



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DESIGN AND DEVELOPMENT OF SAFETY

LOCKER SYSTEM USING IOT

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

by
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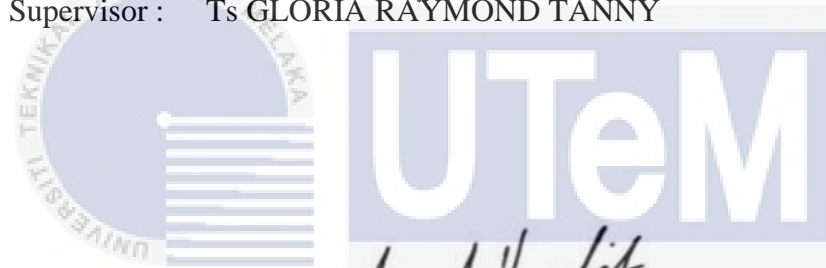
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APPROVAL

This report is submitted to the Faculty of Electrical and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Electronics Engineering Technology (Telecommunications) with Honours. The member of the supervisory is as follow:

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ABSTRAK

Projek ini bertajuk Reka bentuk dan pembangunan sistem loker keselamatan tinggi menggunakan IoT. Tujuan projek ini adalah untuk merekabentuk dan mewujudkan satu sistem loker keselamatan yang dapat memastikan pengguna yang dimiliki oleh selamat dan dapat menyelesaikan masalah yang dihadapi yang berlaku oleh pengguna yang kehilangan kunci, kehilangan Kad RFID, kod kata laluan terlupa. Di samping itu, sistem loker keselamatan akan diwujudkan untuk mengelakkan kes rompakan yang berlaku dan pada masa yang sama dapat mengurangkan kos dengan berkesan. Dari kajian sebelumnya, mereka adalah banyak jenis loker keselamatan yang digunakan untuk menyimpan barang-barangan milik yang akan mengawal kuat kunci pintu. Kaedah mewujudkan projek ini adalah untuk merekabentuk rangka kerja sistem loker keselamatan dengan menggunakan perisian SolidWorks. Litar elektrik juga akan Reka bentuk menggunakan simulasi Proteus. Projek ini adalah mesra alam dan kos rendah berbanding dengan sistem loker keselamatan lain yang dicipta sebelum ini. Ia akan membantu pengguna untuk menyambung telefon mudah alih mereka dengan pintu loker menggunakan aplikasi berkelip untuk mengunci dan membuka kunci loker dengan mudah dan sangat selamat dengan kunci magnet. Secara ringkasnya, ia akan dijangka bahawa sistem loker keselamatan yang tinggi ini akan mempunyai peranti keselamatan yang boleh mengesan rompakan atau apa-apa getaran keras berlaku kepada loker dengan menggunakan sensor penceroboh dan menjejaknya.

ABSTRACT

This project is called Design and Development of High Safety Locker System using IoT. The purpose of this project is to design and create a safety locker system that able to keep users belonging things safely and can able to solve the problem faced that occurs happen by users which losing key, losing RFID card, forgotten password code. In addition, the safety locker system will be created to prevent a robbery cases that occurs happened and at the same time able to minimize the cost effectively. From the previous study, they are many types of safety locker that used to keep belonging things which will control the strong of the door lock. The method of creating this project is to design the framework of the safety locker system using a SolidWorks software. The electrical circuit also will be design using a Proteus simulation. This project is eco-friendly and low cost compared to the other safety locker system that been created before. It will help the users to connect their mobile phone with the locker door using Blink application to lock and unlock the locker easily and very safely with magnetic lock. In a nutshell, it is to be expected that this high safety locker system will have a security device that can trace the robbery or any hard vibration happen to the locker by using intruder sensor and buzzer.

DEDICATION

To my beloved parents Mr. Anuar Bin Alias, Mrs. Radziah Binti Kharuddin and all my siblings for their guidance, support and endless pray. Then, to all my beloved friends who always support and help me with their unconditional love that make me feel motivated while doing this project. Also, to my faithful panels, lecturers and staffs of Universiti Teknikal Malaysia Melaka in FTK for their help in opinion, comments during completing this project. A full appreciation to my supervisor Ts. Gloria Raymond Tanny for guide, support and helping through this project.



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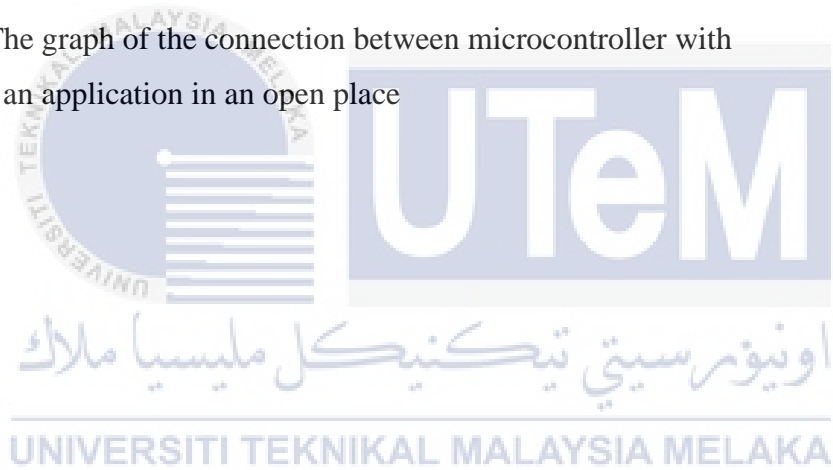
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LIST OF SYMBOLS

V	-	Voltage
mA	-	Mili Ampere
Kb	-	Kilo Bit
MHz	-	Mega Hertz
b/s	-	Bit per Second
s	-	Second
m	-	Metre
cm	-	Centimetre

