MECHANICAL ENGINEERING DEPARTMENT

DIPLOMA OF MECHANICAL ENGINEERING
SESSION 2 2021/2022

FINAL REPORT

SMART HYDROMATIC

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POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

SMART HYDROMATIC

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This project is submitted in partial fulfillment of requirements for the award of

Diploma in Mechanical Engineering

MECHANICAL ENGINEERING DEPARTMENT

SESSION 1 2022/2023
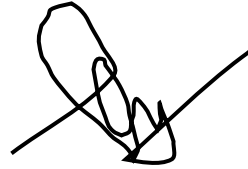
DECLARATION OF AUTHENTICATION AND OWNERSHIP

TITLE : SMART HYDROMATIC

SESSION : 1 2022/2023

1. We, **MUHAMMAD HARITH BIN MOHD ZAKI,MUHAMMAD ARIF MUAMMAR BIN MOHD RUZLAN** are the final year students of **Diploma in Mechanical Engineering, Politeknik Sultan Salahuddin Abdul Aziz Shah**, located at **Persiaran Usahawan, 40150 Shah Alam, Selangor.**

2. We verify that **SMART HYDROMATIC** and its intellectual properties are our original work without plagiarism from any other sources.

3. We agree to release the project's intellectual properties to the above said polytechnic in order to fulfil the requirement of being awarded **Diploma in Mechanical Engineering.**

Prepared by

_____

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(030101-03-0071)

In the presence of project supervisor

_____

WAN MAJDAH BINTI TON MAMAT

(811009-11-5330)

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Thank you.

ABSTRACT

This project is designed from observation based on farmers who are facing problems in processing and fertilization in crops. The scope of this study is focused on the agricultural sector and repairing the existing system from manual to automatic. The problem is that it takes a long time to mix fertilizer and uses many workers. So with this project it can save time for example when using the manual method by mixing fertilizer by hand takes longer than using a smart hydromantic system and can reduce labor. Nowadays, the demand for vegetable crops is increasing. Suppliers and also buyers get fresh vegetables to buy. It can be seen clearly how if the vegetables in the supermarket are always out of stock and lack of stock. Products that have been specially designed and created to speed up the planting process and provide sufficient fertilizer and always enough water. Smart Hydroponics Design was designed using Autodesk Fusion 360 Software. this system uses Arduino uno, Wi-Fi, relay, water pump, power supply and valve. Next, Based on the results and discussions we have discussed; it can be concluded that this Smart Hydroponic has achieved the objectives we have set. This product has also been proven to be able to solve the problems faced by farmers. And this project can run smoothly

ABSTRACT

Projek ini direka bentuk daripada pemerhatian berdasarkan petani yang menghadapi masalah dalam pemprosesan dan pembajaan dalam tanaman. Skop kajian ini tertumpu kepada sektor pertanian dan membaiki sistem sedia ada daripada manual kepada automatik. Masalahnya ialah mengambil masa yang lama untuk membancuh baja dan menggunakan ramai pekerja.

Jadi dengan projek ini ia dapat menjimatkan masa contohnya apabila menggunakan kaedah manual dengan membancuh baja dengan tangan mengambil masa lebih lama berbanding menggunakan sistem hidromantik pintar dan dapat mengurangkan tenaga buruh. Pada masa kini, permintaan terhadap tanaman sayuran semakin meningkat. Pembekal dan juga pembeli mendapatkan sayur-sayuran segar untuk dibeli. Dapat dilihat dengan jelas bagaimana jika sayur-sayuran di pasar raya sentiasa kehabisan stok dan kekurangan stok. Produk yang telah direka dan dicipta khas untuk mempercepatkan proses penanaman dan menyediakan baja yang mencukupi serta air yang sentiasa mencukupi. Reka Bentuk Hidroponik Pintar telah direka menggunakan Perisian Autodesk Fusion 360. sistem ini menggunakan Arduino uno, Wi-Fi, geganti, pam air, bekalan kuasa dan injap. Seterusnya, Berdasarkan hasil dan perbincangan yang telah kami bincangkan; dapat disimpulkan bahawa Hidroponik Pintar ini telah mencapai objektif yang telah kami tetapkan. Produk ini juga telah terbukti mampu menyelesaikan masalah yang dihadapi oleh petani. Dan projek ini dapat berjalan dengan lancar

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CHAPTER 1: INTRODUCTION

PREPARED: MUHAMMAD ARID MUAMMAR BIN MOHD RUZLAN

1.1 INTRODUCTION

In Malaysia now, most people use equipment to facilitate their lives in all aspects. People are always looking for something to help them do heavy and heavy work during their daily affairs. Therefore, we created automatic farming tools to help reduce the use of labor while doing work on farms or agricultural areas to facilitate their work and to reduce the cost of expenses from various aspects. The "hydroponic" method is believed to have been known and practiced by our ancestors approximately 2600 years ago. According to historical records, hydroponic applications existed in Babylon with its hanging gardens, the hanging gardens of Babylon, which were built during the reign of King Nebuchadnezzar. Egypt, China and the Astec tribe in Mexico also practice hydroponics in various models such as "Chinampas", which are square artificial islands that float on lakes (freshwater) for agriculture-often also called floating gardens.

1.2 BACKGROUND RESEARCH

Based on the surveys and studies made, when using the hydroponic system it will delay the time and delay the way for them to do the work. Furthermore, for large crop areas it is difficult for them to take a short time to do the work.

This project aims to help users to create work quickly and not waste their time to complete work in a short time. That is why Smart Hydromatic is designed in a way where this hydroponic system works automatically to flow fertilizer that has been mixed with water to each plant, this system can also be used for fertigation where plants that are on the edge of the crop area can also use water that has been mixed with fertilizer the said. Our project can also be controlled via mobile phone wifi to schedule water to be delivered to the trees.Finally, an ultrasonic sensor is installed on the main tank to measure the water level so that it does not exceed and overflow from the main tank.

1.3 PROBLEM STATEMENT

The main problem that farmers are facing is a waste of time and energy. This is because to manage agricultural areas requires energy to manage the area and requires a long time to cultivate and water or various other. This will slow down the process to complete the work. In addition, the second problem faced by farmers is the occurrence of excess fertilization in tree growth. As a result of the occurrence of excess fertilizer trees can become dry and die. Therefore, to prevent the occurrence of excess fertilization we created a system that is able to control the rate of fertilizer for crops in order to save costs and get fresher trees and not die. Finally, the problem that is being experienced is the need for regular monitoring to ensure that the tree is always fresh. Therefore, if using an automatic system, farmers do not require frequent monitoring to ensure healthy crops

1.4 PROJECT OBJECTIVES

The objectives of this project are:

- To design a hydroponic system that moves automatically to control the farming system as well as fertilization
- To develop a mechanical mechanism in the form of compartments and for the storage of water and fertilizer tanks
- To fabricate and analyze the prototype of the project

1.5 SCOPE OF THE PROJECT

- The control limit for controlling this hydroponic system is 2 to 3 people only. Because it does not require frequent control
- Limit for water tank can only hold 568 liters of water only. If more water tank capacity can break.
- The place where this system can be used is the house or farm area because it can accommodate many trees

1.6 THE IMPORTANCE OF THE PROJECT

I.   Can save time managing agricultural areas
II. Can control the agricultural area easily III. Reduce costs for labor

1.7 DEFINITION OF OPERATIONAL TERMS

- **INDUSTRIAL REVOLUTION 4.0 (I.R 4.0):** The Fourth Industrial Revolution, 4IR, or Industry 4.0, conceptualizes rapid change to technology, industries, and societal patterns and processes in the 21st century due to increasing interconnectivity and smart automation.

