SMART GARDENING SYSTEM

HALIM MOHSIN BIN MOHAMMAH FUZIA

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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IRDA BINTI ROSLAN
Pensyarah
Jabatan Sistem dan Komunikasi Komputer
Fakulti Teknologi Maklumat Dan Komunikasi
Universiti Teknikal Malaysia Melaka (UTeM)

(TANDATANGAN PELAJAR)

Alamat tetap: No 71, Lorong 5, Taman Cempaka, 32000 Sitiawan, Perak

Tarikh: 11 SEPTEMPBER 2021

(TANDATANGAN PENYELIA)

TS. IRDA BINTI ROSLAN

Nama Penyelia

Tarikh: 11 SEPTEMBER 2021

SMART GARDENING SYSTEM

HALIM MOHSIN BIN MOHAMMAH FUZIA

This report is submitted in partial fulfillment of the requirements for the Bachelor of [Computer Science (Computer Networking)] with Honours.

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FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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I hereby declare that this project report entitled

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STUDENT : _____ Date : _____
([NAME OF STUDENT])

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I hereby declare that I have read this project report and found this project report is sufficient in term of the scope and quality for the award of Bachelor of [Computer Science (Software Development)] with Honours.

SUPERVISOR : _____ Date : _____
([NAME OF THE SUPERVISOR])

DEDICATION

This project is dedicated to my beloved family who has consistently been other for me at whatever point I need and gives me a strong support that consistently encompasses me all the time. Moreover, this task likewise committed to my supervisor, Ts. Irda Binti Roslan who has guided me with extraordinary consideration and persuaded me to set a higher objective to produce a better project. To wrap things up, I devoted this project to my friends for the help of any support they have provided to me when I face the problem.

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ACKNOWLEDGEMENTS

First of all, all the praise to Allah S.W.T for giving me the opportunities, strength, and patience throughout the course of the project. Without a blessing from Him, I cannot complete this project according to what has been arranged off.

Secondly, my most gratitude thanks to my beloved parents for their nonstop prayers and also give everything to ensure I succeed in this project. Their support made me never give up and have given my best shot to finish the project which has been started.

Next, I would like to give millions thanks to my supervisor Ts. Irda Binti Roslan for guiding me throughout the course of the project to complete this Final Year Project. She always provided me with precious knowledge, encouragement, and advice which brings me to develop better project.

Furthermore, I would like to thanks to all my friends for their time, concern, efforts which always encouraging me during complete this project. With all the help from involves parties, I manage to finish this PSM with all the help, I manage to complete my report and my project

Finally, thanks to Universiti Teknikal Malaysia Melaka (UTeM) for the opportunity given and providing me with a complete resources and information needed.

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ABSTRACT

In today's digital environment, people expect automation to make tasks easier, more comfortable, faster, and more efficient. The goal is to transform our current system for supplying water in home gardens, farms, and fields into a Smart Automated System. In this project will describe about Smart Gardening System. This system, there are three sensors have been used which soil moisture sensor, soil temperature sensor and temperature and humidity sensor. When the sensor detect low soil moisture, the water pump will sprinkle the plants automatically. Facilities that provided were user friendly and make easier to users for growth of plant. The main problem that facing by a gardeners tend to consume large amounts of water for plantation as they do not know the sufficient amount of water for watering the plants. This problem will give impact in term of shortage of water resources and over-watering the plant or lack of water for plantation. Gardeners also having difficulties in maintain the quality of the soil which one of main important in maintaining the health of a plant. By having this gardening system a gardener or farmer can monitor the soil humidity. The gardeners also having difficulties in learning the growth and condition of plant. This system is helpful for farmer to learn the condition of the plant and earn more knowledge by monitor the data of the plant. Besides that, this gardening system can be used at any plants because it's a portable device and it provide much more precise data. This gardening system not just offer user to monitor the information from plantation but it also provide opportunity for user to have better understanding on plant growth.

