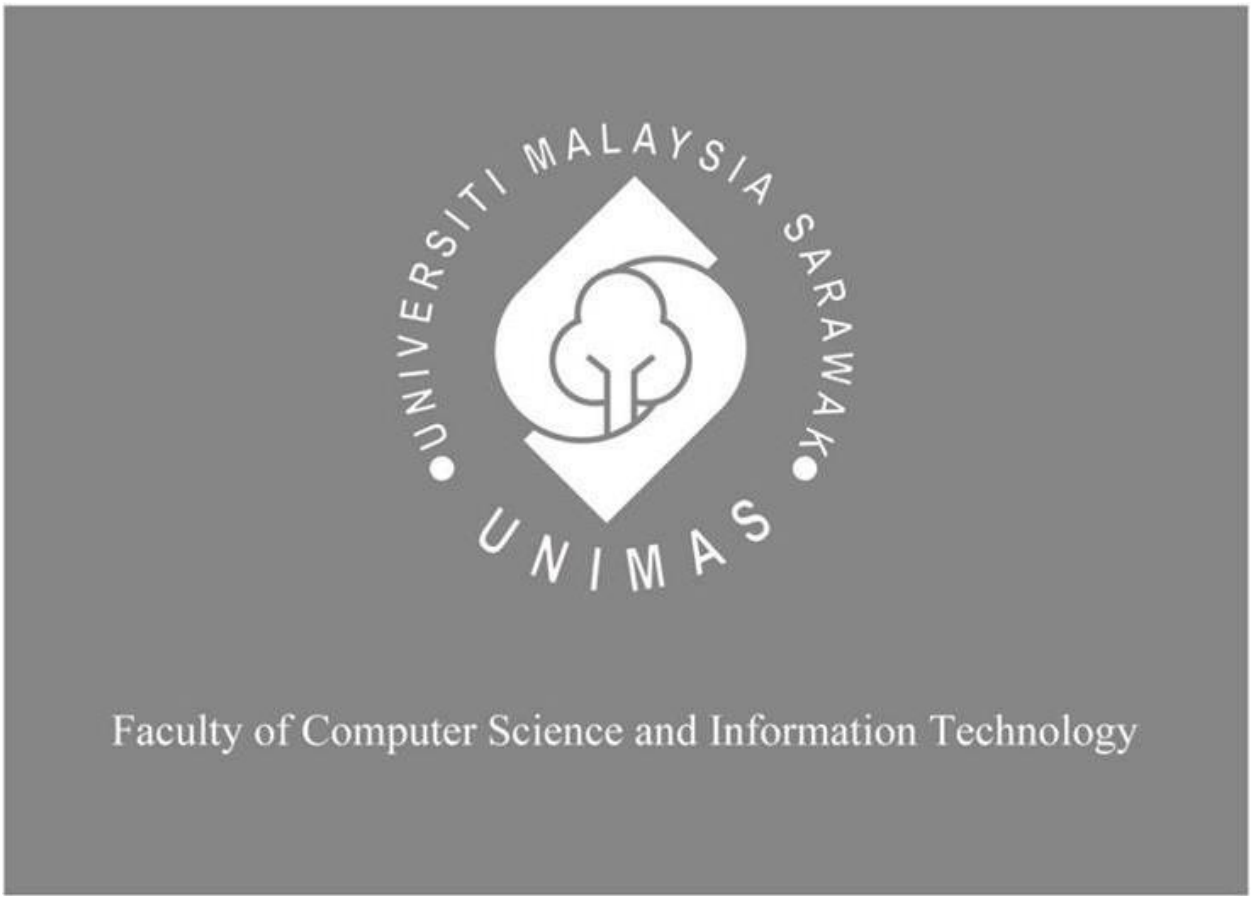

INVENTORY MANAGEMENT APPLICATION FOR ONLINE SELLER

You Hui Ling

Bachelor of Computer Science with Honours
(Multimedia Computing)
2019

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YOU HUI LING

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of the requirements for the degree of
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ABSTRACT

