POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

AUTOMATIC PLANT WATERING SYSTEM WITH IOT

SAIYIDAH NAFISAH BINTI ROSLI

(08DJK20F1002)

PN.WAN NORHIDAYAH BINTI WAN MOHAMED NOR

JABATAN KEJURUTERAAN ELEKTRIK

SESI 1 2022/2023

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This report was submitted to the Department of Electrical Engineering as part of the requirement for the award of the Diploma in Electronic Engineering (Control)

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SESI 1 2022/2023

CONFIRMATION OF THE PROJECT

The project report titled "Automatic Plant Watering System with IoT" has been submitted, reviewed and verified as a fulfills the condition and requirements of the Project Writing as stipulated.

Checked by:

Supervisor's name   :

Supervisor's signature :

Date   :

Verified by:

Project Coordinator name :

Signature of Coordinator :

Date   :

" I acknowledge this work is my own work except the excerpts I have already explained to our source"

1.Signature

Name   :

Registration Number :

Date   :

DECLARATION OF ORIGINALITY AND OWNERSHIP

AUTOMATIC PLANT WATERING SYSTEM WITH IOT

1. I, **SAIYIDAH NAFISAH BINTI ROSLI (NO KP: 020603-11-0128)** is a final year student of **Diploma in Control Electronics Engineering, Department of Electrical, Politeknik Sultan Salahuddin Abdul Aziz Shah**, which is located at **Persiaran Usahawan , 40150 Shah Alam Selangor,**
(Hereinafter referred to as 'the Polytechnic').

2. I acknowledge that 'The Project above' and the intellectual property therein is the result of our original creation/creations without taking or impersonating any intellectual property from the other parties.

3. I agree to release the 'Project' intellectual property to 'The Polytecnics' to meet the requirements for awarding the **Diploma in Control Electronic Engineering** to me.

Made and in truth that is recognized by;

SAIYIDAH NAFISAH BINTI ROSLI) ……….…………….

(Identification card No.: 020603-11-0128)) SAIYIDAH NAFISAH BINTI ROSLI

In front of me, PN.WAN NORHIDAYAH BINTI WAN MOHAMED NOR(821125-14-5106)

As a project supervisor, on the date: ……..………….)

ACKNOWLEDGEMENT

ABSTRACT

Watering is of no value if the water runs down the outside of the root ball, leaving the roots at the core of the plant dry. This can happen if you water the plant too quickly or apply too much water at once. Slower watering is usually more effective. The key is to ensure that water gets to the root zone whether you are tending seedlings, watering houseplants, watering a row of tomatoes or soaking thirsty shrubs and trees. We can't use the "lift test" in your garden or landscape, but you can use a soil moisture sensor to see if it's time to water. For a thorough investigation, push a spade into the soil near your plant and pull it back to see how the soil looks. If it feels moist to a depth of 6 to 12 inches, you're in good shape. If it's bone dry, water. This Project proposed a simple automatic plant watering system by using IOT. This system is useful especially for users who have a day job and travel a lot as this system can water plants only when necessary without any u man intervention. It will notify the user, through a message that will be displayed on the user's mobile phone because the sensor will detect and send the output to the Arduino. The system is realized using Arduino which is programmed to control all the operated circuit.

ABSTRAK

Penyiraman tidak berguna jika air mengalir ke bahagian luar bebola akar, meninggalkan akar di teras tumbuhan kering. Ini boleh berlaku jika anda menyiram tumbuhan terlalu cepat atau menggunakan terlalu banyak air sekaligus. Penyiraman yang lebih perlahan biasanya lebih berkesan. Kuncinya ialah memastikan air sampai ke zon akar sama ada anda sedang menjaga anak benih, menyiram pokok rumah, menyiram sebaris tomato atau merendam pokok renek dan pokok yang dahaga. Kami tidak boleh menggunakan "ujian angkat" di taman atau landskap anda, tetapi anda boleh menggunakan penderia kelembapan tanah untuk melihat sama ada sudah tiba masanya untuk menyiram. Untuk penyiasatan menyeluruh, tolak penyodok ke dalam tanah berhampiran tumbuhan anda dan tariknya kembali untuk melihat rupa tanah. Jika ia terasa lembap hingga kedalaman 6 hingga 12 inci, anda berada dalam keadaan yang baik. Jika ia kering tulang, air. Projek ini mencadangkan sistem penyiraman tumbuhan automatik yang mudah dengan menggunakan iot. Sistem ini berguna terutamanya untuk pengguna yang mempunyai pekerjaan seharian dan banyak melakukan perjalanan kerana sistem ini boleh menyiram tumbuhan hanya apabila perlu tanpa sebarang campur tangan u man. Ia akan memberitahu pengguna, melalui mesej yang akan dipaparkan pada telefon bimbit pengguna kerana sensor akan mengesan dan menghantar output ke Arduino. Sistem ini direalisasikan menggunakan Arduino yang diprogramkan untuk mengawal semua litar yang dikendalikan.

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CHAPTER 1

1   INTRODUCTION

1.1 INTRODUCING

Plants need enough water, not too much or too little. Too little water reduces the process of photosynthesis so that plants lack food and wither. As for if the plants are given too much water, the soil will be too wet and even submerged. This results in a lack of oxygen circulation in the soil. It also makes the plant lack nutrients.

The main goal of this project was to use a microcontroller to automatically deliver water to plants or gardening (Arduino Uno). When we go on vacation, we may have the plants watered automatically so we don't have to bother my neighbours. Sometimes the neighbours water the plants too much, and the plants die anyhow the application of water to land or soil artificially. It's utilised to help with agricultural crop growth, landscape upkeep, and re-vegetation of disturbed soils in dry places and during seasons of little rainfall.

