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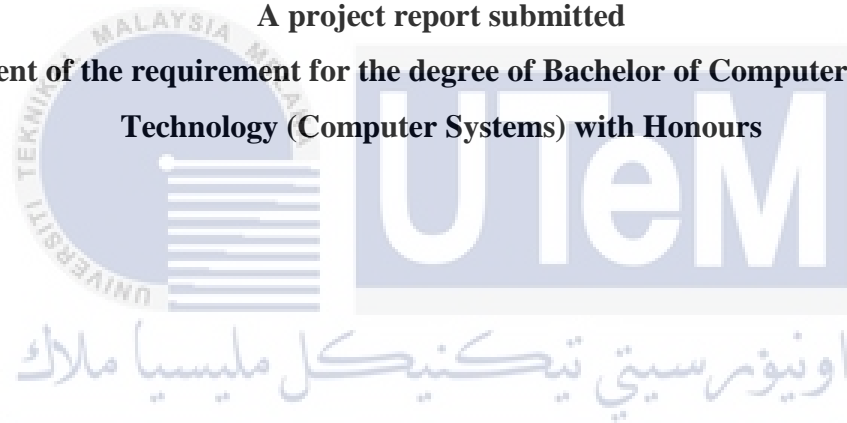
Bachelor of Computer Engineering Technology (Computer Systems) with Honours

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**Development Of Multipurpose Customize Mobile Application for Urban Farming Using
Android Studio**

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**A project report submitted
in fulfillment of the requirement for the degree of Bachelor of Computer Engineering
Technology (Computer Systems) with Honours**



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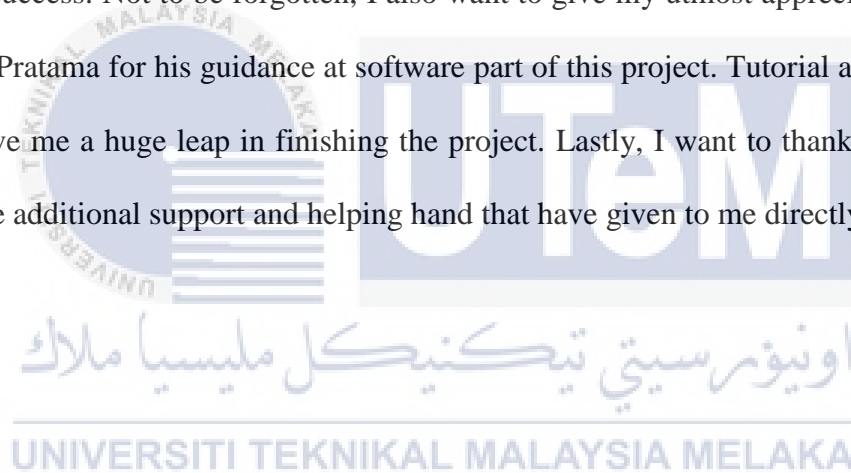
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4 ABSTRACT

Smartphone has intruded heavily in market and promise an opportunity to large amount of people. Based on this statement, this project creates an application that allow user to order irrigated vegetables crops from urban farmer that using simple fertigation system technology which the farmer can be doing at their home with small area. Currently, consumer and seller are using the traditional way to contact each other which is by using paper or any other way that currently exist to place an order from this vertical farming. From the research, the traditional method is not reliable and only momentarily relevant. The application created an online market as an alternative to the farm fresh market based on indoor vertical. The main purpose of the application is to create an ordering irrigated vegetables crops mobile application for small scaled indoor vertical farming targeted to the consumer, courier user, freelance seller, and admin user. Furthermore, the other purpose of this application is to allow the farmer to monitor their farm via the application without needing them to be in the vicinity of their farm. This will ease the farmer especially urban farmer that live far away of their farm. The “Farm Condition” tabs that has been built in the application will provide the farmer with information like temperature, electroconductivity value or more, related to their farm.

