



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**DEVELOPMENT OF AUTOMATED
KEY MANAGEMENT SYSTEM USING LABVIEW**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia MELAKA (UTeM) for the Bachelor of Electronics Engineering Technology (Industrial Electronic) with Honours

By

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DECLARATION

I hereby, declared this report entitled “THE DEVELOPMENT OF AUTOMATED KEY MANAGEMENT SYSTEM USING LABVIEW” is the results of my own research except as cited in references.

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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 Engineering Technology (Department of Electronics & Computer Engineering Technology) (Bachelor of Electronics Engineering Technology (Industrial Electronic) with Honours). The member of the supervisory is as follow

.....
(IR. MOHAMMAD'AFIF BIN KASNO)

Abstrak

Laporan ini membincangkan tentang pengurusan kunci dan juga menghalang orang yang tidak dibenarkan mengaksesnya. Biasanya pihak pengurusan kunci perlu sentiasa memeriksa kunci jika orang yang mengakses kunci sudah memulangkan kunci atau tidak, jadi tugas ini menjadi sedikit memenatkan selepas beberapa ketika. Perkembangan Sistem Pengurusan Kunci Automatik adalah sistem untuk mengurus kunci dengan menggunakan LabVIEW. Sistem ini berguna untuk mengurangkan masa. Projek ini menyediakan data maklumat orang yang mengakses kunci ke Microsoft Excel dan menghantar E-mel kepada kakitangan pengurusan utama. Ia juga dapat memantau melalui perisian GUI. Lebih-lebih lagi, lebih mudah bagi pengguna terutamanya pelajar mengakses dan mengembalikan kunci. Dengan penggunaan teknologi, projek ini menggunakan LabVIEW dihubungkan dengan Arduino untuk menjadikan sistem ini lebih mudah. Sistem ini akan mendapat maklumat apabila pengguna memasukkan kata laluan dan program dalam proses LabVIEW untuk menghantar isyarat kepada Arduino dan mengaktifkan solenoid magnetik untuk membolehkan pengguna mengambil kunci. Setiap kali pengguna mengambil dan mengembalikan kunci, akan ada e-mel yang dihantar kepada kakitangan pengurusan untuk memberitahu mereka. Antara teknologi yang dicadangkan, program LabVIEW dibincangkan secara ringkas di dalam kertas ini.

Abstract

This proposed paper aims at manage the key and also prevent the unauthorized person from access it. Usually person in charge has to regularly keep a check the keys if the person who access the key already put the key or not, so this task becomes tedious after sometime. The Development of Automated Key Management System is a system for manage key by using LabVIEW. This system is useful to reduce time. This project is providing information data of person who access the key into Microsoft Excel and send the Email to key management staff. It is also able to monitoring through GUI software. More, it is easier for the users especially students to access and return the key. With the use of technology, this project is using LabVIEW interfaced with Arduino to make this system more convenient. This system will get information when user insert the password and the program in LabVIEW process it to send the signal to Arduino and activate the magnetic solenoid for enable user to take the key. Every time user take and return the key, there would be an email sent to the management staff to inform them. Among the different technologies proposed, LabVIEW program is briefly discussed in this paper.

Dedication

I would like to dedicate this project to my supervisor, IR. MOHAMMAD'AFIF BIN KASNO that assists me develop this project. I also want to thank to my family members, lectures and friends that help me in developing this project

Acknowledgement

“In the name of Allah, the Most Gracious and the Most Merciful”

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List of Abbreviation, Symbol and Nomenclature

CSV	-	comma separated values
DAQ	-	data acquisition
GSM	-	global system for mobile
GUI	-	graphical user interface
IC	-	integrated circuit
IoT	-	internet
LCD	-	liquid crystal display
LED	-	light emitting diode
LIFA	-	LabVIEW interface for Arduino
PC	-	personal computer
RFID	-	radio frequency identification
USB	-	universal serial bus