1.1.1   Internet of Things

The Internet of Things (IoT) is the ability for devices to connect with one another over the internet or other networks, recording data remotely and providing feedback to help with decision-making for business, industry, and home uses. Typically, sensors connected to a back-to-base system are used for this.

The term "thing" refers to any natural or artificial object that can be given an Internet Protocol (IP) address and has the ability to transfer data over a network, including people with implanted heart monitors, farm animals with biochip transponders, cars with built-in tyre pressure monitors, and other examples.

Organizations across a range of industries are increasingly utilising IoT to run more smoothly, better understand their consumers to provide better customer service, boost decision-making, and raise the value of the company.

1.2 BACKGROUND RESEARCH

For background research, I have browsed the research gate website, google scholar, IEEE explore and also searched for information about the project on google.

1.3 PROBLEM STATEMENT

Many people forget to water their plants during their daily duties, making it difficult for them to keep their plants healthy and thriving. Farmers also face difficulties maintaining their crops and managing plant irrigation during water shortages. Based on the foregoing, we believe it is necessary to implement an automated system that will take care of plants while taking into account all of the various aspects of home gardening (for systems based on household purposes) and larger landscape (for systems based on agricultural farms) and assisting them in growing healthy.

1.4 RESEARCH OBJECTIVE

The main objective of this Project is to facilitate the use IOT automatic crop watering methods that can alert the user from time to time has been achieved.

More specifically the principle objective of this research are:

1. To implement the use of water flow system on plants by using IOT.
2. Develop automatic plant watering methods to control the amount of water on plants.

1.5 SCOPE OF RESEARCH

1. This Project is focusing on tree crops that need to be taken care of for the quantity of water that comes out according to the time set in the system by gardeners, farmers and people who like to plant trees indoors.

2. The emphasis is automatic tree care method when following the daily plant watering system automatically with IOT.

3. The main controller is using Arduino that has been set on the coding to control the condition of the quantity of water that comes out according to the sensor used which is the soil moisture sensor if it detects soil on dry trees.

1.6 PROJECT SIGNIFICANCE

Through the research I have done, the importance of this project is

-can control the quantity of water.

-provide tracking messages about crops to users

- maintain soil moisture

The importance of this project is to take care of the quantity of water and the condition of the trees which are taken care of by auto only. The relationship between tree enthusiasts and their tree planters will be closer because tree enthusiasts will be happy with the condition of the tree that is alive and growing healthily without having to water manually every day and also do not have to worry about the condition of this tree because the condition of the tree will be notified via SMS has been set.

1.7 CHAPTER SUMMARY

For this section chapter 1, this is an introduction to the project. So this introduction are related to my project which is automatic plant watering system with IOT where this project has only one purpose which is to make it easier for farmers, gardeners and tree planting enthusiasts to take care of their trees more carefully when using automatic system instead of manual.

CHAPTER 2

2   LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter, I need to know about the review or research I did on my project. It involves several components needed to make the connection of this project as well as the integration of the IOT system automatically via Arduino coding.

2.2 PREVIOUS STUDIES/REVIEWS/INVESTIGATIONS

Based on the research that I have done to find important information about this project, I found that this project can be used in small gardens to keep their plants awake.

2.3 CHAPTER SUMMARY

This section focusing on one section, it is s about introduction to literature review project as well as about the previous research that I have done before the result of this project.

CHAPTER 3

3 RESEARCH METHODOLOGY

3.1 INTRODUCTION

To realize this Project as a ready -to -use product with ease of use, a very comprehensive plan is being implemented. A step-by-step procedure is done so that the Project can be completed within the stipulated time. This includes collecting data on the correct amount water for plants, IOT systems used for crop care, circuit design testing and validation.

3.2 PROJECT DESIGN AND OVERVIEW

As mention in the previous chapter, the designed controller is using a closed-loop system with Arduino as the main controller. The design of the controller circuit using Arduino realizes using Proteus Software and then convert to PCB circuit.

3.2.1 Methods/Procedures/Techniques for generating projects

The beginning of this project is because if we look at the method of watering the plants in the garden as well as to any enthusiasts who are interested in caring for their trees, they all do it manually only. Therefore it is important for us to know about the automatic method i.e. IOT system nowadays.
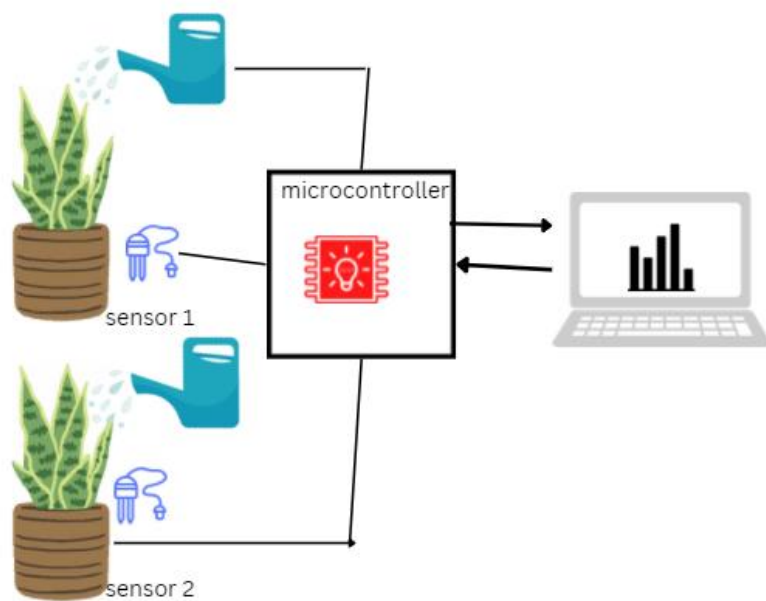
Figure 3.2.1.1 Procedure diagram

