IMPROVING SENSING SYSTEM FOR MAILBOX MONITORING APPLICATION

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

IMPROVING SENSING SYSTEM FOR MAILBOX MONITORING
APPLICATION

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HEE SHIEH LI

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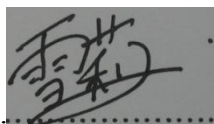|		
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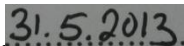
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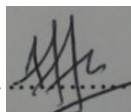"I hereby declare that this report is the result of my own work except for quotes as cited in the references."
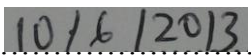
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This project and research work is dedicated to my beloved parents
for their enthusiastic caring throughout my life, my loving sister and
brother also my friends for their encouragement and love. Also, not
to forget, to lecturers that shares their knowledge towards me.

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ABSTRAK

Seperti yang dinyatakan dalam tajuk, iaitu "Aplikasi Pengawalan Untuk Meningkatkan Sistem Mengesan Bagi Peti Surat", tesis ini mengandungi maklumat-maklumat berkenaan tentang fungsi sistem untuk mengawal peti surat dengan mengenal pasti identiti penghantar dan memaklumkan kepada pemilik melalui e-mel dan SMS (Khidmat Pesanan Ringkas) apabila menerima dokumen. Apabila pengguna menerima dokumen-dokumen baru di dalam peti surat mereka, kebanyakan pengguna tidak mendapat diberitahu dan mereka perlu sentiasa memeriksa peti surat mereka di lokasi peti surat tersebut. Kebanyakan bangunan multi-tingkat menghadkan pengguna memeriksa atau mengumpul surat-surat mereka disebabkan lokasi peti surat dipusatkan. Dengan menggunakan sistem peti surat ini, ia memudahkan dan mengurangkan kesusahan pengguna apabila peti surat menerima dokumen dengan menggunakan PLC(Programmable Logic Control). Perkhidmatan SMS dan e-mel yang digunakan untuk memaklumkan pengguna apabila dokumen diterima. Sistem peti surat boleh mengurangkan kerja-kerja manusia dan menjimatkan masa pemilik dengan memberitahu pemilik apabila dokumen diterima. Apabila peti surat sedang menerima dokumen, pemilik akan dapat memberitahu oleh mesej dihantar oleh sistem. Oleh itu, pemilik hanya perlu menyemak status peti surat melalui e-mel atau SMS. Bagi Universiti atau Kolej, pensyarah boleh menetapkan masa tarikh akhir untuk tugasan pada sistem peti surat ini, pelajar boleh menjadi lebih berdisiplin apabila menghantar tugasan pada masa yang tepat. Sistem Mengesan melaksanakan dan menyambung antara perkakasan peti surat dan perisian seperti PLC dan Visual Basic. Dalam projek ini, kami membina prototaip sistem peti surat yang meningkatkan pengesanan dan melaksanakan dan membina litar pengesan dengan pendawaian sistem.

ABSTRACT

As stated in the title which is "Improving Sensing System For Mailbox Monitoring Application", this thesis provides some information about how a system function to control the mailbox/pigeon hole by identify the sender through Email and SMS(Short Messaging Service) to the mailbox owner. Upon the user receiving new documents in their mailbox, most of the user did not get notified and they need to be always checking their mailbox condition by walking to mailbox location. Most of the multilevel building limits the users on limited visits to check or collect their letters due to the centralize mailbox location. By using this mailbox system, it is able to allow people to facilitate and reduce the inconvenience when the mailbox/pigeon hole receiving the document by using PLC (Programmable Logic Control). SMS and Email service is used for the document received informing. Mailbox System can reduce the human work and it can be saving the time of the owner. Owner can always be informing the condition of the document received. When the mailbox is receiving a document, the owner will be get inform by the message was sending out by the system. Therefore, the mailbox owner only needs to check the mailbox status through the Email or SMS. For the University or College, lecturer can set the due date time for the assignment into this mailbox system, the student can be more disciplined during hand in the assignment on time. Sensing system is to implement and interconnect between the mailbox hardware and software such as PLC and Visual Basic software. With this project, it is to build up the improving sensing mailbox system by set up the mailbox prototype structure. Implement and construct the sensor circuits with wiring the system.