- **INTERNET OF THING (IoT):** The Internet of things (IoT) describes physical objects with sensors, processing ability, software, and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks

- **RELAY :** Relay is a Switch that is operated electrically and is an Electromechanical component (Electromechanical) which consists of 2 main parts namely Electromagnet (Coil) and Mechanical (a set of Switch/Switch Contacts). The relay uses the Electromagnetic Principle to move the Switch Contact so that with a small electric current (low power) it can transmit electricity with a higher voltage. For example, with a Relay that uses a 5V and 50 mA Electromagnet, it is able to move the Armature Relay (which functions as a switch) to transmit 220V 2A electricity.

1.8 SUMMARY

In this chapter, the study reviews and describes about the introduction, scope of the project, problem statement, project objectives, background of the study the definition of terms and conclusions in this study. This study is important to get the details that need to be studied, updated, and need to be considered to implement this project. Therefore, in conclusion we need to study the factors for the success of the project

CHAPTER 2: LITERATURE REVIEW

• PREPARED: MUHAMMAD HARITH BIN MOHD ZAKI

2.1 INTRODUCTION

In the early stages of the project, a literature review that includes reviews from sources such as internet sources, newspaper clippings, magazines and related sources on SMART HYDROMATIC. The collection of information from the literature review is very important for the initial steps of research. In the implementation of a project, various steps need to be taken at an early stage until the completion of a project. Problems found in the products studied need to be rectified to get a better and quality product.

2.2 SYSTEM HYDROMATIC CROSS THE TIME

i. 1600-1930 SOILLES PLANT CULTIVATION

studies of non-resistant plant cultivation can be traced back to the 1600s. Belgian scientists Jan Van Helmout (1600), John woodward (1699), Bassungault (1850), Sachs and knop (1860) and W.F Gericke (1930) have contributed much information towards producing good hydroponic systems. Van Helmout was the earliest scientist with a study of the relationship of water and plants. he found that plants need water to get the basic ingredients to live. John Woodward's study found that water from the soil provides a source of material for living plants. He concluded that water and soil are also interdependent to supply essential nutrients and nutrients to plants.

ii. 1950 DEVELOPMENT OF HYDROPONIC SYSTEM

these hydroponic systems began to develop around the 1950s. This development is focused on temperate countries such as Japan, Russia, Italy, Spain, France and Germany.

Today, the development of this system began to spread to hot weather countries such as Mexico, the middle east and tropical countries.

iii. 1980 THE BEGINNING OF HYDROPONIC SYSTEM IN MALAYSIA

In malaysia, the use of hydroponic systems was first pursued by the malaysian agricultural college (now known as the malaysian agricultural university and changed the term agriculture to putra) in the 1980s. After that, the system is extended to their students. Private companies started using hydroponic methods around the year 2000. Meanwhile, the Universiti Putra Malaysia (UPM) and the Malaysian Agricultural Research and Development Institute (MARDI) are active in hydroponic research.

2.2.1 THE DIFFERENCE BETWEEN OLD HYDROPONIC AND SMART HYDROMATIC

In this modern age, many changes are taking place in terms of technology and many more. Table 2.1 below showed the difference between old hydroponic and smart hydromatic

The difference between old hydroponic and smart hydromatic

NO.	HYDROPONIC	SMART HYDROMATIC
1.	-cannot read the pH concentration of the fertilizer solution in the tank	-can read the pH value in the fertilizer solution using the pH Meter
2.	-Fertilizer is mixed manually by hand	-fertilizer is mixed automatically with hydromatic system
3.	-use a hose to fill the water in the channel	- water is filled automatically by following the schedule set on the phone

Table 2.1: The difference between old hydroponic and smart hydromatic

2.3 SMART HYDROPONIC DEFINITION

In recent years there has been a problem that farmers are unable to manage their cultivation areas and increasing rates of crop wilt due to lack of water for crops, following automatic means shifting is the solution. With a full understanding of hydromatic can help farmers to manage planting areas because water and fertilizer are automatically channeled to crops, we have produced hydromatic systems as a solution to the problem for farmers to manage large or medium planting areas to avoid damage or dead crops due to lack water and steel.

2. 4 ADVANTAGES & DISADVANTAGES OF SMART HYDROMATIC

SMART HYDROMATIC is one of the most exciting technologies, but it also has some issue with it. Table 2.2 below showed the advantages and the disadvantages of SMART HYDROMATIC

Advantages & disadvantages of SMART HYDROMATIC

| NO	ADVANTAGES	DISADVANTAGES
1.	-manpower can be reduced	--need high cost manpower can be reduced
2.	-saves time	-complicated maintenance methods
3.	-use a lot of electricity	-use a lot of electricity