3.2.2 Materials and equipment

Figure 3.2.2.1 : List of components/materials
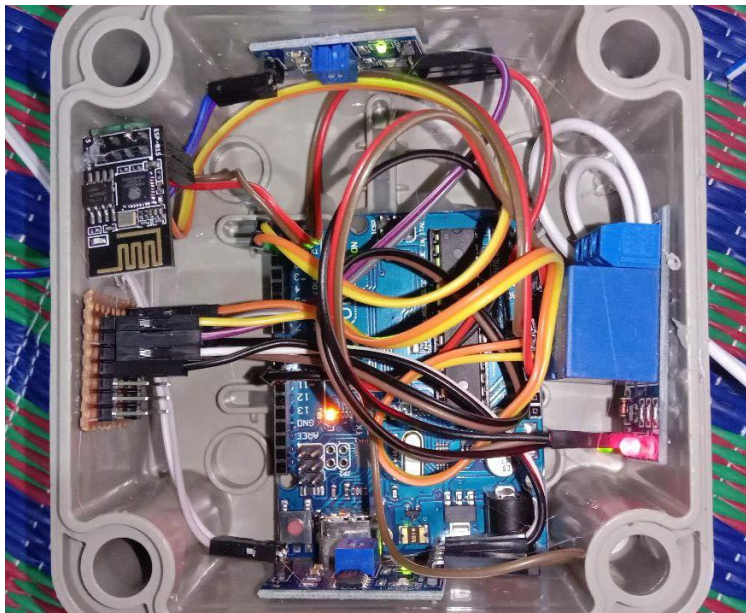
Figure 3.2.2.2 components

SIGNIFICANCE OF MICROCONTROLLER

A microcontroller is an integrated circuit (IC) device that uses a microprocessor unit (MPU), memory, and various peripherals to control other parts of an electronic system. These devices are designed for embedded applications that demand both computation and quick interaction with digital, analogue, or electromechanical components.

Figure 3.2.2.3 : Microcontroller

SIGNIFICANCE OF SOIL MOISTURE SENSOR

Soil moisture sensors measure the water content in the soil and can be used to estimate the amount of stored water in the soil horizon. Soil moisture sensors do not measure water in the soil directly. Instead, they measure changes in some other soil property that is related to water content in a predictable way. Each sensor manufacturer uses different technologies to measure soil moisture content; for a detailed explanation of all the different types, we recommend reading about the various technologies.
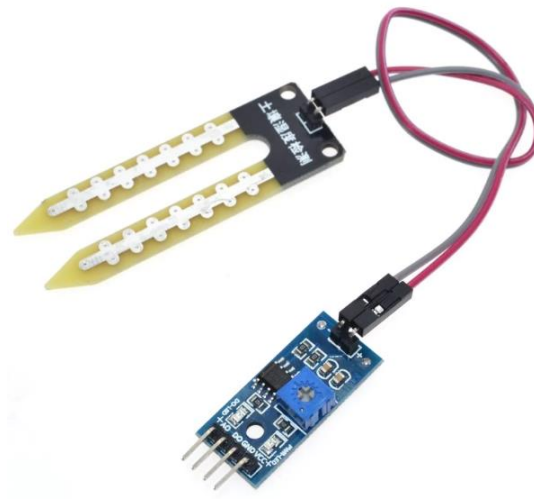
Figure 3.2.2.4 Soil Moisture Sensor

SIGNIFICANCE OF ARDUINO UNO R3

Arduino UNO R3 is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 Analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

Figure 3.2.2.5 Arduino Uno R3

SIGNIFICANCE OF ESP8266

The ESP8266 module enables microcontrollers to connect to 2.3 GHz Wi-Fi, using IEEE 802.11. It can be used with ESP-AT firmware to provide Wi-Fi connectivity to external host MCUs, or it can be used as a self-sufficient MCU by running an RTOS-based SDK. A self-contained SOC with an integrated TCP/IP protocol stack, the ESP8266 WiFi Module allows any microcontroller to access your WiFi network. The ESP8266 is capable of offloading all WiFi networking tasks from another application processor or hosting an application. Each ESP8266 module is pre-programmed with an AT command set firmware, allowing you to connect it to your Arduino device and gain WiFi functionality comparable to that of a WiFi Shield. The ESP8266 module is a very affordable board with a sizable and expanding community.
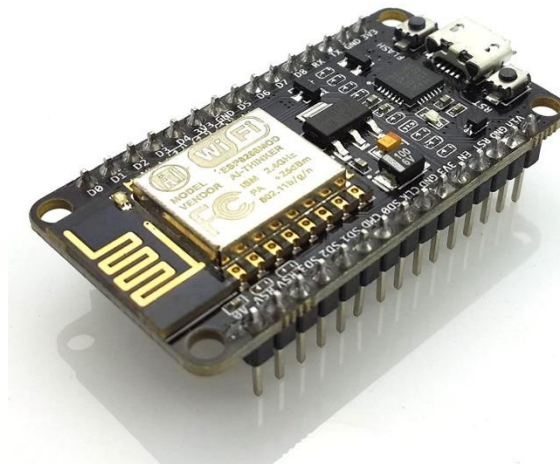
Figure 3.2.2.6 ESP8266

SIGNIFICANCE OF WATER PUMP

Water pump can be used to water your plants, make a fountain or waterfall, and even change your fish tank water. It can also be used in vending machines, plant watering systems and much more. The pump can handle liquids up to a temperature of 80°C and it can suck water through the tube from up to 2m and pump water vertically for up to 3m. It requires between 6 – 12 volt DC and between 0.5 – 0.7 ampere. It delivers its maximum operating values when power is at the upper end of these ranges.