5 ABSTRAK

Telefon pintar telah mencerooboh pasaran dan menjanjikan pelbagai peluang kepada masyarakat. Berdasarkan kenyataan tersebut, projek ini akan membina satu aplikasi yang membenarkan pengguna untuk membuat pesanan tanaman daripada petani-petani bandar yang menggunakan sistem fergitasi ringkas membolehkan petani-petani bandar memulakan aktiviti pertanian di rumah mereka sendiri. Kini, pengguna dan penjual masih lagi menggunakan cara tradisional untuk berhubung iaitu menggunakan kertas atau cara – cara lain that wujud khas untuk pertanian secara menegak. Selain itu, kajian menunjukkan cara tradisional tersebut adalah tidak stabil dan boleh gagal pada masa hadapan. Oleh sebab itu, aplikasi ini akan menyediakan satu pasaran atas talian sebagai alternatif kepada pasaran basah yang berdasarkan pertanian secara menegak. Tujuan utama projek ini adalah untuk menghasilkan aplikasi pesanan tanaman untuk penanam-penanam berskala kecil bertumpuan kepada pengguna, kurier, pekerja bebas dan admin. Di samping itu, tujuan lain bagi projek ini adalah untuk membolehkan para petani untuk mengawasi kebun mereka melalui aplikasi ini tanpa memerlukan mereka untuk berada di kawasan kebun mereka. Ini akan menyenangkan para petani terutamanya petani bandar yang tinggal jauh dari kawasan kebun mereka. Fungsi “Farm Condition” yang telah ditambah di dalam aplikasi ini akan menyediakan informasi seperti suhu dan kekonduksian elektrik berkaitan dengan kebun kepada para petani.

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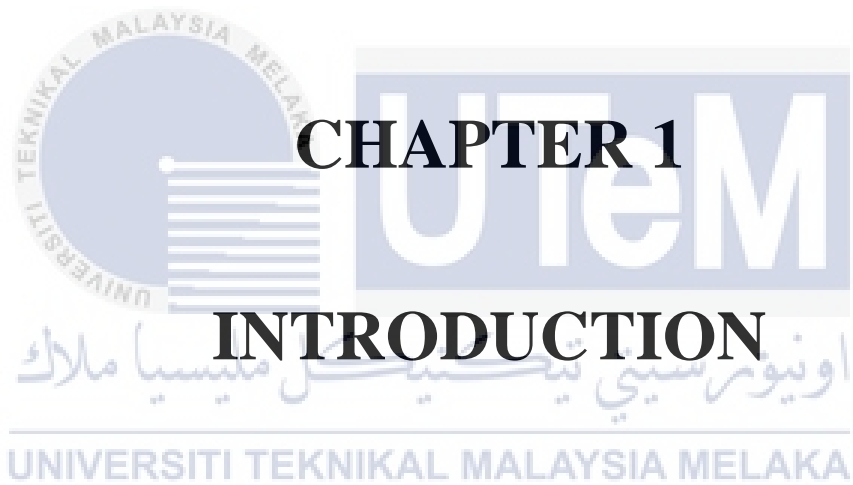
% - percent

IoT – Internet of Things

EC – electroconductivity

°C - Degree Celsius





CHAPTER 1

1 INTRODUCTION

This chapter gave an overall overview of the project, which include project overview, problem statement, objective, and scope of the project.

1.1 Background

Mobile application has a great impact in nowadays world. It has large influence on the way that the community think, their goals and standard. In economy, mobile application has open a lot of new opportunities to people to earn money online successfully. The catalyst of that success is the emerge of e – commerce mobile application. E – commerce mobile application is a platform that host a medium where the seller can sell item, thus the customers can browse and purchase item. Although the e – commerce mobile application become more popular, agriculture sector is still not using the tools to increase the profit of the farmers. Current agriculture supply chain is restricted to traditional way of using paper or hardcopy. Current supply chain of agriculture consists of farmer, middleman and consumer. Middleman is a merchant where they buy most, if not all the crops that the farmer produced to later be distributed to the supermarket, grocery store or else.

The proposed project is an e – commerce mobile application that targeted to farmers and fresh crop consumer. E-commerce mobile application can create new supply chain that bypass the middleman thus overall, directly connect the farmer to the consumer. The benefits can be enjoyed by the consumer are lower price of crops since they buy it straight from the farmers. Meanwhile, the farmers can build farm at various scale from as small as in home farm to as large as they could. The application will provide an online marketplace where the function like add product to cart, sell product and buy product will exist and farmer can sell their crops while consumer can buy the crops. Furthermore, the application

also provides the farmer with monitoring tools to monitor their farm via the apps to ease farmer that does not live in proximity of their farm.

