signal transistor, and it remains a small general purpose transistor[6] of enduring popularity.

The 2N2222 was part of a family of devices described by Motorola at a 1962 IRE convention. Since then it has been made by many semiconductor companies, for example, Texas Instruments.

The JEDEC registration of a device number ensures particular rated values will be met by all parts offered under that number. JEDEC registered parameters include outline dimensions, small-signal current gain, transition frequency, maximum values for voltage withstand, current rating, power dissipation and temperature rating, and others, measured under standard test conditions. Other part numbers will have different parameters. The exact specifications depend on the manufacturer, case type, and variation. Therefore, it is important to refer to the datasheet for the exact part number and manufacturer. All variations have a beta or current gain (h_{fe}) of at least 100 in optimal conditions. It is used in a variety of analog amplification and switching applications.

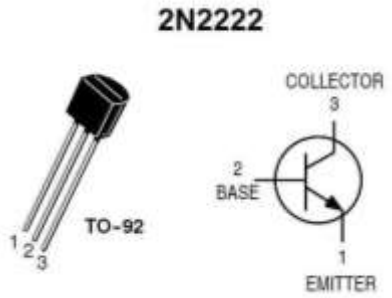


Fig : 2N2222 Transistor

4.3 ARDUINO UNO

Arduino is an open-source computer hardware and software device. It also designs and manufactures Âµc based kits for building digital devices and interactive objects that can sense and control objects with many devices.

The main reason for choosing this device arduino uno is that controller board based on the ATmega328 consists of 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button and Flash Memory 32 KB of which 0.5 KB used by boot loader SRAM 2 KB EEPROM 1 KB Clock Speed 16 MHz.

This board contains a USB interface i.e. USB cable is used to connect the board with the computer and

Arduino UNO

Arduino IDE (Integrated Development Environment) software is used to program the board.

The unit comes with 32KB flash memory that is used to store the number of instructions while the SRAM is 2KB and EEPROM is 1KB.

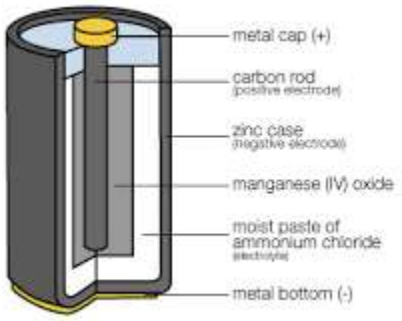
The operating voltage of the unit is 5V which projects the microcontroller on the board and its associated circuitry operates at 5V while the input voltage ranges between 6V to 20V and the recommended input voltage ranges from 7V to 12V.

4.4 BATTERY

Batteries are a collection of one or more cells whose chemical reactions create a flow of electrons in a circuit. All batteries are made up of three basic components: an anode (the '-' side), a cathode (the '+' side), and some kind of electrolyte (a substance that chemically reacts with the anode and cathode). When the anode and cathode of a battery is connected to a circuit, a chemical reaction takes place between the anode and the electrolyte. This reaction causes electrons to flow through the circuit and back into the cathode where another chemical reaction takes place. When the material in the cathode or anode is consumed or no longer able to be used in the reaction, the battery is unable to produce electricity. At that point, your battery is "dead." Batteries that must be thrown away after use are known as primary batteries. Batteries that can be recharged are called secondary batteries.

Without batteries, your quadcopter would have to be tethered to the wall, you would have to hand crank your car, and your Xbox controller would have to plugged in all the time (like in the good old days). Batteries offer a way to store electrical potential energy in a portable container. The invention of the modern battery is often attributed to Alessandro Volta. It actually started with a surprising accident involving the dissection of a frog.

Fig : Battery



4.5 CAPACITOR

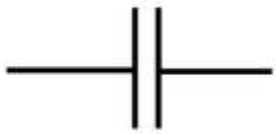
The capacitor is a component which has the ability or “capacity” to store energy in the form of an electrical charge producing a potential difference (*Static Voltage*) across its plates, much like a small

rechargeable battery.There are many different kinds of capacitors available from very small capacitor beads used in resonance circuits to large power factor correction capacitors, but they all do the same thing, they store charge.

In its basic form, a capacitor consists of two or more parallel conductive (metal) plates which are not connected or touching each other, but are electrically separated either by air or by some form of a good insulating material such as waxed paper, mica, ceramic, plastic or some form of a liquid gel as used in electrolytic capacitors. The insulating layer between a capacitors plates is commonly called the Dielectric.

