Faculty of Electrical and Electronic Engineering Technology

DEVELOPMENT OF INTELLIGENCE SUBMISSION BOX WITH APPS NOTIFICATION THROUGH IOT TO THE RECIPIENT

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Bachelor of Computer Engineering Technology (Computer Systems) with Honours

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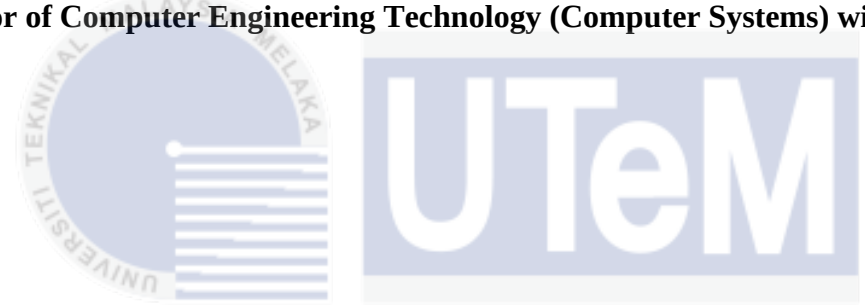
DEVELOPMENT OF INTELLIGENCE SUBMISSION BOX WITH APPS NOTIFICATION THROUGH IOT TO THE RECIPIENT

NURIN FADLHLIN ADLINA BINTI AWANG TAGHIB

A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Computer Engineering Technology (Computer Systems) with Honours



Faculty of Electrical and Electronic Engineering Technology

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2021

DECLARATION

I declare that this project report entitled "Development of Intelligence Submission Box with Apps Notification through IoT to the Recipient" 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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Date	:	23 NOVEMBER 2021

APPROVAL

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 Computer Engineering Technology (Computer Systems) with Honours

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Date : 11 Januari 2022

Signature : 

Co-Supervisor Name (if any) : PN. DAYANASARI BINTI ABDUL HADI

Date : 12/01/2022

DEDICATION

I dedicate this project to My Creator Allah S.W.T, my strong pillar, my source of inspiration, wisdom, knowledge and understanding. He has been the source of my strength throughout this project and on His wings only have I soared. I also dedicate this work to families; En. Awang Taghib bin Ali, my dad and Pn. Fatiah binti Mustaffa, my mom, who has encouraged me all the way and whose encouragement has made sure that I give it all it takes to finish that which I have started. To my sisters, Nurin Fakhira Alya binti Awang Taghib (Kakngah) and Nurin Farzana Arinah binti Awang Taghib (Bibi) who have been affected in every way possible by this quest. To my partner also, Muhammad Ashammil bin Abdullah who always give support. This project I also dedicate to my supervisor, Ts. Eliyana binti Ruslan and co-supervisor Pn. Dayanasari binti Abdul Hadi for their guidance in assisting me through the completion of my degree project. Thank you. My love for all of you all can never be quantified. Allah bless you.

ABSTRACT

Most higher education level still using the manual methods of submitting students' assignment. The students need to submit written assignment through a pigeonhole. After that, the assignment will leave there until the lecturer pickup the assignment. The assignment will remain in the pigeonhole if the lecturer forgets about the student's submission. By doing that, the lecturer will overlook the student assignment. Otherwise, the students might submit the written assignment overdue because the lecturer did not notify them about the student assignment submission. Some students may take for granted about their assignment also. An intelligence submission box with application notification through IoT to the recipient which known as Smart Box 2.0 will help to overcome those problems. This project will be using a mobile application and e-mail for the lecturer to get the notification. Following that, a RFID scanner was used to scan the ID card. After the submission has been properly completed, student's information will be automatically placed into the database to be recorded. This system will be using Blynk App as implementation of mobile application, database system, etc. This system serves as a medium for sending documents and generating a notification. Then, the lecturer can check the database. This project will help the lecturer remind the student to submit the assignment within the due date.

ABSTRAK

Sebilangan besar pendidikan peringkat tinggi masih menggunakan kaedah manual untuk menghantar tugasan. Pelajar perlu menghantar tugasan kedalam kotak surat . Selepas itu, tugasan tersebut akan kekal berada disitu sehingga pensyarah mengambilnya. Sekiranya pensyarah terlupa tentang penghantaran tugasan pelajar, tugasan tersebut akan tetap berada didalam petak surat. Dengan berbuat demikian, pensyarah akan terlepas pandang tentang tugasan pelajar tersebut. Di samping itu, pelajar akan menghantar tugasan lebih dari masa yang ditetapkan kerana pensyarah tidak akan mengetahui tentang penghantaran tugasan pelajar . Segelintir pelajar mungkin memandang ringan terhadap tugasan mereka. Kotak penyerahan pintar dengan pemberitahuan aplikasi melalui IoT kepada penerima atau dikenali sebgai Kotak Pintar 2.0 akan membantu untuk mencerahkan permasalahan ini. Projek ini akan menggunakan aplikasi mudah alih untuk pensyarah mendapatkan notifikasi. Seterusnya, pengimbas RFID digunakan untuk mengimbas ID kad tersebut. Kemudian, selepas penghantaran berjaya dilakukan, kesemua data pelajar akan automatik berada di pangkalan data untuk disimpan. Sistem ini akan menggunakan Blynk App untuk menghasilkan aplikasi telefon pintar, pangkalan data dan sebagainya. Sistem ini berfungsi sebagai ruang untuk menghantar dokumen dan menghasilkan sistem notifikasi. Pensyarah boleh mencari maklumat di pangkalan data. Sistem ini akan membantu pensyarah untuk mengingatkan pelajar untuk menghantar tugasan mengikut waktu yang ditetapkan.

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Alhamdulillah, Praise to Allah S.W.T for his blessing and guidance have helped me carry out my project and thesis completely.

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I sincere appreciation also goes to all my lecturer in FTKEE for their invaluable assistance toward this project. It will never be regretted to enroll myself into FTKEE. This will improve my skills and capabilities on related fields.

My utmost regard also goes to my parents, En. Awang Taghib bin Ali and Pn. Fatiah binti Mustaffa and my family members and friends. They always give me support and encourage me to finish this project and give my best for this project. They also supporting me either mentally or financially while completing this project. The gift of Allah, unforgettable, to bless me with infinite knowledge, experience and confidence to meet these amazing people in my lives. By going through this journey, I strongly believe this may be the breakthrough of my next journey of life. It was impossible for me to complete this project without their support.

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δ	-	Voltage angle
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LIST OF ABBREVIATIONS

V	-	Voltage
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CHAPTER 1

INTRODUCTION

1.1 Introduction

This section briefly describes the intelligence submission box with application notification through IoT to the recipient. It includes information on the project's background, problem statement, objective, and scope.