Table 2.2: Advantages & disadvantages of SMART HYDROMATIC

CHAPTER 3: METHODOLOGY

PREPARED: MUHAMMAD HARITH BIN MOHD ZAKI

3.1 INTRODUCTION

 Methodology is the methods and techniques of designing, collecting, and analysing data in order to produce evidence that can support a study. Methodology describes how a problem is studied and why certain methods and techniques are used. The purpose of methodology is to help understand more broadly or in more detail about the application of methods by making a description of the research process. According to the Fourth Edition Hall Dictionary methodology means a system that includes methods and principles used in an activity or discipline. Other meanings of methodology are method, path, technique, style, manner, rhythm, pattern and system. Methodology also means knowledge of the methods or disciplines used when conducting a particular study to achieve a particular goal. Research methodology refers to the most appropriate method to conduct research and determine effective procedures to answer research problems. Therefore, this chapter will describe the steps taken to solve the problem of "farmers' problems in the hydroponic system". For a clearer understanding of its implementation, the methodology will be shown in the form of a flow chart. This "Smart Hydromatic" design is self -designed based on the suggestions and discussions of group members. The project research flow chat is presented in Figure 3.1
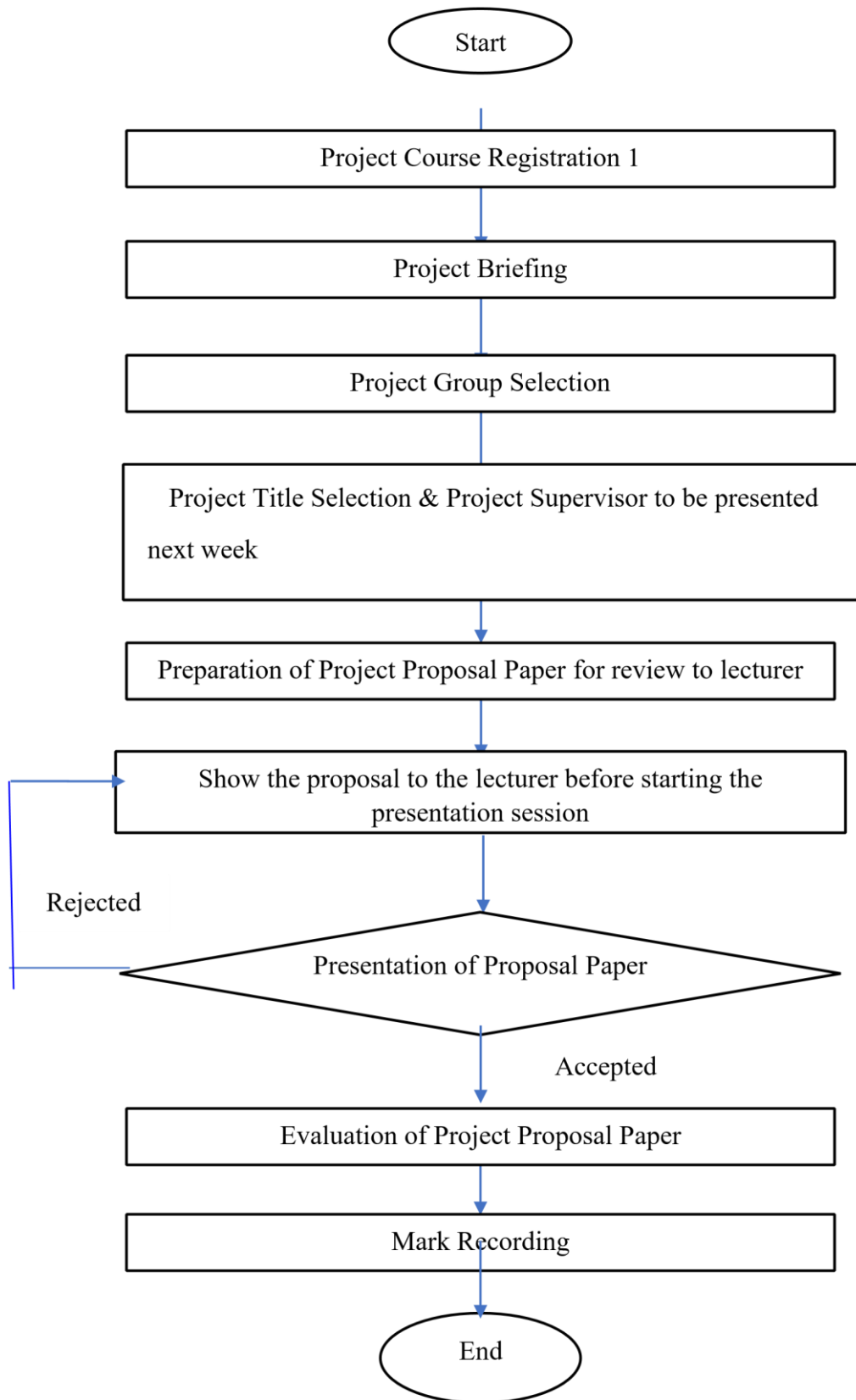
Figure 3.1: Flowchart of project research

3.2 FLOWCHART OF METHODOLOGY
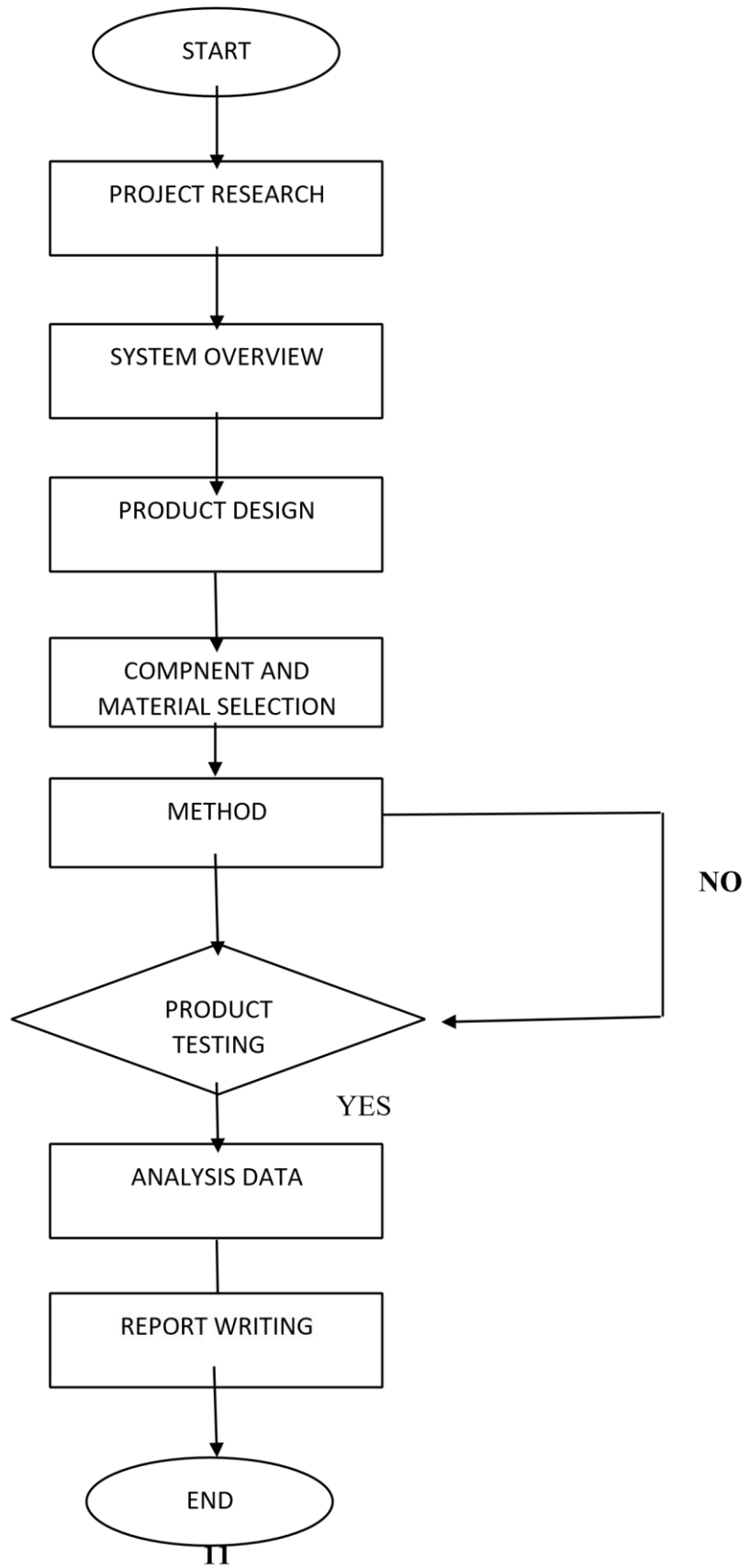
Figure 3.2: Flowchart of Methodology

3.3 FUNCTION OF THE PRODUCT

The general concept of Smart Hydromatic system is designed in the form of an automatic system using a timer and Arduino that allows the hydroponic system to work automatically. mixed can be read using lcd display. This will make it easier for farmers to manage hydroponic farming areas. Smart hydroponic system design Digital Timer, LCD display, Arduino uno R3 compatible (CH340G) .