Due to this insulating layer, DC current can not flow through the capacitor as it blocks it allowing instead a voltage to be present across the plates in the form of an electrical charge. The conductive metal plates of a capacitor can be either square, circular or rectangular, or they can be of a cylindrical or spherical shape with the general shape, size and construction of a parallel plate capacitor depending on its application and voltage rating.

Fig : Capacitor



4.6 INDUCTOR

An inductor is a passive component that is used in most power electronic circuits to store energy in the form of magnetic energy when electricity is applied to it. One of the key properties of an inductor is that it impedes or opposes any change in the amount of current flowing through it. Whenever the current across the inductor changes it either acquires charge or loses the charge in order to equalize the current passing through it. The inductor is also called a choke, reactor or just coil.

The S.I. unit of inductance is henry (H) and when we measure magnetic circuits it is equivalent to weber/ampere. It is denoted by the symbol L.

Meanwhile, an inductor is totally different from a capacitor. In the case of a capacitor, it stores energy as electrical energy but as mentioned above, an inductor stores energy in the form of magnetic energy. One key feature of the inductor is that it also changes its polarity while discharging. In this way polarity during discharging can be made opposite to the polarity during charging. The polarity of the induced voltage is well explained by Lenz law.

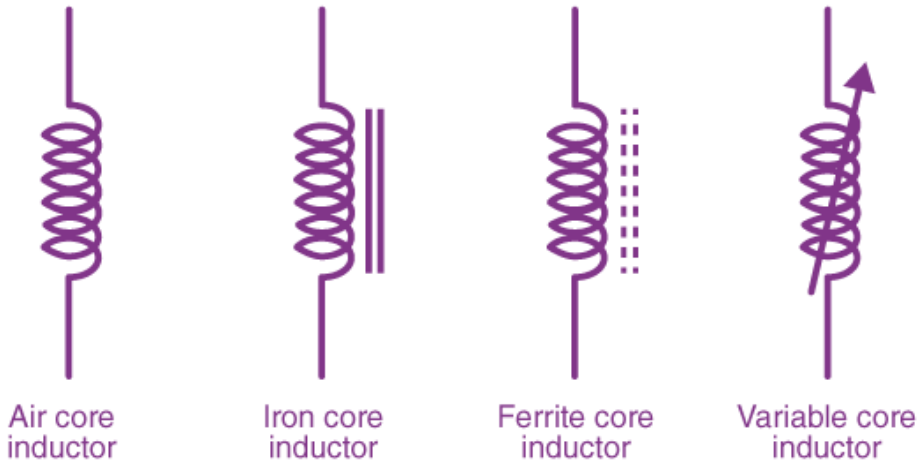


Fig: Inductors

4.7 RELAY

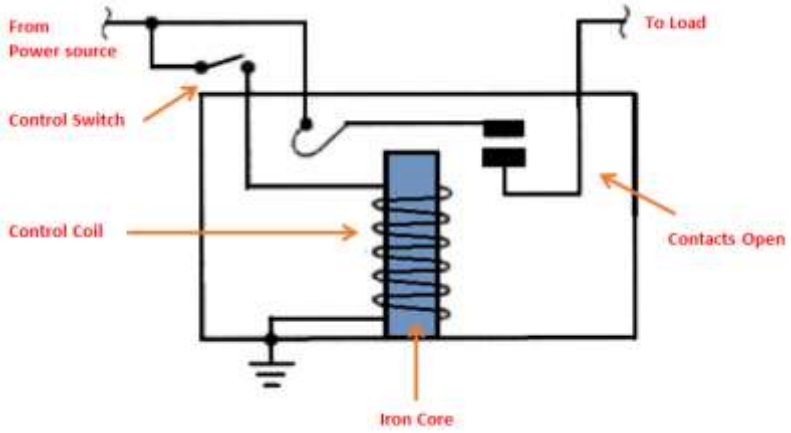
Relays are the switches which aim at closing and opening the circuits electronically as well as electromechanically. It controls the opening and closing of the circuit contacts of an electronic circuit. When the relay contact is open (NO), the relay isn't energize with the open contact. However, if it is closed (NC), the relay isn't energize given the closed contact. However, when energy (electricity or charge) is supplied, the states are prone to change.

