



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**THE DEVELOPMENT OF SMART POINT OF SALE SCANNER
FOR SHOPPING MALL**

This report submitted in accordance with requirement of the Universiti Teknikal
Malaysia Melaka (UTeM) for the Bachelor Degree of Electronic Engineering
Technology (Telecommunication) (Hons.)

by

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Electronic Engineering Technology (Telecommunications) (Hons.). The member of the supervisory is as follow:

.....
(Encik Wan Norhisyam Bin Abd Rashid)

ABSTRACT

At present, usually jams when paying at the cashier is always the case, especially on holidays in supermarkets. We can usually see this situation where customers have to queue up to pay. Probably, with this "The Development of Smart Point of Sale Scanner for Shopping Mall" project, this problem can be solved. These projects can reduce the number of customers at the cashier. By using this scanner technology, customers will only need to tag the items purchased by them before they put it into the cart. It is noted that each goods have different barcode ID. Therefore, scanner that function as scanner will tag in item is scanned and the item information data will be kept automatically. At the line-out, information data that in keep that will in send through RFbee wireless by dispatching sum payment information and item in cashier counter, hence customer will know sum payment that need to be paid and receipt copy will be given. Therefore this system can prevent fraudulent. This can speed up the process even with lots of customers at the cashier counter. Overall this project fully use the hardware and software. This project aims to reduce congestion of the queue when the customer wants to pay at the cashier counter. At the same time, to prevent fraud from happening.

ABSTRAK

Pada masa kini, kebiasaannya kesesakan ketika membayar di kaunter juruwang selalu berlaku terutama pada hari cuti di pasaraya. Kita biasanya dapat melihat situasi ini dimana pelanggan terpaksa beratur panjang untuk membayar. Mungkin dengan adanya projek “The Development Of Smart Point Of Sale Scanner For Shopping Mall” ini masalah yang berlaku dapat di atasi. Projek ini dapat mengurangkan barisan Q ketika di kaunter juruwang. Dengan menggunakan teknologi yang dikenali sebagai pengimbas, pelanggan hanya perlu tag barang yang dibeli oleh mereka sebelum mereka meletakkannya ke dalam troli. Sedia maklum setiap barang yang di beli mempunyai barkod yang berbeza. Oleh itu, alat pengimbas yang berfungsi sebagai pengimbas akan tag pada barang yang diimbas dan data maklumat barang tersebut akan disimpan secara automatik. Apabila di barisan keluar, data maklumat yang di simpan tersebut akan di hantar melalui Rf Bee dengan menghantar maklumat jumlah bayaran dan nama barang di kaunter juruwang, oleh itu pelanggan akan mengetahui jumlah bayaran yang perlu dibayar dan salinan resit akan diberi. Oleh yang demikian sistem ini dapat mengelakkan unsur penipuan. Malahan proses ini dapat mempercepatkan lagi pelanggan ketika membayar di kaunter juruwang. Secara keseluruhan projek ini menggunakan perkakasan dan perisian sepenuhnya. Projek ini bertujuan untuk mengurangkan kesesakan dari beratur panjang ketika pelanggan hendak membayar di kaunter juruwang. Pada masa sama untuk mengelakkan dari berlaku unsur penipuan.

DEDICATIONS

To my beloved parents

Selamat Bin Ramlan

Minah BintiYunus

To my supervisor:

Encik Wan Norhisyam Bin Abd Rashid

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LIST OF SYMBOLS AND ABBREVIATIONS

CCD	=	Charge-couple Device
dBm	=	Decibel milli
FS	=	Fixed Service
GUI	=	Graphical user interface
ID	=	Identification
IDE	=	Integrated Development environment
LANMAR	=	Landmark Routing Protocol
LCD	=	Liquid-Crystal Display
MHz	=	Mega Hertz
MPLS	=	Multiprotocol Label Switching
POS	=	Point of Sale
RF	=	Radio Frequency
RFID	=	Radio Frequency Identification
UART	=	Universal Asynchronous receiver / transmitter
UPC	=	Universal Product Code
USB	=	Universal Serial Bus

CHAPTER 1

INTRODUCTION

This chapter focuses on the project's introduction, background, problem statement, objectives and project's scope regarding the project. The development of scanner at shopping mall will be explained more in details. The problem statement states the reason why this project is being conducted. Then, at the end of the chapter the organization of the thesis will be explained.