3.4   COMPONENTS HYDROPONIC SYSTEM

The selection of the right components is very important in designing form SMART HYDROPONIC to prevent any material abuse or components used. Among the components used are:

- Water Pump DC
- LCD Display
- Arduino uno R3 compatible (CH340G)
- Dupont jumper wires M/M
- Sensor ultrasonic
- Relay
- ESP 8266 Serial Port Wi-fi

3.4.1 Water Pump DC

DC water pump is a machine that transports liquid or pressurizes liquid. When the water pump is working, the coil and commutator rotate, but the magnetic steel and carbon brushes do not rotate. The alternating current direction of the coil is changed by the commutator and brushes that rotate with the motor.

Figure 3.3 Water Pump DC

3.4.2 LCD display

LCD (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. LEDs have a large and varying set of use cases for consumers and businesses, as they can be commonly found in smartphones, televisions, computer monitors and instrument panels

Figure 3.4 Lcd Display

3.4.3 Arduino uno R3 Compatible (CH340G)

Basically, the functions of the Arduino in general are all the same as the functions of other types of Arduinos. The function of Arduino Uno is to facilitate users in controlling electronic components with programs such as LEDs, DC motors, relays, servos, modules, and all types of sensors. The purpose of using an Arduino is to create a product that is sophisticated and useful in everyday life. By creating tools that can work automatically, monitoring, as well as for control. all such work can be created easily, cheaply, and pleasantly.

Figure 3.5 Arduino Uno R3 Compatible (CH340G)

3.4.4 Dupont Jumper Wires M/M

A jump wire is an electrical wire, or group of them in a cable, with a connector or pin at each end, which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering. Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment. There are different types of jumper wires. Some have the same type of electrical connector at both ends, while others have different connectors. Some common connectors are solid tips, crocodile tips, banana connectors , registered jack , RCA connectors , RF connectors and RF jumper cables. Figure 3.6 below shows the Dupont Jumper Wires M/M.

Figure 3.6 Dupont Jumper Wires M/M

3.4.5 Sensor Ultra Sonic

Ultrasonic sensors are sensors that work to convert physical quantities (sound) into electrical quantities and vice versa. An ultrasonic sensor consists of a transmitter and a receiver. One of the most used ultrasonic sensors is the HC-SR04 type ultrasonic sensor**.**

Figure 3.7 ultrasonic sensor

3.4.6 Relay

Relay is an electrically operated switch and is an Electromechanical component (Electromechanical) which consists of 2 main parts which are Electromagnetic (Coil) and Mechanical (a set of Switch Contacts). The Relay uses the Electromagnetic Principle to drive the Switch Contact so that with a small electric current (low power) it can conduct electricity with a higher voltage. For example, a relay that uses a 5V and 50 mA electromagnet is able to move an armature relay (which functions as a switch) to flow 220V 2A electricity.

Figure 3.8 Relay

3.4.7 ESP 8266 Serial Port Wi-fi

The ESP8266 module is a very cheap but really effective platform to use to communicate or control over the internet either used alone or by using an additional microcontroller, in this case an Arduino as the controller.

Figure 3.9 ESP 8266 serial Port wifi

3.5 SYSTEM OVERVIEW

In this section, the working operation of the Hydromatic System will be described in more detail. A description of how each component of the system such as relay and LCD Display with each other will also be described as well as the function of each component on the working operation of the Hydromaric System. As well as system installation work will be shown in this section where it consists of the use of UNO Arduino Software, ultrasonic sensor, serial port Wi-Fi ,pump and Dupont jumper wires M/M.

3.5.1 Basic Operation of the System

The basic operation of the main work of this system consists of three main parts which are Relay, Arduino UNO R3 Compatible and LCD Display. Relay is a device set to control the power supply to the water pump motor and fertilizer to be channelled into the tank. Next, Arduino UNO R3 Compatible is used to control the relay to move the working pump, it is also used to set the ultra-sonic function in this system. The LCD display will display the level of water pressure in the tank.

1. The relay is used to control and supply electricity to the water pump and fertilizer to be flowed to the main tank
2. Arduino UNO R3 Compatible is used to control the relay and to control the ultrasonic which is used to measure the hardness of the water in the main tank that has been mixed with fertilizer.
3. The LCD display will display the total height of the water level in the main tank when the tank shows water pressure, the ultrasonic continues to work and the pump is turned on to deliver water

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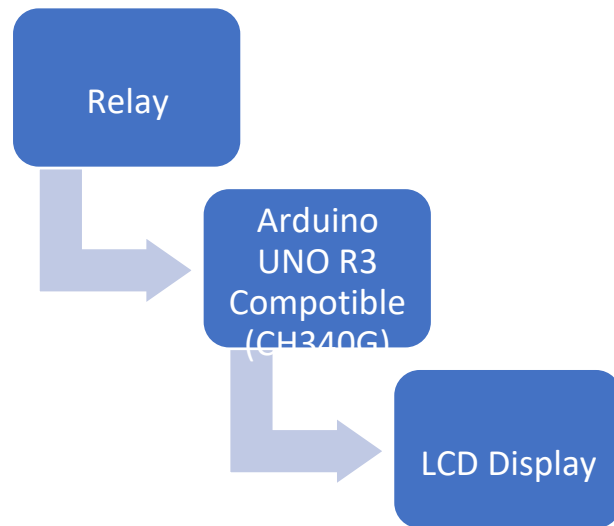
3.10 Block Diagram for The Hydroponic System

3.6 PRODUCT DESIGN

This section is dedicated to project design. A 3D, Isometric, Orthographic Projection, Part Assembly and Exploded drawing has been drawn fully by using Autodesk Fusion 360 Software.

3.6.1 SMART HYDROMATIC 3D DESIGN

The drawing that has been constructed is a drawing of Smart Hydromatic as shown in Figure3 .11 below

3.6 PRODUCT DESIGN

This section is dedicated to project design. A 3D, Isometric, Orthographic Projection, Part Assembly and Exploded drawing has been drawn fully by using Autodesk Fusion 360 Software.

3.6.1 SMART HYDROMATIC 3D DESIGN

The drawing that has been constructed is a drawing of Smart Hydromatic as shown in Figure3 .11 below

Figure 3.11 Smart Hydromatic 3D Design

3.6.2 EXPLODED DRAWING

The SMART HYDROMATIC was contained in 3 parts which is ;

1. Tank Frame   x1
2. Storage Box   x2
3. Plastic Jars   x2

For the tank frame, this project uses 12 meters of iron to make. As such, for the prototype it uses 2 storage boxes, S1 as storage for water and the other as play for fertilizer and water mixed before being fed to the trees.Next, 2 Plastic Jars are used to put fertilizer, namely 1 for fertilizer A and s1 for fertilizer B

Figure below showed exploded drawing for Smart Hydromatic and part list for Smart Hydromatic