Relays are normally used in the *control panels, manufacturing and building automation* to control the power along with switching the smaller current values in a control circuit. However, the supply of amplifying effect can help control the large amperes and voltages because if low voltage is applied to the relay coil, a large voltage can be switched by the contacts.

If preventive relays are being used, it can detect overcurrent, overload, undercurrent, and reverse current to ensure the protection of electronic equipment. Last but not the least; it is used to heat the elements, switch on audible alarms, switch the starting coils, and pilots the lights.

Fig : Relay

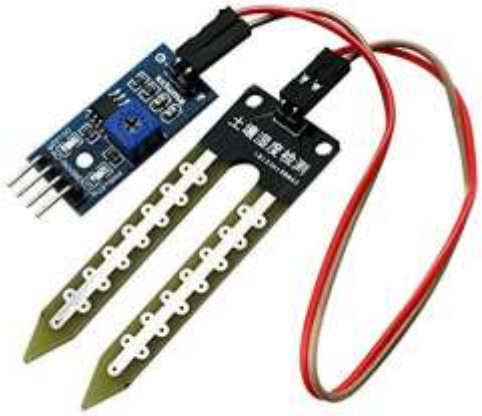
Fig : Block Diagram Of Relay



4.8 SOIL MOISTURE SENSOR

Soil moisture sensors are used for measuring the water content of the soil. The soil moisture sensor uses capacitance to measure dielectric permitivity of the surrounding medium in soil, dielectric permittivity is a function of the water content .The sensor creates a voltage proptional to the dielectric permittivity, and therefore the water content of soil. The sensor averages the water content over the entire length of the sensor. There is a two centimeter zone of influence with respect to the flat surface of the sensor , but it has little or no sensitivity at the extreme edges. The soil moisture sensor is used to measure the loss of the moisture over time due to evoparation and plant uptake, evaluate optimum soil moisture contents for various species of plants, monitor the soil moisture content to control irrigation .

Fig : Soil Moisture Sensor



Soil moisture sensors measure or estimate the amount of water in the soil. These sensors can be stationary or portables such as handheld probes. Stationary sensors are placed at the predetermined locations and depths in the field, whereas portable soil moisture probes can measure soil moisture at several locations.

A better understanding of the basic principles, definitions, and terms behind the soil-water-plant relationship is essential to effectively utilize soil moisture sensors. For more information, see Basics of irrigation scheduling.

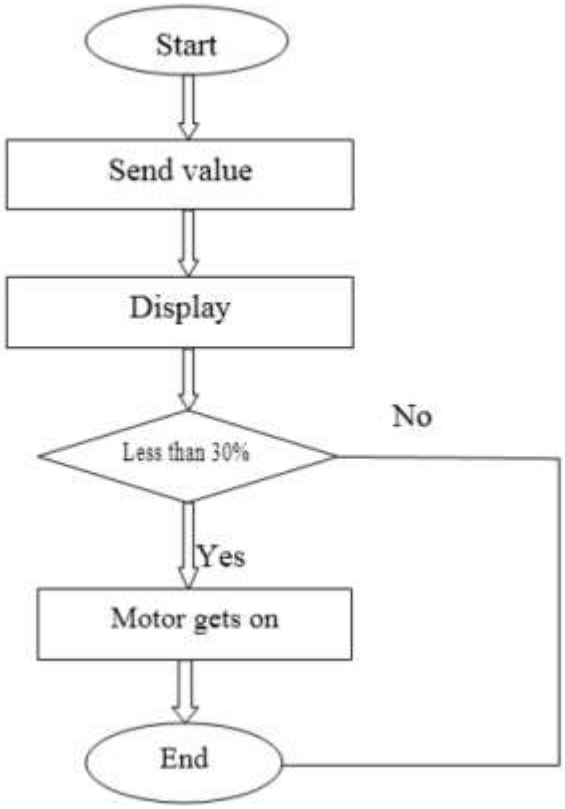


Fig : Flow Chart of Soil Moisture Sensor

4.9 ULTRASONIC SENSOR

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity. High-frequency sound waves reflect from boundaries to produce distinct echo patterns.

Ultrasonic sensors work by sending out a sound wave at a frequency above the range of human hearing. The transducer of the sensor acts as a microphone to receive and send the ultrasonic sound. Our ultrasonic sensors, like many others, use a single transducer to send a pulse and to receive the echo. The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse.

