AUTOMATED IRRIGATION SYSTEM WITH PIR SENSOR

BY

KAHTHERESH A/L MURUGAN

A REPORT

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF COMPUTER SCIENCE (HONOURS)

Faculty of Information and Communication Technology
(Kampar Campus)

JANUARY 2021

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DECLARATION OF ORIGINALITY

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I also would like to thank my parents and my family for their love, support and continuous encouragement throughout the course. Without their unconditional support and love I could not able to finish this project.

ABSTRACT

As water supply is becoming scarce in today's world there is a necessity of adopting automated ways of irrigation for plantation. The manual irrigation method is highly depending on human or animals support to function in order to flow the water to the plants. This leads to producing an ineffective water system which leads to water wastage and affects the growth of the plants. This project aimed to implement automated irrigation system to irrigate the plants automatically in order to reduce water wastage and to encourage the growth of the plants and also to save the soil moisture value occasionally in cloud. In addition, this work proposes to deploy PIR sensor to safeguard the plants from being harmed by humans and animals when the plants left unattended especially at night hours. In the first phase of implementation, the proposed automated irrigation system is built as a prototype in which it helps in conserving water through soil moisture sensor which will take readings of soil moisture values. If the moisture values are lower than 50%, then the water is supplied automatically from the motor pump to the plants. While if the value rises above 50%, then the motor pump will be turned off automatically. The proposed system maintains the desired soil moisture level and sends the data to Arduino which acts as the controlling unit. In addition to that, the readings from the soil moisture sensors will be sent to Blynk mobile application for user's monitoring and viewing purposes. The performance of the proposed system is evaluated against manual watering method to irrigate papaya plants for five weeks. In this experiment, it was observed that the papaya plants irrigated by the proposed system grew taller and healthier as compared to the manual watering method. This is because the water is supplied to the plants according to their needs which eventually encouraged their growth. In addition, by this, water wastage is reduced too. Furthermore, it also able to save the soil moisture value occasionally in cloud. The soil moisture value will be saved in the cloud for every 7 hours of interval for further analysis. The accuracy of this data storage has been tested using the Arduino Ide which displays the same value as the value stored in the cloud. In the second phase of the implementation, PIR sensor is included in the proposed automated irrigation system. It helps to detect the intruders in order to protect the plants from being harmed or destroyed especially at night hours. The accuracy of the PIR system was validated by conducting experiments with hindrance and without hindrance. From the result obtained, it was observed the PIR sensor is able to detect the intruders within six-meter range and constantly alert the users.

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LIST OF ABBREVIATIONS

ADC	Apparent diffusion coefficient
GSM	Global System for Mobile
PIR	Passive Infrared Sensor
GPS	Global Positioning System
IFTTT	If This Then That Application
DHT11	Temperature and Humidity Sensor
LDR	Light dependent resistor

CHAPTER 1: INTRODUCTION

1.1 : Problem Statement and Motivation

The problem domain for this work is on irrigation system. One of the problems of traditional irrigation system is the high dependency on human or animals support to function. In this case, without the presence of human or animal support, this irrigation system will not be able to flow the water to the plants. In addition, the traditional irrigation system is lacking in producing an effective water system. This system leads to water wastage because its main functionality is to supply water to the plants without analyzing the amount of water the plants require at that point of time. By this, it may also affect and suppress the growth of the plants. In addition to that, in manual irrigation system there is no security provided to the plant to protect them. Intruders may cause harm to the plants and this will cause a major effect to the growth of the plant despite burdening the farmers financially.

Thus, this has motivated to develop an automated irrigation system with PIR sensor. In this work, a prototype of the automated irrigation system with PIR sensor will be built where the water is supplied to the plants by measuring the soil moisture level of the plants and also able to save the soil moisture value occasionally in cloud. The water is only supplied to the plants whenever it is needed. Thus, by adopting this proposed system, farmers are able to reduce the water wastage to encourage persistent water management since in present water crisis is becoming a common issue. Moreover, the proposed system also encourages the growth in plants since the water will be supplied according to their needs. Apart from that, the proposed system has an additional feature to detect the intruders in order to protect the plants from being harmed or destroyed especially at night. With the help of this system, farmers can go wherever they want in a state of peaceful mind whereas this system will work for them to supervise the level of water the plants needed and supply the water to the plants as well and also provide security to the plants from the intruders.

1.2 : Project Scope

This project is focused on developing a prototype of automated irrigation system with PIR sensor that detects soil moisture level of plants in a small scale in order to automate the water supply. This system will require Arduino, soil moisture sensor, ESP8266 (Wifi module), Motor driver and water pump. Besides that,the ESP8266 should always connect with internet connection to collect and store the soil moisture value in cloud. Furthermore, in this system additional function will be built using infrared light radiated object in order to enhance the security level in order to protect the plants from being destroyed especially at night.

1.3 : Objective

The objectives of the proposed system are as follows:

1. To develop an automated irrigation system as a prototype in order to reduce water wastage wastage and to save the soil moisture value occasionally in cloud, apart from saving time, cost in long term, effort of farmers and encourages the growth of the plants too.

This proposed automated irrigation system is able to reduce water wastage by providing effective water usage and also to save the soil moisture value in cloud for further analysis. Besides that, farmers would be able to save time, cost in long term, and effort in supplying water to the plants by using this proposed system. It helps the farmers to able to reduce man power to maintain their crops where this also saves their cost of spending to pay the labours, in long run. In addition, the proposed system encourages the growth of the plants to be healthier and taller as the water is supplied automatically according to their needs.

2. To enhance the security level of the plants in the proposed system.

The proposed automated irrigation system is further enhanced by including addition function in order to secure the plants. This is to possibly save the plants from being destroyed by the intruders especially at night within a radius of six meters.

1.4 : Contribution

The main contribution of the proposed irrigation system is to automate the water supply to the plants replacing the traditional manual irrigation system. The proposed system is built as a prototype where by this water wastage is reduced providing effective water usage. In addition, this proposed system is able save time, cost in long term, and effort of farmers in supplying water to the plants. Apart from that, it can save the soil moisture value in cloud for future analysis. Therefore, it also encourages the growth of the plants effectively since the water is supplied to them as per their needs. Moreover, it also enhances the security level of plants by protecting them from being destroyed by the intruders especially at night time.

1.5 : Background Information

Irrigation is the process of applying controlled amounts of water to plants at needed intervals. Irrigation helps to grow agricultural crops, maintain landscapes, and revegetate disturbed soils in dry areas and during periods of less than average rainfall (Toppr, n.d).

These irrigation systems were used in earlier years. However, even today some small farms in rural areas are still adopting these. Although they are cheaper, they are not efficient. This is because these systems need human or animal labor to function. Figure 1.1 shows these traditional irrigation systems which are functioned using are moat, chain pump, dhekli and rahat (Toppr, n.d).

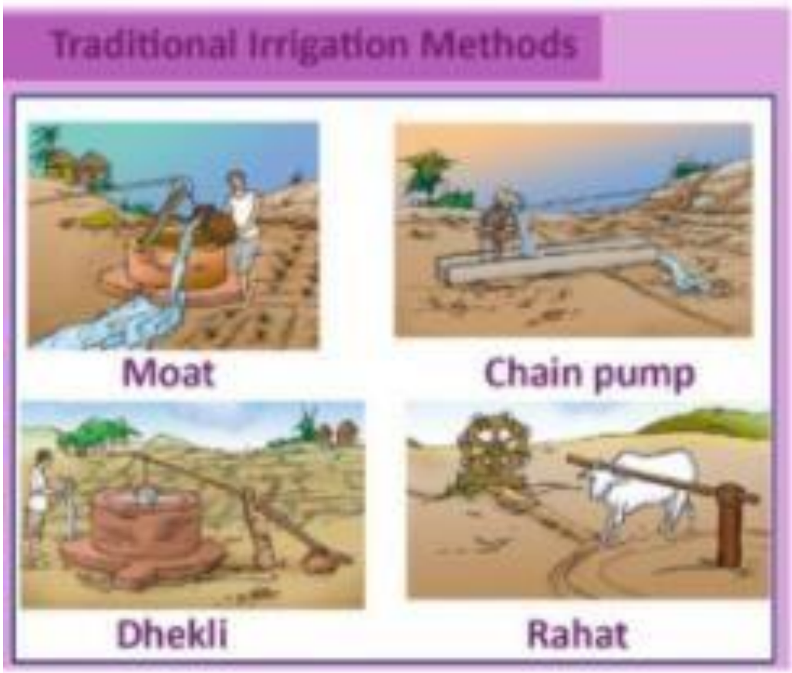


Figure 1.1: Traditional irrigation methods

Moat also called by the pulley system. It involves pulling up water from a well or other such source to irrigate the land. This is a time consuming and labour-intensive process, but it is very cost-efficient. Also, using a moat avoids wastage of water (Toppr, n.d).

While, chain pump consists of two large wheels connected by a chain. There are buckets attached to the chain. Further, one part of the chain dips into the water source. As the wheel turns, the bucket picks up water. The chain later lifts them to the upper wheel where the water gets deposited into a source. The empty bucket gets carried back down (Toppr, n.d).

Dhekli is a process of drawing water from a well or such similar source. Here a rope and bucket are tied to a pole. At the other end, a heavy stick or any other object is tied as a counterbalance. The pole is then used to draw up water. While, rahat uses animal labour. In rahat, a large wheel is tied above a well where an ox or cow would turn the wheel to draw the water from the well (Toppr, n.d).

CHAPTER 2: LITERATURE REVIEW

2.1 : Introduction

Over the decades, there are efficient irrigation systems that have been invented. These help to use water economically without wastage for agriculture. They are automated irrigation systems. The following is the review on these irrigation systems, respectively.

2.2 : Review on existing system

2.2.1 : IoT Based Smart Irrigation Monitoring & Controlling System in Agriculture

Islam et al. (2020), have proposed a smart irrigation using IoT technologies. In this paper, hardware such as Raspberry Pi, Temperature and Humidity Sensor (DHT11), Soil pH sensor, ESP8266 (WiFi module), Soil moisture sensor and Water level sensor have been used. In addition, there are software applications too such as Altair Smartcore, If This Then That (IFTTT) mobile application which shows the weather forecast of next day, and Smart agriculture application which can control on and off of the pump that have been used to build the smart irrigation system using IoT technologies.

In this paper, the hardware and software components are incorporated to observe the environment temperature, soil moistness, soil pH and water level in the agriculture field. This information is sent to the Web worker database via remote transmission. The controlling of each of these tasks is performed through laptop, desktop or mobile with internet support.

Raspberry Pi is good for software applications because it will function as a mini computer and not as a microcontroller board while DHT11 works as a Humidity and Temperature Sensor, which generates calibrated digital output. It displays the temperature in “degree-Celsius”. While the ESP8266WiFi will be used for communication between the microcontroller and website.

Moreover, soil pH sensor is used to measure the acidic or alkaline level of the soil. The range of pH is from 0 to 14. pH level 7 is neutral while pH more than 7 is alkaline and pH less than 7 indicate acidic soil. While, the water level sensor is used to measure the level of water inside the container or in the river or lake. Soil moisture sensor is a simple water sensor that can be used to detect the soil moisture.

Firstly, moisture sensor will detect the moisture level of the soil. The soil may be dry or wet. When the soil dryness level is high the pump is turned on automatically and this information is saved and stored in the server known as Altair Smartcore. Meanwhile, user will too receive the information on the pump status and soil moisture and field environment temperature readings via email.