3	PLASTIC JARS	2	Plastic
2	STORAGE BOX	2	Plastic
1	TANK FRAME	12 Meter steel	Steel
Item	Part Number	Quantity	Material
	part list		

project 2
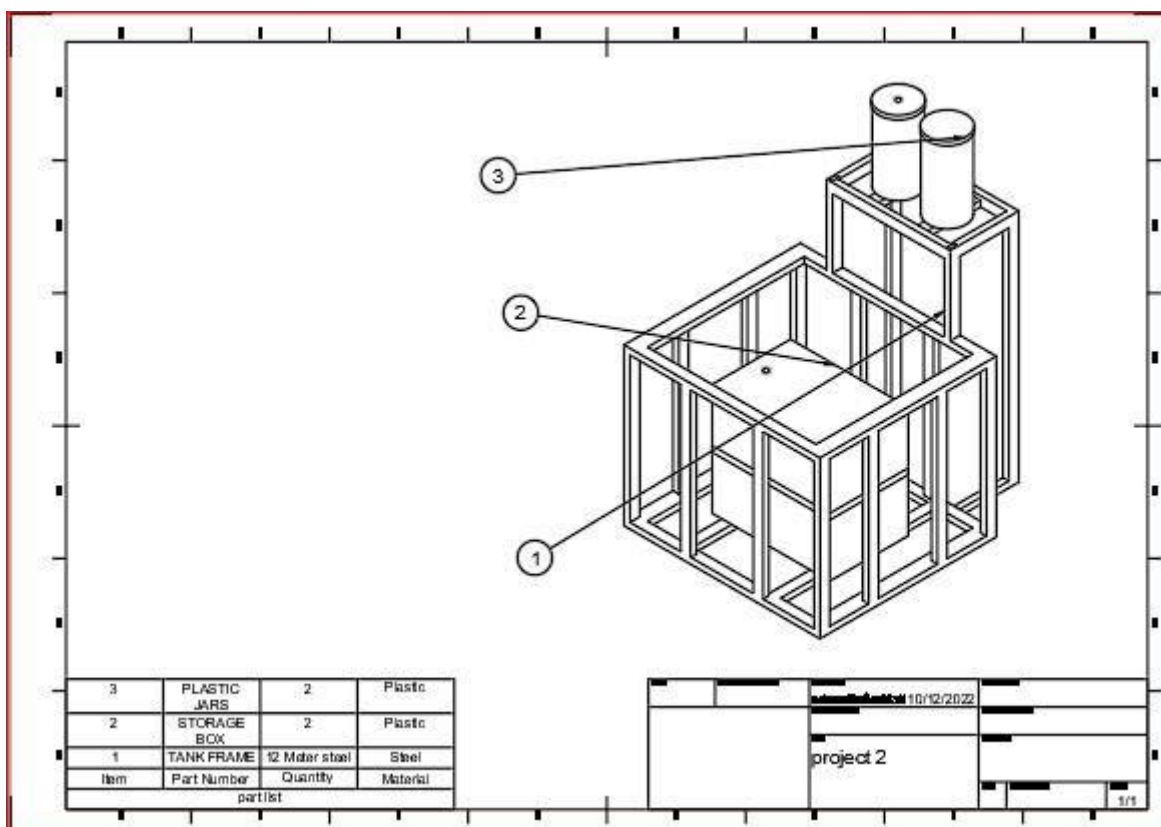
Figure 3.12: Exploded Drawing

3	PLASTIC JARS	2	Plastic
2	STORAGE BOX	2	Plastic
1	TANK FRAME	12 Meter steel	Steel
Item	Part Number	Quantity	Material
partlist			

Figure 3.13 Part List of Design

3.6.3 ISOMETRIC DRAWING

       Isometric drawing is a method for visually representing 3D objects in two dimensions in technical and engineering drawing. Figure below showed the isometric with orthographic drawing of SMART HYDROMATIC from the front view, top view and right side view with its part list.
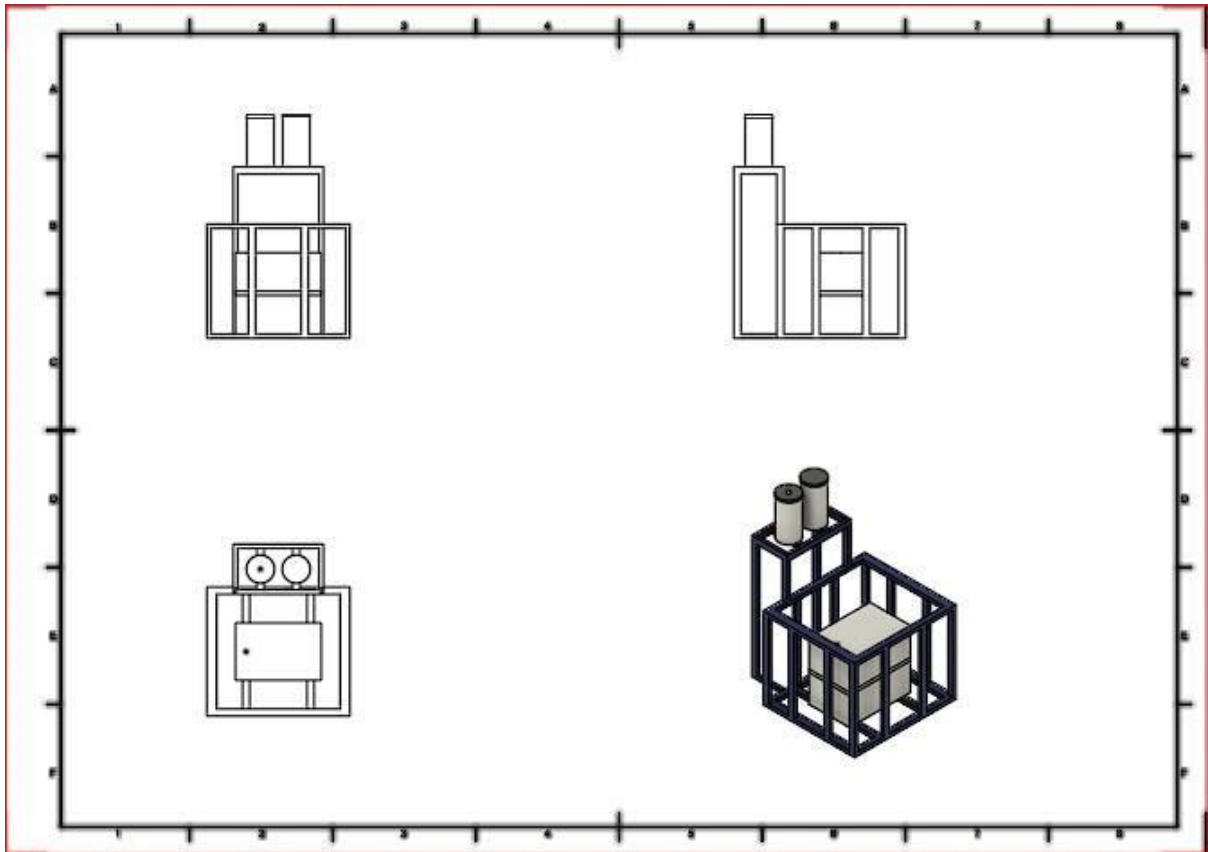
Figure 3.14 Isometric Drawing