FEATURES
- Input Voltage: 6-12 VDC
- Flow Rate: 1.5-2 L/min
- Operation Temperature: 40 Deg
- Operating Current: 0.5-0.7A
- Suction Distance: 2 meter (Max)
- Life of Pump: 1500 Hour
- Main Colour : Silver Tone, White
- Material : Metal, Plastic

Figure 3.2.2.7 Water Pump

3.2.3 Data analysis methods

Analysis is the result of a study I have done on a project to run a water system by obtaining soil moisture data by connecting to a soil moisture sensor. To analyze the data, I use the blynk application to get plant condition data from time to time.

3.3 PROJECT DESCRIPTION

The name of this project is automatic plant watering system with IOT. For more details, this project aims to show or further develop the way or method of watering the plants more easily, quickly and save water so as not to use much more energy for gardeners, farmers. This system also aims to facilitate the way of watering to maintain the quality of tree plants where it is not too dry or too moist so that the tree dies easily. This system is suitable to be recommended to people who like to plant trees but due to the busy work, time to take care of the plants is limited. Therefore, there are many advantages if used on them and utilize this system to take care of crops as well as the quantity of water is also not excessive. The cost required is also not too expensive and the components required also have an affordable price to run this system.

3.4 DESCRIPTION OF MAIN COMPONENT

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.

3.4.1   Component 1

Arduino consists of both a physical programmable circuit board ofter referred as a microcontroller and a piece of software or IDE (Integrated Development Environment) that runs on the computer, used to write and upload computer code to the physical board.

3.4.2   Component 2

Using DC cell to make water pump move. DC cell has two leads one is positive and another one is negative. If we connect them directly to the Arduino board then it will damage the board. To overcome this problem, NPN transistor is used to control the switching activity of the motor according to the code.

3.5 DESCRIPTION OF FLOWCHART

Utilizing a moisture sensor, the device will determine the soil's moisture content. Notification is the additional input. The user will receive notifications from the system, and the system will need feedback from the user. The water flow control valve is the system output for this application. The valve will automatically release the water and direct it to the plant after receiving the message. Timer is the other output. Depending on the time setting, the water will flow. The procedure begins when the sensor in the system determines that the soil is damp.

3.6 SUSTAINABILITY ELEMENTS IN THE DESIGN CONCEPT

For the design project concept of this system, which has environmental design criteria and social design where it uses land and trees from natural resources while social design is because to provide information about trees it uses laptop devices and mobile phones to convey notifications to users. In addition, this project also contributes to the community who really like to take care of trees or those who are so busy with work that they do not have time to manage their tree crops. Therefore, with this system, users will be easier to know the condition of their crops quickly and do not have to use a lot of energy.

3.7 CHAPTER SUMMARY

At the end of the research I have done for this system, I can design the project more carefully just by doing research on block diagrams, flowcharts, schematic design and so on. I can also describe how each component works in this system and has its own role.

CHAPTER 4

4 RESEARCH FINDINGS AND DISCUSSION

4.1 INTRODUCTION

Regarding the research that has been done, it can help us to know about our project in more detail for each component and function so that this project can work according to the purpose that we have wanted.

4.2 TESTING FINDINGS

In order to carry out this project, I need to do a test to find out if it has gone well or not. This testing is done after the wiring on each component has been installed and connected to each other.
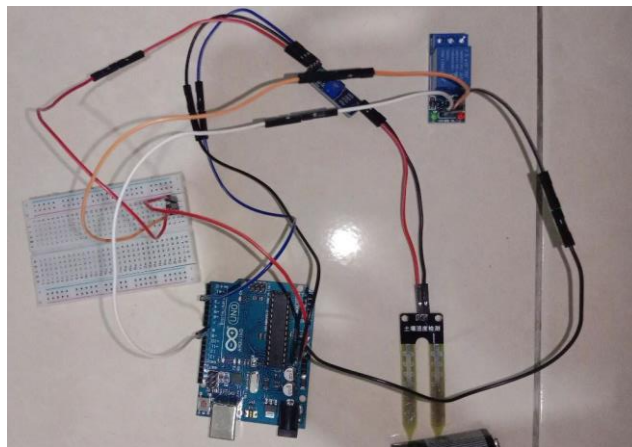
Figure 4.2.1 wire connection before in the casing
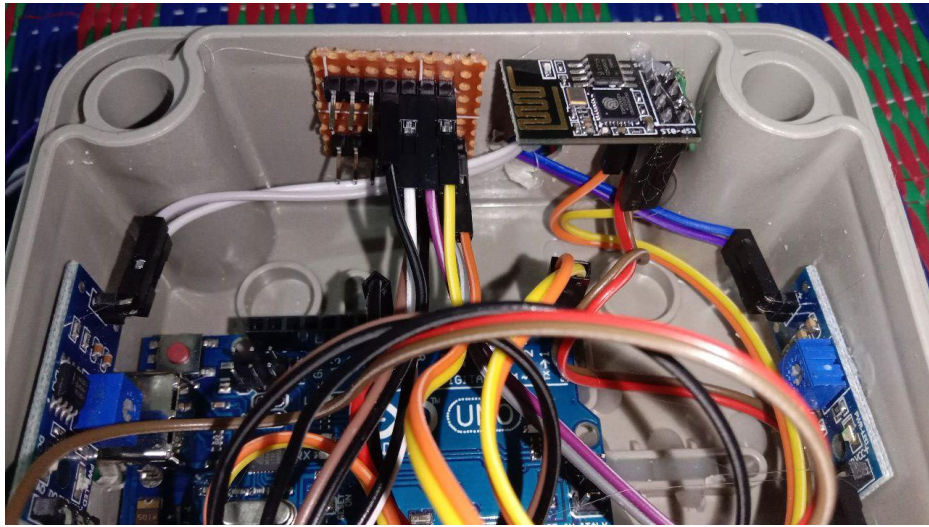
Figure 4.2.2 Wifi esp8266 has connected on Arduino
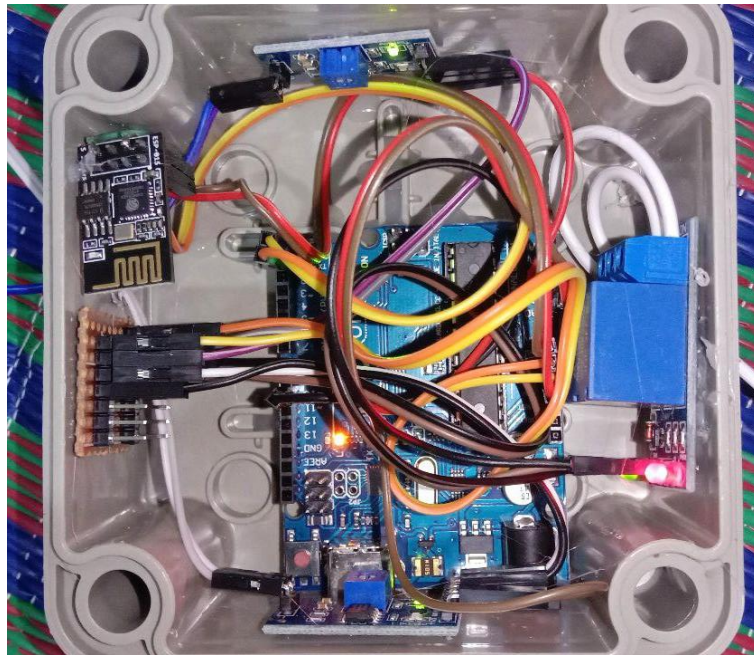
Figure 4.2.3 Wiring is done after entering the casing