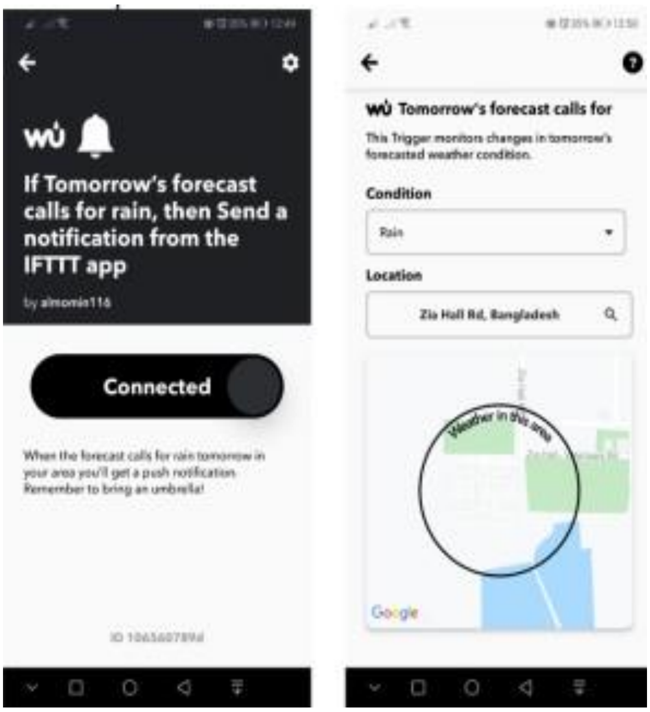


Figure 2.1: IFTTT app's connection and location setup

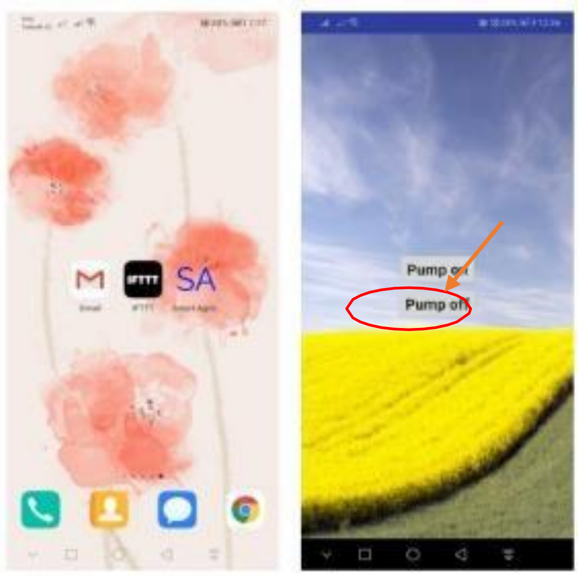


Figure 2.2: Smart agriculture App to turn on/Off pump

In addition, IFTTT application will provide information on the weather updates. From figure 2.1, it shows the user have to set the location to get know about the forecast of that location. For instance, if there is any possibility to rain the following day at that location, the application will send the notification to the user as same as in figure 2.1. As referred to the figure 2.2, the user will turn off the pump via the smart agriculture app for the day.

2.2.2 : Automated Agricultural Monitoring and Controlling System Using HC05 BT Module

In Mehta et al. (2018), have proposed a prototype which can monitor and control the agricultural system. In this paper, Arduino Uno, Soil moisture Sensor (KG003), Light dependent resistor (LDR), Temperature and Humidity Sensor (DHT11) and HC-05 Bluetooth module have been used.

Arduino Uno is an electronics board which can respond to sensors and input meanwhile it also able to interact with large number of outputs such as LEDs, motor and displays. While, Light dependent resistor (LDR) is a light-controlled variable resistor. It is used to detect the presence or level of sunlight. HC-05 module is a Bluetooth Serial Port Protocol module, which will be useful for wireless connection. It able to receive and transmit data.

The proposed prototype focused on monitoring some parameters (soil moisture, temperature and sunlight intensity) of a greenhouse agriculture field and controls the specific parameters by using Bluetooth module. A user friendly mobile android application known as Bluetooth terminal is used to display the values the LDR, DHT11, and soil moisture sensors apart from being used to control the pump motors.

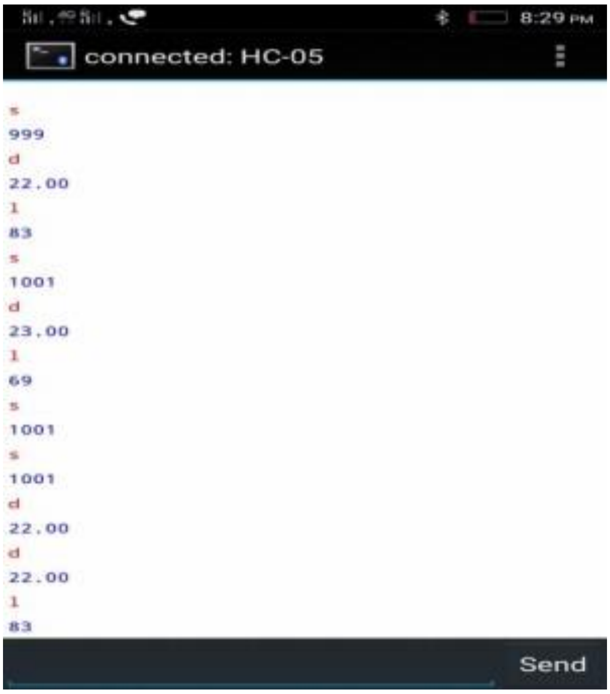


Figure 2.3: Parameter values obtained from mobile app

In addition, in this Bluetooth terminal application, the farmer is able to input a single character for instance, ‘s’, ’d’, ’l’ to receive real-time data from the sensors on their crops. ‘s’ referred to soil moisture sensor (To receive the moisture values), ‘d’ referred to the DHT 11 (To receive temperature values in degree Celsius) and ‘l’ is referred to LDR (to receive the value of sunlight intensity). Figure **2.3** shows the representation of each single character being input by the farmer via the Bluetooth terminal application. Moreover, this application is available for download in play store.

2.3: Iot Based System for Continuous Measurement and Monitoring of Temperature, Soil Moisture and Relative Humidity

In this work, Nath et al. (2018) have designed a smart agriculture which can access the temperature, soil moisture and relative humidity information by using DHT11 and transfers these data to cloud server for remote access. This system comprises of temperature and humidity sensor DHT11, soil moisture sensor, Arduino Uno Board, PC and ESP8266WiFi module. Following figure 2.4 shows the proof of how the experimental has been conducted.

Figure 2.4: Experimental set-up for measuring soil moisture

The temperature and humidity sensor module DHT11 give the digital value of temperature and relative Humidity that will be read by the microcontroller. The soil moisture sensor detects the soil moisture and produces an analog output voltage. Later, it transmits these data to the WiFi module (ESP8266) through a serial port to be finally saved in the Thingspeak server. Once the data is available in the cloud server, it can be accessed, remotely, via internet.

2.2.4 : IoT Based Agriculture and Transportation Surveillance

Patil et al. (2018) have developed a smart irrigation system for farmers and at the same time to inform the farmers the exact location of the vehicles that carry the crops produced from the farm. This prototype comprises of temperature sensor, humidity sensor, light sensor, soil moisture sensor, Global Positioning System (GPS), and Global System for Mobile (GSM) Module. GPS is used to receive information on the vehicle location whereas GSM is used to send the collected location data of GPS to the user.

In the proposed system, the data such as the humidity and temperature values are uploaded to the website using the Arduino microcontroller at regular interval of time through ESP8266 Wi-Fi module. In addition, the proposed system is an embedded system which helps in improving the quality of crops. The DHT11 sensor sense the changing in temperature and humidity and sends it to the digital pin of the Arduino microcontroller. Later, using Arduino, the detected humidity and temperature values are transferred to the website to be accessed by the user.

Apart from that, the proposed system by also has transport surveillance system. This transport surveillance system comprises of GPS and GSM modules which can identify the location of the vehicle that carrying the produce from the farm.

2.2.5 : A study on smart irrigation system using IoT

The main objective of Singla et al. (2018) is to design a smart irrigation system where all the information about the field condition detected through sensors is sent to the user’s mobile using Wi-Fi Relay Module (ESP8266 Wi-Fi module) and Arduino UNO R3 is used to automatically control the water supply. This prototype consists of soil moisture sensor, temperature sensor, Arduino UNO R3 (latest version of Arduino Uno), ESP8266 Wi-Fi module.

In this proposed system, both the sensors DHT-11 temperature sensor and soil moisture sensors are connected to the input pins of Arduino Uno R3 microcontroller board. The Analog values produced from the sensors are converted to a digital output value by the Arduino Uno R3 microcontroller. The sensed values are displayed in the mobile application known as the “Bluetooth Terminal Android Application”. The water pump is set in auto mode so that it will be turned on and off, automatically based on the soil moisture level.

2.3: Critical Remarks

Table 2.1 summarized the advantages and disadvantages of the existing works on smart irrigation system that have been reviewed in Section 2.1. In the work proposed by Islam et al. (2020), the system has used three software applications. Among the three software applications, IFTTT application can be considered as an advantage for this system because it functions uniquely, which is to update the weather report of the following day to the user. User is able to set their current location in order to receive the weather updates of the following day through the application. Moreover, the Altair smartcore server is an advantage to this proposed smart irrigation system because it does not only send the notification of the sensor (environment temperature, soil moistness, soil pH and water level) to the user but it also sends this information to the user via email. By this, if the user has mistakenly cleared the notifications sent, he/she is still able to retrieve these notifications from email.

Even though, IFTTT application is able to forecast the weather condition however, this forecast may also be incorrect at times. In this case, due to this incorrect forecast occurrence, this causes the user to turn off the water pump the whole day. This may cause the plant to become wither. In addition to that, Altair smartcore server is not free of charge, it is offered free for a limited duration of time. User has to pay in order to continue using it.

While the advantage of the proposed system by Mehta et al. (2018) is that it has been built to receive the real-time data of their crops soil moisture, the environment temperature and sunlight intensity level values. This is to enable the user to receive an instant update about their crops and their environment rather than waiting to receive the notification from the system. Apart from that, this system uses Bluetooth module rather than Wi-Fi relay module. This will help the system to receive or transfer the data without internet connection.

Although, this system is able to produce real-time data to users but however, it failed to alert a warning message or notification to the user when the soil moisture level is low. In addition, the usage of Bluetooth module in this system made the system to send or transmit the data within a short range only. If the user exceeds the limit, he/she could not able to send commands through the Bluetooth terminal mobile application to receive the output (soil moisture, the environment temperature and sunlight intensity level values).

Meanwhile in the system proposed by Nath et al. (2018), it stores the sensors data values in the Thingspeak server for backup purposes. These data can be viewed remotely via internet. One of the major disadvantages of this proposed system is that despite of be built with many sensors such as the soil moisture, temperature and humidity sensors to monitor the plants conditions however, this system has failed to automatically set up water service to the plant.

In addition, the advantage of the proposed system by, Patil et al. (2018) is that the farmer is able to know and detect the exact location of the vehicle carrying produce from the farm. The GPS module finds the exact vehicle location which includes its latitudes and longitudes where the GSM module collects these data and sends them to the web server. However, the major drawback of this system is that the proposed smart irrigation system is only applicable for general-purpose plant such as sugarcane and it is not suitable for all type of seasonal plants.

In the work proposed by Singla et al. (2018), the advantage of the proposed system is the usage of Bluetooth module rather than Wi-Fi Relay module to transfer the data. This will help the system to transfer the data without the internet connection being required. However, the main disadvantage of this system is the Bluetooth module transfers the data within short range only. If the user exceeds the limit, he/she could not able to send commands to the mobile application to receive the output (soil moisture and surrounding temperature value).

Table 2.1: Advantages and disadvantages of the existing automated irrigation systems

Systems	Advantages	Disadvantages
IoT Based Smart Irrigation Monitoring & Controlling System in Agriculture (Islam et al., 2020).	IFTTT application is used in this proposed system. It will provide information on the weather updates of the following day.	When the weather prediction goes wrong, the plants will not get water supply for the whole day.
	User is notified on the status of the pump and the humidity and temperature of the soli via email.	This system is costly because Altair smartcore server offers free trial only for limited duration of time.
Automated Agricultural Monitoring and Controlling System Using HC05 BT Module (Mehta et al. 2018).	User able to receive the real-time data of their crops soil moisture, the environment temperature and sunlight intensity level values rather	This system failed to prompt warning message to the user when the soil moisture level is low.

	than waiting to receive the notification from the system.	
	It is equipped with a Bluetooth module.	Only supports a short range.
Iot Based System for Continuous Measurement and Monitoring of Temperature, Soil Moisture and Relative Humidity (Nath et al. 2018).	The parameters sensed by the sensors are fed to the microcontroller ATMEGA328. It transmits the data to the Thingspeak server through internet. These data can access remotely via internet.	Although plenty of sensors were used in the proposed system however it has no automatic water services to water the plant.
IoT Based Agriculture and Transportation Surveillance (Patil et al. 2018).	Used GPS and GSM module which enables the farmer to know the exact location of the vehicle carrying produce from the farm.	This smart irrigation method can only be used for the general-purpose plants.
A study on smart irrigation system using IoT (Singla et al. 2018).	It uses Bluetooth module to transfer the data	Bluetooth module only supports a short range.