E-commerce is growing rapidly due to the rapid development of mobile application. Many people start to work as a fulltime or a part time online seller. However, online seller faces difficulties while managing with the inventory as manage inventory manually waste a lot of time and hard to keep track with it. In this project, a mobile application is developed in order to overcome the problem of online seller to manage their inventory as well as keep track with their inventory. In this paper, the development of the proposed application will be discussed. A questionnaire also conducted in order to find out the problem faced by online seller as well as users' expectation toward the application. The methodology used to develop the proposed application is rapid application development (RAD) and this methodology will be discussed in this paper. Finally, this project is expected to meet the requirement of the online seller on an inventory management system and gain more users and users' trust on the application. In a nutshell, this project work could contribute to online seller in order to management their inventory using a mobile application.

ABSTRAK

E-dagang sedang berkembang dengan cepat kerana perkembangan dan kegunaan aplikasi mobile semakin cepat dari sehari ke sehari. Banyak orang mula bekerja sebagai penjual online sepenuh masa atau separuh masa. Walau bagaimanapun, penjual online mengalami masalah untuk mengurus inventori kerana mengurus inventori secara manual sangat membazirkan masa dan susah bagi mereka untuk mencari rekod-rekod inventori. Dalam projek ini, satu aplikasi mobile akan dibinakan untuk menyelesaikan masalah penjual online semasa menguruskan inventory mereka. Soal selidik telah dijalankan untuk mencari masalah yang dihadap oleh penjual online semasa mengurus inventori dan jangkaan pengguna terhadap aplikasi yang akan dibinakan. Kaedahologi yang akan digunakan semasa membinakan aplikasi ini ialah rapid application development (RAD) dan kaedahologi ini akan dibincangkan dalam projek ini. Akhirnya, projek ini dijangka akan mencapai keperluan pengguna terhadap aplikasi pengurusan inventori dan menambah lebih banyak penggunna dan dapat kepercayaan pengguna.

CHAPTER 1: INTRODUCTION

1.1 Introduction

Ecommerce is growing by leap and bounce nowadays due to the development of communication technology. According to Schoder, Ding and Campos (2016), It is currently appeared to be a marketing channel for various products and services that is growing the fastest. Sellers and buyers now are no longer restricted by the operating hours, physical and geographical marketplace or the catalog mailing list. Sellers nowadays tend to sell their products and services online through ecommerce platform or social media. However, a new problem arises due to the growth of ecommerce which is the online seller started to face difficulty to keep track and record their inventory when the amount of inventory become larger.

Muller (2019) stated that raw materials, work-in-process, supplies used in operation and finished goods are all considered as inventory. To build a successful ecommerce or online retail brand, an effective inventory management is very important because it can help online seller to have better inventory planning and managing which can help to prevent overstock items. Inventory management also can increase productivity and efficiency because less time and resources are spent. It can help online seller to fulfill order on time and more accurately.

In recent years, smart phone has become one of the essential tools that people will use in their daily life. Ma, Gu and Wang (2014) claimed that as the smart phone and android system getting more widely used, people tend to do almost everything like listen to music, watch video, record important memo etc. by using a smart phone. Hence, by developing an android mobile application of inventory management system, it enables the online seller to manage their inventory easily at their fingertips. It let the online seller can keep track and record their inventory at any location and respond to buyers' inquiries faster by using the application. In the end of this project, a user-friendly inventory management application will be developed for the online seller to increase their productivity and efficiency while handling their inventory.

1.2 Problem Statement

Although there is quite many inventory management application had been developed, the number of online sellers that choose to use the application to manage their inventory is not many. There are several reasons that caused these phenomena to happen which are bad user interface (UI) design and user experience (UX), usability problems and different users' expectations.

The major reason why a user abandons an application is usually due to the bad UI and UX of the application. According to Maioli (2018), not only users will be frustrated by a badly designed UI and UX, it will also give a great impact on a business especially when we talked about the online business. Bad design of an application includes information overload, complexity, not-responsive design, inconsistent style and etc. The design of the UI and UX should be focus during developing an application so that user retention can be improved.