The working principle of this module is simple. It sends an ultrasonic pulse out at 40kHz which travels through the air and if there is an obstacle or object, it will bounce back to the sensor. By calculating the travel time and the speed of sound, the distance can be calculated.

Ultrasonic sensors are a great solution for the detection of clear objects. For liquid level measurement, applications that use infrared sensors, for instance, struggle with this particular use case because of target translucence.

For presence detection, ultrasonic sensors detect objects regardless of the color, surface, or material (unless the material is very soft like wool, as it would absorb sound.)

To detect transparent and other items where optical technologies may fail, ultrasonic sensors are a reliable choice.

Fig : Ultrasonic Sensor

5. SOFTWARE USED

5.1 PROTEUS

The Proteus Design Suite is a proprietary software tool suite used primarily for electronic design automation. The software is used mainly by electronic design engineers and technicians to create schematics and electronic prints for manufacturing printed circuit boards.

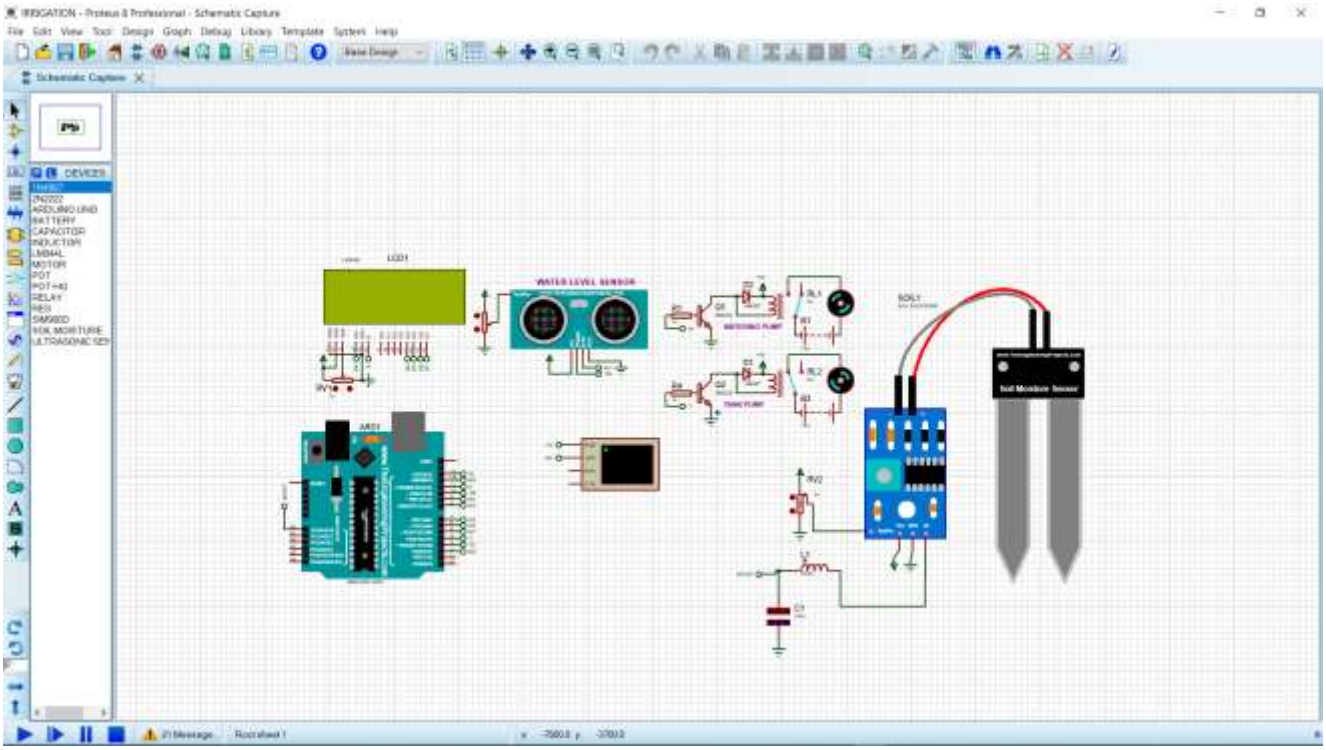


Fig : Circuit Diagram of Smart Irrigation System On Proteus

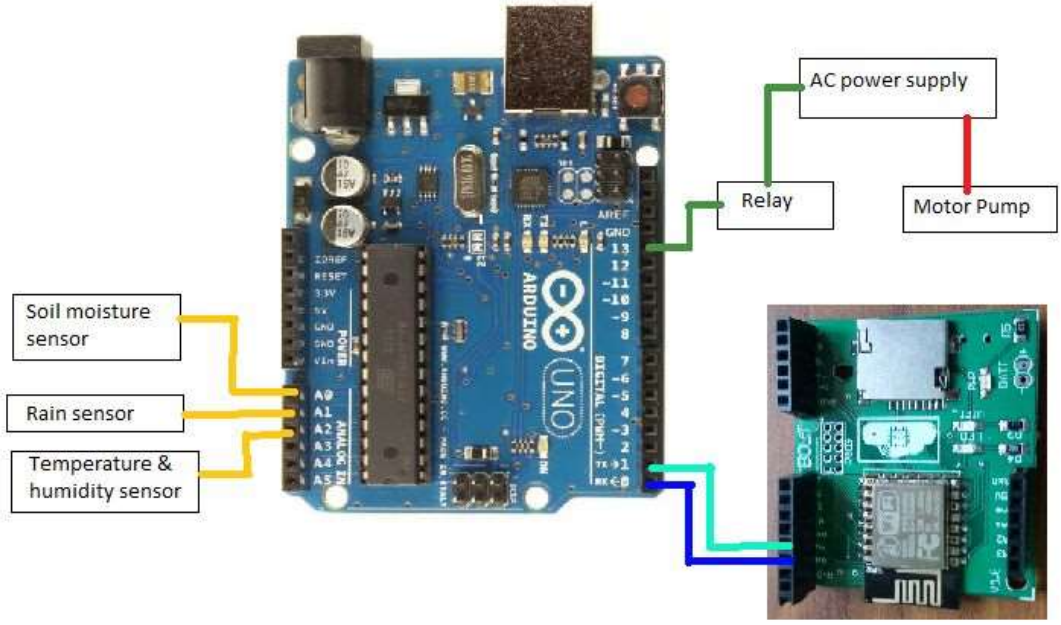
5.2 ARDUINO IDE

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++.[3] It is used to write and upload programs to Arduino compatible boards, but also, with the help of third-party cores, other vendor development boards.

The source code for the IDE is released under the GNU General Public License, version 2.[5] The Arduino IDE supports the languages C and C++ using special rules of code structuring.[6] The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub *main()* into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution.

6. WORKING

In the agriculture field, sensors are used like soil moisture. The information received from the sensors is sent to the Database folder through the Android device. In the control section, the system is activated using the application, this is finished using the ON/OFF buttons in the application. Also, this system is automatically activated