1.0 Introduction

Shopping has changed overall in recent years. The people now prefer to go to a shopping mall to buy groceries, household and essential goods. Nowadays, with the availability of the supermarket, hypermarket and shopping mall in town or city, it has become a must to go place to visit and get the essential goods. Shopping malls are one of the place that people like to come and outing with their friend and family. In addition, currently, shopping mall is a situation where the masses bring their day-to-day requirements of life, including food products, clothing, electrical appliances and others.

Nowadays numbers of large as well as small shopping malls have increased throughout the world caused by increasing demands of the public. Occasionally customers have problems regarding the incomplete information of the product and the time spent while queuing at the billing counters. Continuous improvement is called for in the traditional billing system to better the tone of shopping experience to the clients.

It has become a trend for the people to buy things online rather than spending time at the shopping mall. Perhaps for them to prevent from facing traffic congestion and facing people congestion when spooned. Apart from that, to prevent from idle

away too long queue in cashier counter when pay. Therefore, a method was introduced which it already have been somewhere modern shopping mall. Among them, scanning the barcode by itself for every detail. Normally, this situation we will assure in any supermarket or shopping mall.

Established on the observation, one of the project will be created using the newfangled technology, which is devices and software will combine to develop the project. This project, known as The Development of Smart Point of Sale Scanner For The Shopping Mall. The project will be using scanner and other hardware to make one project. Problem line up length is a trouble and complaint that used to be taken over in a supermarket or shopping mall regarding the shopping experience. The aim of this project is to ease people when they desire to pay their groceries at a shopping mall or store shop.

This project will reduce the queuing line at the cashier counter. Moreover, there are functions to make sure able to know the details of each product including their prices. Other than that, this project will automatically detect the product item and then it will know the total of payments so it is convenient for people to pay when they arrive at a cashier counter because they know already how much they need to pay.

1.1 Background

In this project, the main area is focused on the shopping mall or supermarket. The purpose of this project is to reduce the queuing line at cashier counter and to convenient the customer when them to buy the stuff. By using a barcode scanner, the customer will be used own self to scan the barcode item and no longer needs help staff to find the information about good purchased when shopping at a shopping mall. Barcode scanner as a main device to implement the project. A barcode scanner is an electronic device that could be reading the output to produce the barcode to a computer. The basic concept of this project is by using a barcode scanner, the number of barcode items will be detected when the barcode scanner are scans. However, Arduino UNO and several of the Arduino device are used in this project as a controller and then transmit the number of barcode items. Besides that, RF Bee as a

wireless communication will be to transmit and receive the data. Visual basic will receive a number of barcode to transfer into the database. Thus, visual basic will transmit the data to display the main information such as name of the item and price on the LCD keypad shield. Lastly, at the counter cashier the data will receive and interface will display on the screen of the cashier counter.

The visual basic are one of the software are used to display the GUI (graphical user interface). This part will display the information such as name of item, price and total. The data will be stored in a database.

1.2 Problem Statement

Payment process usually often not go smoothly and orderly in fact customer has to queue length and require a time waiting on cashier counter. Queue problem has been a major problem with a shopping mall or supermarket. Usually, clients need to queue up for a long time to pay for goods they purchased. This trouble may be a re encounter with the existence of a new project invented specifically to resolve problems. The Development of Smart Point of Sale Scanner Of Shopping Mall acts to help in minimizing the queue time, of customers to pay for the goods item at the cashier.

Ultimately, by applying this system will bring many benefits and it can also save time, apart from that can prevent disorder when paying at the cashier counter.

1.3 Project Objective

This proposed project that is the development of smart point of sale scanner of the shopping mall was developed using the highest technologies to give more convenience to the user. Instead, there are several objectives as follows:

- 1) To design a system based on scanner technology that reduce the queuing line at the cashier counter.