1.2 Background

The project at hand is a Development of Intelligence Submission Box with Apps Notification through IoT to the recipient, also known as Smart Box 2.0, where students can turn in their assignments. Currently, students will present their assignment into the standard box, which calls pigeonhole. However, sometimes lecturers forget to collect students' assignments inside the box through the conventional method. Therefore, it is difficult for the lecturer to notice the students' assignment submissions. To overcome the problem, this project will introduce a better solution. Besides, it can quickly remind the lecturer about student assignment submission; it can also help the lecturer mark the assignment on time and save time. An automatic identification system used in this project to identify the student is Radio Frequency Identification (RFID). RFID refers to the non-contact wireless data transmission using radiofrequency waves. Users may automatically and uniquely identify and track inventories and assets by tagging them with RFID tags [1]. RFID advances barcode technology by allowing tags to be read without requiring line of sight, with reading ranges ranging from a few centimetres to over 20 metres depending on the kind of RFID. RFID has gone a long way since

its original use in World War II when it was used to determine whether planes were friendly or hostile. Not only is technology improving year after year, but the cost of adopting and operating an RFID system is also decreasing, making RFID more cost-effective and efficient. Low, High and Ultra-High Frequency are the three basic frequency bands utilised for RFID transmissions within the electromagnetic spectrum [4].

Next, a sensor is an input device that converts from analog input signals to digital output signals that machines or humans can interpret. The main control system, such as a microcontroller, is the interface between the physical to the electrical device. There are many types of sensors and their implementation such as Light Dependent Resistor (LDR), Temperature Sensor, Smoke and Gas Sensors and Humidity Sensor. Hence, sensor widely used in the industry can boost the world through diagnostics in medical applications, boost energy sources such as solar power and batteries, boost security, health, and safety for humans [2]. On the other hand, the database collects numerous connected data for a certain task. The majority of businesses and organisations have a system to handle visitors' data to their premises. This invention has made it easier to manage and have instant access to a database system. This database system is restricted to a small number of users. It will be easier for students to submit their assignments and for the lecturer to notice the submission of the assignment if this comparison is used in the submission box design. This system will embed with a database to keep and collect all the data from time to time. This system will replace the manual submission box for student assignment submission.

1.3 Problem Statement

UTeM uses a manual approach for box assignment submission. The present manual submission box has many flaws. Students must submit their assignments in the usual manner, with the lecturer unaware of the submission. In addition, it also can cause the student will take

for granted by submitting the assignment over the due date. It will make the student feel irresponsible to submit their assignment because the lecturer cannot notify their submission. It also can cause the lecturer to overlook on student's assignment.

Furthermore, the assignment submission box is also effective for hybrid classes only because students will submit printed assignments directly instead of scanning all assignments and submit through e-mail. In addition, it will be easier for the lecturer to mark students' assignments by using printed assignments.

Next, suppose there is no notification system for the submission box. In that case, the lecturer will not know which student had submitted the assignment until the lecturer collects all assignments through a pigeonhole. Sometimes, students prefer to stay at college to finish their assignments until 7 pm. At that time, the lecturer was already going home. So, the assignment submission box's notification is effective for the lecturer to notify the student assignment submission.

1.4 Project Objective

The objectives were established after reviewing all of the issues. In order to construct an intelligence submission box with IoT notification to the receiver, some requirements must be met.

a) To develop an intelligence submission box with a sensor that detects the existence of an assignment and sends out an alert.

b) To help the lecturer in becoming more aware of the submission of the student's assignment

c) To complete an effective project that will address the problem and allow the lecturer to easily control the submission of the assignment into the submission box.

1.5 Scope of Project

This project's scope is as follows: This project aims to create an intelligence submission box with apps notification. This system will replace the manual submission box, which has no notification of submission. An RFID scanner will be used in this project, which will be built with a personal computer. This system's functions include allowing students to submit assignments and displaying and recording a database of each student's submission activities in real-time. Lecturers and students are the two user groups in this system. The data of students who submit assignments will be. Aside from that, the teacher has access to the student's information and submitted assignments.

The students need to scan the identity card and confirm the personal details. Once the scanning ID card is done, all the student’s details will display.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the literature review on an existing system with similar functionality and process to the proposed system. A comprehensive analysis will be discussed in depth regarding the system strengths, weaknesses, and features of those systems. The Intelligent Submission Box system is designed with several key points taken as a subject studied for this research. Several sources have been identified as resources for this literature review, such as books, thesis, journals, and websites.

2.2 Existing System Review

Eight systems have been chosen during this research. Sensor-based Mobile Pigeonhole Alert System, Smart Parcel Box with UV based sanitisation, A Novel Method to Monitor and Alert System for A Letter Box, I-Box (Intelligent Mailbox), Smart Electronic Pigeon Hole System, Pigeonhole Notification System Using Telegram Messenger Pigeon Hole Smart Box University Application, and Automation Of Parcel Delivery Collection Using IoT [5] [6]are some of the research projects that have been completed.

2.3 Related Research

2.3.1 Sensor-based Mobile Pigeonhole Alert System

This project is mainly concerned with business mail. This project was created due to experience with lost messages, late delivery, undetected incoming mails, and late feedback. Consequently, the suggested system has made office clerks' and pigeonhole users' jobs simpler by reducing the stress of daily pigeonhole check-in and providing instant feedback mechanisms for the smooth record and operation of important messages. A 6V battery powers the circuit. When the system is turned on, the Light Emitting Resistor (LER) emits a brilliant white light, which causes the Light Dependent Resistor (LDR) to detect new mail. When a signal is detected, the ATmega8 receives it and sends a signal to the GSM-Module to notify it of the arrival of mail. The LDR will not activate if the LER fails to turn on the light since new messages are not identified. After being tried in numerous locations, this project still has flaws due to unreceived SMS notifications after the messages were added. However, 92.5 per cent of e-mails were sent correctly by SMS [7].

Figure 2.1 Wooden Pigeonhole Implementation

The model of a wooden pigeonhole implementation is shown in Figure 2.1. This project used LDR, LER, LDD, Atmega8, GSM-Module and SMS to trigger the staff because new mails arrived. However, this system lacks security because the wooden is disclosed, resulting in document loss. This project recommends that the method be enhanced by calculating the LER's resistance, frequency, wavelength, voltage, and power dissipation, increasing the LDR's detection output. This will surely enhance the coverage of the sensor-based system.

2.3.2 Smart Parcel Box with UV based sanitisation

Because of covid-19, Smart Package Box with UV Based Sanitisation creates a box that sanitises the parcel using Ultra-Violet radiation. This initiative was created to reduce the transmission of illness. This project is Wi-Fi enabled. UV rays will begin to sanitise the packet as soon as it is introduced. Once the item has been sanitised, consumers will get an SMS message to pick up the parcel. This project's additional features include a plethora of security cameras and alarms. The benefit of this project is that it is appropriate for individuals who live in bungalows, rent, factories, and high-security societies. By avoiding cargo delivery rescheduling, this innovative strategy will save time. Customers may securely click and get their cargo using their app, which includes live streaming. The most significant function of this product is that it can supply the consumer with a sanitised product. People will be less disinfected if this procedure is used. This project was created in three sizes: small (width 22 cm, dimension 18 cm, height 29 cm), medium (width 33 cm, dimension 27cm, height 39cm), and big (width 44 cm, dimension 35cm, height 58cm) [8].

Figure 2.2 Model of Smart Box with UV Rays Sanitization

Figure 2.1 shows the Model of Smart Box with UV Rays Sanitization. This project used Wi-Fi Module Camera Module Limit Switch Load Cell ULN2003 Relay Servo Motor UV Light and SMS to trigger the users. The best part of this project is complete with cameras to ensure the parcel is received in good condition.