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SMS	Short Messaging Service
PLC	Programmable Logic Control
ZLSR	Zelio Logic Smart Relay
GSM	Global System for Mobile Communications
FBD	Function Block Diagram Language
IDE	Integrated Development Environment
BASIC	Beginner's All-purpose Symbolic Instruction Code
RAD	Rapid Application Development
GUI	Graphical User Interface
VBA	Visual Basic Application

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CHAPTER I

INTRODUCTION

1.1   Introduction

Mailbox is a receptacle for receiving incoming mail for the owner at a private residence, schools, or business. In the late 18th century, the first encouraged people to install letterboxes to facilitate the delivery of mail were British Post Office [1]. The original mailboxes design had been installed in the doors and walls of house for postman or people to drop off incoming mail [1]. For the multilevel building, pigeon-hole mailboxes were used in some residential area, office, or some academic. It is an internal mail system commonly used for communication in workplaces, organizations, and educational institutes in every country. Documents and messages are place in a person's pigeon-hole for them to collect.

As the Chinese proverb, "Time is gold; an inch of gold cannot buy an inch of time [2]." Now, modern people think time is very precious, some people think that one day twenty four hours is not enough. Before this, people always needed go to their centralize mailbox center to check their mailbox condition whether the mails received or not. By doing this, people feel that very inconvenient and wasted their time.

It is also will be great if the Mailboxes can always give the notification by inform their owner when the letter was received by the sender. A Mailbox System is

one of the ways can be used to inform the mailbox owner by sending the notification message while the documents received. This Mailbox System could be used for home environment, office area, and multilevel building, such as apartment, university, and even schools.
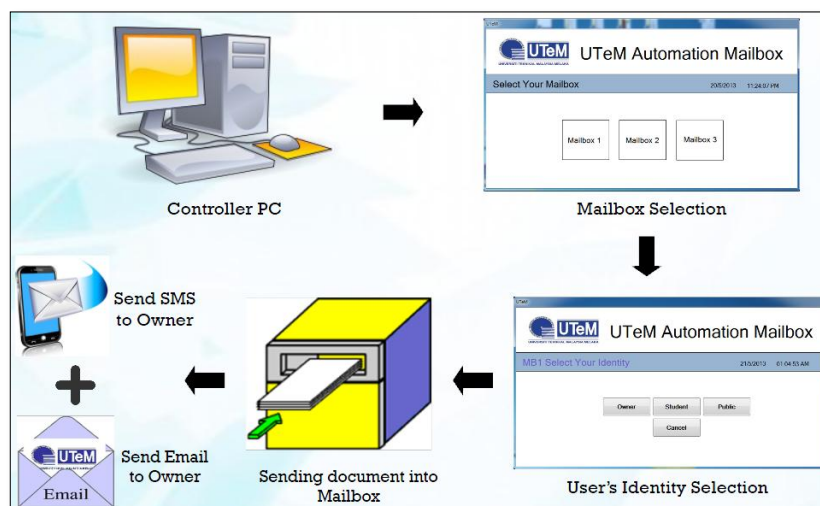
Figure 1.1: Mailbox System Process Flow.

Mailbox System (Pigeon Hole System) is a project with a system function to control the mailbox/pigeon hole by identify to the owner. It will register the sender identity; time of document received, and also can inform the mailbox owner through E-mail or SMS (Short Messaging Service) while the document had received. Based on Figure 1.1, before sender need to send the document to owner, they need to register with the controller server, if not they are unable to insert the document into the mailbox. After that, they need to select which mailbox they want to accessed and select their identity. Lastly, after register everything they can insert the documents into the mailbox and an Email and SMS will send to owner account for informing document received.