when the soil moisture is low, the pump is switched ON based on the moisture content. The application has a feature like taking some time from the user and water the agriculture field when the time comes. In this system, there is a switch used to turn off the water supply if the system fails. Other parameters such as the moisture sensor demonstrate the threshold price and the level of water in the soil.



Further, this project can be enhanced by designing this system for large acres of soil. Also, this project can be incorporated to make sure the value of the soil and the expansion of harvest in each soil. The microcontroller and sensors are successfully interfaced and wireless communication is attained between a variety of nodes.

Also, further this proposed system can be enhanced by adding up machine learning algorithms, which are capable to study and recognize the necessities of the crop, this would aid the agriculture field to be an automatic system. The inspections and outcomes tell us that this result can be executed for a lessening of water loss and decrease the manpower necessary for a field.

7. BENEFITS

- INCREASE OF PRODUCTION

As every step that we follow by using this technology is very much accurate like accurate planting, wateringand harvesting then the production of the crop increases.

- CONSERVATION OF WATER

With the use of automated and accurate details of crops and the amount of water needed also the sensors of moisture and humidity the water is used whenever it is required. Hence the water wastage won't be a problem and water will be conserved.

- LOWERED OPERATION COST

With the use of automated machines and the database containing complete information about the crops there won't be any human errors hence there won't be any excess cost for the operations which reality without accuracy errors occur and have to spend excess cost to cover it up.

- QUALITY OF PRODUCTION

With the help of accurate results, the quality of the crop is increased because the pests, bacteria in soil, etc. will be minimized automatically once they are detected and the quality of soil is improved which also improvesthe quality of the crop.