2.3.3 A Novel Method to Monitor and Alert System for A Letter Box

This system is made for houses purposes. This project was done because people frequently overlook or forget to collect letters from the mailbox. If the individual fails to check the letterbox on time, there is a considerable risk of missing vital applications, notices, couriers, and letters. This system is designed to alert the user through controllers and sensors that can communicate with one another via the cloud and mobile applications. The letter box monitoring system user may utilise the cloud and mobile application to check the status of any fresh mail dropped into the letterbox. This device is portable and simple to install inside a letterbox that may be hung at the front of the home, at the gate, or in the compound. The sensor and the display unit are connected to the control unit, which is organised to receive sensed signals from the sensor at predefined time intervals to determine the number of letters inside the letterbox and generate an alert notification via the cloud, and mobile application based on the received

sensed signals. The numerical count of the letters inside the box and a specified message are included in the alert notice. This is used for the postman to insert any letter to the mailbox easily, and the user easily detects the presence of mails. This box is suitable for inserting the letter but not for a big parcel [9].

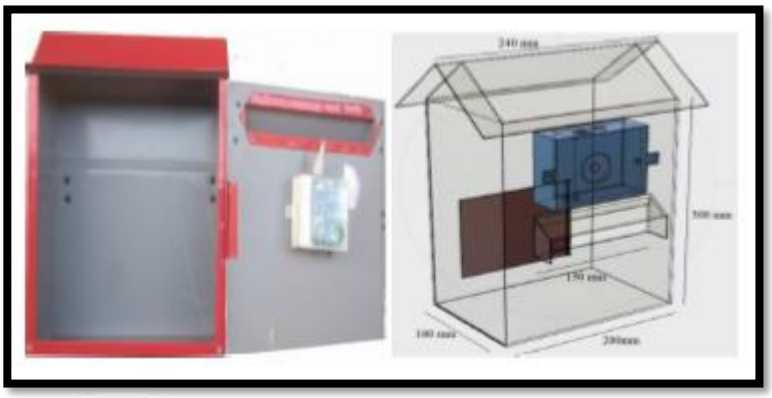

Figure 2.3 Hardware

Figure 2-3 shows a prototype of the project. It is only connected to ESP-32 and IR sensors. The application aims to obtain information from the IR sensor module to recognise any fresh letters placed in the letterbox. The detection data is downloaded to both the mobile app and the cloud server.

2.3.4 I-Box (Intelligent Mailbox)

This system is designed to overcome forgetful habits by sending alert e-mails to the users. I-Box purposed are to create a mailbox with a sensor connected that detects the presence of mails, invoices, and other documents whenever they come into touch with it. Next, to aid users by sending notifications that provide short notice, users are more aware and remind people to check their mailbox frequently. Then, to see how effective the product is in solving difficulties by testing the performance of your product. Furthermore, the goal is to see if it aids users in addressing difficulties in the first place. These projects helped users reduce the loss of parcels or letters because this mailbox will send notifications through 'Blynk' apps with a good

Wi-Fi connection. After the parcel or letter is inserted into the mailbox, the IR sensor will detect the motion of the parcel or letter. Then, the IR sensor will signal to Arduino Mega about the motion of the parcel or letter. ‘Blynk ’ apps will receive the signal from Arduino Mega, and it will show a notification there have inserted a parcel or letter. Once the parcel or letter take off by users from the mailbox, ‘Blynk’ apps show ‘0’ inserted parcel. The suggestion of this project that has been provided is to use solar energy as its power source instead of the Li-Po battery or power adapter used in the beginning. Solar electricity is more practical and environmentally suitable because it produces no pollutants. Next, install closed-circuit television (CCTV) in the mailbox to keep an eye on things and send notifications if there are mails; the I-Box should be concerned about delivering notifications about the Li-Po battery health and percentage, as well as the state of the other components. When there is damage, quick action can prevent more serious difficulties and ensure that the components are always working properly [10].

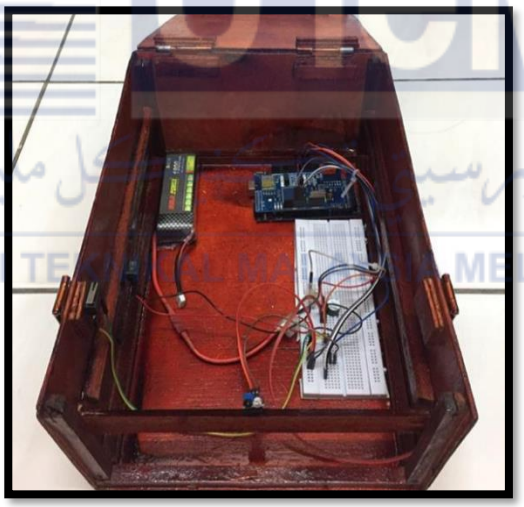

Figure 2.4 Intelligent Box with complete equipment

Figure 2.1 shows the project model that used a few components: Arduino Mega as a microcontroller, Wi-Fi Shield, IR sensor, Lithium Polymer Battery (LIPO) 11V, Buzzer, Limit Switch and Blynk Apps for sending the notification through the user.

2.3.5 Smart Electronic Pigeon Hole System

This system is designed to overcome the staff's need to check their pigeonhole every day despite no document inserted, and it must notify the owner to prevent lost documents. It will also reduce issues that most customers may face, such as forgetting to collect essential documents. Smart Pigeonhole with Notification System introduced as an innovation from traditional pigeonhole. The design begins with an LCD displayed "Enter no mailbox". The user will need to use the keypad to input the mailbox number. The chosen number will appear on the LCD when the mailbox number has been entered. After that, the mail was placed through the pigeonhole after a 10-second wait. If the IR sensor detects no mail, the message "No letter input" appears, and the user is prompted to enter the mailbox number again. If the letter exceeds the ultrasonic capacity established by the administrator, a red LED will light, and an e-mail will be sent to the pigeon's owner. If the capacity specified by the ultrasonic sensor is not met, a white LED will light. This project's future work recommendations include a security system such as a basic lock system with a motor that only opens when the user enters the correct password and prevents the loss of important documents or mail, building an app that can be monitored, the admin can change the owner of the pigeon hole without having to change the entire coding by using a database system and adding an extra sensor that can precisely indicate the number of letters received as well as [11].

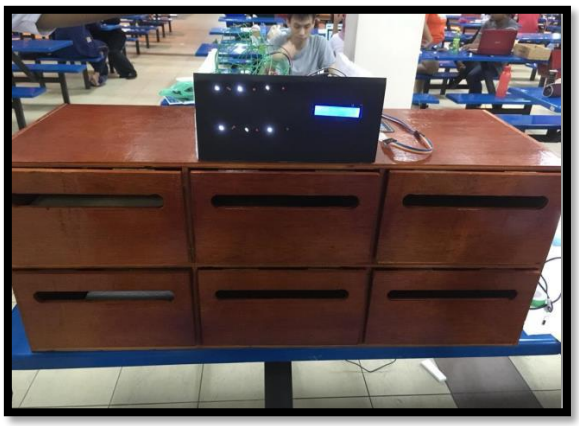

Figure 2.5 The complete project model

Figure 2.2 shows the complete model of the project that used a few components: Arduino mega, IR sensor, ultrasonic Sensor, Wi-Fi Module, LCD, keypad, ultrasonic sensor, white and red LED, and Blynk Apps notification through the user.

