



Faculty of Electrical and Electronic Engineering Technology



**DESIGN OF A SMART PIGEONHOLE USING ARDUINO GSM
SYSTEM**

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Bachelor of Electronics Engineering Technology (Telecommunications) with Honours

2022

DESIGN OF A SMART PIGEONHOLE USING ARDUINO GSM SYSTEM

MUHAMMAD AKMAL BIN MOHD HAFIZ

**A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Electronics Engineering Technology (Telecommunications) with Honours**



Faculty of Electrical and Electronic Engineering Technology

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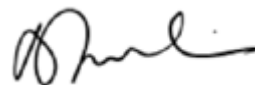
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I declare that this project report entitled “DESIGN OF A PIGEONHOLE USING ARDUINO GSM SYSTEM” is the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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I hereby declare that I have checked this project report and in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Electronics Engineering Technology (Telecommunications) with Honours.

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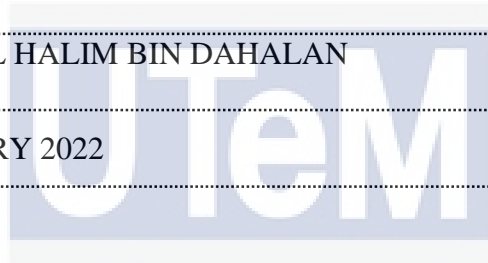
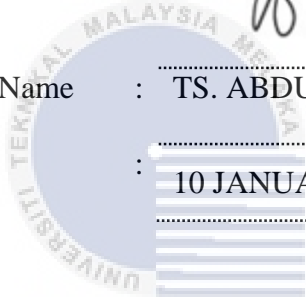
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DEDICATION

To my beloved mother, Zaiton binti Salleh, and father, Mohd Hafiz bin Idris, my family members, sister and brother. Not to be forget my special thanks to, my friends and my supervisor and lectures.



ABSTRACT

Present era, lecturers use pigeon holes as a platform or placement for students to submit assignments or documents. Even so, the lecturer has no control over ensuring that each student submits their by the assignment on time. Pigeon holes function similarly to letterboxes in that letters or memos addressed to a specific person are placed in their letterbox. The way of verifying a document or assignment in a pigeon hole has not been changed to the point that most lecturers still using the old fashion method which is checking the pigeon hole by themselves. This project will assist lecturers in informing them any time a document or assignment is submitted. In this project, it will helps lecturers to get notify either the document or assignment has go through the pigeon hole. The project is using Arduino microcontroller, an IR sensor, and a GSM module are used to alert the user of the existence of a new document or assignment. To alert the existence of new assignment or document in the pigeon hole, the device will produce an SMS notification. Since it is no longer important to inspect pigeons every day, the machine is simpler, saves time, and is more fun for lecturers to use.

ABSTRAK

Pada zaman sekarang, pensyarah menggunakan peti surat sebagai peantaraan atau perhubungan bagi pelajar untuk menyerahkan tugas atau dokumen. Walaupun begitu, pensyarah tidak mempunyai kawalan untuk memastikan bahawa setiap pelajar menyerahkan tugas mereka tepat pada waktunya. Peti surat berfungsi sama dengan mana-mana peti yang menyimpan surat atau memo yang ditujukan kepada orang tertentu ditempatkan di tempat penyimpanan mereka. Cara mengesahkan dokumen atau tugas di peti surat tidak diubah sehingga kebanyakan pensyarah masih menggunakan kaedah fesyen lama iaitu memeriksa peti surat sendiri. Projek dapat memudahkan rutin harian dalam untuk memaklumkan bahawa tugas atau dokumen telah dihantar apabila masuk ke dalam peti surat. Dalam projek ini, akan membantu pensyarah untuk memberitahu bahawa dokumen atau tugas telah melalui peti surat. Projek ini menggunakan mikrokontroler Arduino, sensor IR, dan modul GSM digunakan untuk mengingatkan pengguna akan adanya dokumen atau tugas baru. Untuk menyedari adanya tugas atau dokumen baru di peti surat, peranti akan menghasilkan pemberitahuan SMS. Oleh kerana adanya teknologi seperti ini, pengguna dapat mengelakkan untuk memeriksa peti surat setiap hari, kaedah ini lebih mudah, menjimatkan masa, dan lebih senang digunakan oleh pensyarah.