3.6.4 DRAWING SMART HYDROMATIC
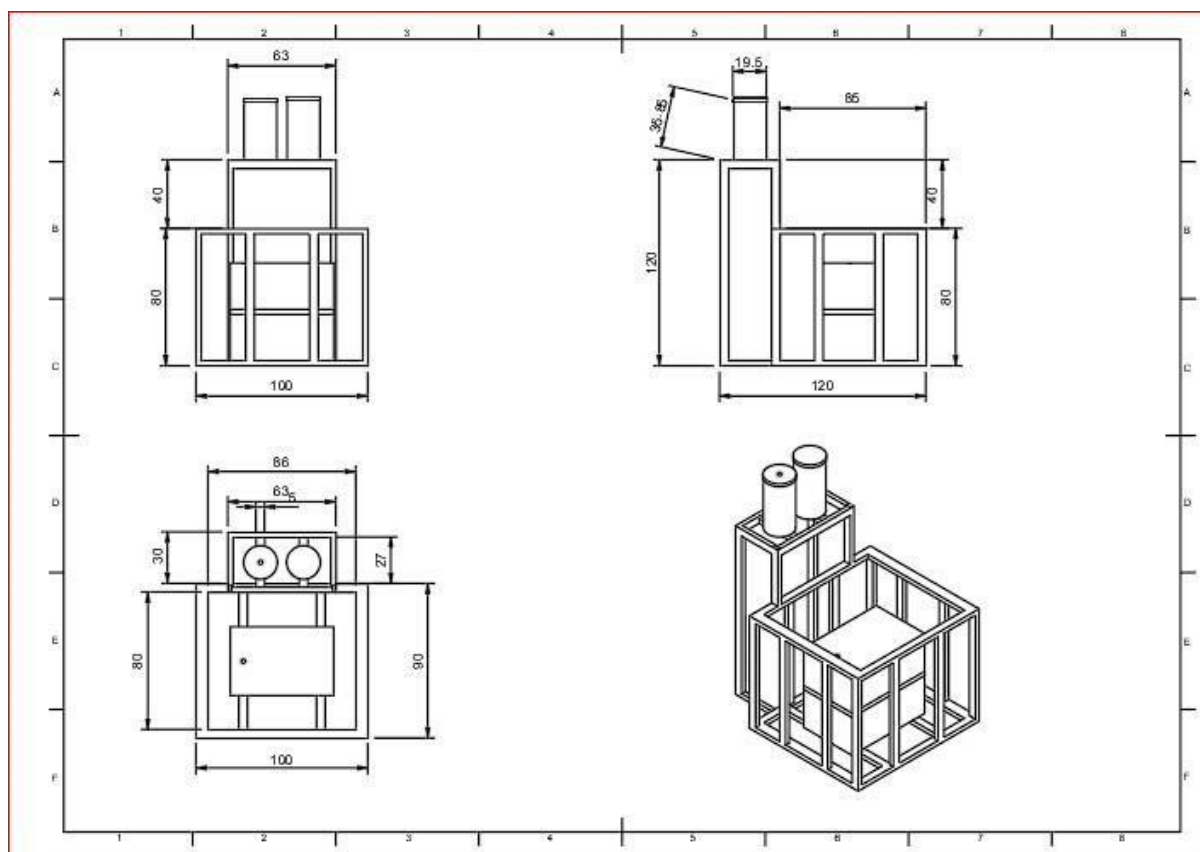
Figure 3.15 Smart Hydromatic Drawing

3.7 BUDGET CALCULATION

Below is our table of expenses.

No	Materials / Equipment	Amount	Price	Total
1.	Rectangle Steel	12 Meters	RM 155.00	RM 155.00
2.	Water Pump	4 unit	RM 19.00 each	RM 76.00
3.	Solenoid Valve	3 unit	RM 9.90 each	RM 19.80
4.	Storage Box	2 unit	RM 19.90 each	RM 39.80
5.	20cm 40 ways Dupont jumper wire Male to Male	1 unit (40 pieces)	RM 3.70	RM 3.70
6.	Relay-4 ways	1 unit	RM 9.90	RM 9.90
7.	Blue Spray	2 unit	RM10.00 each	RM 20
8.	20cm 40 ways Dupont jumper wire Male to Female	1 unit (40 pieces)	RM 4.60 each	RM 4.60
9.	LCD 1602/2004 16x4 LCD Screen Liquid Crystal Display Module	1 unit	RM 19.90 each	RM 19.90
10.	HC-SR04 Ultrasonic Distance Sensor	1 unit	RM 4.90 each	RM 4.90
11.	Arduino Uno	1 unit	RM 32.00 each	RM 32.00
12.	1.4.6 ESP 8266 Serial Port Wi-fi	1 unit	RM 9.90 each	RM 9.90
	Grand Total			RM 395.50

3.8 PROJECT ACTIVITY (GANTT CHART)

Projected table below illustrates the activity schedule for Smart Hydromatic

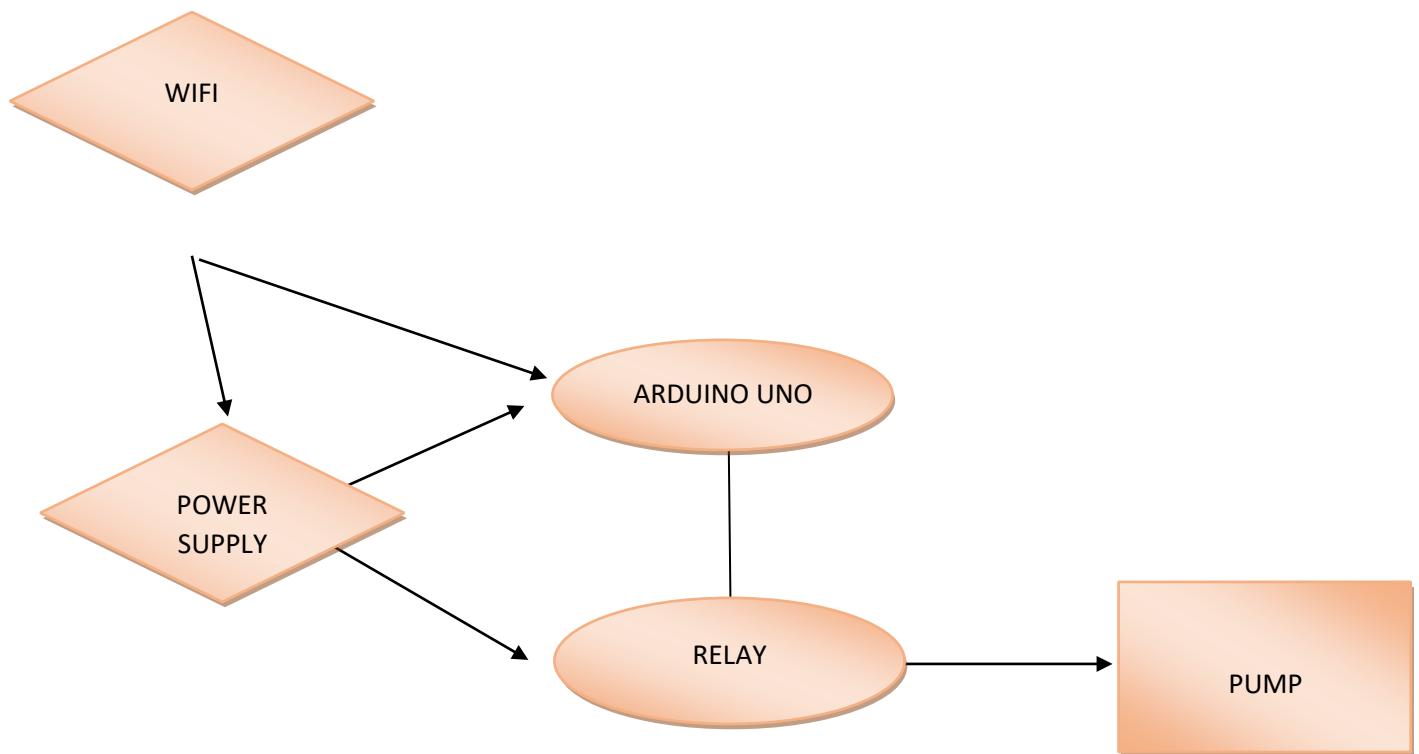| Project Activity	Weeks														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Briefing and Project Planning (Planning)	■														
Briefing and Project Planning (Actual)	▨	▨													
Project Design Improvement and Finalization (Planning)		■	■												
Project Design Improvement and Finalization (Actual)		▨	▨	▨											
Material Selection (Planning)			■	■	■										
Material Selection (Actual)			▨	▨	▨										
Component Purchased (Planning)				■											
Component Purchased (Actual)					▨										
Welding Frame Project (Planning)					■	■									
Welding Frame Project (Actual)					▨	▨	▨								
Programming (Planning)							■	■	■						
Programming (Actual)							▨	▨	▨	▨					
Product Testing (Planning)											■				
Product Testing (Actual)												▨	▨		
Analysis Data and Report Writing (Planning)												■	■		
Analysis Data and Report Writing (Actual)												▨	▨	▨	
PITEX Preparation (Video and slide making) (Planning)													■	■	
PITEX Preparation (Video and slide making) (Actual)													▨	▨	
PITEX Presentation (Planning)														■	
PITEX Presentation (Actual)														▨	▨