CHAPTER 3: PROPOSED METHOD

3.1 Design Specification

In this chapter the methodology used to develop the proposed automated irrigation system with PIR sensor is discussed. This includes the requirement, analysis, design, development, execution, and testing phases that are in involved in the proposed system.

3.1.1 Methodology of the proposed system

The Waterfall methodology is chosen to develop the proposed Automated Irrigation System with PIR sensor. In waterfall methodology as illustrated in figure 3.1, a schedule is set with deadlines for each stage of development. It makes ease to proceed through the development model phases one by one. The waterfall model progresses through easily understandable and explainable phases and thus it is easy to use. Each phase has specific deliverables and a review process. Moreover, in this methodology the developers able to make some changes in early stages whenever there is a need. In this model, phases are processed and completed one at a time and they do not overlap (Buzzle, n.d).

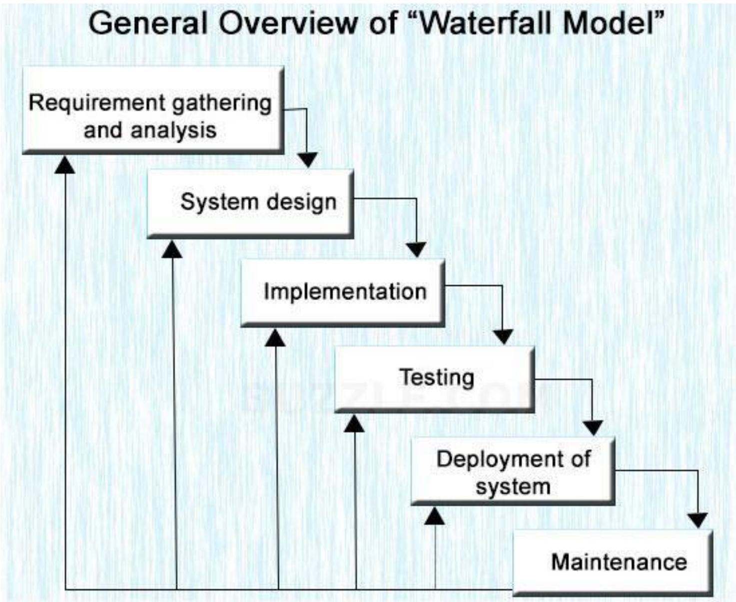


Figure 3.1: Waterfall Methodology

Figure 3.1 showed the phases of Waterfall methodology in sequence. The first phase of Waterfall methodology is known as requirements. It involves the understanding of the design, function, and purpose of the system. In the second phase, analysis, the requirement specifications from the first phase are studied and analysed. This is followed by the design phase. In this phase, the hardware and system requirements are specified and it also defines the logical design of the overall system architecture. The next phase is called as implementation. In this phase, the system is developed in a unit (small programs) based on the logical design of the system and that hardware and software specifications that were in the design phase (Buzzle, n.d).

While, in the testing phase, each unit of the system that has been developed are integrated tested for its functionality. Once the testing succeeds the system is deployed and released into the market for purchasing. The final stage of waterfall methodology is maintenance. This step occurs after installation, and involves actions of modifications to the system or an individual component to alter attributes or improve the performance (Buzzle, n.d).

3.1.2 Tools to use

Software

Blynk

Blynk is a mobile application which can download from Play Store for free. This will help to build an interface for controlling and monitoring the hardware of the project from mobile device.

Arduino Ide

Arduino Ide is a software which help to write and upload the code into the board and other hardware too.

ThingSpeak

ThingSpeak is a Cloud platform which is used to store and save the data read by the sensor in cloud for further analysis.

Hardware

Arduino Uno

Arduino Uno is an electronics board (microcontroller) which responds to sensors and input. Meanwhile it also able to interact with large number of outputs such as LEDs, motor and displays.

ESP8266 (Wifi module)

It will be used to establish communication between the microcontroller and website.

Passive Infrared (PIR) Sensor

It is used to detect whether movement of a human or animals within the range (6-10) meters.

Relay Driver Modules

The relay driver modules will be used whenever there is a need for a low voltage circuit to switch a light bulb ON and OFF.

Soil Moisture Sensor

It can detect the moisture level of soil.

Water Pump

The water pump controls the flow of water.

3.1.3 System Performance Definition

System performance of this project is determined through the automation of water supply to the plants. This prototype has been designed to detect the moisture value of soil and to supply the water to the plants as per their needs. Apart from that, it also saves the soil moisture value in cloud occasionally. In addition, PIR sensor is included as an additional function to protect the plants from being harmed by human and animals especially during night hours.

Besides that, the proposed system's performance is evaluated against the manual watering method to irrigate the plants. This is to observe the growth of the plants and to conclude that water wastage is reduced when the plants are irrigated according to their needs. Furthermore, the accuracy of the soil moisture values being stored in the cloud, occasionally is tested against the Arduino Ide for comparison purposes. Moreover, the efficiency of the PIR sensor is in detecting the intruders especially during night hours is evaluated by conducting experiments with hindrance and without hindrance.

3.2 System Design

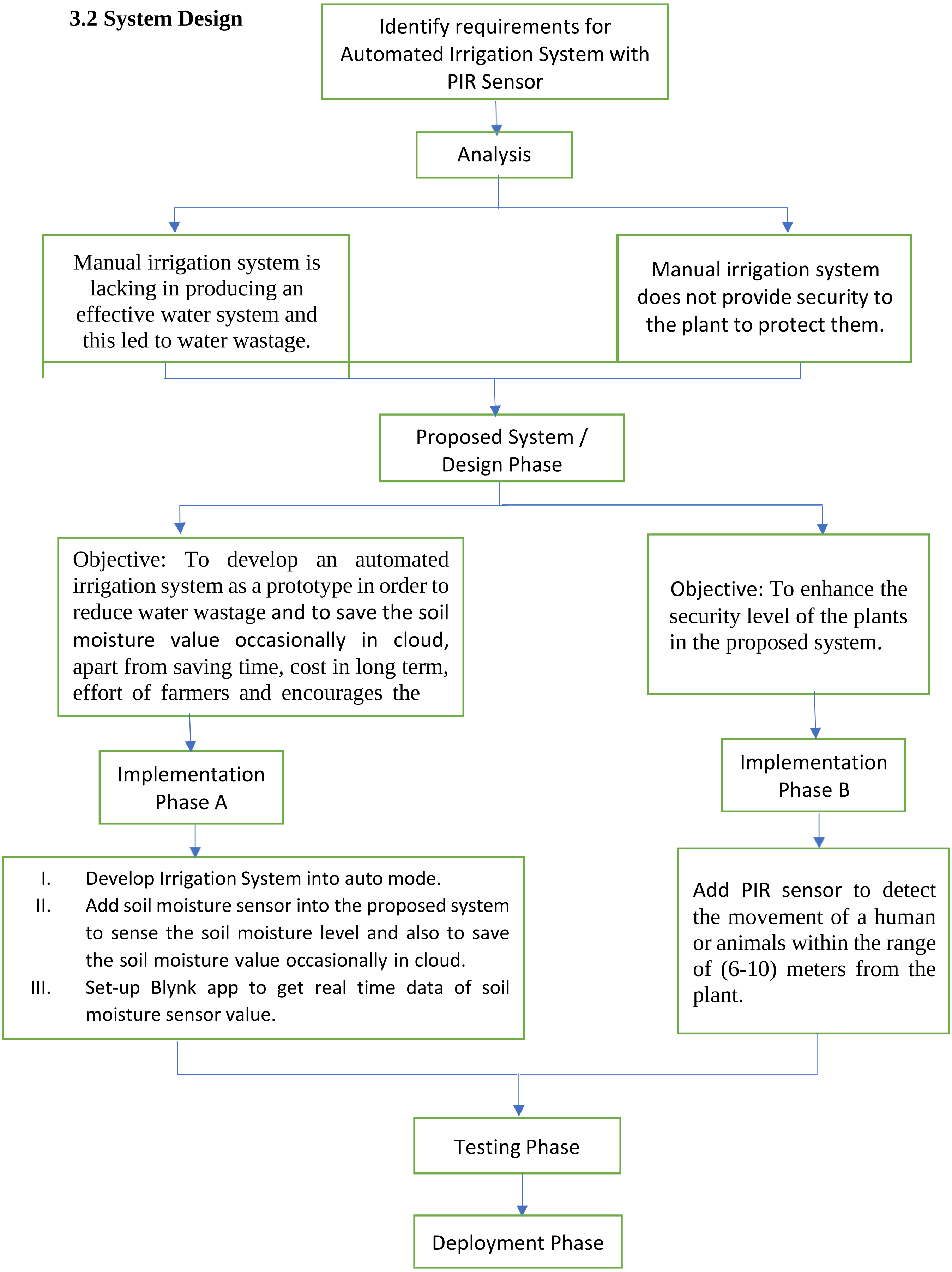


Figure 3.2 The Phases of the Proposed Automated Irrigation System with PIR Sensor In-Line with Waterfall Methodology

The Waterfall model which acquires requirements, analysis, design, implementation, testing, deployment, and maintenance phases are essential for the development of the proposed Automated Irrigation System with PIR sensor as shown in Figure 3.2. However, the maintenance phase will not be considered in this project, due to this project is still in deployment phase and is not yet ready to be published. The details of the processes of the proposed system will be discussed with the guide of waterfall methodology in the subsection below.

3.2.1 Requirement

For the requirements phase, all possible requirements of the system to be developed are captured to accomplish the concept of Automated Irrigation System with PIR sensor, which include the requirement specification document. The requirement here refers to the main focus of this proposed system to be developed as an automated irrigation system with PIR sensor.

This proposed automated irrigation system with PIR sensor is should able to reduce water wastage by providing effective water usage. Besides that, farmers would be able to save time, cost in long term, and effort in supplying water to the plants by using this proposed system. It helps the farmers to able to reduce man power to maintain their crops where this also saves their cost of spending to pay the labours, in long run. In addition, it also encourages the plants growth by supplying the water automatically as per their needs. Moreover, it also able to save the soil moisture value occasionally in cloud. The proposed automated irrigation system is further enhanced by including addition function in order to protect the plants. This is to possibly save the plants from being destroyed by the intruders within a radius of six to meters.

3.2.2 Analysis

Second phase of the proposed Irrigation System is the analysis phase, where all the collected document and requirements will be further analysed in to order to develop the system. It took some days to collect relevant information regarding this topic in order to draft out the project milestone for each phase involved in developing the proposed system. The Gantt chart is used for this purpose as shown in figure 3.8. The project milestone for each phase as show in the Gantt chart will help to recall the tasks to be completed be within the timeline given. The tasks involved in the proposed system development are planning requirement, analyzing, and designing specification, managing the identified hardware and software configuration, designing final testing, completing report writing, preparing presentation slides and presentation videos. These tasks for FYP1 are to be completed in 7 weeks and 2 days. In planning requirement and designing specification task, review on the existing automated irrigation systems with PIR sensor to address the advantages and disadvantages in these systems. By this, the proposed system is designed to address the advantages and flaws in these existing automated irrigation systems. From the review it was concluded that the existing irrigation systems leads to water wastage, water not supplied to the plants according to their needs, and does not provide protection to the plants especially at night hours. Moreover, they are also not able to store the soil moisture values in the cloud for further analysis. In addition to this, the hardware and software required to develop the proposed automated irrigation system will be identified as well during this task. Later, the identified hardware and software are configured and the proposed system is implemented to achieve its objectives. In this work, a prototype of the proposed system will be configured and built in a small scale to achieve the objectives of this work. While, in designing final testing the proposed system is tested for efficiency and compared with manual watering system to evaluate its performance by observing the growth of the plants, respectively for a period of time. Furthermore, the accuracy of the data being saved accurately in the cloud has been verified through the Arduino Ide result which displays the soil moisture value time-to-time. Moreover, the efficiency of the PIR sensor is in detecting the intruders especially during night hours is evaluated by conducting experiments with hindrance and without hindrance. This is followed by completion of report writing, presentation slides and videos for presentation purposes.

3.2.3 Design

During the design phase of the proposed automated Irrigation System, the hardware and software system requirements will be identified. After further analysis, Arduino board has been selected to build this prototype. This board has been chosen to integrate all other identified hardware as it is cheaper as compared with Raspberry Pi (Orsini, L, 2014, May 7). Arduino board also works as intermediate hardware where developers will be able to send commands to control other hardware through it.