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ABSTRAK

Dalam persekitaran digital masa kini, orang mengharapkan automasi membuat tugas lebih mudah, lebih selesa, lebih pantas, dan lebih cekap. Tujuannya adalah untuk mengubah sistem kita sekarang untuk membekalkan air di kebun rumah, ladang, dan ladang menjadi Sistem Automatik Pintar. Dalam projek ini akan menerangkan mengenai Sistem Berkebun Pintar. Sistem ini, ada tiga sensor yang telah digunakan yaitu sensor kelembapan tanah, sensor suhu tanah dan sensor suhu dan kelembapan. Apabila sensor mengesan kelembapan tanah yang rendah, pam air akan menaburkan tanaman secara automatik. Kemudahan yang disediakan adalah mesra pengguna dan memudahkan pengguna untuk pertumbuhan tanaman. Masalah utama yang dihadapi oleh tukang kebun cenderung memakan sejumlah besar air untuk perladangan kerana mereka tidak mengetahui jumlah air yang mencukupi untuk menyiram tanaman. Masalah ini akan memberi kesan dari segi kekurangan sumber air dan penyiraman tanaman yang berlebihan atau kekurangan air untuk perladangan. Tukang kebun juga menghadapi kesukaran untuk menjaga kualiti tanah yang salah satu yang penting dalam menjaga kesihatan tanaman. Dengan adanya sistem berkebun ini, tukang kebun atau petani dapat memantau kelembapan tanah. Tukang kebun juga mengalami kesukaran dalam mempelajari pertumbuhan dan keadaan tanaman. Sistem ini berguna bagi petani untuk mengetahui keadaan tanaman dan memperoleh lebih banyak pengetahuan dengan memantau data tanaman. Selain itu, sistem berkebun ini dapat digunakan di mana-mana tanaman kerana ia adalah alat mudah alih dan menyediakan data yang lebih tepat. Sistem berkebun ini tidak hanya menawarkan pengguna untuk memantau maklumat dari perkebunan tetapi juga memberi peluang kepada pengguna untuk memiliki pemahaman yang lebih baik mengenai pertumbuhan tanaman.

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LIST OF ABBREVIATIONS

FYP	-	Final Year Project

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Smart gardening system is a system that control plantation automatically by computers and electronic devices. The system also attached with soil sensor to monitor the moisture and temperature of the soil, meanwhile the system also contain air sensor to monitor the local air temperature and humidity. The gardening system contain soil sensor to monitor the soil humidity and temperature time to time to maintain the growth of plant. The gardeners also get precise data by monitor the plantation.

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This system is designed to resolve the gardener their problems. The first problem that faced by gardeners are they don't know when and how much quantity of water that should watering the plants. Some of farmers consume large amounts of water for plantation which will lead to shortage of water resources. To avoid the over-watering and lack of water for the plantation this gardening system will be helpful. Next problem that faced by farmers is maintain the quality of the soil for maintain the growth of the plants. The soil need to be in good humidity and temperature to maintain the plants growth. The gardening system contain soil sensor to monitor the soil humidity and temperature time to time to maintain the growth of plant. The farmers also get precise data by monitor the plantation.

The objective of this project is to develop smart gardening system using multiple sensors. Second objective is to monitor and analyses humidity and temperature of plant and soil. The last objective is to display data to user about

humidity and temperature of plant and soil. The expected output for this project is to successfully develop the gardening system which using NodeMCU and Blynk for the user to monitor air temperature and humidity and soil temperature and humidity.

1.2 Project Background

Smart gardening system is a system that controlled automatically. Although gardening already have systems and electronic devices, the gardening system with NodeMCU and Blynk contain multiple function which is monitoring and plant watering system using advance sensors, monitor the soil moisture and temperature and monitor local air temperature and humidity. The main problem that facing by a gardeners tend to consume large amounts of water for plantation as they do not know the sufficient amount of water for watering the plants. This problem will give impact in term of shortage of water resources and over-watering the plant or lack of water for plantation. Gardeners also having difficulties in maintain the quality of the soil which one of main important in maintaining the health of a plant. By having this gardening system a gardener or farmer can monitor the soil humidity. The gardeners also having difficulties in learning the growth and condition of plant. This system is helpful for farmer to learn the condition of the plant and earn more knowledge by monitor the data of the plant.

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Besides that, this gardening system can be used at any plants because it's a portable device and it provide much more precise data. This gardening system not just offer user to monitor the information from plantation but it also provide opportunity for user to have better understanding on plant growth.

1.3 Problem Statement

The problem statement of this project are:

1. Gardeners tend to consume large amounts of water for plantation as they do not know the sufficient amount of water for watering the plants.

2. Gardeners can't keep an eye on their plants because have no time to monitor in daily time.

3. Gardeners also having difficulties in learning the growth and condition of plant.

1.4 Project Question

1. How much quantity of water needed for watering the plant using Smart Gardening System?

2. How to monitor the plant using Smart Gardening System?

3. How to validate the result of the plant condition using Smart Gardening System?

1.5 Objective

The objective of this project are:

1. To develop a smart gardening system using multiple sensor.
2. To monitor and analyses humidity and temperature of plant and soil.
3. To display data of humidity and temperature of plant and soil to user.