■ Planning   **25**   ▨ Actual

Table 3.12 Gantt chart of project activity

3.9Coding

This coding and wiring is an important process for the success of our project because it is the key to being able to control our project using the phone. Before this process is done, we produce the first frame to organize the coding and wiring trip to adjust the conditions to place the coding and wiring items**.**

This project uses coding for Arduino. When the switch is opened make sure the phone is ready with hotspot for internet connection. After this system is connected to the phone it can be controlled through the phone only by using the blink IoT app.

Also, as a student studying in purely mechanical engineering stream, our knowledge about computer programming were shallow and only limited to ourselves and general knowledge. Thus, it is one of our incentive where we seek help from Mr Mohd Ariffin Zulkifli, a professional IOT consultant and trainer which own a company that provide a consultation and training service regarding IOT programming called 'MyInvent Technologies Sdn Bhd" nearby to our place. There we learn a lot and were consulted by Mr Mohd Ariffin with a precise knowledge.

3.10 PROJECT EXECUTION
3.10.1 PROJECT STRUCTURE BUILDING

I. Cutting

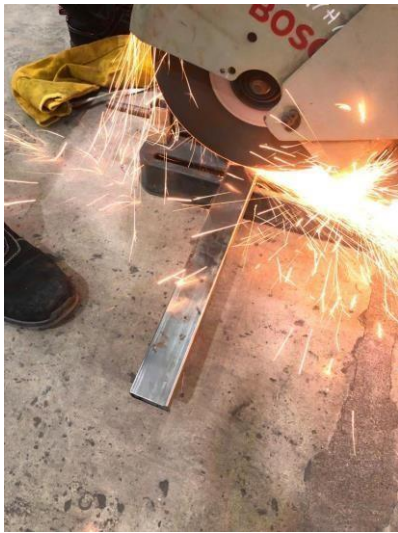Cut the mild according to the marking using cutting machine

Figure 3.16 cutting Mild

II. Fabrication

Fabricate the mild steels using welding proses to get the shape of the project.
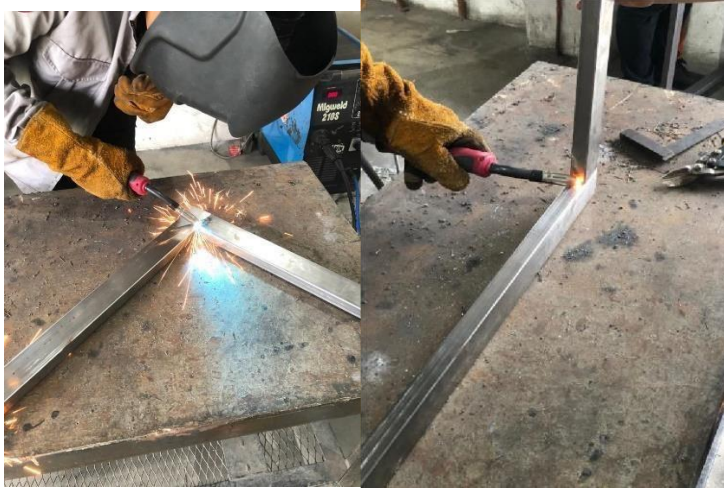
Figure 3.17 Fabrication

III.   Grinding
    This process is to remove unwanted work materials such as messy welding or dirt that sticks to the iron so as not to leave traces before spraying paint.

Figure 3.18 Grinding

IV.   Painting

We use galaxy brand catspray (cristal blue) with a spray process on the iron structure to prevent the iron from rusting and show the finish on the iron

Figure 3.19 Painting

3.10.2 APPLICATION SOFTWARE

As IoT (Internet of Things) technology develops, more and more platforms are emerging that are made to facilitate access, one of which is Blynk App.

Created in 2015, this Android and IOS Mobile OS specific application platform has the function of media connecting internet connection with microcontroller devices such as Arduino, NodeMCU or Mini CPU such as Raspberry Pi.

The app is one of the most frequently used platforms because of its ease of use and the simplicity of the source code for each command in the application. In addition, for the use of a few orders or for just a trial, Bynk App gives a limit of 2000 points for each new user so that if you just want to access it then you don't have to pay. This is different if you want to use it on a commercial scale and in the long term

We use Blink IOT as the main controller to control the smart hydromatic because it is easy by using a connection from wifi we can control everything we want
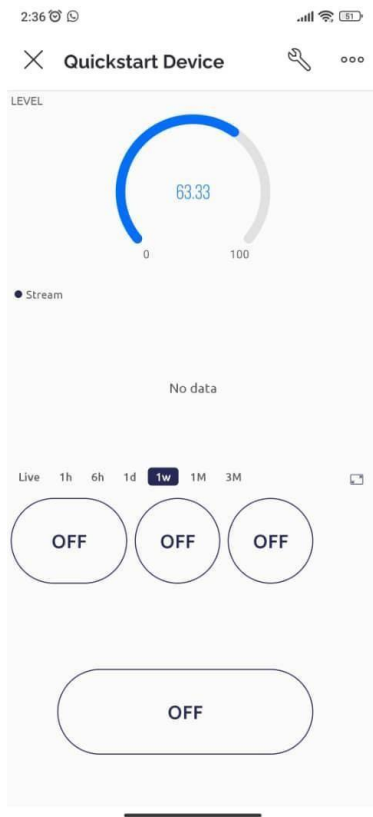
Figure 3.20 Applicatioon Software

3.11 Summary

In conclusion, in this chapter, Smart Hydromatic shows how progress is described and detailed. from the first step of the feasibility project study as a preliminary review, to the process of designing products and developing system programming and mechanical forms formed using welding. In addition, the process in this chapter is conducted in an orderly and systematic manner. It is because in this chapter according to the methodology that shows that the research framework for Smart Hydromatic is successfully completed. we also feel proud and satisfied with what we produce until it becomes the product we want

CHAPTER 4 : ANALYSIS DATA AND DICUSSION

PREPARED:MUHAMMAD ARIF MUAMMAR BIN RUZLAN

4.1 INTRODUCTION

This chapter will explain the importance of doing data analysis before planning a project. We have collected some data through a survey made to get information about our project. In addition to having a discussion from the analyzed data is also very useful because that is where we learn and improve our thinking to determine the material for the project. On the other hand, ensuring safety measures are a must element that has been considered while doing the project.