4.3 DISCUSSION

As a result of the findings of the research and testing on this project, I was able to learn that each component has its own role and has a specific function in each part. During the testing session of this project, it will happen that this project cannot run due to coding that has an error, which will have an impact during the testing session on this project.

4.4 CHAPTER SUMMARY

At the end of the research that I have studied regarding the testing for this system project, it gives new guidance and a picture of how this project system has been running and it is also does not give a bad effect on society because this system takes care of crops in a more efficient way and also simplifies the work of users from thinking about easy ways to maintain plant trees for a healthier and more fertile life.

CHAPTER 5

5   CONCLUSION AND SUGGESTION

5.1 INTRODUCTION

Follow up at the end of the project until it is completed and successfully made tests, studies, get results such as data analysis and so on. Here it gives a lot of new knowledge lessons about each project information in detail and is beneficial during the project making process.

5.2 CONCLUSION

A microcontroller, a moisture sensor and other electrical devices were designed for an automatic system. The proposed methodology was found to control the soil moisture content in agricultural areas. If the soil is dry and in need of water, the motor will begin pumping water automatically. It will stop when the soil's moisture level is kept at the appropriate level.

5.3 SUGGESTION

To improve this project, in terms of the application used, which is blynk where the user can set if they want to set the time when the water will be watered according to the schedule we have made.

5.4 CHAPTER SUMMARY

In this chapter, it focuses on the conclusions that I got at the end of this project in terms of every aspect that has been done successfully. In addition, in the end this project can bring benefits to the users who use it.

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APPENDICES

APPENDIX A- GANTT CHART

APPENDIX B – PROJECT COST

APPENDIX C – LIST OF MATERIALS AND EQUIPMENT

APPENDIX D – SKETCHES/CIRCUIT DIAGRAMS/FLOWCHARTS

APPENDIX E – PROGRAMMING CODING PROJECT

APPENDIX A- GANTT CHART

Minggu / Aktiviti Projek	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16
INSTALLATION OF SOFTWARE	▬															
INSTALLATION OF CONTROL CIRCUIT/SYSTEM			▬													
INSTALLATION OF WIRING	▬▬	▬														
INSTALLATION OF PROJECT CASING		▬▬▬▬▬														
TESTING		▬▬▬▬▬														
TEST THE ELECTRONIC PART		▬▬▬▬▬▬														
TEST THE MECHANICAL PART		▬▬▬▬▬														
TEST THE OVERALL PROCESS/PROJECT			▬▬▬▬▬▬▬													
DOCUMENTS		▬▬▬▬▬▬▬														
PREPARATION OF PROJECT 2 FINAL REPORT	▬▬▬▬▬▬▬▬▬		▬▬													
PREPARATION OF INSTRUCTION MANUAL			▬▬▬▬▬▬▬▬▬													
INSTALLATION	▬▬▬▬▬▬▬▬▬															
INSTALLATION OF COMPONENTS ON PCB	▬															
PREPARATION OF SLIDE PRESENTATION		▬▬▬▬▬▬▬▬														
PREPARATION OF LOGBOOK		▬▬▬▬▬▬▬▬▬														

APPENDIX B – PROJECT COST

Costs related to acquiring materials and components will be incurred throughout project implementation. The Arduino Uno, a soil moisture sensor, breadboard jumper wire, and other parts are on the list of materials that will be utilised in this project. All of these parts are bought via the online buying process to save time and money. The total gross budget estimate for doing this project is RM342.37. The project's cost is also consistent with one of the essential qualities of a competent project developer, which is having a cheap cost yet high quality project.