2.3.6 Automation Of Parcel Delivery Collection Using IoT

The following existing system is Smart Freight Box (SFB) that can confirm and accept the requested package and acknowledge the consumer and e-retailers. This system has been divided into 3 phases: Pre-delivery Phase, Delivery Phase, and Post-delivery Phase. For Pre-delivery Phase, the client uses any e-retailer website to place a purchase. If the order is verified, the e-retailer will e-mail the client parcel information, including the barcode and estimated package weight. These facts can then be fed into the cloud by the customer.

The consumer will safely get their delivery no matter where he is in the globe once it is fed into the cloud. Next, for the Delivery Phase, the package delivery person enters the box to be delivered. For delivery, the worker must place the item in SFB. He enters SFB through the front door and places the package on the shifting belt. The SFB verifies the package using two parameters: barcode and weight. The verification procedure has two components. SFB delivers a message to the customer after verifying the cargo, confirming that the two parameters match the information put into the cloud. The front door automatically shuts, and the moving belt shifts the package inside, preventing intruders from obtaining the parcel until the SFB is unlocked from the backdoor located within the home. Finally, the package delivery worker must tell the e-retailer that the item has been delivered to the customer by sending an acknowledgement to the e-retailer during the Post-delivery Phase. The e-retailer sends the customer a delivery link, and the consumer must confirm that the item has been received and that it is the same as the one purchased. Following this last verification process, the e-retailer may conclude that the package has been delivered to the customer [5].

Figure 2.6 Model of Smart Freight Box

The figure below shows that the barcode sensor is mounted on the SFB's sidewall while the weight sensor is mounted on the base.

2.3.7 Pigeonhole Notification System by Utilizing Telegram Messenger

This project was developed to assist the lecturers gets notifications for the present document in their pigeonhole. Once the present document is inserted into the pigeonhole, this system will trigger a message and send it to the lecturer via Telegram messenger. Telegram messenger is widely used in media social because it is also the other communication application for people. Other than that, if the pigeon hole is complete, the lecturers will get the notification through Telegram Messenger. The ultrasonic sensor is a piece of equipment that measures the space left inside the pigeonhole. Lecturers can access the notification from a tablet, smartphone, laptop, or personal computer [6].

2.3.8 Pigeonhole Smart Box for University Application

This project was built to overcome the student always take for granted in submitting their assignment. It also gives an alert for lecturers about student submission assignments. This system starts with the student inserting the assignment through the pigeonhole. After that, the IR sensor will detect the assignment inserted, triggering the GSM Module for sending SMS.

The IR sensor will detect and count the assignment inserted, and the LED will display ‘Assignment’ and ‘Counter = 0’. If the lecturer wants to collect the assignment inside the pigeon hole, they need to command ‘b’, and the pigeonhole will automatically unlock using an electromagnetic lock. If the lecturer wants to count the total assignment received inside the pigeon hole, they need to command ‘c3’ using the SMS [12].

2.4 Table Comparison Between Previous Work

Based on their chosen methodologies and features, the existing and proposed systems are compared below.

Table 1 Comparison between the existing systems and the proposed system

System	No	Year	Publication	Hardware Used	Software Used	IoT application	Advantage	Disadvantage
EXISTING SYSTEM	1	2020	Smart Pigeonhole Alert System with SMS Notification	LDR, LER, LDD, Atmega8, GSM-Module,	SMS, JAVA	None	• Simple to use • Friendly-use.	• Heavy because of the thick wood • Lack of security.
	2	2020	Smart Parcel Box with UV based sanitisation	Wi-Fi Module, Camera Module, Limit Switch, Load Cell, ULN 2003, Relay, Servo Motor, Uv Light	Not stated	Not stated	• Have security cameras and alarms. • Using UV rays to sanitise parcel	None

	3	2020	A Novel Method to Monitor and Alert System for A Letter Box	ESP32, IR Sensor,	Mobile Apps	Thingspeak Could Database	• Low cost • Light Weight	• Any unnecessaries mail will enter the box • Lack of security.
	4	2019	I-Box (Intelligent Mailbox)	Arduino Mega, Wi-Fi Shield, IR Sensor, Battery Lipo 11V, Limit Switch, Buzzer	Blynk Apps	Blynk Could database	• Low cost • Highly reliable	• Easy for document loss because there is an open hole. • The notification will lose after clearing the taskbar on the smartphone.
	5	2019	Smart Electronic Pigeon Hole System	Arduino Mega, IR sensor, Ultrasonic Sensor, Wi-Fi Module, LCD, Keypad, White and Red LED	Blynk Apps	Blynk Could database	• Low cost • User friendly	• Easy for document loss because there is an open hole. • The notification will lose after clearing the taskbar on the smartphone.

	6	2017	Automation Of Parcel Delivery Collection Using IoT – Smart Freight Box	Barcode Scanner, Weight Sensor Load, Robodo Uno R3 Development Board Atmega328p Atmega16u2	Mobile Apps	Not Stated	• Contactless delivery • Save time for delivery.	• Lack of security
	7	2014	Pigeonhole Notification System by Utilizing Telegram Messenger	Raspberry Pi, IR Sensor, Ultrasonic sensor	Telegram	Telegram Database	• can be accessed with all devices.	• Lack of security system.
	8	2015	Pigeon Hole Smart Box For University Application	IR sensor, Arduino UNO, GSM Module, Electromagnetic Lock.	SMS	SMS database	• low cost • user friendly	None

PROPOSED SYSTEM	9	2021	Intelligence Submission Box With Apps Notification Through Iot To The Recipient (Smart Box 2.0)	ESP-32, IR sensor, Mc522 RFID, LCD, Green and Red LED, Buzzer, Servo Motor.	Blynk App	Firebase Database	• The lecturer knows the name and no matric student. • The lecturer has their tag to open the door.	None

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter will emphasise the project's particular implementation strategy and the process of putting the analysis into action to make it a reality. Furthermore, the approach is used to achieve the project's purpose of finishing project. Some study has been carried out to accomplish the project's objectives. This section includes the process flow chart and design.

3.2 Research Design

First and foremost, some research on several resources had been carried out. The project will start with a literature review to gain the related information about the intelligence submission box with application notification to the receiver via IoT, how the system works, and which applications were employed for this project. The information needed for this project's implementation was collected through the analysis. Furthermore, this system is built on a mobile application that lecturers may use to access. As a result, the lecturer will better notice when a student submits an assignment.