Other reason that caused low user engagement and low user retention of an application is usability problem. If an inventory management application is confusing and difficult to use, most of the user will choose to abandon the application immediately and choose another application. Regular and consistence testing should be done continuously to avoid bugs and improve the performance of the application.

Last but not least, another problem while developing an application is different user expectations. Santos, Kroll, Sales, Fernandes and Wildt (2016) stated that the challenge in developing a mobile application is the diversity of users and their expectations. An application can be downloaded by millions of users and have users from different country. Each user has their own expectation and preferences toward the application. Hence it makes an application harder to satisfy the expectation due to the large diversity of the users.

1.3 Scope

The scope of study can be divided into 3 categories which is the goals of the project, the target users that involved in the project and the development tools used.

i. Goals

The goal of this project is focus on developing of an android mobile application that can increase the productivity and efficiency of the users when dealing with their inventories. Besides, the main idea of the project is to promote an easier way for the users to manage their inventory other than using the traditional manual inventory management that is inefficiency and costly.

ii. Target Users

The users that had been targeted in this project is the users that selling their products or services on the e-commerce website or social media. Besides of the online sellers, the users that conducting a small business is also one of the application's target user.

iii. Development tools

The main development tool that had been chosen to develop the inventory management application is Android Studio which is the official integrated development environment for Google's Android operating system. Java programming language will be used to develop the application while local SQLite database is chosen as the application database.

1.4 Aims and Objectives

The aim of the project is to develop a user-friendly and approachable android mobile application of inventory management system for online seller.

The objectives of the project include:

- To develop an inventory management application that enable user to keep track and record inventory details.
- To enable user to check inventory status, price and quantities at any location.
- To enable user to record and check customers' order list.

1.5 Brief Methodology

In this project, the methodology applied is Rapid Application Development (RAD) model. RAD is an agile framework that is focusing on working system, rapid prototyping of the application as well as the user feedback. According to Khalid, Zhara and Khan (2014), agile is an emerging software engineering methodology which is based on users and embracing changing needs of users. RAD methodology has been chosen for inventory management application development due to its speed and ability to make quick change. RAD methodology is suitable to use while developing an application because it can assure different phrases of the software development life cycle and it is able to solve the issues occur during the mobile application development more efficiently. Traditional application development methodology not suitable to apply in mobile application due to the rapid requirement of the mobile application users. Hence, agile methodology which has a short development cycle is more suitable.

RAD methodology consists of four main phases which is requirement planning, requirement analysis, user design as well as implementation. By using RAD methodology in application development, the project can be divided by short and transparent iterations which will decrease the price for the changes implemented in the application.