No.	Component and materials	The unit price	Quantity	Total
1	Arduino UNO set	RM 55.00	1	RM 55.00
2	soil moisture sensor	RM 5.00	2	RM 10.00
3	Breadboard jumper wire	RM 14.66	1	RM14.66
4	Water pump	RM 10.66	1	RM 10.66
5	Relay	RM 4.38	1	RM 4.38
6	pipe tube	RM 1.20	2	RM 3.60
7	Jumper wire female-male	RM 3.45	1	RM3.45
8	Jumper wire male-male	RM 3.40	1	RM3.40
9	Battery	RM 12.02	1	RM12.02
10	ESP8266 microcontroller	RM15.30	1	RM15.30
			Total :	**RM 132.47**
	List of other costing			
1	Transportation			RM10.00
2	wiring			
3	Casing			RM50
4	Internet			
5	Application			
			Total :	**RM192.47**
			Overall total	**RM342.47**

APPENDIX C – LIST OF MATERIALS AND EQUIPMENT

No.	Component and materials
1	Arduino UNO set
2	Soil moisture sensor
3	Breadboard jumper wire
4	Water pump
5	Relay
6	Pipe tube
7	Jumper wire female-male
8	Jumper wire male-male
9	Battery 12V
10	ESP8266 WIFI

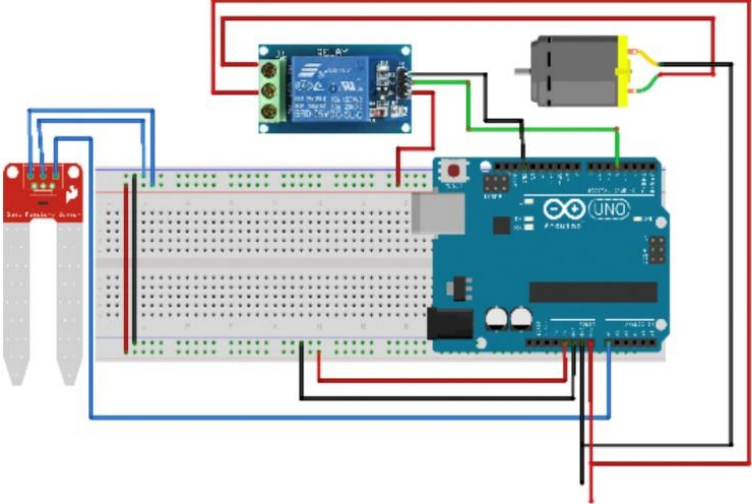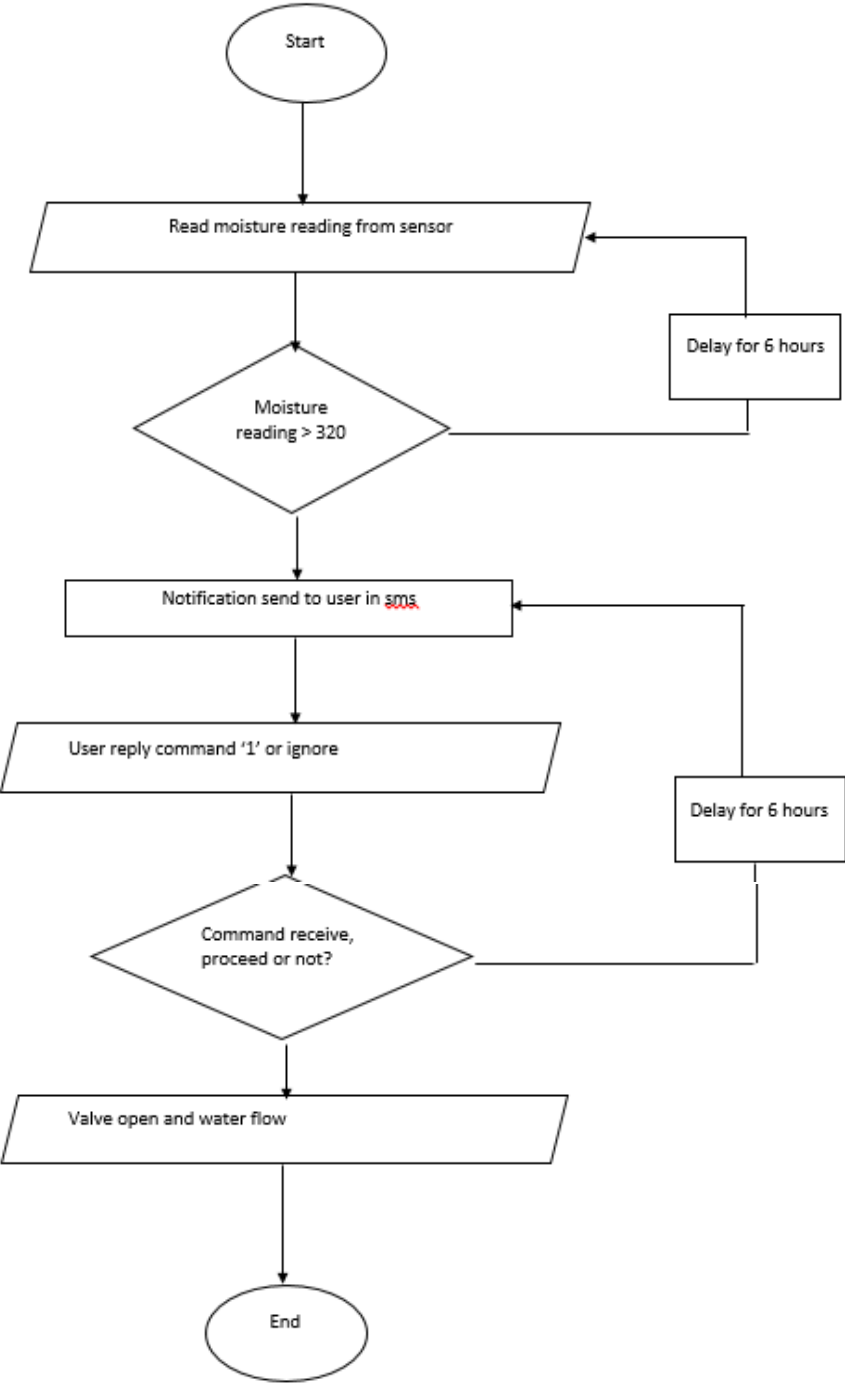# APPENDIX D – SKETCHES/CIRCUIT DIAGRAMS/FLOWCHARTS