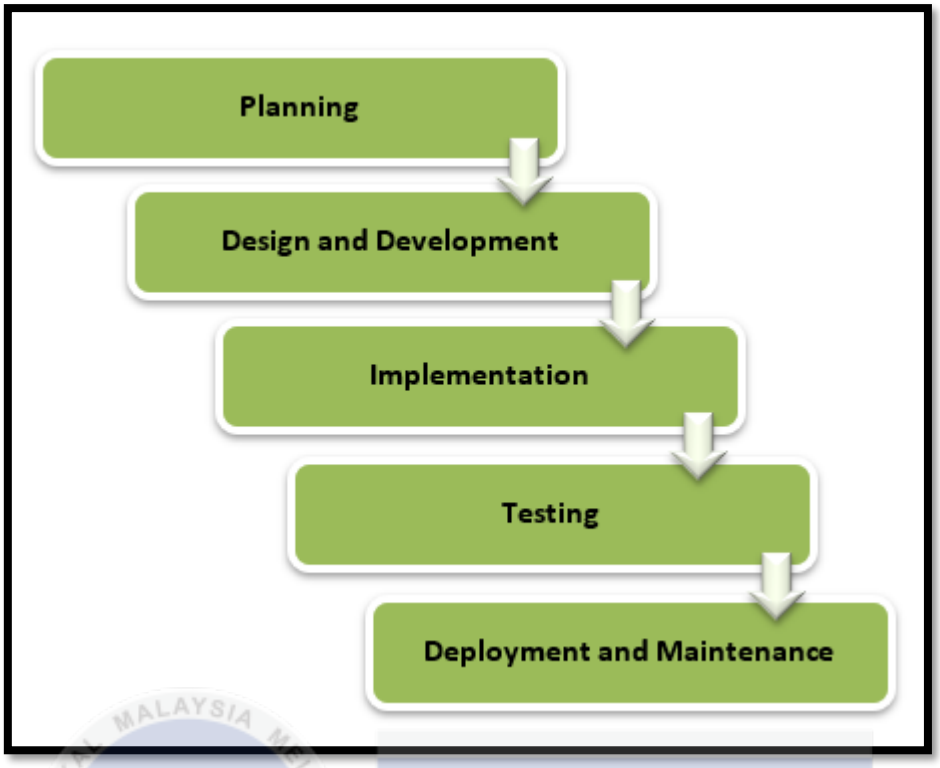

Figure 3.1 Waterfall model

Figure 3.1 shows the waterfall model of the Intelligence Submission Box with Apps Notification Through IoT to the Recipient. The first phase is Planning the requirements system. After doing some research on the existing project, the planning is done, and we develop a better design. The second phase is the design and development; this phase is to identify the function that should be included in this project. In this phase, we will design the flow of the project and suitable equipment for this project. Next, the third phase is implementation. In this phase, we will construct a design into the actual project using appropriate equipment. Then, the fourth phase is testing, which is it will test the functionality of this project. Lastly, deployment and maintenance will be applied to centralise the system's scalability, usability, and availability.

3.3 Flowchart of the general flow of PSM

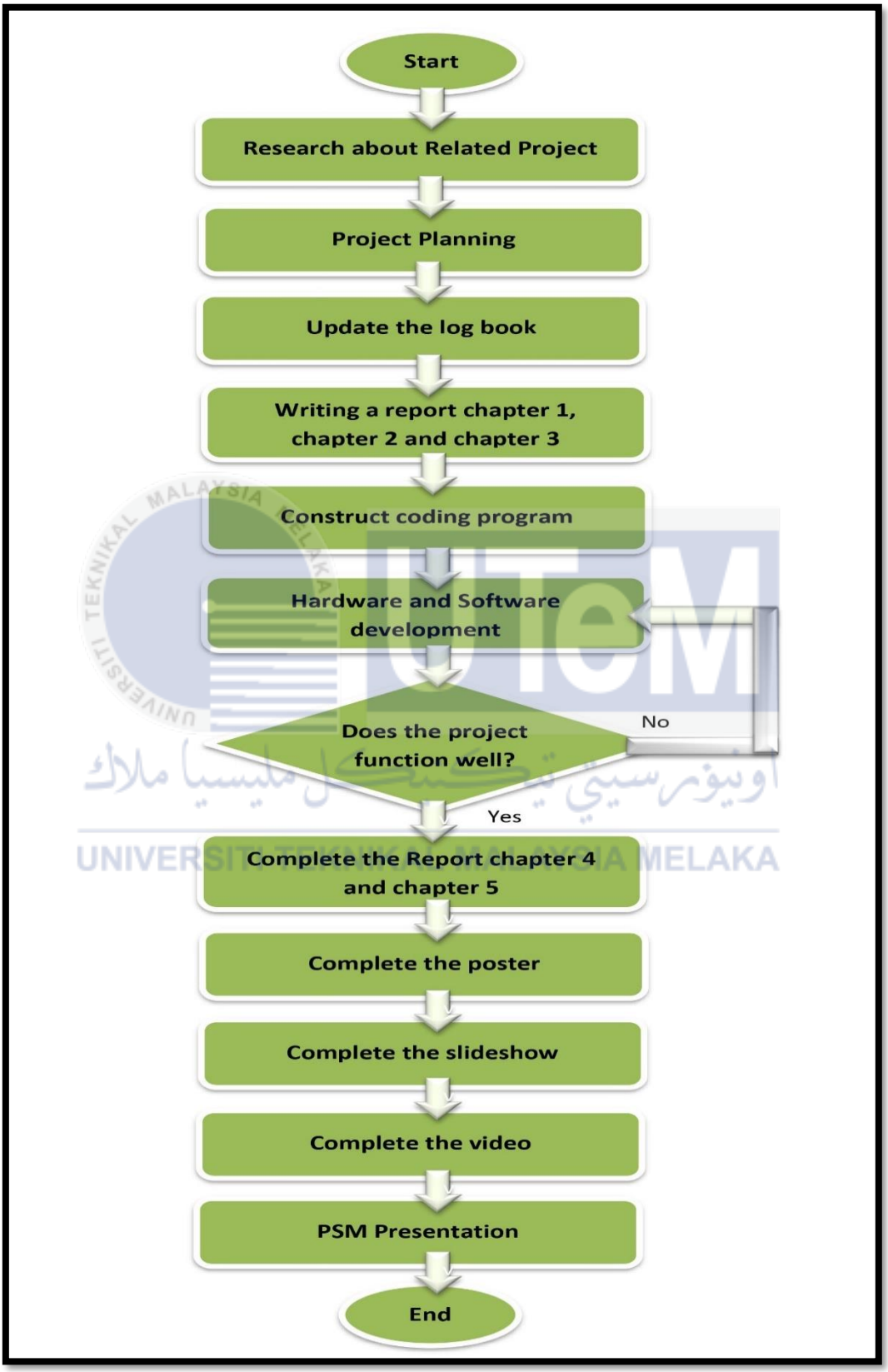

Figure 3.2 PSM Flowchart

Figure 3.2 shows the PSM flowchart that will be used in this project. The first stage is to do preliminary project research. The study's findings and suggestions may then be used for this project. This phase allows it to identify the hardware and software utilised. Each piece of hardware and software has its own set of benefits and downsides. Then we may build the code and simulation to confirm the project works. The last stage is to ensure that the system flow is smooth.

