UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF COIN COLLECTOR NOTIFICATION SYSTEM USING GSM

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronics Engineering Technology (Telecommunications) with Honours.

by

AHMAD ADIB BIN RUSLI
B071410718
9210625146715

FACULTY OF ENGINEERING TECHNOLOGY
2017

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: **DEVELOPMENT OF COIN COLLECTOR NOTIFICATION SYSTEM USING GSM**

SESI PENGAJIAN: **SEMESTER 1 2017/2018**

Saya **AHMAD ADIB BIN RUSLI**

mengaku membenarkan Laporan PSM ini disimpan di Perpustakaan Universiti Teknikal Malaysia Melaka (UTeM) dengan syarat-syarat kegunaan seperti berikut:

1. Laporan PSM adalah hak milik Universiti Teknikal Malaysia Melaka dan penulis.
2. Perpustakaan Universiti Teknikal Malaysia Melaka dibenarkan membuat salinan untuk tujuan pengajian sahaja dengan izin penulis.
3. Perpustakaan dibenarkan membuat salinan laporan PSM ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. **Sila tandakan (✓)

☐	SULIT	(Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia sebagaimana yang termaktub dalam AKTA RAHSIA RASMI 1972)
☐	TERHAD	(Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)
☐	TIDAK TERHAD	

Disahkan oleh:

_____ _____

Alamat Tetap:

No 12A, Jalan WM 3/1,

Bandar Behrang 2020,

35950 Behrang Stesen,Perak D.R

Cop Rasmi:

Tarikh: _____ Tarikh: _____

** Jika Laporan PSM ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa/organisasi berkenaan dengan menyatakan sekali sebab dan tempoh laporan PSM ini perlu dikelaskan sebagai SULIT atau TERHAD.

DECLARATION

I hereby, declared this report entitled “Development of Coin Collector Notification System using GSM” is the results of my own research except as cited in references.

Signature :
Author’s Name : AHMAD ADIB BIN RUSLI
Date :

APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as apartial fulfillment of the requirements for the degree of Bachelor of Electronic Engineering (Telecommunication) with Honours. The member of the supervisory is as follow:

……

(Project Supervisor)

ABSTRAK

Pada era globalisasi ini, dunia kian pesat membangun dan manusia semakin matang menguruskan perihal hidup masing - masing. Ini dapat dilihat dari pelbagai aspek antaranya kehidupan yang bertukar kearah kemodenan. Oleh kerana kemajuan yang diperolehi hari ini, manusia mula mengunakan teknologi untuk menjadikan kehidupan lebih teratur. Selain itu, taraf hidup yang tinggi menyebabkan ramai peniaga mula beralih kearah perniagaan yang mengurangkan kos perbelanjaan tetapi mampu menghasilkan pulang yang lumayan, antaranya ialah perniagaan mesin layan diri. Dengan adanya mesin tersebut, peniaga hanya meletakan mesin tersebut dilokasi yang mempunyai daya tarikan dan hanya mengambil wang keuntungan mengikut jadual setiap bulan. Kajian ini dibuat untuk membantu peniaga menguruskan perniagaan dengan lebih teatur. Sistem yang dihasilkan ini mampu untuk menghantar pesanan dalam bentuk sistem pesanan ringkas terus kepada peniaga sekiranya tabung duit syiling yang terdapat pada mesin layan diri telah penuh. Hal ini dapat membantu peniaga terus ke lokasi untuk mengambil hasil tabung dan tidak perlu mengikut jadual bulanan seperti sebelum ini. Selain itu, kajian ini turut menghasilkan bacaan yang tepat ketika menghantar pesanan ringkas kepada peniaga mengikut bacaan nilai syiling yang ditetapkan didalam tabung. Sistem ini turut dilengkapi dengan slot pengasingan duit syiling, yang mana mampu memudahkan peniaga mengasingkan nilai mengikut kategori duit syiling. Teknologi ini tehasil daripada gabungan sistem GSM sebagai penghantar pesanan ringkas manakala Arduino dan sensor digunakan bagi tujuan membuat kiraan dan memastikan nilai yang dikumpul adalah tepat. Sistem yang dihasilkan ini sedikit sebanyak mampu untuk memastikan peniaga dapat menguruskan akaun setiap mesin layan diri mereka dengan lebih teratur.