Other than Arduino board, ESP8266 is used to establish the communication between the microcontroller and Blynk application., While Passive Infrared (PIR) Sensor is used to detect the movement of a intruders within a range of 6-10 meters. Relay Driver Modules are used whenever there is a need for a low voltage circuit to switch ON and OFF. Apart from these, other hardware such as soil moisture sensor is used to detect the plants soil moisture level while water pump is used to control the flow of the water to the plants. Besides hardware, software also has been used to build this proposed prototype. They are Arduino Ide, ThingSpeak and Blynk Application. Arduino Ide is used to write and upload the code into the Arduino board and other hardware as well while Blynk application is used to build an interface for controlling and monitoring the hardware of the proposed system from mobile device. Therefore, ThingSpeak is a Cloud platform which is used to store and save the soil moisture values read by the sensor in cloud for further analysis.

3.2.4 Implementation

The implementation is divided into two phases as shown in Figure 3.2. These phases are phase A – Automated Irrigation System and the latter is phase B – PIR Sensor.

(I) Phase A – Automated Irrigation System

In the implementation of Phase A, the identified hardware and software from the design phase are integrated and configured to implement the proposed Automated Irrigation System as shown in Figure 3.3.

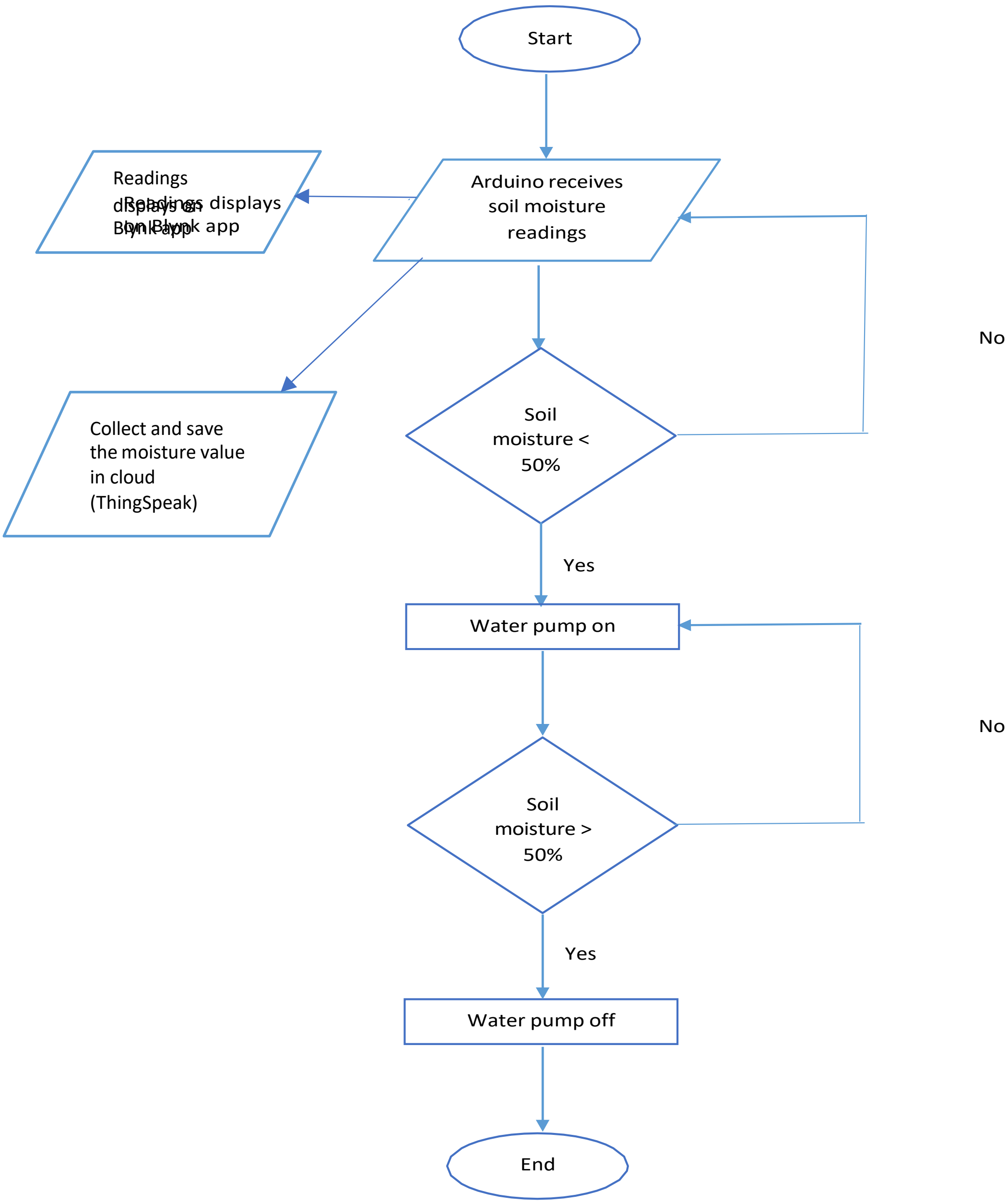


Figure 3.3: Implementation Phase A - Proposed Automated Irrigation System

In order to build the proposed system, the first step would be connecting all the hardware with Arduino board via jump wires. While configuring/connecting jump wires in Arduino board pin, it is essential to take note on which jump wire is being connected to which number of Arduino board Pin number. By this only, the code can be written and uploaded in Arduino board via Arduino Ide software as shown in figure 3.4. While the hardware used for this configuration is Arduino, soil moisture sensor, ESP8266 (Wifi module), Motor driver, breadboard and water pump.

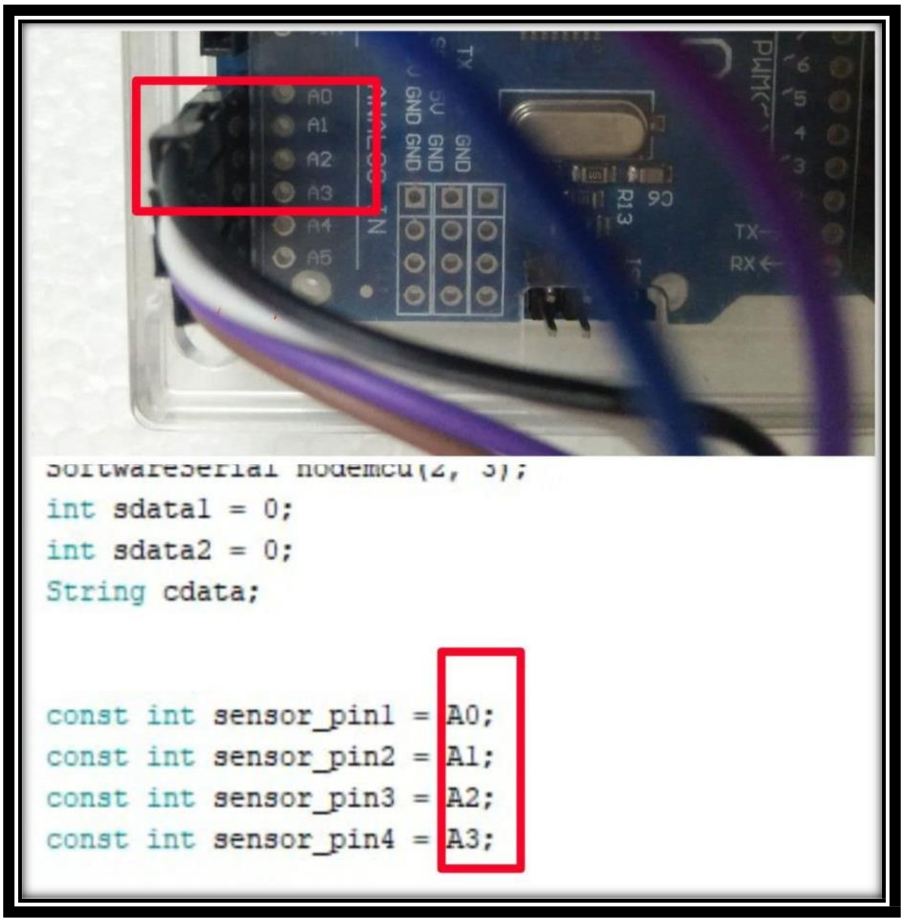


Figure 3.4: Configuration section

The following explains the working process of the proposed system. After the configuration is completed, the soil moisture sensor that is connected to Arduino board will start to take reading of the plant soil moisture. In this work, papaya plants are used as the testing data. The reading will be captured by ESP8266 via Arduino board and then it is transmitted in real time to the Blynk application that is installed in the user mobile as shown in figure 3.5. In order to that, the ESP8266 should be configured through Arduino Ide and is made sure to always be connected to internet to monitor the soil moisture data value from time-to-time by the user via mobile.

Figure 3.5 Blynk Application Interface

```
float m1= ( 100.00 - ( (analogRead(sensor_pin1)/1023.00) * 100.00 ) );
Serial.print("  m1 = ");
Serial.print(m1);
```

Figure 3.6: Soil Moisture Sensor Code

The output of the soil moisture sensor is processed using Apparent diffusion coefficient (ADC). The ADC refers to the measurement of the water molecules. The output of the soil moisture sensor changes in the range of ADC values from 0 to 1023. This configuration is necessary to enable the soil moisture sensor to perform the soil moisture reading accurately. Figure 3.6 shows the programming code that is applied in the Arduino board to measure the soil moisture level in percentage. This value then will be displayed in serial monitor of Arduino Ide as shown in figure 3.7.

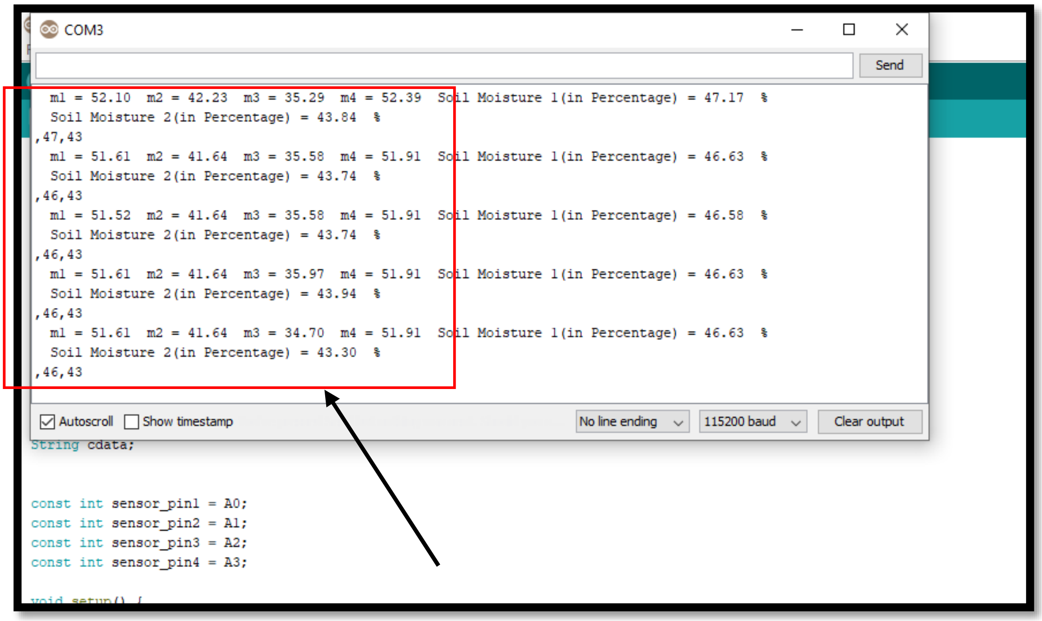


Figure 3.7: Serial Monitor of Arduino Ide

```
if (moisture_percentage1<50)
{
    digitalWrite(motorPower,HIGH);
    digitalWrite(motorPower2,HIGH);
delay(1000);
}
        if (moisture_percentage1>50)
{
digitalWrite(motorPower,LOW);
digitalWrite(motorPower2,LOW);
delay(1000);
}
```

Figure 3.8: Coding section for water pump work automatically

As shown in figure 3.8 the code indicates that, if the soil moisture sensor reads the plant soil moisture level lower than 50% then the water pump will be turned on automatically to supply water to the papaya plants. While if the value rises above 50%, then the motor pump will be turned off automatically. From figure 3.6 and 3.7, the coding clearly shows that, the soil moisture readings have been determined accurately by the soil moisture sensor to supply water to the papaya plants according to their needs to encourage their growth. Simultaneously by this, the water wastage is reduced since the water is supplied to the plants as per their needs.