\

- IMPROVED LIVESTOCK FARMING

With the usage of sensors and robot the health and the reproduction of animals are monitored and the necessary steps are taken automatically which improves livestock management.

- REMOTE AND EQUIPMENT MONITORING

Hence every machine is interlinked the user can use the machines manually or pre-programmed algorithms(automation) can also be used.

8. CODE USED

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

#define echo 9
#define trigger 10
#define tank_pump 4
#define watering_pump 13
#define moisture_sensor A0
long duration;
int distance;
int moisture_value;
int distance_percent;
int moist_percent;
SoftwareSerial SIM900(2, 3);
LiquidCrystal lcd(12,11,8,7,6,5);

void setup () {
lcd.begin(20,4);
SIM900.begin(9600);
Serial.begin(9600);
pinMode(echo,INPUT);
pinMode(moisture_sensor,INPUT);
pinMode(trigger,OUTPUT);
digitalWrite(trigger,LOW);
pinMode(watering_pump,OUTPUT);
pinMode(tank_pump,OUTPUT);
digitalWrite(watering_pump,LOW);
digitalWrite(tank_pump,LOW);
lcd.setCursor(0,1);
lcd.print(" IRRIGATION PROJECT"    );
```

```
delay(500);
lcd.clear();
}

void loop(){
 // LEVEL SENSOR
 digitalWrite(trigger,LOW);
 delayMicroseconds(2);
 digitalWrite(trigger,HIGH);
 delayMicroseconds(10);
 digitalWrite(trigger,LOW);
 duration=pulseIn(echo,HIGH);
 distance=duration*0.017;
 distance_percent=map( distance,0,1023,0,100);
 moisture_value= analogRead(moisture_sensor);
moist_percent=map(moisture_value,0,1023,0,100);
 condition();

}

void sms(){
SIM900.print("AT+CMGF=1\r");
 SIM900.println("AT + CMGS = \"+91534244766\"");// recipient's mobile number
SIM900.println("WATERING PUMP IS OFF"); // message to send
SIM900.println((char)26); // End AT command with a ^Z, ASCII code 26
Serial.println((char)26);
SIM900.println();
}
void sms1(){
SIM900.print("AT+CMGF=1\r");
```

```
 SIM900.println("AT + CMGS = \"+91534244766\"");// recipient's mobile number

SIM900.println("TANK PUMP IS OFF"); // message to send
Serial.println("TANK PUMP IS OFF");

SIM900.println((char)26); // End AT command with a ^Z, ASCII code 26
Serial.println((char)26);
//delay(200);
SIM900.println();

}
void sms2(){
SIM900.print("AT+CMGF=1\r");
SIM900.println("AT + CMGS = \"+919534244766\"");// recipient's mobile number
SIM900.println("WATERING PUMP IS ON"); // message to send
Serial.println("WATERING PUMP IS ON");
//delay(200);
SIM900.println((char)26); // End AT command with a ^Z, ASCII code 26
Serial.println((char)26);
//delay(200);
SIM900.println();

}

void sms3(){
SIM900.print("AT+CMGF=1\r");
 delay(2000);
 SIM900.println("AT + CMGS = \"+919534244766\"");// recipient's mobile number
SIM900.println("TANK PUMP IS ON"); // message to send
Serial.println("TANK PUMP IS ON");
//delay(200);
```

```
SIM900.println((char)26); // End AT command with a ^Z, ASCII code 26
Serial.println((char)26);
//delay(200);
SIM900.println();

}

void condition(){
if (distance_percent>65 &&moist_percent<85){
LCD_3();
digitalWrite(tank_pump,LOW);
digitalWrite(watering_pump,HIGH);
 sms1();
 sms2();
delay(1000);
}
else if (distance_percent<65 &&moist_percent>85)
{
LCD_2();
digitalWrite(tank_pump,HIGH);
digitalWrite(watering_pump,LOW);
sms3();
sms();
delay(1000);
}
else if (distance_percent>65 &&moist_percent>85)
{
LCD_4();
digitalWrite(tank_pump,LOW);
digitalWrite(watering_pump,LOW);
```

```
sms1();
sms();
delay(1000);