3.4 Project Flowchart

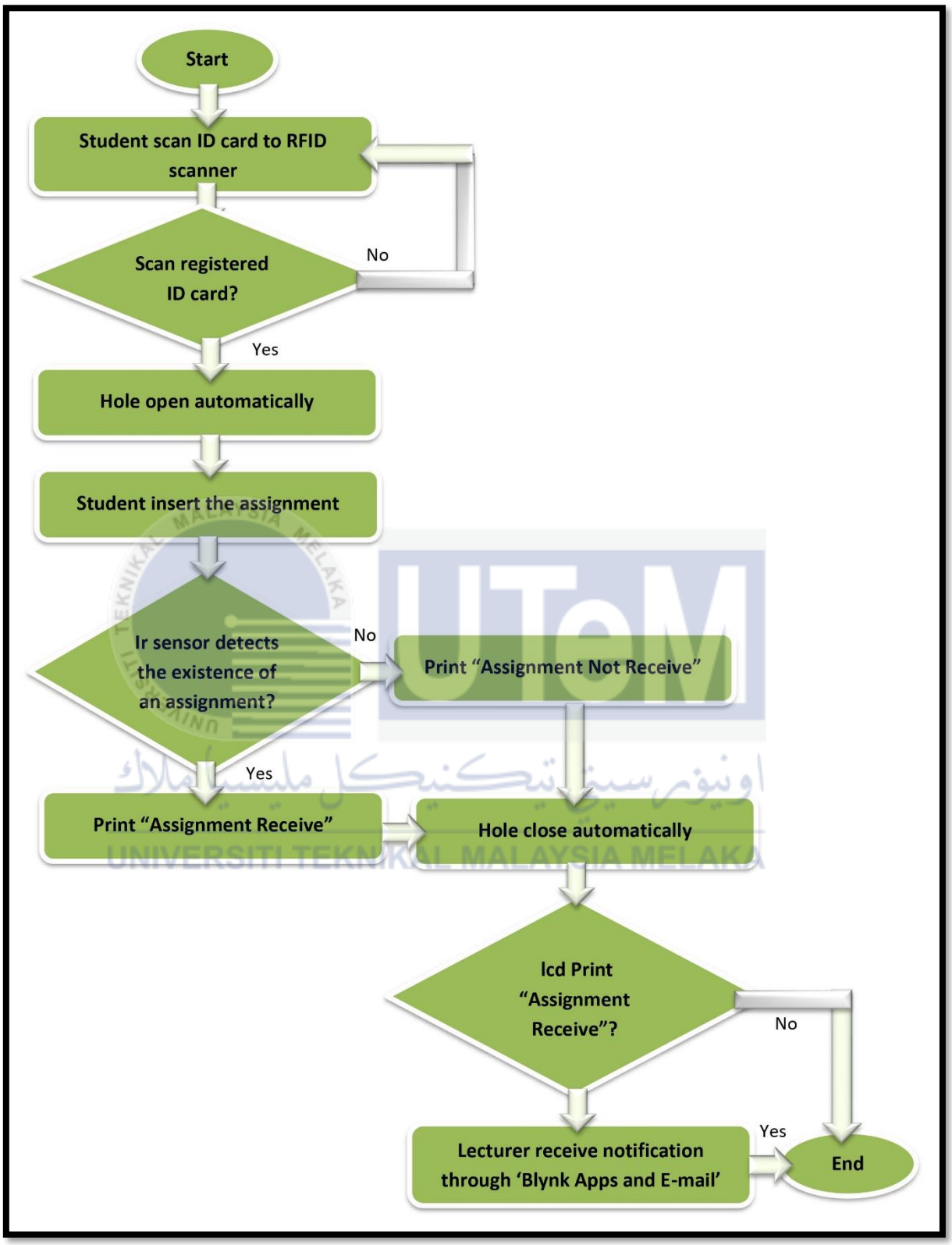

Figure 3.3 Project Flowchart

These are the sequence steps of the intelligence submission box with apps notification through IoT, as shown in Figure 3.3. First, the student needs to scan the ID card containing their name and matric number into the RFID scanner. If the student scans the card that registers into the database, the buzzer will sound for 1 second and led green will turn on. Meanwhile, if the student scans the card that does not register into the database, the buzzer will sound for 3 seconds, and the led red will turn on. After the student scans the right card, the hole of the submission box will automatically open for the student to slot in their assignment inside the box. If the student slot in their assignment, the sensor will detect the assignment through the box and print "Assignment Receive" through LCD, but if the student does not turn in the assignment, it will print "Assignment Not Receive" the door will close automatically. Lastly, if the student slot in the assignment, the lecturer will get the notification about students' assignments that were successfully submitted.

3.5 Block Diagram

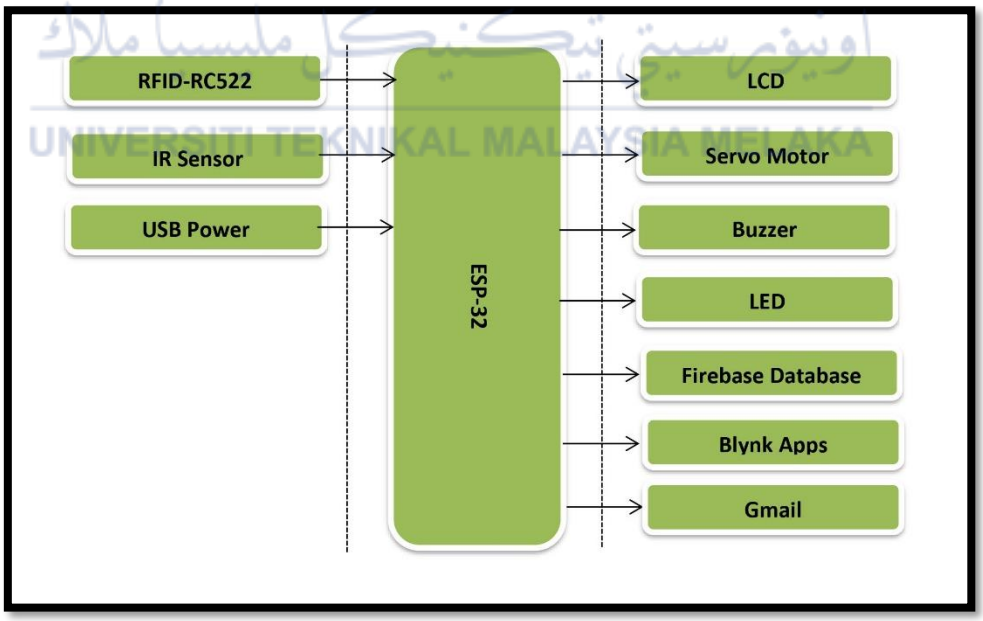

Figure 3.4 Block Diagram of Project

The project's block diagram is shown on figure 3.4. This project's input devices include the RGID-RC522, an IR sensor, and a USB cable. Meanwhile, the project's output consists of an LCD, servo motors, buzzer, led, Firebase, Blynk Apps, and Gmail. The ESP-32 is utilised as the microcontroller in this project.

3.6 Gantt Chart of Program

This Gantt chart below shows the timeline of PSM 1 and PSM 2 throughout this project.