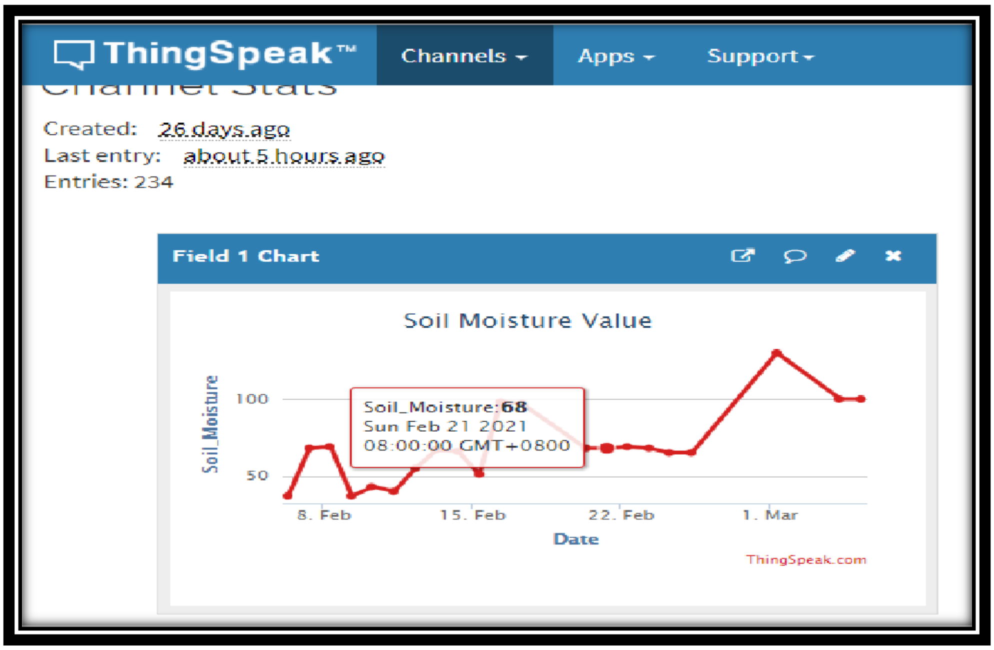


Figure 3.9: ThingSpeak interface where the soil moisture values saved in the cloud

```
void loop()
{
    delay(25200000);
    value = ( 100.00 - ( (analogRead(sensor_pin1)/1023.00) * 100.00 ) ) ;

    Serial.print("connecting to ");
    Serial.println(host);

    // Use WiFiClient class to create TCP connections
    WiFiClient client;
    const int httpPort = 80;
    if (!client.connect(host, httpPort)) {
        Serial.println("connection failed");
        return;
    }
```

Figure 3.10: Coding implemented to save the soil moisture values in the cloud

The soil moisture values that are read by the sensor will be saved automatically in the cloud during certain period of interval. Figure 3.9 shows these values are being saved in the cloud. In addition, the value 25200000 (1000*60*60*7) which has been highlighted in figure 3.10 represents 7 hours in milliseconds. This value in milliseconds displays the interval time the soil moisture values are saved in the cloud.

(II) Phase B – PIR Sensor

In the implementation phase B, the identified hardware and software from the design phase are integrated and configured to implement the PIR sensor with the proposed Automated Irrigation System.

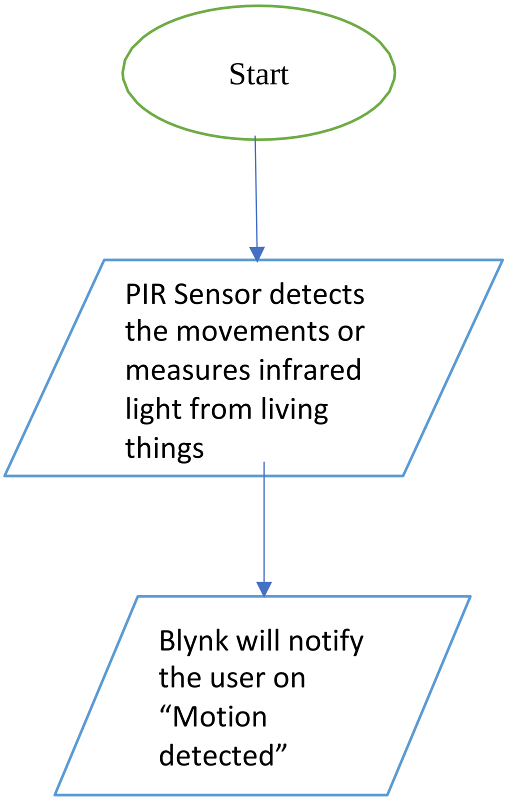


Figure 3.11: Implementation of Phase B: Passive Infrared (PIR) Sensor

As shown in Figure 3.11, in order to build the PIR sensor with the proposed system, the first step would be connecting the PIR sensor with ESP8266 via jump wires. The reason behind the connection of this hardware is to notify the user when intruders has been identified within six to ten meters away from the plants. PIR sensor will easily identify the movements through the infrared light rays emitted from the human/animal body. The moment when the movement has been identified, ESP8266 will send the instruction to notify the user through the blynk app. A message that "Motion detected" will be sent to the users' mobile to alert them on the intruder. This is to possibly saves the plants from being destroyed by the intruders/animals especially at night within a radius of six meters.

```
void loop()
{
if (pinValue == HIGH)
{
getPirValue();
}
Blynk.run();

}void getPirValue(void)
{
pirValue = digitalRead(pirPin);
if (pirValue)
{
Serial.println("Motion detected");
Blynk.notify("Motion detected");
```

Figure 3.12: Coding section for the PIR sensor

Figure 3.12 shows the configuration of the PIR sensor. Whenever the PIR sensor sensed the infrared light which is emitted from human/animal body, the Arduino and Blynk will be identified. Then the Blynk app will notify the user on the motion detection.

3.2.5 Testing

In this phase, the proposed automated irrigation system with PIR sensor will be tested to evaluate its effectiveness and to identify any issues that need to be resolved. In this phase the system performance will be tested to determine if the soil moisture sensor measures the moisture values correctly. By this, the water would be supplied automatically to the papaya plants according to their needs. In addition, in order to evaluate the proposed automated irrigation system performance, comparison would be made with manual water supply to the plants. In this comparison, same type of plants, soil, and landscape will be used in order to evaluate the manual watering method and proposed automated irrigation system. The growth of the plants for certain period of time would be observed and considered as the measurement of the effectiveness of the proposed system. Apart from that, the soil moisture values which are recorded in the cloud will also be tested to evaluate the accuracy of the data being saved. Besides that, the accuracy of the PIR sensor in detecting the infrared ray emitted from humans/animals are also tested. Further descriptions on these are given in Chapter 4.

3.2.6 Deployment

The final phase which is the deployment phase is not considered in this work as the system is still in prototype level and is not ready to be published.

3.3 Implementation Issues and Challenges

Among the issues met, during the development of the proposed system, one of them is on the implementation. In the initial implementation stage, the proposed automated irrigation system was unable to supply the water automatically to the plants when the soil moisture level decreases. Eventually the issue was resolved but however, it took almost a week to identify the root cause. This is because in order to resolve the issue, testing has to be performed in order to identify if the water supply is not automated due to hardware malfunction or error in coding. Once the testing was performed, it was found that there is no error in the coding but however, the wire that was connecting Arduino board and motor drive had malfunctioned. Once it has been replaced, the proposed system was able to supply the water automatically to the plants from the moisture level readings.

Secondly, in the first attempt of the PIR sensor implementation, the sensor was unable to detect humans/animals movements. However, after several testing, it was found that there were errors in the coding. Once the error had been rectified, the PIR sensor was able to function accordingly.

3.4 Timeline

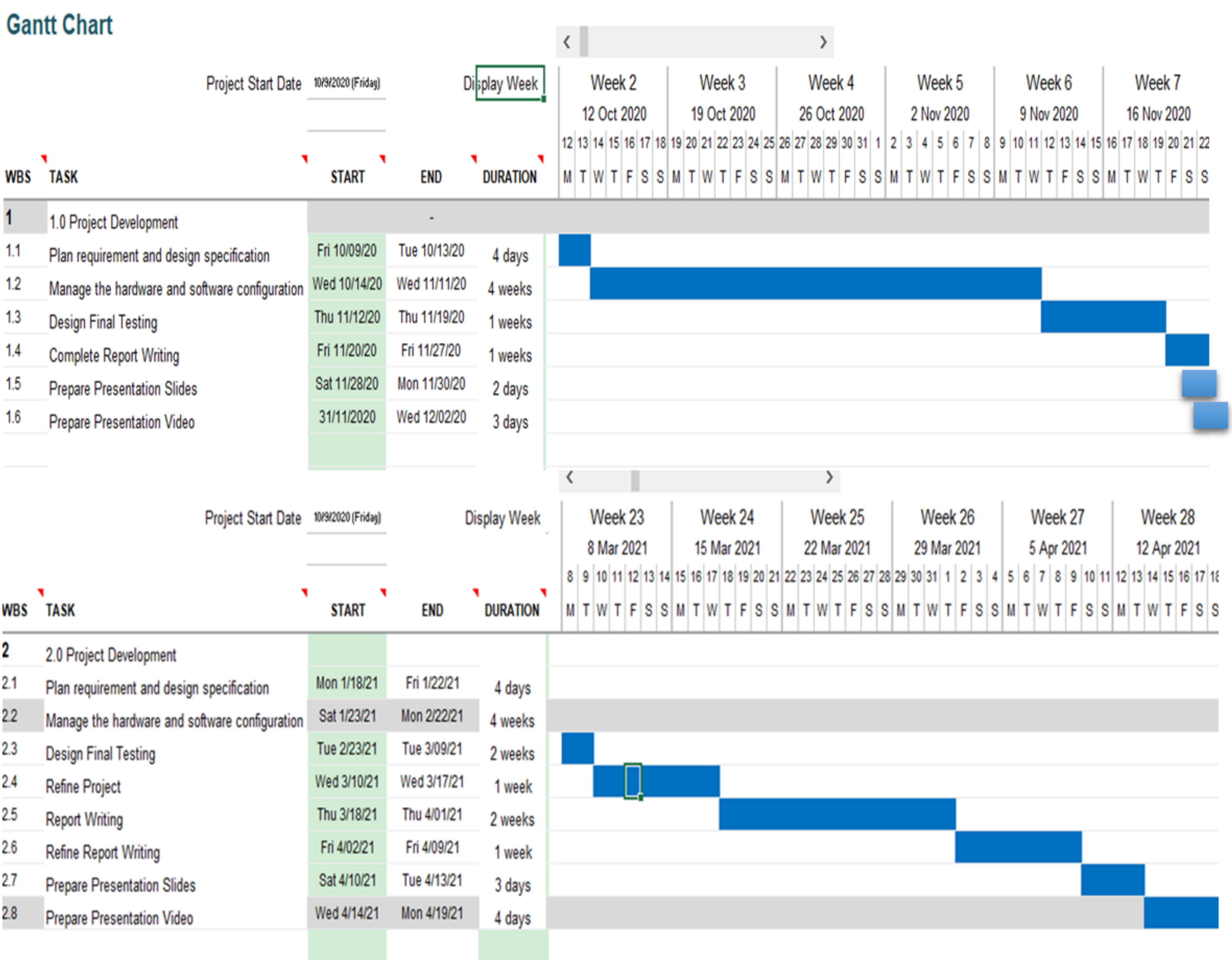


Figure 3.13 Gantt Chart

As referred in Figure 3.13, the design and implementation of the proposed Automated Irrigation System with PIR sensor are been divided into FYP1 and FYP2. In FYP I, the prototype of the proposed system is built such that it is able to measure the soil moisture value and then supplies water automatically to the plants according to their needs. In addition, user is able to monitor the soil moisture value via Blynk mobile app regularly. While, in FYP 2, the proposed system is further extended to build the PIR sensor to detect the intruders in a 6-meter radius range at night and also to store the soil moisture values occasionally in the cloud.

CHAPTER 4: EXPERIMENTAL WORK

4.1 Introduction

This chapter discuses on the experimental work of the proposed automated irrigation system with PIR sensor. As mentioned in Section 3.2.5 Testing, this chapter will describe the performance and effectiveness of the proposed system.