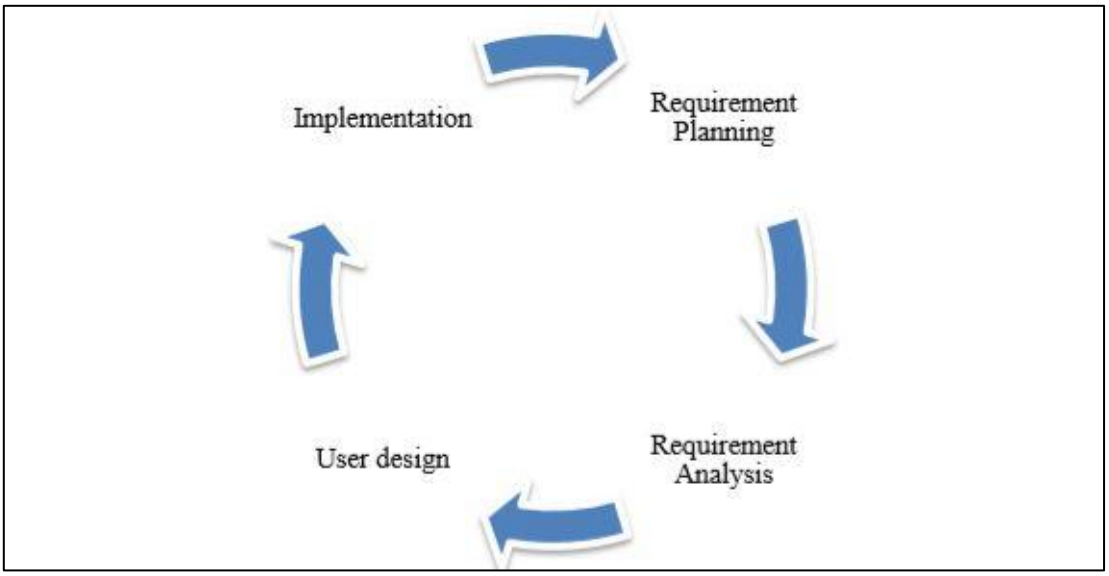

Figure 1.1: RAD methodology phases

1.6 Significance of Project

The inventory management application is developed to increase the productivity and efficiency of the online seller to manage their inventory rather than using the manual inventory management. The application enables user to keep track and record inventory details easily at their fingertips. Other than that, the application also let the user to check their inventory status, price and quantities at any location and any time. Another function of the application is it can also enable user to record and check customers' order list and shipping status.

1.7 Project Schedule

Task Mode	Task Name	Duration	Start	Finish
	Final Year Project 1	**60 days**	**Fri 20-09-19**	**Thu 12-12-19**
	Brief Proposal	7 days	Fri 20-09-19	Sun 29-09-19
	Full proposal	16 days	Mon 30-09-19	Sat 19-10-19
	Chapter 1	7 days	Sun 20-10-19	Sat 26-10-19
	Chapter 2	17 days	Sun 27-10-19	Sat 16-11-19
	Chapter 3	15 days	Sun 17-11-19	Thu 05-12-19
	Final Report	5 days	Fri 06-12-19	Thu 12-12-19
	Final Year Project 2	**96 days**	**Wed 01-01-20**	**Wed 13-05-20**
	Requirement Gathering	6 days	Wed 01-01-20	Wed 08-01-20
	Data analysis	6 days	Thu 09-01-20	Thu 16-01-20
	Develop concept model	10 days	Fri 17-01-20	Thu 30-01-20
	Develop Design	12 days	Sat 01-02-20	Mon 17-02-20
	Development of application	45 days	Mon 17-02-20	Fri 17-04-20
	Implementation	4 days	Sat 18-04-20	Wed 22-04-20
	Testing	3 days	Thu 23-04-20	Sun 26-04-20
	Evaluation	3 days	Mon 27-04-20	Wed 29-04-20
	Maintanance	3 days	Fri 01-05-20	Tue 05-05-20
	Final Report	4 days	Wed 06-05-20	Mon 11-05-20
	Presentation	2 days	Tue 12-05-20	Wed 13-05-20