3.6.1 Gantt Chart PSM 1

Table 2 Gantt Chart PSM 1

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12	WEEK 13	WEEK 14
TASK 1: Background study: Search for the paper related to the project														
TASK 2: Find suitable methodology for the project														
TASK 3: Complete report for chapter 1 (Introduction)														
TASK 4: Complete report for chapter 2 (Literature Review)														
TASK 5: Design planning for next semester work														
TASK 6: Complete report for chapter 3 (Methodology)														
TASK 7: Submit first draft report (**Due: 01/06/2021**)														
TASK 8: Report correction														
TASK 9: Submit a report to panel														
TASK 10: Prepare slide presentation. Mock presentation in front of SV (**18/06/2021**)														
TASK 11: BDP 1 Presentation														

3.6.2 Gantt Chart PSM 2

Table 3 Gantt Chart PSM 2

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12	WEEK 13	WEEK 14	WEEK 15	WEEK 16
TASK 1: BDP 2 briefing by JK PSM FTKEE																
TASK 2: Start Construct the software																
TASK 3: Start Construct the hardware																
TASK 4: Check the functionality project																
TASK 5: Complete chapter 4 (Result and Discussion)																
TASK 6: Complete report for chapter 5 (Conclusion)																
TASK 7: Submit first draft report (**Due: 28/12/2021**)																
TASK 8: Report correction																
TASK 9: Upload report to e-PSM																
TASK 10: Prepare slide presentation. Mock presentation in front of SV (**04/01/2021**)																
TASK 11: BDP 2 Presentation																
TASK 12: Submit final softcopy format																

The Gantt chart of progress for this project is shown in Table 3.1, which is needed in PSM 1. From week one through week four, I am looking for a paper connected to the topic. After that, task 2 is allocated from week 4 to week 6. In this assignment, I'll have to figure out which approach is best for the job. After that, you must prepare reports on this project for tasks 3, 4, and 5. In assignment 4, I'm supposed to make a plan for the work I'll be doing in the next semester. We must send the report via SV after finishing it in PSM1. Finally, in week 14, the BDP 1 Presentation will be given.

Table 3.2 shows the PSM 2 Gantt chart showing progress for this project. The professor will begin by providing an overview of PSM 2 in task one. Then I'll develop the hardware and software from week 2 through week 10. I must finish all of the reports in Chapters 4 and 5 after the hardware and software fulfil the criteria. The work must be submitted to the supervisor for grammar and format revision in week 11. When I get the report, I'll need to make a few adjustments. Finally, for the BDP 2 presentation, I must complete the presentation slide, poster, and video.

3.7 Hardware

The hardware that can be used in this project will be explained in this section.

3.7.1 RC522 RFID Reader Module

One of the most essential parts of this project is the RC522 RFID reader module. The Intelligent Submission Box will be connected to the scanner. Radio Frequency Identification system, or familiar with RFID, is a technology that contains two main parts: transponder or known as a tag, and transceiver that is known as a reader. A Reader comprises a Radio Frequency module and an antenna that produces a high-frequency electromagnetic field. The tag is a passive device with a microchip containing information and no battery use. The information will receive by the RFID reader module, and it will transmit signals to be processed. The module's operational voltage ranges from 2.5 to 3.3V with 13 to 26mA. The frequency range of the reader module is 13.5 MHz, and the read range is between 0 to 5cm.

Figure 3.5 RC522 RFID Reader Module

The figure 3.5 above shown the RC522 RFID Reader Module with white rectangle ID card and blue ID tag than contains some information of student.

3.7.2 ESP-32

The Espressif Systems 32, sometimes known as the ESP32, is a low-cost System on Chip (SoC) Microcontroller. The 32-bit Xtensa LX6 Microprocessor from Tensilica is available in single-core and dual-core models with integrated Wi-Fi and Bluetooth. The ESP32 has additional capabilities such as support for two wireless connections: Wi-Fi with up to 150 Mbps and Bluetooth v4.2 BR/EDR. Following that, it has internal memory such as ROM with 448 KiB for booting and core function, SRAM with 520 KiB for data and instruction, and integrated flash connected internally through IO16, IO17, and others. It also has a secure boot and flash encryption for further protection. Because it can be programmed in more than one programming environment, the ESP32 is user-friendly. Arduino IDE, JavaScript, and MicroPython are the most used programming environments.

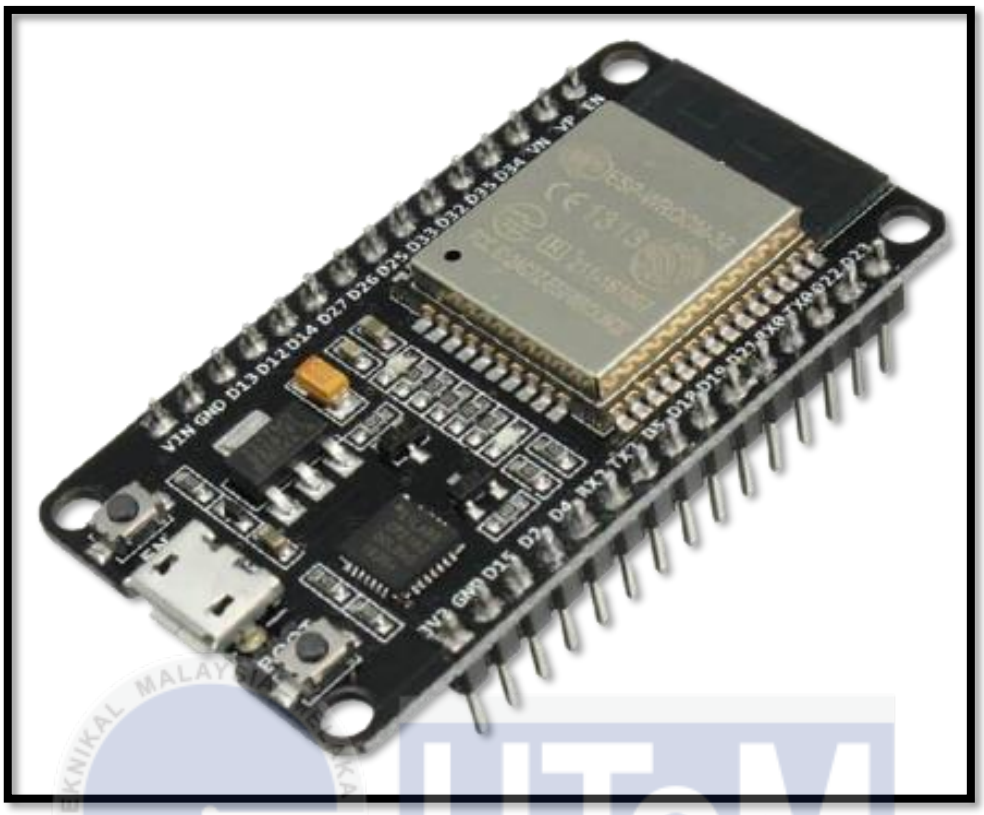

Figure 3.6 ESP-32

The firgure 3.6 shows the Esp32 has widely been used in Internet of Things (IoT) devices such as smart industrial devices, smart medical devices, and smart energy devices.

3.7.3 Infrared (IR) Sensor

Another device utilised in this project is an infrared (IR) sensor. An infrared sensor is a kind of electrical gadget that produces infrared light to detect specific environmental conditions. An infrared sensor can detect motion and measure an object's heat. A "passive IR sensor" is one that monitors infrared radiation rather than emitting it. This electrical device detects and quantifies infrared radiation in its immediate surroundings. The human eye cannot see infrared because its wavelength is longer than that of visible light. The wavelength ranges from 780 nm to 50 m. There are two sorts of sensors: active sensors and

passive sensors. LEDs and receivers are two forms of active sensors. Because LEDs do not generate infrared radiation, only passive IR sensors can detect it [3].