1.2 Problem Statement

Agriculture's sector has a lot of things that need to be improved. Although the income of farmer has steadily increase year by year[1], the farmer always been restricted to be selling their crops to the middleman. This traditional ways of getting the crops to the consumer makes the agriculture sector hard to access to beginner or people that want to venture into farming. The new farmer needs to find themselves the middleman to be able to makes profit from their farm. Without the middleman, the farmer has no clear marketplace where they can sell their crops directly to the consumer. Thus, with this mobile application, they can host the marketplace themselves to prevent themselves from relying with the middleman.

Secondly, pandemic Covid – 19 has major impact on the agriculture supply chain[2]. Almost all sectors have been ordered to be shut down to contain the virus from widely spread between the co – worker. The middleman service that collects the crops from the also has been halted due to restricted movement during the pandemic. This causes many crops to become wasted since it cannot reach the consumer without the distribution service from the middleman. Hence, the traditional method of distribution the crops is outdated and need a major update to improve the system. This project can prevent the situation from occurring by allowing the customer to order the crops directly from the farmer.

Lastly, urban farming has been revealed to has potential to increase access to healthy and nutritious food[3]. There are many scales of urban farmer that currently exist, from small farm inside their garden to large scale farm that incorporate many systems like hydroponic to allow them to farm inside the building. Without a mobile application to track the farm condition, the efficiency of their crop produced is lower compared if they have complete information of their farm even when they are not in the vicinity of their farm. This project will negate the problem by providing the monitoring system needed by the farmer.

1.3 Objective

- I. To design an application where farmer can host a marketplace themselves.
- II. To design a monitoring system both hardware and software allowing farmer to monitor their farm.

1.4 Scope of Project

The scope of work for these projects are:

a) Design

This research focus on two main parts: designing an application that can host a marketplace and implement the feature of monitoring system inside the same application.

b) Simulation

The sensors that farmer use inside their farm will send the data in real time to the database. Then, the data will be read by the application to be displayed inside the designated interface. Next, the hardware will be tested according to the data read by the application. Beside that, the user of the application can sign into the application and place the order inside the application.

c) Measurement

The EC Value and temperature is all measured.

1.5 Thesis Structured

Chapter 1:

This chapter will give the brief idea of the project. Element like Project Overview, Problem Statement, Objective and Scope of the project will be explained throughout this chapter.

Chapter 2:

The second chapter will focus on theory and concept of the project with the characteristic of hardware component that been used in the project. Theory will be discussed with higher degree of detail to corelate the research with the theory.

Chapter 3:

The third chapter will mainly about the methodology of the project. This chapter will explain the steps that need to be completed to finish the project with explained procedure taken.

Chapter 4:

The fourth chapter will be focused on the result that we get based on the methodology that we stated in the chapter 3. Furthermore, this chapter will discuss about the data that been collected in finer detail. Lastly, the result will be compared with the objective written in chapter 1.

Chapter 5:

Conclusion and future work suggestion will be the main topics that be discussed in chapter 5, along with some recommendation of how to improve the current project in various aspect such as cost, performance and more.

CHAPTER 2



CHAPTER 2

2 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter will be concentrating on the research and studies that have been done in order to succeed with the current project, and that the primary sources of information used to solidify the research will be articles, books, journals, and the internet. In addition, it is stated that the chapter will be focusing on the research and studies that have been done in order to succeed with the current project. This indicates that the literature evaluation will be vast and comprehensive, including a wide variety of sources that are pertinent to the topic at hand.

In addition, it is indicated that the study that has been done connects to the present project. This is crucial in order to guarantee that the literature review is pertinent and helpful for the research that is currently being conducted. As these subjects are considered to be significant and relevant to the current project, as they are the contributing factors for the function of the project application, the chapter will also provide information and explanation for vertical farming, m-commerce, and remote monitoring system. This is because these topics are considered to be significant and relevant to the current project. In addition, the chapter will include prior studies and a comparison table to demonstrate the differences between previous projects and the present project. This will assist in identifying any gaps in the earlier research and will offer context for the current study.