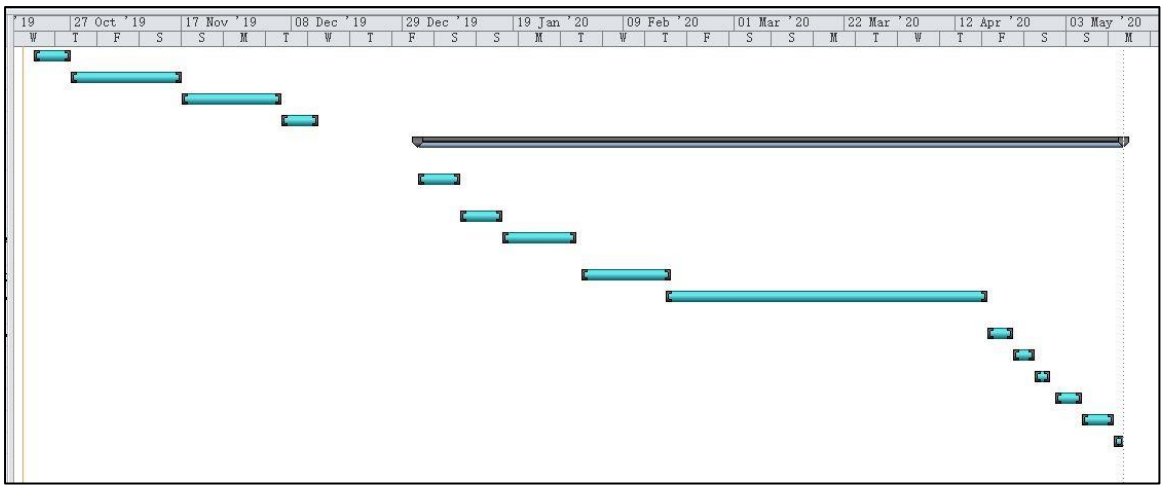

Figure 1.2: Gantt Chart of the project schedule

1.8 Expected Outcome

In the end of the project, a user-friendly android mobile application of inventory management system for online seller will be developed.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Literature review is an important part in the entire research work because it discusses and do a summary of the statistic literature which relevance to specific area and topic of the research problem. In this chapter, literature review will focus on the existing inventory management mobile application which is similar to the topic. In order to develop a better application, feature and technology used in the similar application had been identified. By doing the review on the existing application, the strength of the system can be implemented into the application and the weakness of the system can be detect and improve while developing the application. Literature review gives a clear idea on designing the features and technology that will be used to develop the proposed application. There are three journal that will be reviewed in order to identify its pros and cons as well as make a comparison with the proposed application. Three journal that had been selected are:

- An Android Inventory App
- E-Inventory management system using android mobile application at Faculty of Engineering Technology laboratory stores
- Designing Intelligent Secure Android Application for Effective Chemical Inventory

2.2 Review Similar Application

In this section, three existing application that similar to the topic will be reviewed and then compared it with the proposed application.

2.2.1 An Android Inventory App

This journal is written by V. Shiva Prasad, D.V.S Mythili and Ruhi Sania in February 2019 that is published in International Research Journal of Engineering and Technology (IRJET). In this paper, an android inventory application that combined inventory management and e-commerce had been discussed. This application involved two user which is the customer and the seller. According to Prasad, Mythili and Sania (2019), this android inventory application let user to follow sales and consignments thus formulate it effortless for user to organize more from the listed e-commerce platform. The inventory management application able to list out all products with their corresponding stock available because it has a real time database which is able to hold a huge number of data.

Moreover, the application had designed various functions for both users. In order to start using the application, customer need to login using the correct username and password. Error massage will pop up if customer insert either username of password incorrectly. However, the user interface design for the login page in this paper is not so nice due to the background color selected. User might find it hard to see the words due to the background color. The main feature used by the customer is the search and order function in the application. Customer can search for the product in the catalog of the application and make order with the seller by using application. If the customer wish to order more products that is not available in the system presented, customer can click on the "Order more" button designed at the top right corner of application and send an email to the seller to make order by providing how many products the customer wants. This function let customer to order the products easily through this inventory application. Once an order is made, the customer will receive a confirmation email from the seller.

Figure 2.1: Interface of catalog

Figure 2.2: Interface of login

In the other hand, the functions designed by the authors for the seller is different with functions of customers. After login to the application system, seller can edit the cost of products, amount of stock available, details of the supplier, and upload a picture of the product. Thus, seller is able to keep track with their inventory and manage them in a simpler way. Seller can add, remove as well as update a new product in the system so that the customer can track the availability of stock easily using the application. Prasad, Mythili and Sania (2019) stated that a variety of data is used to keep track of the inventory which including the lot numbers of stock, serial numbers of stock, cost of stock as well as the quantity of stock.