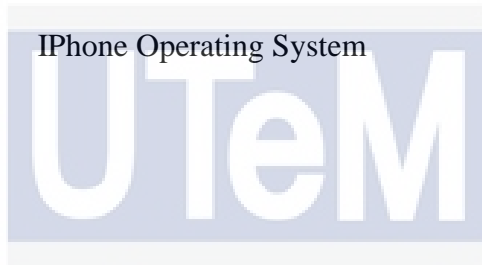


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LIST OF ABBREVIATIONS

IoT	-	Internet of Things
IP	-	Internet Protocol
GSM	-	Global System for Mobile
GPS	-	Global Positioning System
BLE	-	Bluetooth Low Energy
RFID	-	Radio Frequency Identification
SMS	-	Short Message Service
USB	-	Universal Serial Bus
IOS	-	iPhone Operating System



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CHAPTER 1

INTRODUCTION

1.1 Introduction

The background project, problem statements, objectives, and scope of project will be expounded in general to brief an idea about the project in this chapter. Besides that, the structure on this project also been described to give an early idea and understanding of the project.

1.2 Background

Security and safety have always been of prime concern to every individual or an organization. And also the assurance that it is the most important for human beings. For an object or place, a protection system is needed to guarantee the security of the belonging items, stuffs or any important thing. In the last twenty years, the security system has passed through single route monitoring system, control loop monitor system, and processor plus multimedia monitoring system eras.

Besides, lockers can be placed anywhere: at student dorm, at library, at college and elsewhere. In particular, a safe functioned to protect valuables from theft or robbery. Lockers must have a sophisticated security system to prevent theft. There was a method been used for securing the locker by using the keypad to enter a password, fingerprint and RFID. And all of that can be combined in such a way so as to protect the valuables contained in lockers.

From the previous project which keypad, fingerprint and RFID are the method to access the safety locker where only the owner or user can activate it. The owner or user can choose a password that he wants to get into the locker access without being noticed by others. While the fingerprint has its own features. That makes it hard for others who would like to open the locker. Other than that, buzzer that serves as a marker can also be placed in the safe if someone else has forced the locker to open. This further strengthens the locker making it safe. Besides that, the safety locker system also produces a password reset code to open the locker if users forgot their own password. This is one of the inventions that can retain security of belonging in figure 1.1 below.



Figure 1.1: Safety Locker System Device

1.3 Problem Statement

Mostly, the safety locker system which ever been designed were in high cost and not too user friendly. Meanwhile, losing belonging thing were often occurs at some places which at student dorm, at library, at college and elsewhere to the locker.

The major problems that faced about the locker are sometimes user forgot to lock the locker door back or sometimes they are not sure that the locker door is lock or haven't, so they have to go back to make sure or leave it and risk of losing important stuff. Furthermore, most lockers designed with key lock commonly suffer from some possible flaws such as lost key, lost RFID card, unauthorized key part, forgot to bring the keys. This is because of the careless of the user itself with not be more responsibility to their belonging things.

The other problem that this project attempts to solve locker from any rob cases and make the locker more safety. There must be an efficient and reliable system to help the user especially student to lock the locker door. Besides that, the complexity of installing and high cost configuration of previous safety locker system leads to not receive much demand and attention. Using a biometric fingerprint locker system will solve the problem, but due to the costly cost it is not affordable to certain users. This device will provide real-time monitoring by sending an emergency alert notification to user via Internet through IoT. Monitoring of the system can be done anytime and anywhere as long as there is signal available, it offers more secure to the users.

The safety locker system using IoT proposes proper system that is user easy to access. Using Bluetooth connectivity along with mobile phone application that helps user to unlock locker using an application.



Figure 1.2: Current Safety Locker System

To overcome this problem, integrated safety system will be design and developed using Arduino. This safety locker system also designed to change previous method to modern and easier in order to help users with a minimal cost, high safety and efficient.

1.4 Objective

The objectives of this project are:

- To develop a Safety Locker System features IoT technology.
- To implement the security and safety features to this an IoT Safety Locker System for unauthorized user access by using Blynk Application.
- To build up and incorporate an IoT Safety Locker system with Arduino.

1.5 Scope

The scope could be an important reference to gain related information on the research.

This project focuses on keeping the belonging things of users in a safety system. A model of the safety locker system will be designed and developed with a suitable measurement for a normal backpack which 25L backpack: 21” x 11” x 6.5”. This locker will be integrated with mobile phone so it will able to monitor the lock and unlock process to the locker door. Other than that, some software like Arduino IDE will be used to create the code of programming for controlling the input and output. Besides that, a graphical user interface will be created using ‘blynk’ software as can control and monitor the input and output.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter provides a review from a previous research and study that related to this final year project and related work dependent on the Arduino and Internet of Things IoT. The previous research is from several sources such as books, journals, and websites. Other than that, the safety of the locker process will be discussed in this chapter.

2.2 Short Message Service (SMS) Overview

Nowadays, Global System for Mobile Communication is commonly used in advanced technology industries. It is known as a cellular digital system standard phone. By using GSM technology, GSM-900 supplies the basis for several other networks. It is named as GSM-900 because it consists of the frequency band of 900MHz. The GSM network running on a frequency band of 1800MHz and 1900MHz is used as a short message service (SMS), which is one of the main components of GSM network technology. It enables text messages from a computer to a cell phone to be sent, and for this purpose it has become the largest source of industrial technology for the communication process. Technology become the largest facilitated the improvement and increase of text messaging. The word “SMS” is used as a synonym for a text message from one person to another by sending a text message using global system communications. Figure 2.1 shows how the SMS work on this technology industries.