}

else if (distance_percent<65 &&moist_percent<85)
{
LCD_1();
digitalWrite(tank_pump,HIGH);
digitalWrite(watering_pump,HIGH);
sms3();
sms2();
delay(1000);

}
}
  void LCD_1()
  {
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.print("TANK LEVEL=  ");
  lcd.print(distance_percent);
  lcd.print("%");
  lcd.setCursor(0,1);
  lcd.print("MOIST CONTENT= ");
  lcd.print(moist_percent);
  lcd.print("%");
   lcd.setCursor(0,2);
  lcd.print("W-PUMP STATUS  ");
  lcd.print("  ON");
```

```
  lcd.setCursor(0,3);
  lcd.print("T-PUMP STATUS  ");
  lcd.print("  ON");
  }

void LCD_2(){
  lcd.clear();
  lcd.setCursor(0,0);
   lcd.print("TANK LEVEL=  ");
  lcd.print(distance_percent);
  lcd.print("%");
  lcd.setCursor(0,1);
  lcd.print("MOIST CONTENT= ");
  lcd.print(moist_percent);
  lcd.print("%");
   lcd.setCursor(0,2);
  lcd.print("W-PUMP STATUS ");
  lcd.print("  OFF");
  lcd.setCursor(0,3);
  lcd.print("T-PUMP STATUS ");
  lcd.print("   ON");
  }
  void LCD_3(){
  lcd.clear();
  lcd.setCursor(0,0);
   lcd.print("TANK LEVEL=  ");
  lcd.print(distance_percent);
  lcd.print("%");
  lcd.setCursor(0,1);
  lcd.print("MOIST CONTENT= ");
  lcd.print(moist_percent);
```

```
lcd.print("%");
 lcd.setCursor(0,2);
lcd.print("W-PUMP STATUS ");
lcd.print("  ON");
lcd.setCursor(0,3);
lcd.print("T-PUMP STATUS ");
lcd.print("  OFF");
}

void LCD_4(){
lcd.clear();
lcd.setCursor(0,0);
 lcd.print("TANK LEVEL=  ");
lcd.print(distance_percent);
lcd.print("%");
lcd.setCursor(0,1);
lcd.print("MOIST CONTENT= ");
lcd.print(moist_percent);
lcd.print("%");
 lcd.setCursor(0,2);
lcd.print("W-PUMP STATUS");
lcd.print("  OFF");
lcd.setCursor(0,3);
lcd.print("T-PUMP STATUS");
lcd.print("  OFF");
}
```

9. FUTURE SCOPE

This project are often made further more innovative by adding -controlling and monitoring the sprinkles, checking the faults in the irrigation network and correcting them remotely and Watching the live working of integrated system in field area by pc/mobile. Also the longer term plan aspects of this model are always made into an intelligent system, where in the system predicts user actions, rainfall pattern, time to reap and much of more features which may make the system not to depend on human operation. All the system can be also updated to Real Time systems, such that users receive real time updates and standing of condition of the sector. Thereby, enabling the user to require immediate action just in case of any problems. By measuring variations within a field and adapting the strategy accordingly, farmers can greatly increase the effectiveness of pesticides and fertilizers and use them more selectively. Future the system can be included with more number of sensors like metal and sound sensors in order to make the agricultural field intrusion free. In future the same system can also be developed to sense the amount of nutrients required and to supply the same in correct quantities. A detailed study of effect of foliage surrounding plants on scattering of the wireless signals can be carried out so as to decrease the number of extra nodes.

10. CONCLUSION

The utilization of horticulture organizing innovation is need of the advanced rural improvement, yet additionally a significant image of things to come level of rural improvement; it will be the future heading of agrarian advancement. In the wake of building the rural water system framework equipment and breaking down and inquiring about the system chain of importance highlights, usefulness and the comparing programming design of accuracy agribusiness water system frameworks, really applying the web of things to the profoundly viable and safe rural creation significantly affects guaranteeing the effective utilization of water assets just as guaranteeing the productivity and strength of the horticultural generation. With greater headway in the field of IoT expected in the coming years, these frameworks can be increasingly productive, a lot quicker and less costly. In the Future, this framework can be made as a savvy framework, where in the framework predicts client activities, precipitation design, time to collect, creature interloper in the field and conveying the data through trend setting innovation like IoMT can be actualized with the goal that rural framework can be made free of human activity and thus quality and colossal amount yield can be acquired.