SKETCHES
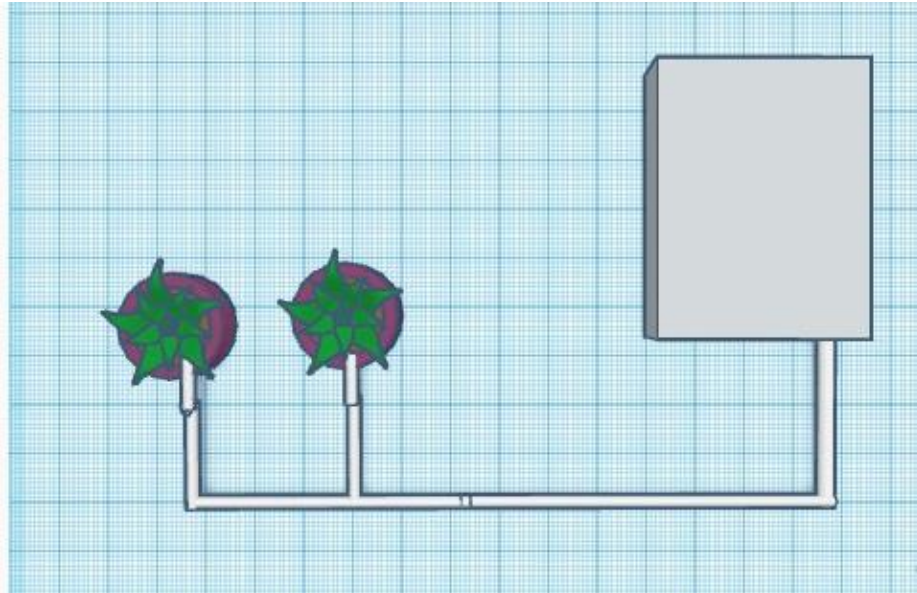
CIRCUIT DIAGRAM

FLOWCHART

The circuit diagram of the whole system. It is show that this system will be repeated when the soil condition is dry then the sensor will detect to remove air on the tree crop.