CHAPTER 1

INTRODUCTION

1.0 Background

The motivation of Development of Automated Key Management System is to provides a system to the user in easy way to keep a record of keys. There is a problem regarding the manual key management system in the hostel, whereby the key has been carried in bulky and it is not convenient. It also difficult to manage and often lost. Usually user has to regularly keep a check the keys if the person who access the key already put the key or not, so this task becomes tedious after sometime. The other problem may occur when someone lost their key or left at somewhere, they have to find solution to unlock the key which is sometimes contribute some dangerous accident to happened. This system allows for keys to be stored in a smart storage cabinet that records for each user by their passcode, time and date. Keys are physically secured and only released to the users. The system keeps a track of keys by using ARDUINO and LABVIEW. Its will obtain the data using connection of hardware that connect to ARDUINO and then sends it to LABVIEW. When user want to take key, user have to enter their passcode to be able to access the required key. If user take the wrong key, an alarm will trigger. Every single of key has the specific information of user include the passcode so that when user enter the passcode, the key which is have same passcode can be access. Hence, the user will always know who is in possession of each key as they are provided with an email contains information which key was taken.

1.1 Project Objectives

The Objective of this development are:

- a) To study of solution for efficiency of key management by taking example from UTeM College.
- b) To develop an Automated Key Management System using LabVIEW.
- c) To analyse the performance of Automated Key Management System by refer to UTeM College (Sri Utama) Management procedures.

1.2 Problem Statement

There is a problem regarding the manual key management system in the hostel, whereby the key has been carried in bulky and it is not convenient. Locks and keys also allow us to secure the building, but when keys are lost or stolen, the inconvenience and expense of changing locks and re-issuing keys can be considerable. It also difficult to manage and often lost. Usually user has to regularly keep a check the keys if the person who access the key already put the key or not, so this task becomes tedious after sometime. The other problem may occur when someone lost their key or left at somewhere else, so they have to find solution to unlock the key.

For example, recently a terrible accident happened at Universiti Malaysia Perlis (UniMAP) which a 21-year-old student has died after falling from the seventh floor of the Unicity campus hostel at 2.50pm, Wednesday 19 April 2017. Goh Xin Xi, a first-year student with UniMAP's engineering faculty, slipped and fell when he tried to get into his hostel through a window after forgetting to take his keys. ^[1]

UniMAP student falls to his death

BY SHARANPAL SINGH RANDHAWA



Figure 1.2 (a): Accident at Universiti Malaysia Perlis (UniMAP)

Based on the problem, we can see without of good key management, a terrible accident can happen. So from the problem statement, Development of Automated Key Management System Using Labview is created to help the user to monitor the keys and able to access it with the passcode.

1.3 Project Scope

The scope of this project are the overview concept of monitoring data system by using LabVIEW, by understanding it operation and knowledge, we can create an automated key management in order to keep track purpose. Sometimes, student want to access key around 3 am. In order to access the required key, they have to wake up the warden. Using concept of vending machine – can access in 24 hours. By using Automated Key Management System, the student can access the required key anytime by insert their passcode.

- a) Study the development of Automated Key Management System for UTeM College (Sri Utama)
- b) Design the prototype of Key Management System Using LabVIEW.
- c) Analyse the Key Management System performance following the procedures for UTeM College (Sri Utama).

CHAPTER 2

LITERATURE REVIEWS

2.0 Introduction

This chapter will discuss about finding and analysis of previous project that related with Development of Automated Key Management System. All the detail is taken from several resources such as journal, thesis, book and valid websites. Usually keys been stored in a storage box that have a hooks that can put the keys hang to it. Automated Key Management System is a system that give access to the electronic key box and to individual keys is under user complete control. User can access required key by insert the passcode, with the communications capability, the user always know who removed any key and when it was taken. This give a great advantage for user such as more value, more storage and more convenient accessibility.