Figure 2.3: Interface of adding an item

Figure 2.4: Interface of editing an item

2.2.2 E-Inventory management system using android mobile application at Faculty of Engineering Technology laboratory stores

The authors of this paper are Rohana Abdullah, Kek Zi Xiang and Muhammad Ilman Hakimi Chua Abdullah and it is published in Proceedings of Mechanical Engineering Research Day 2018. This application is developed to do inventory control for laboratories in Faculty of Engineering Technology, Universiti Teknikal Malaysia Melaka (UTeM). According to Rohana, Kek and Muhammad (2018), current system of laboratories in UTeM still using manual record keeping and retrieving which is using a yellow form and an Excel spreadsheet. By doing the inventory control manually, the academic laboratory of UTeM facing issues with inaccurate inventory record. Hence, an electronic inventory control mobile application named E-Inventory was developed in order to improve the accuracy of inventory record and manage the inventory properly. E-Inventory has help Faculty of Engineering Technology, UTeM to improve the efficiency of the laboratory consumables materials management.

In the process of developing E-Inventory, the methodology used is System Development Life Cycle (SDLC). The SDLC consists of five main phases which is project planning, system analysis, design, testing and implementation. At the project planning phase, it mainly focuses on how to solve the inventory management problem of the laboratories and analysis the existing application as well as relevant technology. Next, interview session had

been conducted at system analysis phase to gather information regarding the current method used by the laboratories management.

After gathering the information, system design phase had been carried out. At this phase, the basic requirement of software, hardware and network were identified. E-Inventory uses Fireball cloud database to manage and store the data and Android Studio is chosen for developing the application. A barcode scanning feature was developed in E-Inventory application. By scanning the barcode using the application, it is able to show the product details such as name and quantity. Besides, it can also use to record the product movement coming in or out of the laboratories store. By clicking at the inventory items button, user can see all items' information and its quantity. User also able to add new products into the system by using E-inventory. Moreover, transaction report regarding the products can be generated and view in the application. Figure below show the home page of E-Inventory.

Figure 2.5: E-Inventory Home Page

2.2.3 Designing Intelligent Secure Android Application for Effective Chemical Inventory

This paper is written by Mohd Afizi Mohd Shukran et al in 2017 and it had been published in OP Conf. Series: Materials Science and Engineering as an open assess article. In

this paper, an automated chemical inventory management application for schools, universities or other education institutions was developed in order to improve the lab safety issue as well as efficiency of the laboratory. As stated by Shukran et al (2017), laboratory assistant might encounter problem of spending too many time on searching for chemical inventory or fail to track the availability of certain inventory if using the old manual inventory management method. By using the automated chemical inventory management application, it let the management of chemical inventory easier because it allows user to keep track of the real time inventory status and able to control the usage of chemical inventory. Hence, the quality of the chemical laboratories can be enhanced because the application can help to identify which inventories are unsuitable and inappropriate to be used by student or have the potential to harm environment.

In order to use the application, user authentication is needed in order to protect the data of chemistry laboratories. User need to log in the system using the correct username and password. If the user failed to provide the correct username and password, the application will not allow user access to the system. The login authentication is very important in order to prevent the unauthorized user from misuse the application. The main idea of the application is the usage of QR code on getting chemical inventory information and monitoring the movement of the inventory. By scanning on the QR code inventory, the user can get every single details of the chemical product such as manufacturing and expired date, chemical name, quantity of chemical product, description of chemical product and also the location of it. Besides, user can also check the availability of certain chemical product, add new product, delete product and also update the detail of the chemical product by using the chemical inventory mobile application. Below shows the figure of user interface of the proposed secure mobile chemical inventory system by the authors.

Figure 2.6: User interface of the proposed secure mobile chemical inventory system

2.3 Comparison of Features in Similar System

System / Features	E-Commerce Inventory App (2.2.1)	E-Inventory App for laboratories (2.2.2)	Chemical Inventory App (2.2.3)	Proposed Inventory App for Online Seller
Login	✓	✓	✓	✓
Sign Up	✓	✓	✓	✓
Home	✓	✓	✓	✓
View	✓	✓	✓	✓
Edit	✓	✓	✓	✓
Add	✓	✓	✓	✓
Delete	✓	✓	✓	✓
Generate Report	×	×	✓	✓
Search	✓	×	×	✓
Scan	×	✓	✓	×
Upload photo	✓	×	×	✓
Real time database	✓	✓	✓	✓

Table 2.1: Comparison of Features in Similar System