4.2 Soil Moisture Reading and Automated Water Flow in The Proposed System.

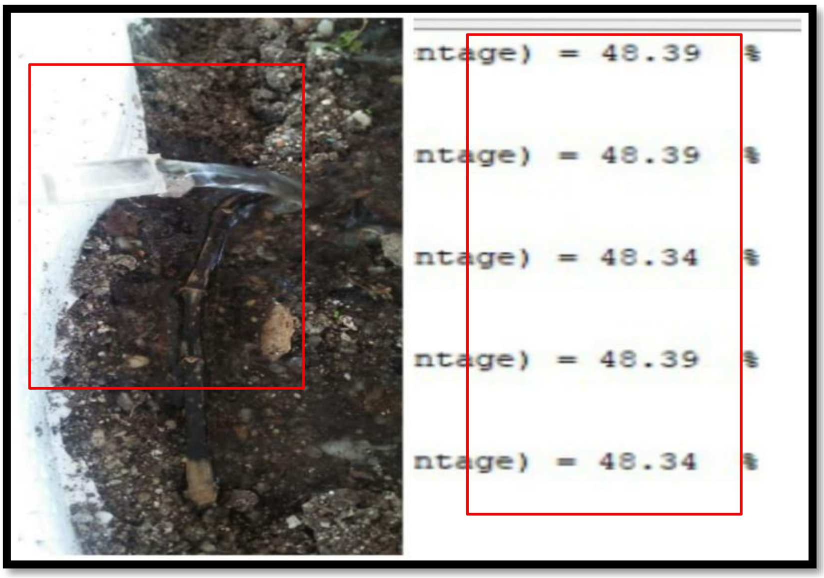


Figure 4.1: The water is supplied automatically when soil moisture reading goes below 50%.

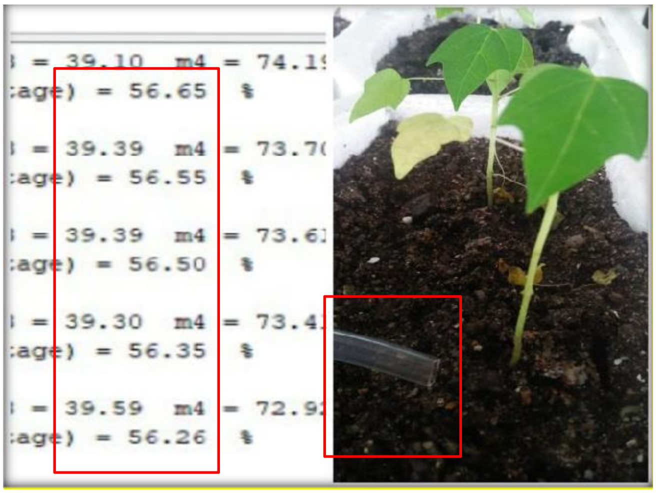


Figure 4.2: The water supply is stopped automatically when soil moisture reading rises above 50%.

From the figure 4.1, it is shown that if the soil moisture reading by the soil moisture sensor is less than 50%, the water pump will start to irrigate the plants, automatically. Otherwise, when the soil moisture reading rise to above 50% the water pump stops the water flow, automatically as shown in Figure 4.2. By this, the water is irrigated to the plants whenever they are in need and this encourages their growth and reduces the water wastage at same time.

4.3 Experiment

4.3.1 Experiment on Implementation Phase A - Automated Irrigation System

In this experiment, plant from fruit category was chosen. In this work, papaya plant has been chosen. There is no specific reason to choose this plant, however by using this plant it saves the cost of the project since the papaya seed obtained was free of cost.

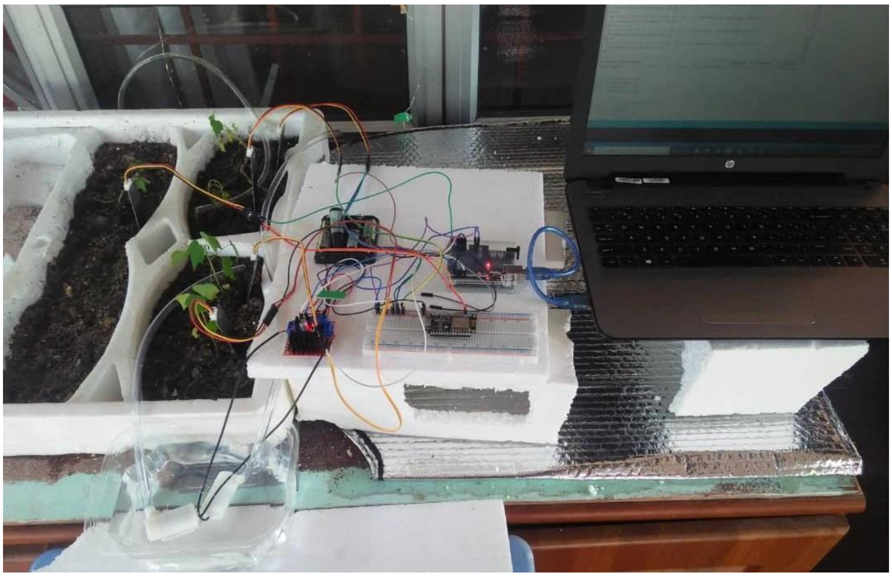


Figure 4.3: Experimental setup

In this experiment on implementation of Phase A, a comparison is performed to measure the effectiveness and performance of the proposed automated irrigation system with 1 motor pump and 2 motor pumps along with manual watering method. In this experiment same number and type of plants, soil and landscape area are used to evaluate the performance of the proposed system in comparison to the manual watering method. From the figure 4.3, it is shown that eight papaya plants have been used which are divided into two parts, that the right side of plants are irrigated by the proposed automated irrigation system and the left side of plants are watered manually. While watering the plants automatically, it also able to save the soil moisture value in the cloud as shown in figure 4.4. To undergone the proposed automated irrigation system, four soil moisture sensors are needed to detect the soil moisture value of each plant respectively and an additionally one soil moisture sensor has been used for manual watering as well. The landscape area of (47*30cm) is equally divided between the proposed system which are 1 motor pump, 2 motor pump and manual watering method to plant the papaya plants as shown in Figure 4.5. As for the manual watering method, the water is supplied to the plants every day for a duration of two to three times per day with an amount of 280ml. The healthiness and the growth of these plants are observed every day for a duration of five weeks. The results observed for every week are shown in figure 4.5.

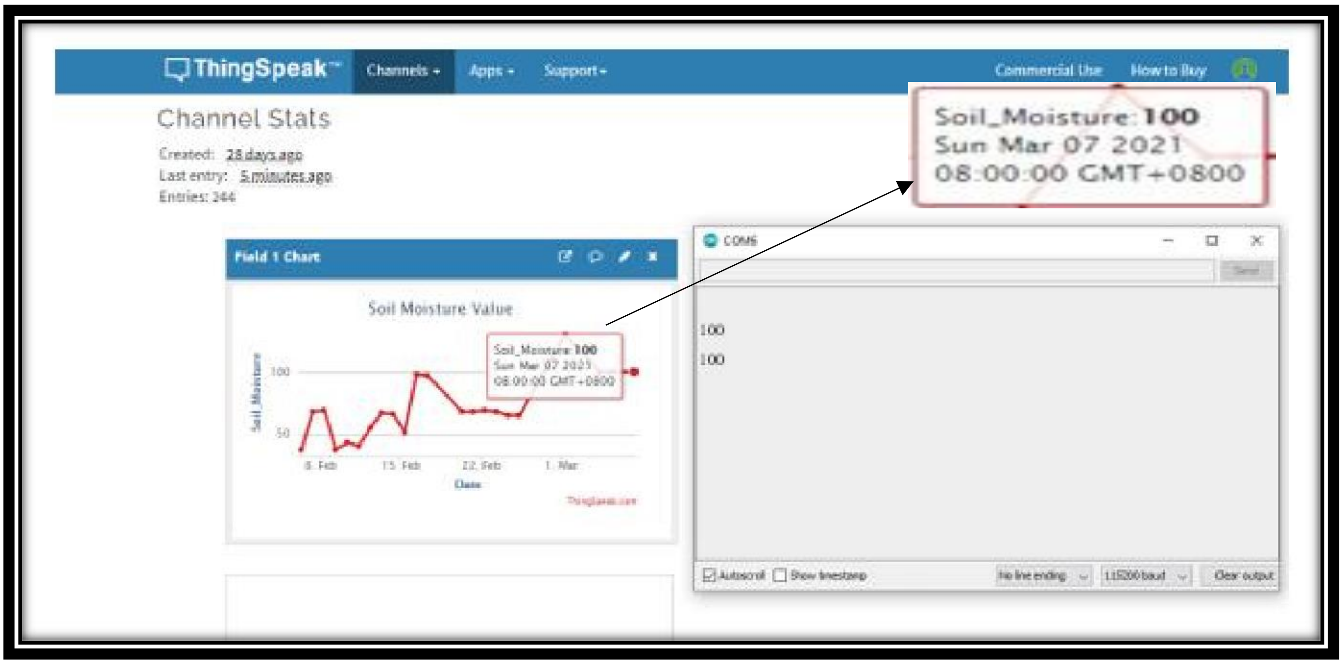
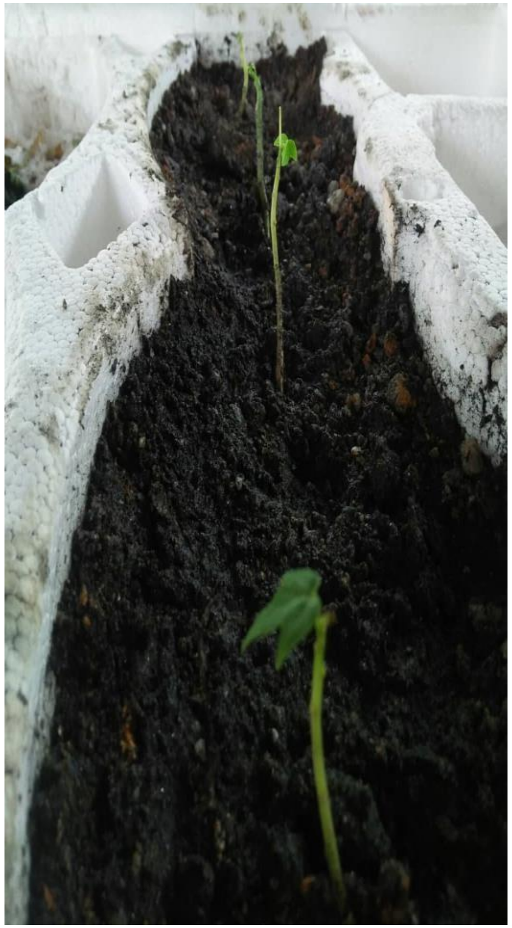
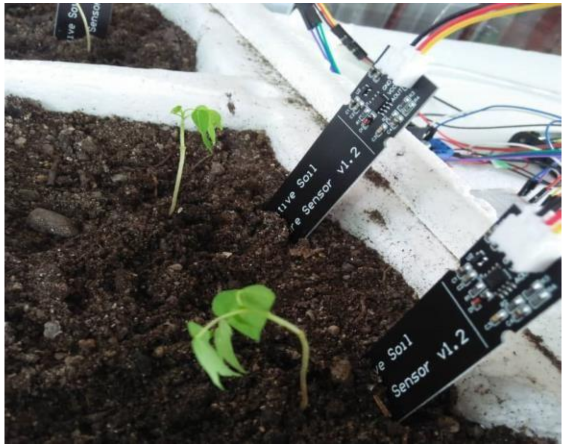
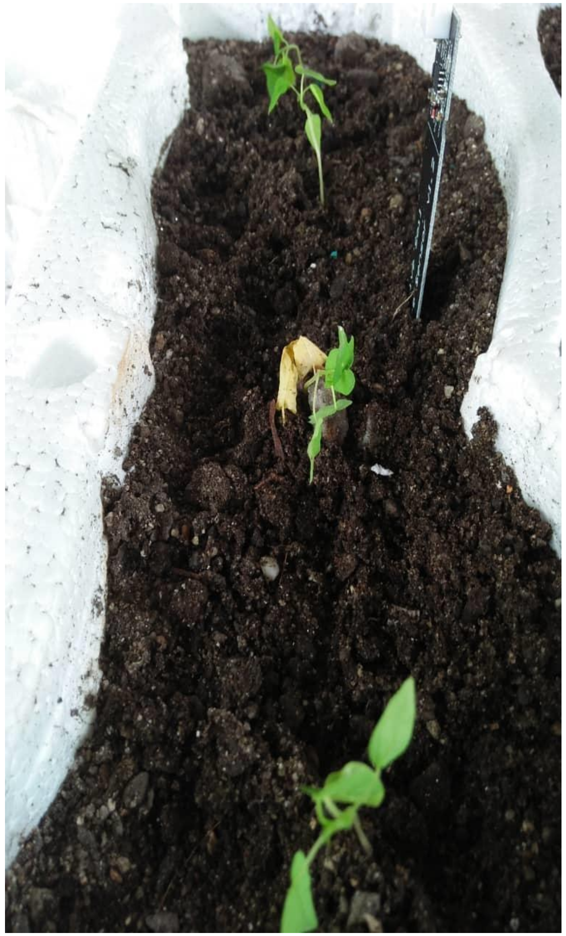