2.2 BACKGROUND RESEARCH

2.2.1 Vertical Farming

In the article that been published on 13 January 2020 from The Malaysian Reserve, former two-time Finance Minister Tun Dr. Daim Zainuddin said when the agriculture becomes more profitable and attractive to the younger people, it will be the key to reduce the Malaysia's import bill simultaneously lifting millions of people out from unemployment and boost the federal revenue[4]. The demand of food supplies and

vegetables are increase steadily years by years as stated in figure 1.0, thus validating that venture into agricultural industry is a feasible and attractive solution to Malaysia's economy[5].

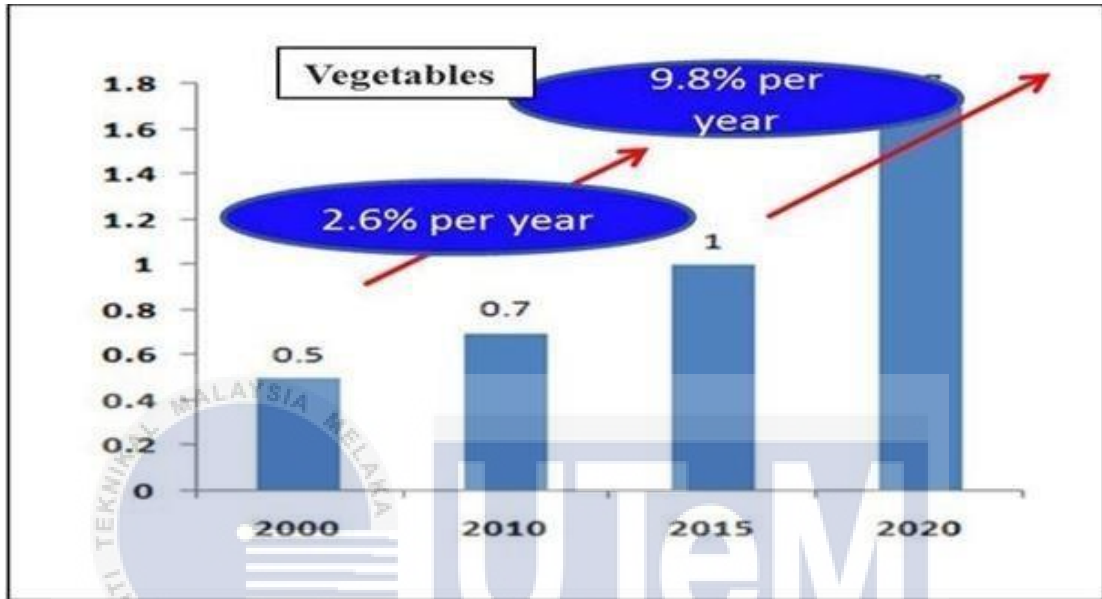


Figure 2.0: Vegetables production in Malaysia.

As the world population growth continuously in rapid rate, in which 80% of those population are living in urban areas, the demand of the food supply will emerge to be critical in the next 50 years resulted by the increase of population year by year[6]. This call for a sustainable urban food production strategy. To compensate the future demand, a new vertical farming technology is come to light (figure 2.1). The vertical farming involves the cultivation with livestock on vertically inclined area such as tall building and skyscraper that are abundance in urban area. This farming technology also compliment well with farming in urban area as there are limited land and space exist in urban area. Besides that, advantages that vertical farming brings to the people in urban area is providing job opportunities to them [7], [8] as unemployment is still a problem in urban area. Other than that, this agricultural activity also provide indirect job opportunity to those are not in agriculture industry as there are more than planting the

plant and selling them. The local distribution center, society outreach, logistic and delivery services are also involved to make sure the crops are in consumer hand.



Figure 2.1: Indoor Vertical Farming

2.2.2 M-commerce application

There is research on investigating the business transformation caused by the internet via mobile application[9]. The term M-Commerce comes from Mobile Commerce, and it is a new way to shopping and doing business as the example is stated in Figure 2.2. M- Commerce is widely successful since it closely related to mobile device. Nowadays, almost everyone got their own mobile device as such young age although that statement is highly related to the income of each household. With such a wide range of age on mobile device, the intention of using the M-Commerce application also differ from each other. Table 2.0 show the demographic profile such as age, gender and education also strongly influence the consumer's intention of using the M-Commerce application. The table can be summarized that the consumer's intention of