ABSTRACT

In this era of globalization, the world is growing rapidly and humans are becoming mature in managing their respective lives. This can be seen from many aspects of life that are turning to modernity. Due to the progress made today, humans began using technology to make life more organized. In addition, a high standard of living causes many traders to move towards a business that reduces the cost of spending but is able to generate lucrative returns, such as vending machines business. With such a machine, traders simply put the machine in a location that has the charm and only take profit money on schedule each month. This study is designed to help traders manage their business more efficiently. The resulting system is able to send notification in the form of short message system directly to the trader if the coin found on the vending machine is full. This can help the trader direct to the location to get the machine outcome and not have to follow the monthly schedule as before. In addition, this study also produces the accurate reading when sending short messages to traders according to the value of coins set in the tank. The system is also equipped with coin separate slots, which can facilitate traders to separate value by category of coin. This technology is complemented by a combination of GSM as a notification system while Arduino and sensors are used for calculation purposes and ensure that the values collected are accurate. The system is designed to ensure that traders are able to manage the accounts of each vending machines more organize.

DEDICATION

To my beloved parents, I acknowledge my sincere indebtedness and gratitude to them for their love, dream and sacrifice throughout my life. Their sacrifice had inspired me from the day I learned how to read and write until what I have become now. I cannot find the appropriate words that could properly describe my appreciation for their devotion, support and faith in my ability to achieve my dreams.

ACKNOWLEDGEMENT

First and foremost, all praise to Allah the Almighty for giving me the strength, health, knowledge and patience to successfully complete this Finale Year Project report in the given time. I would like to address my deepest appreciation to the supervisor, Madam Siti Asma Binti Che Aziz and my co-supervisior Madam Aziean Binti Mohd Azize for his encouragement, comments, guidance and enthusiasm through the time developing the report. This project report might be impossible to complete without all of your help. Last but not least, thank you to everyone that directly and indirectly involved in helping me finishing this Finale Year Project report. Thank you.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS, SYMBOL AND NOMENCLATURE

IR	-	Infrared
RFID	-	Radio frequency identification
I/O	-	Input or Output
IDE	-	Integrated development environment
PC	-	Personal Computer
PCB	-	Print Circuit Boards
PWM	-	Pulse Width Modulation
USB	-	Universal Serial Bus
EMF	-	Electromotive Force
LED	-	Light Emitting Diode
EDGE	-	Enhanced Data rate over Gprs Evolution
SMS-C	-	Short Message Service Centre
BSS	-	Base Station Subsystem
BTS	-	Base Transceiver Station
SIM	-	Subscriber Identity Module
FDD	-	Frequency Division Duplexed
ARFCN	-	Absolute Radio Frequency Channel Number
FCA	-	Fixed Channel Allocation
GSM	-	Global System for Mobile Communication
SMS	-	Short Message Service
LCD	-	Liquid Crystal Display
GPRS	-	General Packet Radio Service
MMS	-	Multimedia Message Service

MSC	-	Mobile Service Centre
AMPS	-	Advanced Mobile Phone System
VLSI	-	Very Large Scale Integration
TDMA	-	Time Division Multiple Access
HSCSD	-	High Speed Circuit Switch Data
3G	-	Third Generation
4G	-	Fourth Generation
WAP	-	Wireless Application Protocol
WWW	-	World Wide web
HSDPA	-	High-Speed Downlink Packet Access
SDL	-	Serial Data Line
SCL	-	Serial Clock Line

CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter significant focus is introduction, problem statement, objectives and projects scope relating to the project. The explanation about development coin collector notification using GSM will be describe. The problem statement will show the reason project is carried out and build up. Moreover, at the end of this chapter will explained about thesis and organization to complete it.

1.1 Introduction Of Project

Speaking of technology, we do not run from the evolution or change. Sometimes it may be a very interesting things, and sometimes it may become annoying things. In this modern era, many things would be conducted by humans within a short time. The one that very common people would like to do is easy shopping. Now with the Internet technology, people can simply choose what type items there want and it could be purchased by the user with just one click into the web or application in the mobile or computer. The trends is help people to save their time and also sometimes it more cheaper compare to price in shopping malls or boutique.

Besides the online shopping, the demands of people can be seen more in ease their daily life style such as drinks and eat, and sometimes they want snacks or candy while waiting a train. Therefore various high-tech products was manufactured by engineering companies to archive the customer desire. Beyond the demands of public,

there are also some smart entrepreneurs take advantage of appearing at this time to generate a machine that can provide a satisfaction to the users and also able to provide convenience to customers. Among the invention that capable to generate lucrative incomes to entrepreneurs and most obvious during this time is, vending machine. The machine is appeared in various guises and each machine provides various types of sales, such as water cans, snacks, coffee and a lot of things.