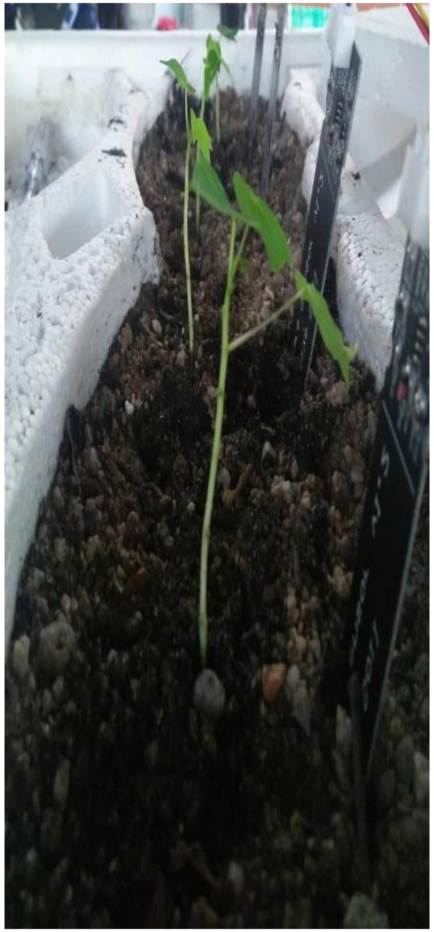
Figure 4.4: Soil moisture value saved in cloud

Figure 4.4 illustrates the measured value from soil moisture sensor which is 100 that is shown simultaneously in both ThingSpeak and Arduino Ide. Hence it proves that, the soil moisture value which is recorded in ThingSpeak (cloud) will not have any data redundancies and does not have any false value being recorded. Furthermore, it shows that ThingSpeak will collect the data accurately and save it accordingly in the cloud for every 7 hours of interval.

	Proposed Automated Irrigation System (1 motor pump)	Proposed Automated Irrigation System (2 motor pump)	Manual Watering
Week 1			
Observation	It does not matter which irrigation method has been applied, could not find any observation on the growth of plants in first week.		

Week 2		 	
Observation	For the 2nd week, the growth of papaya plant between 1 motor pump and 2 motor pump are almost alike but in manual watering, one of the papaya plants got wilted even though the plant was watered on a daily basis.		

<table>
<tr><td>Week 3</td><td></td><td>
</td><td></td></tr>
<tr><td>Observation</td><td colspan="3">In week 3, the growth of papaya plant still remains the same in 1 motor pump and 2 motor pump but however, the healthiness of the plant became worse in the manual watering method. The plant which is in third position (as highlighted) in the manual watering system was getting wilted progressively.</td></tr>
</table>

Week 4			
Observation	In the 4th week, the growth and healthiness of the papaya plants in the manual watering method has deteriorated day by day. In week 2 only one plant got wilted but in week 4 it has increased by 2 plants. Meanwhile the plants in the automated irrigation system which are 1 motor pump and 2 motor pump were growing healthier and taller.		

Week 5			
Observation	In manual watering method, only two plants survived while in the proposed automated irrigation system which are 1 motor pump and 2 motor pump, all four plant grew taller and healthier. This shows the performance and effectiveness of the proposed automated irrigation system of 1 motor and 2 motor pumps in comparison to the manual watering method.		

Figure 4.5: Experiment in comparison of the proposed automated irrigation system (1 motor pump & 2 motor pumps) with manual watering method.

As shown in Figure 4.5, the growth of the papaya plants was healthier and taller in the proposed automated irrigation system as compared to the manual watering method throughout from week 2 to week 5. This is because the proposed automated irrigation system used four soil moisture sensors to detect the soil moisture value of each of the plant. In addition, two plants which are near to each other will use one motor pump while the other two papaya plants use another motor pump. Thus, the average soil moisture values are taken using the two soil sensors and the water will be flowed according to the need of the plants which prevents over irrigation or under irrigation. Eventually, this increases the growth of the plants.

Furthermore, the automated irrigation system has been configured that whenever the soil moisture percentage of the two plant goes below than 50% the system will automatically supply water to the plants. By this, the water wastage is reduced since the water is supplied to the plants according to their needs and at the same time this encourages the plants growth.

While in manual watering method, the water will be supplied to the plants on a daily basis but however it does not comply to the needs of the plants. This affects the growth of the plant and at the same time causes water wastage.

In this work, in order to further evaluate the effectiveness of the proposed system, comparison has been conducted by dividing the proposed system with 1 motor and 2 motor pumps as shown in figure 4.5. From the figure 4.5, the result of 1 motor pump and 2 motor pumps which is the growth of the plants is similar. This is because the experiment was conducted in smaller area with just four papaya plants. If the experiment were conducted in bigger scale with more plants, the growth of the papaya plants in 1 motor pump will be less healthy as compared to the 2 motor pumps. The reason is, in larger area with just one motor pump the water will flow from one direction only. In this case, the water flow will stop before it reaches the last few plants in the area, since by then the average soil moisture values will reach to the optimum level, 50% when the majority of the plants have been irrigated. This will eventually affect the growth of these plants that have not been irrigated.

4.3.2 Experiment on Implementation Phase B: PIR Sensor

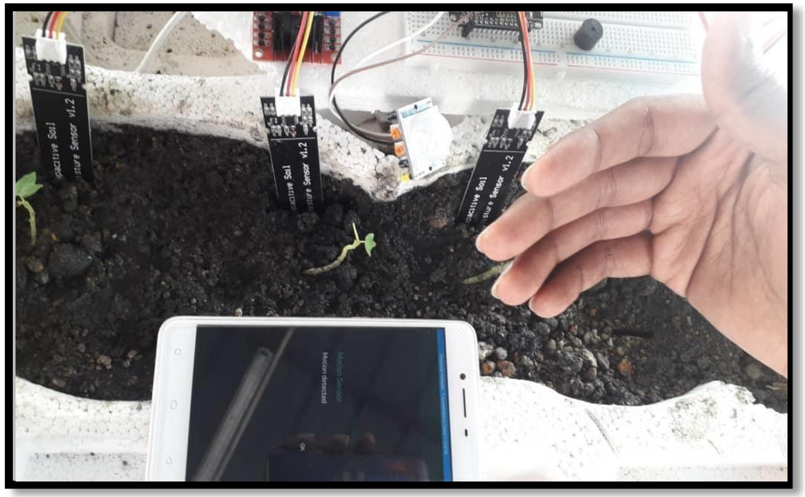
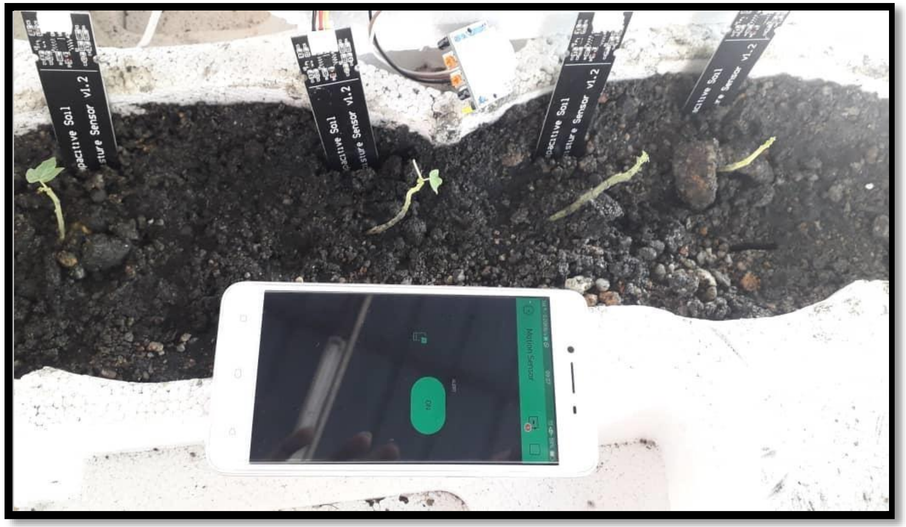
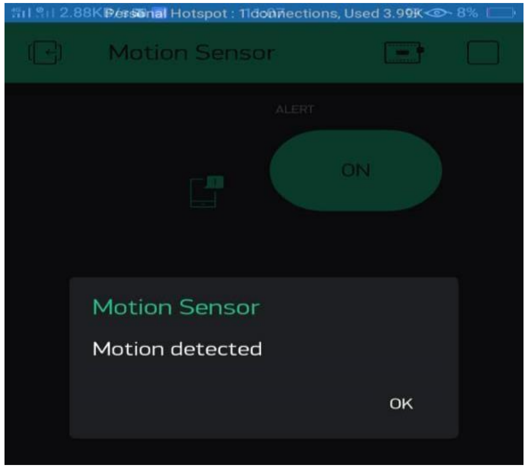
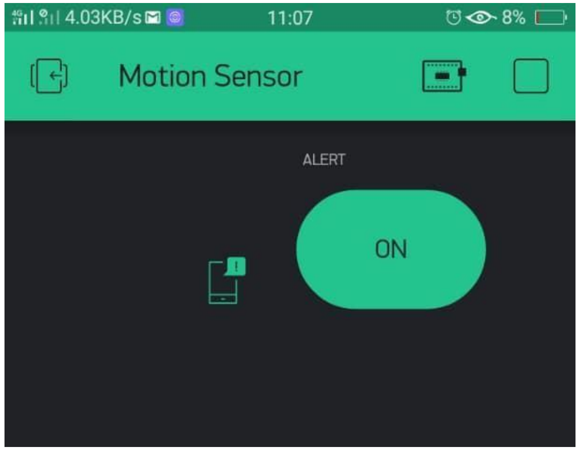
<table>
<tr><th></th><th>1: Testing the PIR sensor with hindrance</th><th>2: Testing the PIR sensor without hindrance</th></tr>
<tr><td>Experiment</td><td></td><td></td></tr>
<tr><td>Results</td><td>
</td><td>
</td></tr>
</table>

Figure 4.6: Experiment in testing the PIR sensor (marked in red box) with and without hindrance

Figure 4.7: Interface of Blynk application

In the implementation of phase B, as shown in figure 4.6, the experiment has been conducted to evaluate the accuracy of the PIR sensor in capturing the infrared light emitted from human/animal body. The PIR sensor has been set-up in the middle of four papaya plants which has been shown clearly in figures 4.6 This is to ensure the PIR sensor covers the area of the four papaya plants evenly. By this, it is able to detect the intruders and prevent the plants from being destroyed.

Two experiments have been conducted to test the accuracy and functionality of the PIR sensor in the proposed system. In the first experiment, the accuracy of the functionality of the PIR sensor has been tested by bringing hand nearing to the PIR sensor within the range of 0.5m to 6m. Figure 4.6 shows the test conducted approximately the range of 0.5-0.8m. Once the hand moves towards to the PIR sensor, it starts spamming alert message to the user's mobile through Blynk application. The spamming is necessary to constantly alert the users on the intruders especially during the night hours. In addition, the user can choose stop the notification by turning off the "ON" button in the Blynk application as shown in Figure 4.7. In this report, the remaining results of 1m to 6m could not be included due to the difficulties in visualizing the alert message. It could not be possible to show in a single picture in detail on the alert being sent to the user's mobile when the distance between the plants and the user is increasing. In the second experiment, the experiment has been conducted without any hindrance. As shown in the figure 4.6, since there is no hindrance, thus the PIR sensor will not send any spam alerts to the users. Therefore, the same result in Figure4.6 will be given when the intruder is not within the range of six meters because the PIR sensor can only detect within six meters only. By this, it shows that the PIR sensor is very efficient and accurate in detecting the intruder movement to safeguard/protect the plants especially at night hours.