- 2) To program the system using visual basic and to implement the system at the grocery shop.
- 3) To analyze the effectiveness of the system designed in the grocery shop.

1.4 Scope of Project

The scopes of this project involved the design of the scanner, application of the scanner barcode, Arduino and visual basic. To go through the sensor to detect the barcode by using a scanner and at the same time, the information will be salted away in Microsoft access. The scanned barcode which is located on the object to be identified will be used as the data carrier in the system. The scanner barcode has the characteristics of a number code that can identify a data item and display information on the screen counters.

This project needs one stored to keep the information from barcode scanner at the trolley. Other than that, this system will display name of product, number of barcode and a price. This project will use a scanner where it is more convenient due to its can operate without power supply. Hence, Arduino as a controller and link between barcode scanner and visual basic. Then, RF Bee 433MHz UART wireless module as a wireless communication function as transmit the data to counter cashier.

For the first part, focus on the barcode scanner. When the customer scans the barcode item using the barcode scanner. The data will be stored from the barcode scanner. Then, the barcode scanner is linked with USB Host shield. In this part, focus on how the barcode scanner will detect the barcode number and how the data will be stored. Then, the USB Host shield is compatible with Arduino UNO. Apart of this, Arduino IDE software is used to ensure this device are connected and can be connected to another Arduino.

1.5 Organization of Thesis

Generally, this thesis is divided into five chapters which is to explain all the flows and efforts in completing this project. Each chapter will discuss on different issues related to the project. The thesis cover on the introduction, literature review, research methodology, discussion, conclusion and recommendation.

The first chapter will give the overview of the project. By means that even people do not follow the development of project until the end they can still know about the project through the overview. The overview includes of Project Introduction, Problem Statement, Project Objectives, and Scope of Work. The objective that create based on the aim why this project was conducted and the project scope about the methodology. Then, the problem statement states the reason why this project is conducted.

Next, Chapter 2 concentrates on the literature review that will describe all the information that was referred as a reference in order to finish up the project. Basically literature review will contain the facts or other aspect that we need that correspond to the project that will build. For this project, the literature review covers the thing about a cashier payment system that are used all around the world. The chosen literature review also explains the basic knowledge of scanner, Arduino and also laser.

Next, Chapter 3 will states and discuss about the methodology taken to complete this project with success based on the given period of time. Methodology is the important aspect as it is the beginning process of planning. If the methodology are not organized only then will encounter the problem involve in the project.

Meanwhile, Chapter 4 show the result were obtained from the system testing and modified in order to achieve the overall objectives of the project. Chapter 4 considers as an important part also because the project will fully finish if the result are obtained as well as planned. Thus a lot of time has to put to carry out this chapter.

Finally, Chapter 5 after through all the process and successful to achieve the objectives as stated in the earlier chapter. The project can be concluded and explain the detail in this chapter. Other than that, a future recommendation for this project also includes improving this project for the future improvement and upgrade.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter will explain about the previous development of the customer shopping experience system that is currently used around the worlds. The states that are using customer shopping experience system includes of United State, Europe, Japan, and many other nations. Also, this chapter will focus on the scanner, Arduino, laser and wireless. In accession, it will concentrate on the hardware and software that will be utilized for the project. This chapter is also provided with the research development that has been done to collect all the information about the main idea of this project. The source came from the journals and articles wrote by the previous researchers which related to this project. Their theory and results help this research as they can be a comparison between this research and theirs.

2.1 Evolution of Customer Shopping Experience System Development

2.1.1 Universal Product Code (UPC)

The Universal Product Code is a unique 12-digit number assigned to retail merchandise that identifies both the product and the vendor that sells the product. It is a bar code that consists a price, name of the product and etc. Besides that, it also provides the real time data on store traffic and the item should include the data in order. The UPC on a product typically appears next to its bar code, the machine-readable representation of the UPC. Meanwhile, it is experienced as a UPC which is a barcode symbology. UPC currently used in the United States, Canada, Britain, New Zealand, and Australia and also other countries in the world this is because for