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1.6 Scope

The targeted user for this project is mostly focused on farmers or gardener. The user does not need any basic knowledge about the way to handle the growth of a plant because the user can get information regarding to the condition of the plant by monitoring the plants using the gardening system. The gardening system consists of different type of sensors where user can get information from the sensors based on the plantation according to the information they need which soil sensor use for monitor the soil moisture and temperature and air sensor use for monitor local air temperature and humidity.

1.7 Expected Output

The expected outcome for this project is to successfully develop the smart gardening system using NodeMCU for user to monitor air temperature, air relative humidity, soil temperature and soil moisture. The gardening system also water the plant automatically. This gardening system able to use to any plants.

1.8 Conclusion

For conclusion, the implementation of a smart gardening system using other Internet of Things to make sure user can monitor their plant easily. The problem statement, research objectives and scope within this chapter is for identifying and discuss the problem statement, as well as creating a possible solution. A report organization is also made in this chapter to show the sequence of the project.

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CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

In this chapter, it will explain more about the literature review and the existing system for the product. For this project, the observation is made based on the project domain, developing techniques and technology that have been used. The literature review is usually based on several sources such as journals, articles, website, interviews, and technical documents.

2.2 Related Work

2.2.1 Agriculture

Agriculture is the science, art and practice of cultivating plants and livestock. Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that enabled people to live in cities. (Wikipedia, 2020)

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In recent years, greenhouse technology in agriculture has shifted toward automation, information technology direction with the IOT (Internet of Things) technology rapid development and wide application. Remote monitoring system with internet and wireless communications combined is proposed. At the same time, taking into account the system, information management system is designed. The system data that collected provided for agricultural research facilities.

Agriculture greenhouse production environment measurement and control system is an example of lOT technology application in agriculture. The critical temperature, humidity and soil signals are collected real-time in the agriculture production process, which is transmitted by wireless networks through machine to

machine support platform. It is to gain real-time data of agriculture production environment using SMS (Short Messaging Service), web, WAP (wireless application protocol) pattern, so that the terminal can master the information to guide the production. (Ji-chun Zhao, 2010)

2.3 Related project

2.3.1 Monitoring Moisture of Soil

Project Monitoring Moisture of Soil using Low Cost Homemade Soil Moisture Sensor and Arduino UNO (M. S. Kumar et. al., 2016) presented a method to manufacture soil moisture sensor to estimate moisture content in soil hence by providing information about required water supply for good cultivation. The system will use a low-cost homemade with soil moisture sensor and Arduino UNO. This is a simple Arduino project for a soil moisture sensor that will light up a LED at a certain moisture level. Rapid measurement techniques using electronic sensors which is time domain reflectometers, impedance, capacitance and dielectric sensors offer an alternative to destructive and time consuming gravimetric sampling.

Figure 2.1 shows simple Arduino project for a soil moisture sensor that will light up a LED at a certain moisture level. It uses Arduino Uno microcontroller board. Two wires placed in the soil pot form a variable resistor, whose resistance varies depending on soil moisture. This variable resistor is connected in a voltage divider configuration, and Arduino collects a voltage proportional to resistance between the 2 wires. Insert the 2 probes (wires, pcb) in the dry soil and measure the resistance value and then pour water and measure it again. Same sample of soil was analyzed by varying the volume of water, with values tabulated for various amounts of water. Using this method, we can determine the zone from which a sample originates, as well as the requirements for a successful plantation. To test sensor output values, the circuit consists of one sensor, a resistor, three LEDs for three areas, and an Arduino Uno Board Matlab interface for Arduino.