CHAPTER 5: CONCLUSION

As a conclusion, this project developed an automated irrigation system with PIR as a prototype in order to reduce water wastage and to save the soil moisture value occasionally in cloud, apart from saving time, cost in long term, effort of farmers and encourages the growth of the plants too. Besides, the proposed system has an additional feature to detect the intruders in order to protect the plants from being harmed or destroyed especially at night. The proposed system was built using Arduino board, ESP8266, Blynk mobile application, relay driver modules, soil moisture sensor, PIR sensor and water pump.

The proposed prototype has been configured that if the soil moisture sensor read the plant soil moisture level lower than 50% then the water pump will be turned on automatically to supply water to the papaya plants. While if the value rises above 50%, then the motor pump will be turned off automatically. The user can view the soil moisture level in real time using Blynk mobile application. In addition to that, the soil moisture values are also saved in the cloud for further analysis. In order to evaluate the performance of the proposed automated irrigation system, comparison was made against manual watering method to irrigate the papaya plants. The growth and healthiness of the plants were observed for five weeks to determine the performance of the proposed system. From the experiment conducted, it was found that the growth of the papaya plants in the proposed system was healthier and taller as compared to the manual watering method. This is because the system has been designed in a way which it measured the soil moisture value in order to supply water, automatically, to the plants as per their needs. In addition, by this, water wastage is also reduced. Besides that, this proposed system also provides security to the plants from any form of intruders especially at night hours. Whenever human/animal movements are detected nearing to the plants within the range of six to ten meters the PIR will detect the movements and alert the users via mobile.

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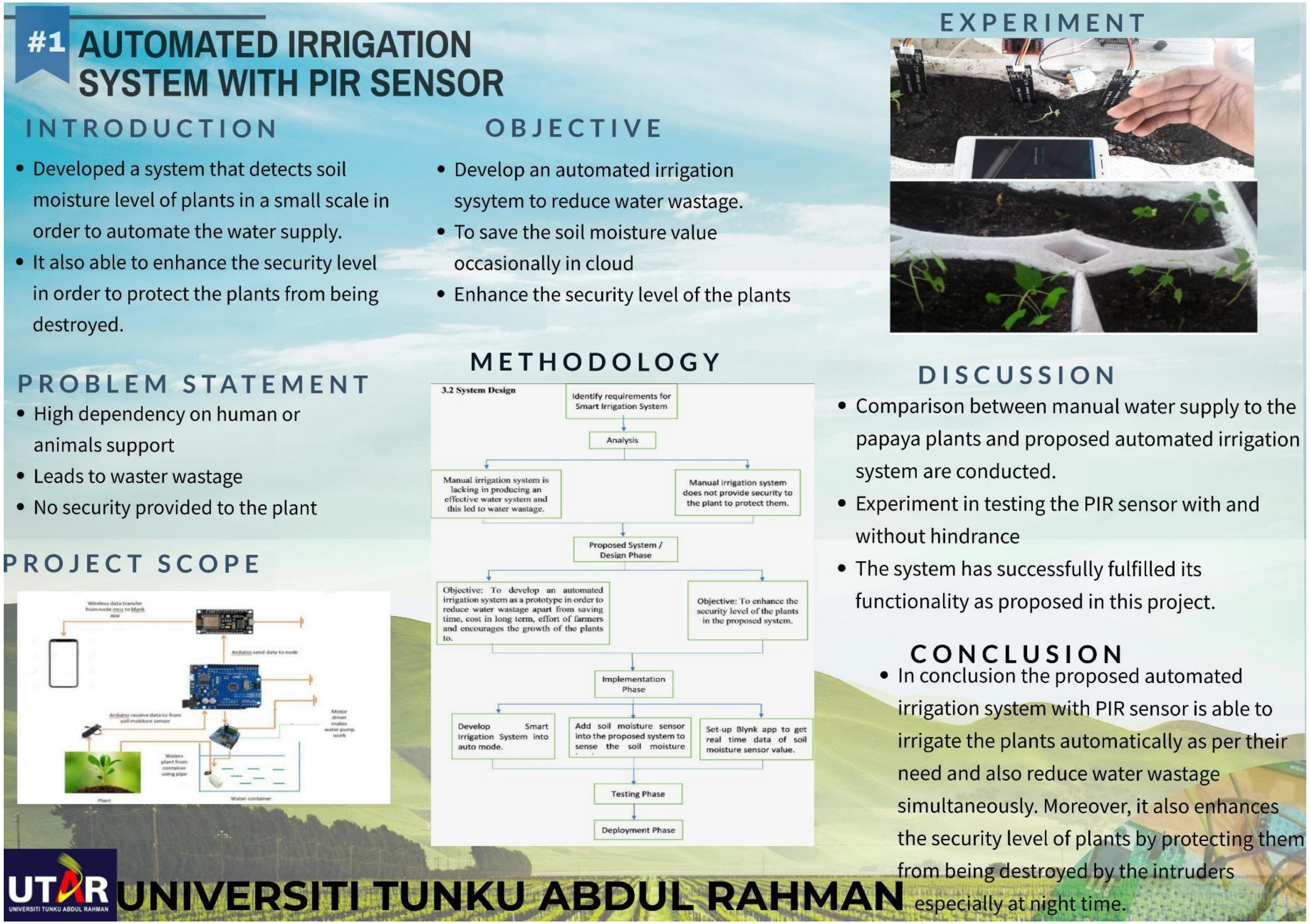
APPENDICES



#1 AUTOMATED IRRIGATION SYSTEM WITH PIR SENSOR
INTRODUCTION
• Developed a system that detects soil moisture level of plants in a small scale in order to automate the water supply.
• It also able to enhance the security level in order to protect the plants from being destroyed.
OBJECTIVE
• Develop an automated irrigation sysytem to reduce water wastage.
• To save the soil moisture value occasionally in cloud
• Enhance the security level of the plants
EXPERIMENT
PROBLEM STATEMENT
• High dependency on human or animals support
• Leads to waster wastage
• No security provided to the plant
PROJECT SCOPE
METHODOLOGY
3.2 System Design
Identify requirements for Smart Irrigation System
Analysis
Manual irrigation system is lacking in producing an effective water system and this led to water wastage.
Manual irrigation system does not provide security to the plant to protect them.
Proposed System / Design Phase
Objective: To develop an automated irrigation system as a prototype in order to reduce water wastage apart from saving time, cost in long term, effort of farmers and encourages the growth of the plants to.
Objective: To enhance the security level of the plants in the proposed system.
Implementation Phase
Develop Smart Irrigation System into auto mode.
Add soil moisture sensor into the proposed system to sense the soil moisture
Set-up Blynk app to get real time data of soil moisture sensor value.
Testing Phase
Deployment Phase
DISCUSSION
• Comparison between manual water supply to the papaya plants and proposed automated irrigation system are conducted.
• Experiment in testing the PIR sensor with and without hindrance
• The system has successfully fulfilled its functionality as proposed in this project.
CONCLUSION
• In conclusion the proposed automated irrigation system with PIR sensor is able to irrigate the plants automatically as per their need and also reduce water wastage simultaneously. Moreover, it also enhances the security level of plants by protecting them from being destroyed by the intruders especially at night time.
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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: S3, Y3	Study week no.: 1
Student Name & ID: KAHTHERESH S/O MURUGAN & 18ACB03987	
Supervisor: Ms MOGANA D/O VADIVELOO	
Project Title: AUTOMATED IRRIGATION SYSTEM WITH PIR SENSOR	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- **List out the hardware requirements for the PIR SENSOR and manage to fix it in the correct form.**
- **Prepare the data collection.**

2. WORK TO BE DONE

- **Hardware and software configuration**

3. PROBLEMS ENCOUNTERED

- **Even though I have bought all the required tools earlier but while building the prototype I need some other tools as well. Again, the CMCO has been extended and I have faced the same problem as in FYP I.**
- **Due to pandemic situation the shop has been closed and I have to wait for few days for the shop to reopen.**
- **If I order the hardware from online it might take longer time than the shop open, so I have to wait until the shop open.**
- **It delays my works to be done.**

4. SELF EVALUATION OF THE PROGRESS

- **In the short period I able to buy the hardware**
- **At the same time, I have prepared data collection as well.**
- **So, I did my work very well. 10/10**

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: S3, Y3	Study week no.: 2
Student Name & ID: KAHTHERESH S/O MURUGAN & 18ACB03987	
Supervisor: Ms MOGANA D/O VADIVELOO	
Project Title: AUTOMATED IRRIGATION SYSTEM WITH PIR SENSOR	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- **As plan earlier this week able to configure the hardware and software part.**
- **Has been fixed PIR sensor together with buzzer and led.**

2. WORK TO BE DONE

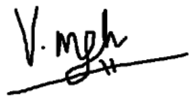
- **Cross check the Arduino ide code whether did mistake in the PIR sensor code or not.**
- **Configure Blynk app with the Arduino to notify the user that intruders have been entered into our gardening area.**

3. PROBLEMS ENCOUNTERED

- **Led is not working but buzzer working**

4. SELF EVALUATION OF THE PROGRESS

- **In a week of time able to complete half of the Arduino ide code, just the led part is leftover.**
- **9/10.**



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FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: S3, Y3	Study week no.: 3
Student Name & ID: KAHTHERESH S/O MURUGAN & 18ACB03987	
Supervisor: Ms MOGANA D/O VADIVELOO	
Project Title: AUTOMATED SMART IRRIGATION SYSTEM WITH PIR SENSOR	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- **Since Blynk app is connect with Arduino ide, it will notify the user so that, the Led and buzzer is no longer needed for this assignment. Just connect with PIR sensor only.**
- **Configuration of Blynk app.**

2. WORK TO BE DONE

- **Start with the documentation part.**
- **Connect with ThingSpeak server to save the soil moisture value occasionally in cloud.**

3. PROBLEMS ENCOUNTERED

-

4. SELF EVALUATION OF THE PROGRESS

- **Finally, PIR sensor works fine.**
- **10/10**

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: S3, Y3	**Study week no.: 4**
Student Name & ID: KAHTHERESH S/O MURUGAN & 18ACB03987	
Supervisor: Ms MOGANA D/O VADIVELOO	
Project Title: AUTOMATED IRRIGATION SYSTEM WITH PIR SENSOR	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- **Documentation part has been finished until Chapter 3**
- **Configuration of ThingSpeak server done but still need some modifications.**

2. WORK TO BE DONE

- **Have to re-create the Poster.**
- **ThingSpeak server need to re-configure to store soil moisture value 7 hours once.**
- **Have to complete the unfinished chapters of report writing**

3. PROBLEMS ENCOUNTERED

- **ThingSpeak server only able to collect data for one hour but not for seven hours.**

4. SELF EVALUATION OF THE PROGRESS

- **Everything goes well as per planned.**
- **10/10**

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: S3, Y3	**Study week no.: 5**
Student Name & ID: KAHTHERESH S/O MURUGAN & 18ACB03987	
Supervisor: Ms MOGANA D/O VADIVELOO	
Project Title: AUTOMATED IRRIGATION SYSTEM WITH PIR SENSOR	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- **Complete report writing**
- **Completed configuration part of ThingSpeak server.**

2. WORK TO BE DONE

- **Have to create Poster**
- **Should refine the report writing**

3. PROBLEMS ENCOUNTERED

So far nothing.

4. SELF EVALUATION OF THE PROGRESS

- **Everything goes well as per planned.**
- **10/10**

Supervisor's signature

Student's signature

FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: S3, Y3	**Study week no.: 6**
Student Name & ID: KAHTHERESH S/O MURUGAN & 18ACB03987	
Supervisor: Ms MOGANA D/O VADIVELOO	
Project Title: AUTOMATED IRRIGATION SYSTEM WITH PIR SENSOR	

1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- **Poster created**

2. WORK TO BE DONE

- **Have to create a video and presentation slides**

3. PROBLEMS ENCOUNTERED

So far nothing.

4. SELF EVALUATION OF THE PROGRESS

- **Everything goes well as per planned.**
- **10/10**

Supervisor's signature

Student's signature

Automated Irrigation System with PIR Sensor

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Full Name(s) of Candidate(s)	KAHTHERESH A/L MURUGAN
ID Number(s)	18ACB03987
Programme / Course	COMPUTER SCIENCE
Title of Final Year Project	AUTOMATED IRRIGATION SYSTEM WITH PIR SENSOR

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V.mgh

Signature of Supervisor
Name: Mogana Vadiveloo
Date: 16-April-2021

Signature of Co-Supervisor
Name:
Date:

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Student Name	KAHTHERESH A/L MURUGAN
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