4.2 FRAME STRESS ANALYSIS

The frame is the most important part of our project. This is because it is the most experienced pressure during operation. This stress analysis aims to ensure that the frame is always in good condition despite experiencing great stress during operation. The diagram below shows the shape of the frame that can accept a load of up to 100KG

Figure 3.21 Frame Stress Analysis

4.3 PROJECT TESTING ANALYSIS

Elements	Normal ladder	Advanced Ladder
Picture		
Material	plastic	steel
Weight	40KG	20KG
Price	RM100	RM 395.50
Pump (V)	14(V)	12V
Ultrasonic sensor	-	1
Pump	1	4
System Type	Manual	Automatic
Time to complete a work (s)	40	20

4.4 End Project

After doing all the fabrication activities, our final project is produced. The diagram below is the final product of our project.

Figure 3.22 End Of project

4.5 SUMMARY

This chapter describes the sources used to collect and analyze the data required to address the research questions. Furthermore, this chapter discussed about the safety measures that are taken into concern in this project. This chapter begins with data analysis in the survey, followed by a discussion about the data analysis in the survey we have done.

CHAPTER5: DISCUSSION AND CONCLUSION
PREPARED:MUHAMMAD HARITH BIN MOHD ZAKI

5.1 Introduction

In this chapter, conclusions and discussions about SMART HYDROMATIC will be made. As a result, this chapter also discusses the recommendations and the impact on farmers.

5.2 Discussion

Based on the literature review that has been done in chapter 2, several studies have been conducted for this project. First, research methods to identify existing products in the market, then we have modified so that this project works faster than existing products. We have successfully achieved the objectives of this project as stated in chapter one.

5.3 Conclussion

Through Arduino programming, Farmers who use SMART HYDROMATIC can distribute fertilizer in liquid form using just a phone. This innovation helps reduce the burden and cost of farmers in terms of how to make the complete fertilizer solution and payment for workers. This development process includes design, fabrication, and testing phases

5.4 Recommendation for Improvement

There are many weaknesses in our project that can be fixed. Among them are:-

• replace the existing pump with a more powerful auto water pump PK138/GT400 that can deliver water faster

• Replace storage boxes and plastic jars with larger and more suitable tanks such as blue tank drums and poly tanks. It can hold more water capacity

• replace the silicon pipe that has been used with a poly pipe

5.5 Projek Limitations

This project has some limitations, and these are also considered the scope of this innovation.
The limits are stated as below:-

a) Can only be used when connected to the internet.

b) can only be set by the owner of the product and other people can only control it

c) Can only flow fertilizer or water in liquid form only

5.6 Impact to the communities

Production of our project can bring positive impacts to the consumers, industry and country. These include: -

Users	
	I. Make it easier for users to do their own work and reduce user effort II. Reduce the cost of living for consumers
Institution	I. Can control the agricultural sector automatically and systematically II. Reduce operating costs III. Increase farm productivity
Country	I. Increase the country's economy II. Advance agriculture in the trade sector

Reference

- Wikipedia. (June 12, 2022). Fertilizer.

  https://en.wikipedia.org/wiki/Fertilizer

- https://teknikelektronika.com/pengertian-relay-fungsi-relay/
- https://glosarium.org/arti-blink-di-komputer/

SMART HYDROMATIC

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ABSTRACT

This project is designed from observation based on farmers who are facing problems in processing and fertilization in crops. The scope of this study is focused on the agricultural sector and repairing the existing system from manual to automatic. The problem is that it takes a long time to mix fertilizer and uses many workers. So with this project it can save time for example when using the manual method by mixing fertilizer by hand takes longer than using a smart hydromatic system and can reduce labor. Nowadays, the demand for vegetable crops is increasing. Suppliers and also buyers get fresh vegetables to buy. It can be seen clearly how if the vegetables in the supermarket are always out of stock and lack of stock. Products that have been specially designed and created to speed up the planting process and provide sufficient fertilizer and always enough water. Smart Hydroponics Design was designed using Autodesk Fusion 360 Software. this system uses arduino uno, wifi, relay, water pump, power supply and valve. Next, . Based on the results and discussions we have discussed; it can be concluded that this SmartHydroponic has achieved the objectives we have set. This product has also been proven to be able to solve the problems faced by farmers. And this project can run smoothly

OBJECTIVE

- To design a hydroponic system that moves automatically to control the farming system as well as fertilization
- To develop a mechanical mechanism in the form of compartments and for the storage of water and fertilizer tanks
- To fabricate and analyze the prototype of the project

PRODUCT DESCRIPTION

I. Designed using FUSION 360
II. Material used :
- stainless still
- cylindrical plastic container
- STORAGE BOX

SMART HYDROMATIC
I. Using Arduino uno to control the system
II. Using WiFi to connect to the phone to control the system mover
III. Using an ultra sonic sensor to measure the water level in the main tank

METHODOLOGY

- First, this project make a project research and make a system overview for this project can run smoothly
- Beside that , this project make a product design and do the component and material selection to make project perfect
- After follow the work step ,this project make a project testing
- After the project testing went smoothly ,Smart Hydromantic make a analysis data
- Lastly, do the report writing

RESULT

Comparison between an Hydroponic with Smart Hydromantic

NO.	OLD HYDROPONIC	SMART HYDROMATIC
1.	-cannot read the pH concentration of the fertilizer solution in the tank	-can read the pH value in the fertilizer solution using the pH Meter
2.	-Fertilizer is mixed manually by hand	-fertilizer is mixed automatically with hydromantic system
3.	-use a hose to fill the water in the channel	-water is filled automatically by using the timer installed
4.		

ORIGINALITY

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CONCLUSION

The conclusion, got from this project created is that can find out how the system works In addition,the objective we want has already been achieved for example this project want to use an automatic system and the project have already achieved it in project The name of this project is Smart Hydromantic which is a fertilization and plant system for hydroponic trees or cultivated trees In fact, this project also has its own special feature, which is that it has a sensor, for example, the sensor is used when the desired water level will exceed the level, causing the machine to beep End once, this project is able to be controlled through a smart phone, it can be controlled and take care of our plants easily

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APPENDIX C – MY INVENT

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