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LIST OF SYMBOLS

V	-	Voltage
A	-	Ampere
Ω	-	Ohm
F	-	Farad
V	-	Voltage



LIST OF ABBREVIATIONS

CPU	-	Central Processing Unit
FTDI	-	Future Technology Devices International Limited
GPRS	-	General Packet Radio Service
GSM	-	Global System For Mobile Communications
IDE	-	Integrated Drive Electronics
iOS	-	Iphone Operating System
IR	-	Infrared
LCD	-	Liquid Crystal Display
LDR	-	Light-Dependent Resistor,
LED	-	Light-Emitting Diode
LER	-	Light Emitting Resistor
LR	-	Literature Review
NPN	-	Negative-Positive-Negative
PCB	-	Printed Circuit Board
PCMCIA	-	Personal Computer Memory Card International Association
PIC	-	Peripheral Interface Controller
PLC	-	Programmable Logic Controller
PNP	-	Positive-Negative-Positive
RFID	-	Radio Frequency Identification
RX	-	Receiver
SMS	-	Short Message Service
SSID	-	Service Set Identifier

TX	-	Transmitter
USB	-	Universal Serial Bus
WLAN	-	Wireless Local Area Network
XML	-	Extensible Markup Language
ZLSR	-	Zelio Logic Smart Relay



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CHAPTER 1

INTRODUCTION

1.1 Introduction

The project having a goal will be stated covering most mandatory subject. Begin with a brief summary of the project it is background. Then, in order to overcome the problem statement, the problem statement that inspired the concept for this project and the goal that is intended to be reached are developed. This chapter also outlines the scope of the project and the relevance of the endeavor.

1.2 Background Study

The fundamental plan of this project work is to study and develop a smart pigeonhole to assist the lecturer to alert the document their received. Based on the development, the project has been done step by step to achieve the knowledge of electronic project. A study is presented by revising and analysing the performance of smart pigeonhole. Besides, smart pigeonhole is tested on simulation to determine the performance and the ability to assist each user. Mainly, infrared or IR sensor and been used to detect the movement that goes through within the holes. Thus, when the IR sensor detects the movement between the holes of pigeonhole, it will alert the GSM to a sent the signal and proceed to a sent SMS to the selected user. Furthermore, the GSM is used whereby, the GSM able to detect the real time location of the selected user because the GSM has the GPRS. The system has been developed with much more simple feature integrated to contribute the each

user. Therefore, the IR sensor RF will alert the phone number that registered on the GSM and will alert when the pigeonhole has been inserted document or assignment. Last but not least, the development of the project has a lot to be improved in the future such many more sensor and indicator of electronic component.

1.3 Problem Statement

These days, students often take their assignments for granted, even when they are given a enough time before deadline. In this case, the lecturer is unable to ensure that each student completes the task on time. Furthermore, the lecturer always uses a pigeon hole as a medium or location for students to submit their assignments, but sometimes the lecturer forgets to check the pigeon hole. The others mail or document always been mixed together with student assignment could lead the assignment that has been handed over by student the could be missed. By proposing the smart pigeonhole can that helps student and lecturer to receive the document or assignment successfully

1.4 Project Objective

The primary goal of this project is to present a systematic and practical technique for estimating the projects functioning. The following is the project main objective:

- 1) To create a pigeon hole smart box for a university application by combining a GSM module and an Arduino.
- 2) To create a message that would inform lecturers through SMS about on-time the document or assignment has been inserted.

1.5 Project Objective

The process of creating the Smart Pigeon Hole using GSM is developing by many previous projects and to notify the individual mail in the office or home. The project will cover scope that consists of hardware and software both in generally. The software that will be using in the coding platform such the Arduino and hardware is Arduino Uno, GSM Modem and infrared sensor is the main item required to gets the project done.

The notification system will trigger in this case we use GSM acts as the main process to control the system information signal if someone inserting document in pigeonhole. The hardware sensor circuit that will be create consist of IR sensor to sense a mail go through the hole of pigeon hole or not.



CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter would summarize the literature from previous studies in order to improve the smart pigeonhole box. This chapter will discuss and detail out the topic containing knowledge gathered in order to gain input and ideas for project completion.

As a subject for this analysis, the smart pigeon hole for university application is built with a few key points gained. Several examples, including posts, academic papers, journals, and websites, have been used as guides. It included the circuits functionality as well as the hardware and software that will be included in the project.

2.1.1 Smart Pigeonhole A Novel Method to Monitor and Alert System for a Letter Box

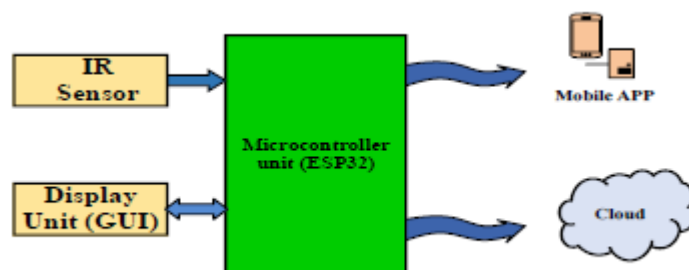


Figure 2.1 Block diagram LR1

This journal focuses on developing a project using a microcontroller component. The controller used by the author is a Programmable Logic Control unit (PLC). The PLC will collect and transfer data related to the letter box. [1] Figure 2.1 is the block diagram of

the project .The controller unit is prepared to receive a signal from the infrared sensor module. The data will be uploaded. The project would mount a tracking system inside the letter box. A Service Set Identifier (SSID) and a password are used as input data to link to the device through a Wireless Local Area Network (WLAN)[1]. The reminder messages will be sent to the users cell phone. The device can communicate with an infrared sensor module to identify any document placed in the letter box. The author design is compact and simple to add inside the box; it can be hung on the letter boxes frame[1]. The tracking data will be imported to the smartphone app and even the cloud service. Figure 2.2 below is the flowchart of the project.