2.1 Background History

Today, keys are the most common manufactured metal object in world, it made us to live in the cutting edge progress which are have many of the feature of security and locked behind of millions of locks. It is easy to carry because of it is in small size. They are also easy to manufacture and offer intuitive way of operating mass produced lock that guard our physical properties such as cars, structure, doors, safes and more [2]. The definition of key is a device that used for operate a lock which to lock or unlock it. A normal key consists of a small piece of metal consisting of two parts, the blade, which slides into the keyway of the lock and distinguishes between different keys, and the bow, so that torque be applied by the user which is left protruding.



Figure 2.1 (a): Locks and keys Ancient Greece

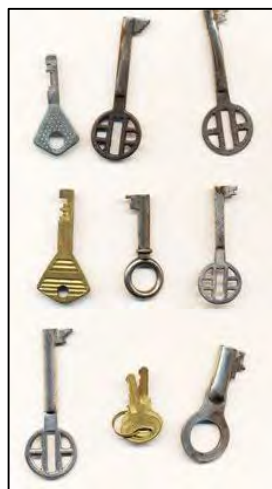


Figure 2.1 (b): Example the type of key



Figure 2.1 (c): Keys are stored in a simple box.

Linus Yale, Jr. was inspired by the original 1840s pin-tumbler lock designed by his father in 1861, thus creating and patenting a smaller flat key with serrated edges as well as pins of varying lengths within the lock itself, still remains in use today which is the same design of the pin-tumbler lock [2].



Figure 2.1 (d): Example of hook key rack which is normally people use.

Based on Steven Kurutz, in this age of rapid transformation, the house key has been surprisingly resistant to change. Mostly switched to key fobs is car. As for the pass card, hotels and office building are using it [3]. In order to keep save the keys, a storage box is designed to store all the key to avoid lost it. A storage box or key safe is a simple storage that can store a set of keys. A set of keys hang at hook in the storage box. An example of storage box is Supra lockbox. Over 55 years ago, first key lockbox was invented by Delbert Williams, Supra's Founder.

Delbert is a real estate professional. He need to chased down the keys in order to show homes to the clients. He crafted a key box from a Yale® bicycle lock and a sand-cast aluminum container. The lockbox served its purpose well which is eliminating the need for agents to search for listing keys in order to get into houses for sale. [4]



Figure 2.1 (e): Key Storage Lock Box

In order to maintain the communications of security, keys must be stored securely. Security is important and there are many ways to do so. Basically, an encryption application manages keys for the user and to control use of the key must be depended on access password. Sargent lock state that key control is an organized and formal security system which addresses control of master keys within a building or facility. To avoid unauthorized access by using documentation management and status of reporting of critical elements in the master key system is key control. [5]

Based on Fernando Pires, the reliable and cost-effective methods to improve security are key control and asset management by ensuring the facility keys are legitimately managed with regard to access, storage and tracking. For effectively addressing the safety and security of building occupants and the security of the building assets by using key control and management systems have become a tool of higher level management. To ensure a safe and secure, the information of the identity of authorized key holder such as which keys they take or have access to and when the key been used are important. ^[6]

More, open protocols and technological developments have made it possible to key control with get to control and other security systems as a component of a facility's organized security system. Presently, a user who has taken a particular key can be denied egress from the facility until the key is returned, and chosen administration can be alerted by email if a key has not been returned on time. ^[6]

2.2 Related Project/Journal

2.2.1 Patient Data Management System in Intensive Care Unit (ICU) Using LabVIEW. ^[7]

Amritjot Kaur, Shimi S. L proposes a system that use the advantages from data flow technology. The goal is to obtain the data from monitoring system in the intensive care unit (ICU) and save the data for further analysis. Medicinal staff can be accessible to analyze data and take the suitable medication for patients. In fact, large amount of data quickly and continuously provides by this monitoring system in intensive care unit. Lots of units operate with a limited storage capacity which make the information access for temporarily.