Based on the observation, the vending machine will have a coin collector to store their coin. Basically all the data when the coin is coming will not be calculated by owner of machine. This project, known as the development of coin collector notification using GSM. On this project, the GSM will used to notify the owner and other hardware also will be used to form one project. The purpose of this project is to ease the entrepreneurs to manage their time to collect the coin in their vending machine, beside the accurate amount will automatically send to their mobile phone.

1.2 Background

This project, main focused is in every type of vending machine that's using coin as exchange to the product sell. The purpose of this project is to help owner of vending machine to manage their time by using new technology beside give an accurate data storage. By using this system, owner can be easily collect their coin in storage box before the coin is full besides also can load back their products sell on time. This new system is designed to receive each coin entry and will count every coin that goes by the value of the coins. This project uses a combination of Arduino Uno and sensor system for calculate the value of each coin entered correctly. Each calculated value of the coins will be stored in the database. GSM is used in this project intended to send a message to the user and in addition users can also send its SMS (short message system) to know the value of money in the possession of coin collector.

1.3 Problem Statement

Since time immemorial humans have been exposed to the discipline of saving. At the beginning of saving multiple tube save money is created. Storage coins have been innovated in every generation, ranging from bamboo tubes until tubes of iron. Now with the innovations storage coin have been applied in a variety of places, such as vending machines, banks, restaurants, and more. Before this every vending machine will only collect and save the coins, so the problem that's been issue is the program not notify the owner when the storage is full of coin and also it will give a loss of time to owner for collect the coin if the storage is not full. So in this project, the storage coins will be improve by using a combination of GSM system and Arduino system to produce more efficient system. In other word, Global System for Mobile Communication is a system that connect the project and. The system can produce a transmitting network and also can receive a signal in voice or text message. For arduino, the uno module hardware will implement because it contain an enough port to use. This coin collector is create to calculate each coin incoming and will count accurately then store the value system. The owner of this system will receive the notification from the coin collector when the coin is already full. Moreover, it can also be accessed by the owner to know the value of coins savings in the tank.

1.4 Project Objective

The objectives of this project is recommend to count with accurate value coin and to achieve this project, the objectives should be succeed:

I. To study the system and the operation of coin collector
II. To develop a coin collector notification system using GSM to give notification and save time to collect the coin.
III. To analyse the coin collector using GSM system.

1.5 Project Scope

This project covers implement in the vending machine that's use coin as a medium to returns & exchange coins. A few part will describe to complete this project. Beside this project will combine all part into a single innovation.

The hardware part will use an acrylic as a prototype.

a) Hardware Prototype Development Scope: The hardware part will use an acrylic as a prototype.
b) Electronic Scope: A circuit will be design to connect between Arduino Uno, GSM module and slotted optical sensor.
c) Software Scope: The programming software to use is Arduino IDE, circuit.io and Proteus.

1.6 Thesis Organization

In thesis organization, the flow of the thesis will be explain by the chapter. To make this thesis more helpful and easy to understand in the future, so the chapter will be divide into a few chapter.

In the introduction chapter, it will give an early introduction about this project. In this chapter all the main idea is discuss likewise in every project must have Introduction, Problem Statement, Objective and Scope of project. By refer all the point, the researcher can understand the concept of this project.

For the second chapter, this thesis will explain about literature review. In literature review all the information about past last project, innovation about project and similarity about project will be explain. Besides the data about the project will obtain to make sure this project is proper to build. Other than that all the study and research about this project is collected from trusted source, so it will gain knowledge

about the system will be using in this project. In this chapter all the component and hardware that will implement in this project will be describe, such as Arduino, GSM, and the Sensor.

Then in chapter three, the methodology about this project will be explain. Methodology is about how this project will be process. In this part all the planning about his project is show by a few of flow chart and also a solution if the process have a trouble. Furthermore the methodology is one of the aspect that's make this project running smoothly and organized.

Next in chapter four, this chapter is about discussion. In this chapter the discussion will be explain based on the experiment conduct. By understand all the data collect, the analysis will be explain in the figure and graph. From the beginning this project is about to notify the owner. So the experiment is make by refer to objective. The experiment conduct will be in different location, therefore to collect the required data and make an analysis about location that's suitable for this project.