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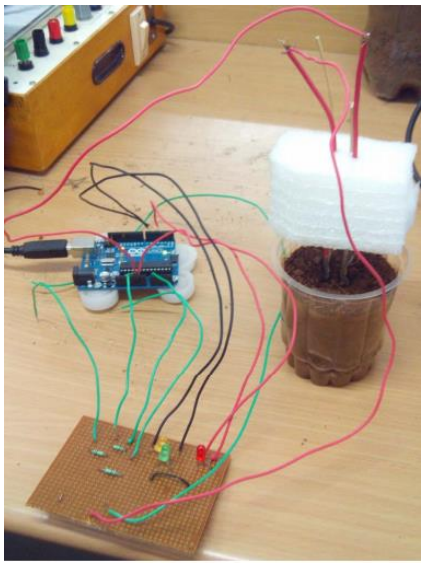

Figure 2.1: Figure 2.1: Setup for measuring soil moisture of a sample ure of a sample

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Figure 2.2, 2.3 and 2.4 shows reading are taken for repeated number of times to check the repeatability of sensor and results are found to be not too deviating from the average value as shown in figures. Accuracy of setup can be increased by implanting more sensors in soil at different locations. Also the variation in soil moisture can be estimated over an area.

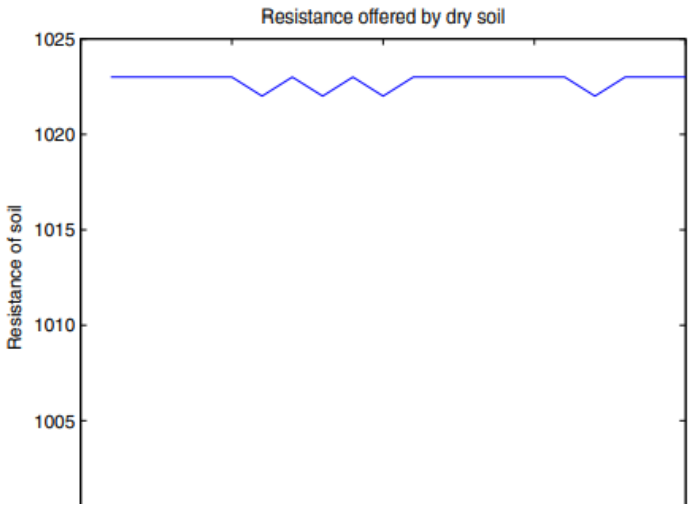

Figure 2.2: Result of dry soil

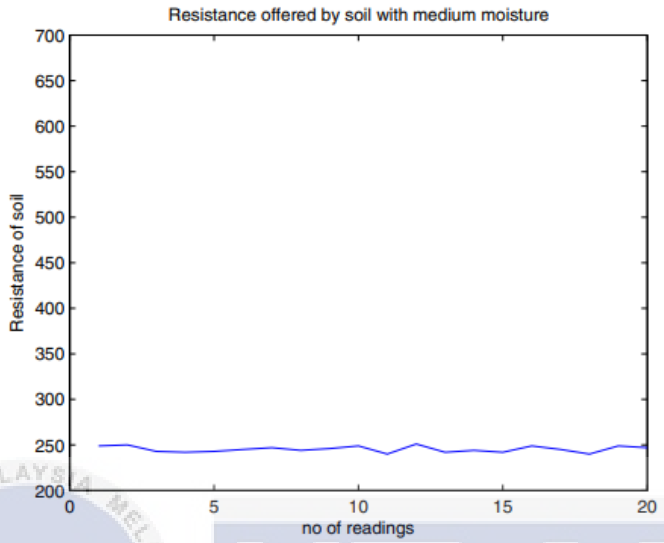

Figure 2.3: Result of medium moisture soil

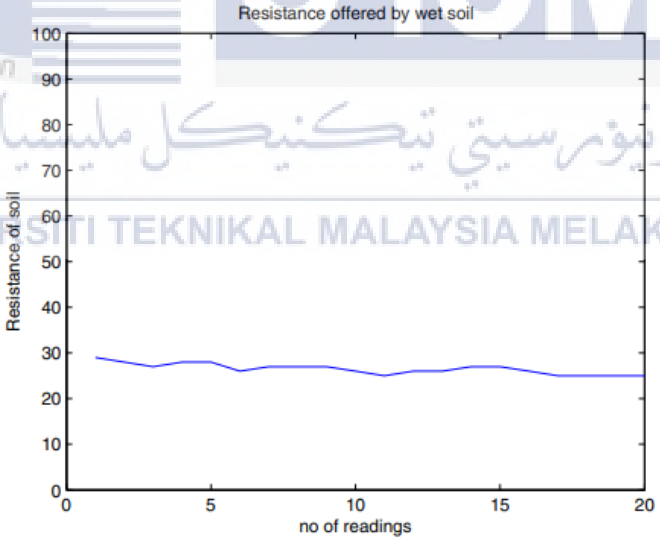

Figure 2.4: Result of wet soil

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