This Mailbox System has security password system to secure the owner privacy. Owner can set the personal password before start using the Mailbox System. Owner is free to changing and set the security password of the system. It can allow the mailbox owner to set the time for received the document from public or assignment from student hand it. This function can be used to avoid for student late hand in the assignment. The owner also can set the timing when they want to block

the receiving door for the student late hand in assignment or document. For the university user, mailbox owner/lecturer needed to create the assignment name to let students hand in the assignment.

This system can be used in two types of users. First type user is student and the second type is public such as others lecturer or postman. When the students want to hand in the assignment, they need to choose the lecturer mailbox and select types of user which is Student. After that, students need to choose the assignment name that had created by lecturer. They need to key-in the identity number to get the permission to hand it the document that under the time frame was set by the mailbox owner/lecturer.

The student hand in assignment/document record will be send by Email according to the time setting of the owner/lecturer and a text message will be send to the owner thru SMS to the mobile number that was set by owner and with the message by the owner. The mailbox owner can setting the Email account and mobile phone number in the Owner Setting page. For the public users, the informing of the receiving document from public user will send directly by email and SMS once received the document.

While the mailbox owner want to collect their documents had received, they need to insert their mailbox password to open the mailbox main door. By using sensing system, the mailbox owner will just need to check the email to ensure that who is the one that hand it the document in time, on time, even over time.

Mailbox System is reducing the human work and it can be saving the time of the owner. Owner can always be informing that the condition of the document received. When the mailbox is receiving a document, the owner will be get inform by the message was sending out by the system. With this system, the owners no need to walk to the mailbox to check the condition of the mailbox. By using this mailbox system, the student can be more disciplined and hand in homework on time.

This project has 3 sections. First sections are computing part, for the sender part, the sender will need to key-in the data (such as Matrix Number) that require

over the server. For the owner part, the owner will need to key-in the password to open the Mailbox main door to collect their received documents. Secondly is mechanism part. The receiving door will open and close while receive the documents from the sender. Thirdly is the sensing part. The document will be detected by the sensor to show that document is received. After that computing part will sending a message to the owner's Email account and SMS while receive any document or mailbox was full.

1.2 Objectives

Improving sensor system for mailbox monitoring application is a system that installs or add-in system to the conventional mailbox. It is system that able to allow people to facilitate and reduce inconvenience when receiving the document (mail/assignment) by using Programmable Logic Control (PLC).

With this project, it is able to build up the improving sensing mailbox system by set up the mailbox prototype structure. Implement and construct the sensor circuits with wiring the system.

Sensor system is also able to implement, test, and interconnect between the hardware and software, such as using PLC with the Visual Basic.

1.3 Problem Statement

Mailbox is a device that very command in our life. At home, office, apartment and even in University. In University, the command mailbox that was using is the rack type (pigeon hole). Pigeon hole is having a big amount of the mailbox [3]. It is commonly use for communication in organizations, workplaces and educational institutes to collecting the documents from postman, lecturer, courier and student. The documents are placed in a person's pigeon hole for them to collect.

The main problem of the pigeon hole is between the owners with student. For the first problem, student will not able to sending the assignment or document at a designated time that require from lecturer. Therefore, this will lead to increasingly lazy and undisciplined students. Secondly, the owner need to always walk to the mailbox checking for the mailbox status confirmation. This will bring a lot of inconvenience and will waste a lot of precious time.

By technically, for the recently mailbox system, a few of problem was define. For the first technical problems, small document was not able to be sense. The second problems are the space of the pigeon hole will have a limit after installing the sensing device.

The system was create is to reducing the human work and it can be saving the time of the owner by sending a message to the owner when document was received. The message was sending will be including the time of receiving, status (full of document) of the mailbox and the sender identity. The mailbox will reject the document that was over the time frame in which the time was designated by the owner.

By technically, a special sensor which is thru beam type sensor will be use to detect the document that was received, not even the big size of document or a small size of document. A special type of the design of the mailbox will be use to overcome the limited space of the mailbox.

1.4   Scope of Project

Improving Sensing System for Mailbox System Monitoring Application is covering the process of the sender sensing controller (sensor using), the sensor will be a monitoring device of the system, the type of sensor will be research and use by more accuracy. The sensor was using is able sense the document what never the small of size or the big of size.