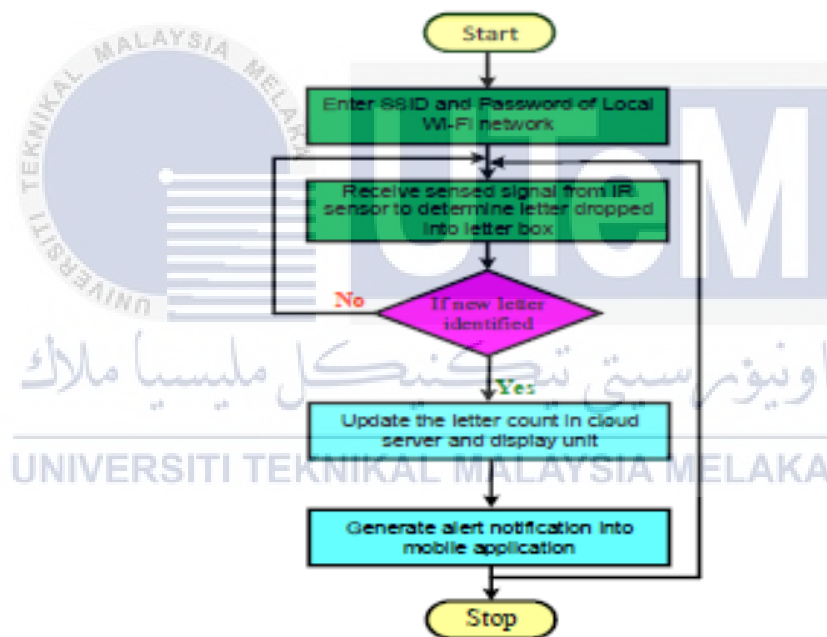


Figure 2.2 Flowchart LR1

2.1.2 Smart Pigeonhole Alert System with SMS Notification

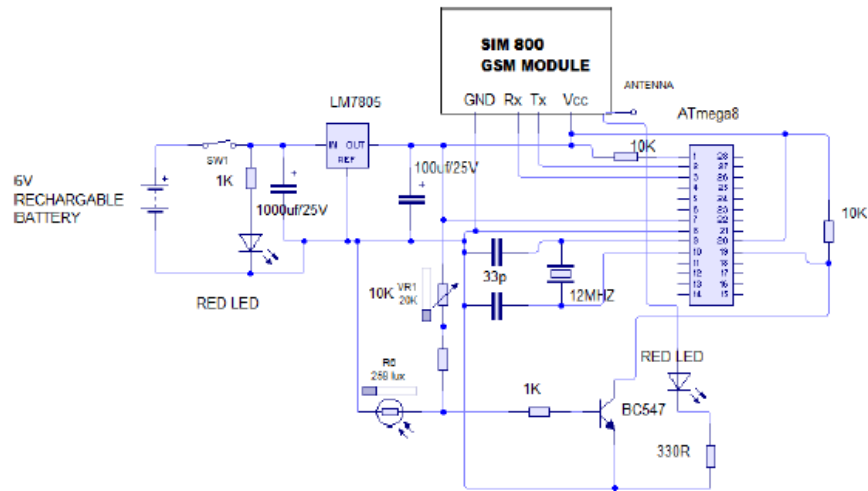


Figure 2.3 Schematic diagram LR2

This project was written by four people: Gabriel, Bolanle, Olajide, and Michael. The article is more analytical than practical. They devise a statistical model of the proposed scheme. The idea is being discussed to develop a model that will aid in the execution of their findings[2]. It consists of one or several pigeonholes for each employee of each of its departments.. Figure 2.3 schematic diagram was created with Proteus and the schematic diagram was given on their research paper. The pigeonhole circuit will notify the user that it has been turned on by 6V. The pigeonhole is based primarily on an ATmega8, a GSM assembly, a Light Emitting Resistor (LER), and a Light Dependent Resistor (LDR). The LER emits a white light, causing the LDR to sense the arrival of mail in the package. The sensor then sends a signal to the ATmega8 microcontroller[2]. On the arrival of a mail, the controller can send a signal to the GSM-Module based on the received signal. The results were obtained by comparing each department and demonstrating that they had a high success rate.