In last chapter, which is about recommendation. This chapter is important for researcher to study. All the recommendation about this project will be describe and give an idea to implement and enhance this project in future. Beside the recommendation also will discuss about how to make this project more valuable.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

Before starting to commit any effort, some opinions and insights of some engineers, scientists and innovators should also be considered and it's very helpful to produce better quality of projects. Mind-set of the presentation and review about the results and the study include outlining engineering, mechanical measures, improvement and renewal of the program. This chapter has also discussed about the concept and theories of the coin operated machine to do the coin counting and sorting process. In this section, point of interest study and analysis of previous project will describe in detail about the components that is used. Thus, literature review is the beginning step to understand the ideas to develop the project and act as the guidance for the project.

2.1 Early Invention Coin Collector

In the early idea of creation, the mechanical tools of the coin machine is able to do the counting and wrapping all types range of coin such as Gold, Nickle, Silver, and Copper in USA. It comprises of a counting board, a different numbering tube for every group and size of coin, and separate metal tubes for attacking and wrapping. The mechanical method based systems use parameters like diameter or radius and thickness. But these parameters used to differentiate between the different materials of the coins based on S.Mohamed mansoor roomi and R.B.Jayanthi rajee,(2015) [1]

The procedure of operation is easy and simple. A modest bunch of coins of any section are set in a counting-tube of the correct size. The tube is then run rapidly over the scored tracks of the counting board, where they are deposited. Each track holds just ten coins. At the point when the coins are altogether put on the track, the board is slightly tilted, consequently tossing the coins into the spaces between the tracks. One end of the board is then raised, and the coins rapidly keep running down the paths into the stacking-tube to the end of the tray. This tube contains a paper wrapper, which can without much of a stretch be closed when the tube is opened. Once in the past coin counting was a field work for a specialist, yet this machine meets in speed and exactness the best of the old fashioned money handlers known to keeping money distinction. So these changes and the other parameters like diameter, thickness, weight and magnetism can be used to differentiate between coins (R.B.Jayanthi rajee and S.Mohamed mansoor roomi, 2015)[1]. Figure 2.1 show the example of old sorter machine. From the figure, it also show how the tube was used to flow the coin.

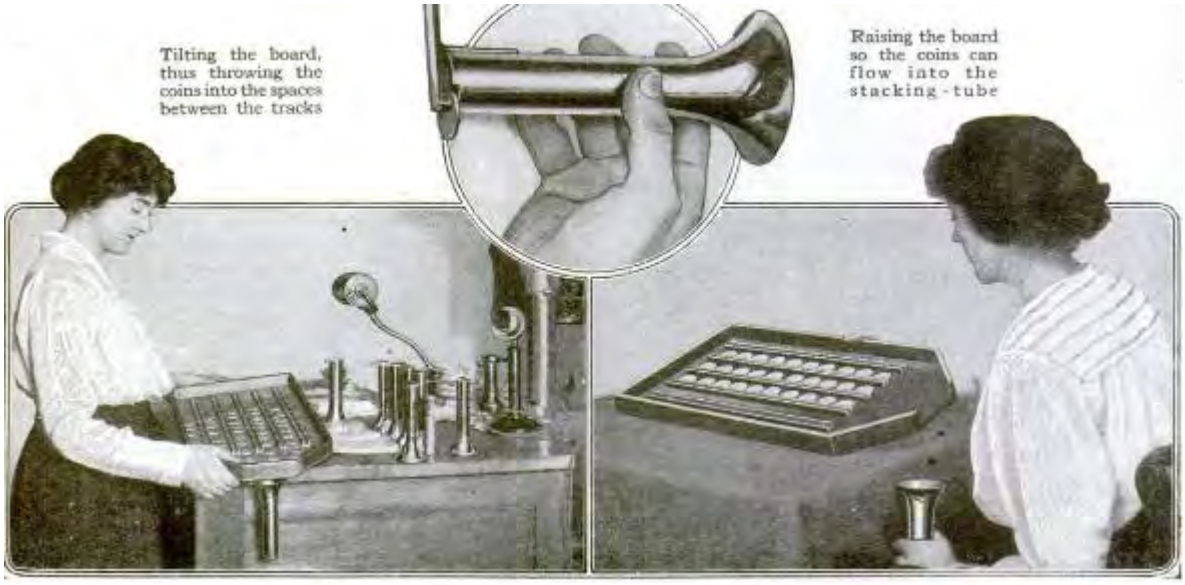

Figure 2.1: The early invention of the coin counting and wrapping machine

Source: R.B.Jayanthi rajee and S.Mohamed mansoor roomi, 2015