APPENDIX E – PROGRAMMING CODING PROJECT

```
#include <dummy.h>
//iotprj8
// Template ID, Device Name and Auth Token are provided by
the Blynk.Cloud
// See the Device Info tab, or Template settings
#define BLYNK_TEMPLATE_ID        "TMPL7NqCV9C1"
#define BLYNK_DEVICE_NAME        "Quickstart Device"
#define BLYNK_AUTH_TOKEN
"8VT7aXSsc2NI9TfJHvsaiMWLECwN72_b"


// Comment this out to disable prints and save space
#define BLYNK_PRINT Serial


#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>


char auth[] = BLYNK_AUTH_TOKEN;


// Your WiFi credentials.
// Set password to "" for open networks.
char ssid[] = "MOISTURE";
char pass[] = "12345678";


int Rly1=0, Rly2=0, Rly3=0, Rly4=0, Rly5=0, Rly6=0,  Rly7=0,  Rly8=0;
int Val1=90, Val2=0, Val3=0, Val4=0, Val5=0, Val6=0,  Val7=0,  Val8=0;
String Temp1x="";
String PHx="";
String Temp2x="";
String Temp1y="";
String PHy="";
```

```
String Temp2y="";
String Temp3y="";
String Temp3x="";
String Temp4y="";
String Temp4x="";
String Temp5y="";
String Temp5x="";
String Temp6y="";
String Temp6x="";
String Temp7y="";
String Temp7x="";
String Temp8y="";
String Temp8x="";
String Temp9y="";
String Temp9x="";
String Temp10y="";
String Temp10x="";
int DataIn=0;

BlynkTimer timer;

int pos=0;
bool led_set[2];
long timer_start_set[2] = {0xFFFF, 0xFFFF};
long timer_stop_set[2] = {0xFFFF, 0xFFFF};
unsigned char weekday_set[2];

long rtc_sec;
unsigned char day_of_week;

bool led_status[2];
bool update_blynk_status[2];
bool led_timer_on_set[2];

// This function is called every time the Virtual Pin 0 state changes

// This function is called every time the device is connected to the
Blynk.Cloud
BLYNK_CONNECTED()
{
  // Change Web Link Button message to "Congratulations!"
 // Blynk.setProperty(V3, "offImageUrl", "https://static-
image.nyc3.cdn.digitaloceanspaces.com/general/fte/congratulations.png");
 // Blynk.setProperty(V3, "onImageUrl",  "https://static-
image.nyc3.cdn.digitaloceanspaces.com/general/fte/congratulati
ons_pressed.png");
```

```
 // Blynk.setProperty(V3, "url",
"https://docs.blynk.io/en/getting-started/what-do-i-need-to-
blynk/how-quickstart-device-was-made");
}

// This function sends Arduino's uptime every second to Virtual Pin 2.
void myTimerEvent()
{
  // You can send any value at any time.
  // Please don't send more that 10 values per second.
 // Blynk.virtualWrite(V2, millis() / 1000);
}


BLYNK_WRITE(V10)
{
  Rly1 = param.asInt(); // assigning incoming value from pin V1 to a
variable

 if (Rly1==1){
   Serial.println("!");
 //  Blynk.logEvent("manual", String("MESSAGE"));
 }
  if (Rly1==0){
   Serial.println("@");
 //  Blynk.logEvent("manual", String("MESSAGE"));
 }

 // process received value
}

BLYNK_WRITE(V11)
{
 Rly2 = param.asInt(); // assigning incoming value from pin V1 to a
variable

 if (Rly2==1){
   Serial.println("#");
 //  Blynk.logEvent("manual", String("MESSAGE"));
 }
  if (Rly2==0){
   Serial.println("$");
 //  Blynk.logEvent("manual", String("MESSAGE"));
 }
 // process received value
}
```

```
BLYNK_WRITE(V2)
{
  Rly2 = param.asInt(); // assigning incoming value from pin V1 to a
variable

  if (Rly2==1){

  }

  // process received value
}


BLYNK_WRITE(V4)
{
  Rly4 = param.asInt(); // assigning incoming value from pin V1 to a
variable

  if (Rly4==1){

  }

  // process received value
}

BLYNK_WRITE(V5)
{
  Rly5 = param.asInt(); // assigning incoming value from pin V1 to a
variable

  if (Rly5==1){

  }

  // process received value
}


BLYNK_WRITE(V6)
{
  Rly6 = param.asInt(); // assigning incoming value from pin V1 to a
variable
```

```
  if (Rly6==1){

  }

  // process received value
}



BLYNK_WRITE(V1)
{
  Val1 = param.asInt(); // assigning incoming value from pin V1 to a
variable


  // process received value
}


BLYNK_WRITE(V9)
{
  unsigned char week_day;

  TimeInputParam t(param);

  if (t.hasStartTime() && t.hasStopTime() )
  {
    timer_start_set[0] = (t.getStartHour() * 60 * 60) +
(t.getStartMinute() * 60) + t.getStartSecond();
    timer_stop_set[0] = (t.getStopHour() * 60 * 60) + (t.getStopMinute() * 60)
+ t.getStopSecond();


    Serial.println(String("Start Time: ") +
           t.getStartHour() + ":" +
           t.getStartMinute() + ":" +
           t.getStartSecond());

    Serial.println(String("Stop Time: ") +
           t.getStopHour() + ":" +
           t.getStopMinute() + ":" +
           t.getStopSecond());


    for (int i = 1; i <= 7; i++)
    {
      if (t.isWeekdaySelected(i))
      {
```

```
      week_day |= (0x01 << (i-1));
      Serial.println(String("Day ") + i + " is selected");
     }
     else
     {
      week_day &= (~(0x01 << (i-1)));
     }
    }

   weekday_set[0] = week_day;
  }
  else
  {
    timer_start_set[0] = 0xFFFF;
    timer_stop_set[0] = 0xFFFF;
  }
}
//
###########################################################
#######################################################


void setup()
{
  // Debug console

  Serial.begin(9600);

  Blynk.begin(auth, ssid, pass);
  // You can also specify server:
  //Blynk.begin(auth, ssid, pass, "blynk.cloud", 80);
  //Blynk.begin(auth, ssid, pass, IPAddress(192,168,1,100), 8080);

  // Setup a function to be called every second
  timer.setInterval(1000L, myTimerEvent);


  pos=0;
}

void loop()
{
  Blynk.run();
  timer.run();
  //--------------------------------------------------
   while (Serial.available()) {
    // get the new byte:
    char inChar1 = (char)Serial.read();
```

```
  if (inChar1 == '*') {
    DataIn++;

  }

  if (inChar1 == 'Y') {

 }
if (inChar1 == 'X'){

}

  while (DataIn > 0){
    while (Serial.available()) {
  // get the new byte:
  char inChar = (char)Serial.read();
  if (inChar == '*') {
   DataIn++;

  }
  if (inChar != '*' && inChar != '#' && DataIn==1) {
   Temp1x+=inChar;

  }
  if (inChar != '*' && inChar != '#' && DataIn==2) {
   Temp2x+=inChar;

  }
  if (inChar != '*' && inChar != '#' && DataIn==3) {
   Temp3x+=inChar;

  }
   if (inChar != '*' && inChar != '#' && DataIn==4) {
   Temp4x+=inChar;

  }
   if (inChar != '*' && inChar != '#' && DataIn==5) {
   Temp5x+=inChar;

  }
   if (inChar != '*' && inChar != '#' && DataIn==6) {
   Temp6x+=inChar;

  }
   if (inChar != '*' && inChar != '#' && DataIn==7) {
   Temp7x+=inChar;
  }
   if (inChar != '*' && inChar != '#' && DataIn==8) {
```

```
      Temp8x+=inChar;

  }
   if (inChar != '*' && inChar != '#' && DataIn==9) {
   Temp9x+=inChar;

  }
   if (inChar != '*' && inChar != '#' && DataIn==10) {
   Temp10x+=inChar;

  }
 if (inChar == '#') {
   DataIn=0;
   Temp1y=Temp1x;  PHy=PHx;    Temp2y=Temp2x;
Temp3y=Temp3x;  Temp4y=Temp4x;
   Temp5y=Temp5x;
   Temp6y=Temp6x;
   Temp7y=Temp7x;
   Temp8y=Temp8x;
   Temp9y=Temp9x;
   Temp10y=Temp10x;
   Temp1x="";
   PHx="";   Temp2x="";
   Temp3x="";
   Temp4x="";
   Temp5x="";
   Temp6x="";
   Temp7x="";
   Temp8x="";
   Temp9x="";
   Temp10x="";
   Blynk.virtualWrite(V0, Temp1y);
   Blynk.virtualWrite(V1, Temp2y);
   Blynk.virtualWrite(V2, Temp3y);
  }
     }
   }
}
```