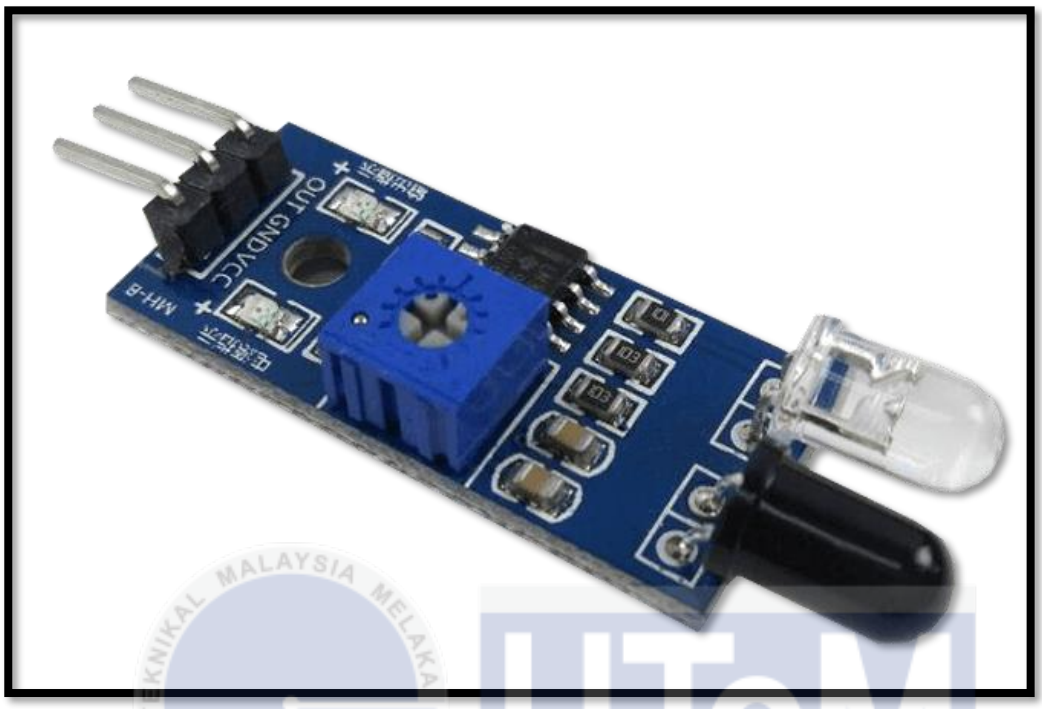

Figure 3.7 IR Sensor

3.7.4 4x20 LCD Display

A 20x4 LCD is a relatively simple module that may be found in various devices and circuits. Seven-segment and other multi-segment LEDs are favoured over these modules. LCD is being produced is inexpensive, simple to programme, and has no restrictions on showing unique and even bespoke characters (unlike seven segments), animations. A 20x4 LCD can display 20 characters per line on each of its four lines. Each character is presented in a 5x7 pixel matrix on this LCD. Command and Data are the two registers on this LCD. The LCD on the HD44780 controller is standard. The LCD features are 4 lines x 20 characters, HD44780 (built-in) LCD Controller Equivalent, works with ATMEGA, ARDUINO, PIC, and a variety of other microcontrollers and kits, Data I/O interface with 4

or 8 bits and low usage of electricity. In this project, we used the 4x20 LCD is to show the character that contains the name, matric number and instruction for students to insert the assignment.

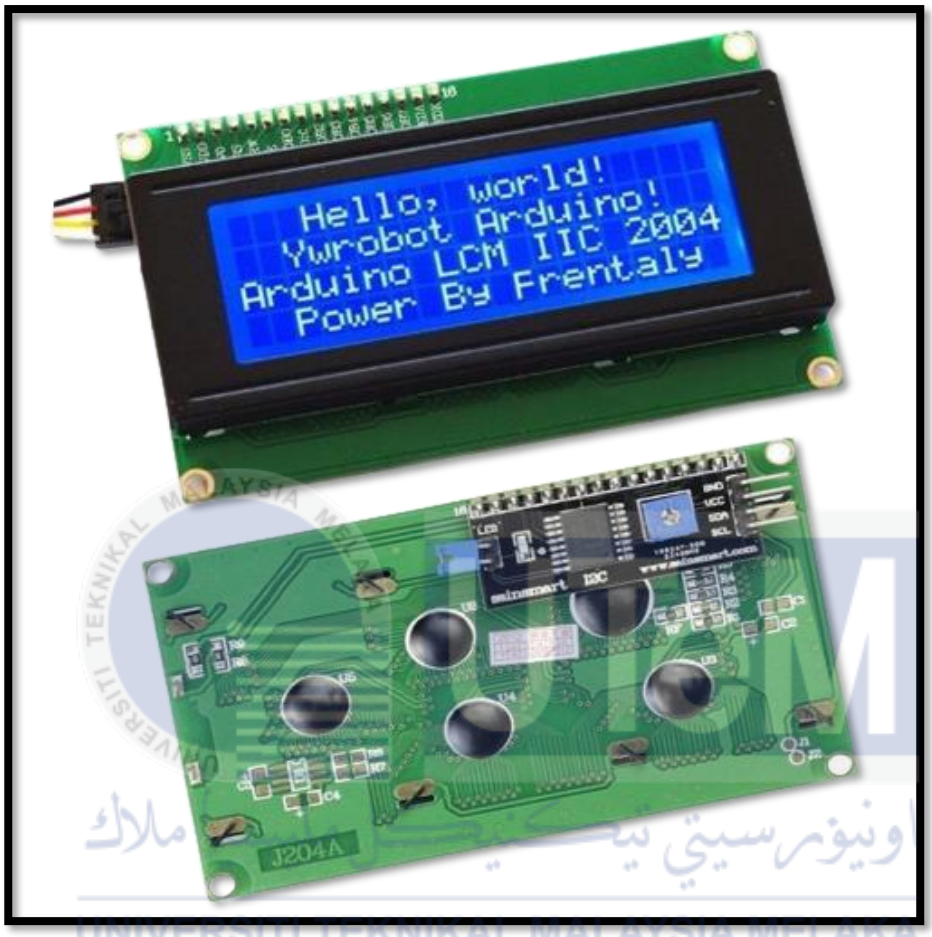

Figure 3.8 2x16 LCD Display

3.7.5 Servo Motor

A servo motor is a precision-rotating motor. Servo motors are often equipped with a control circuit that gives feedback on the present position of the motor shaft. This feedback allows the servo motors to spin with high precision. A servo motor is used to spin an item at a precise angle or distance. It's simply a servomechanism with an essential motor. Servo Motor consists of a controlled device, output sensor and feedback system. It is a closed-loop system in which a positive feedback mechanism controls the motion and ultimate position

of the shaft. A feedback signal is formed by comparing the output signal with the reference input signal to operate the device. The servo motor can turn from 0 to 30 degrees and return to neutral. Servo motors have a few types, which are SG90 plastic gear micro 0-180 degree, MG90s metal gear micro 0-180 degree. MG 955 metal gear micro 0-180 degree, MG 955 metal gear micro 0-360 degree, MG 996 metal gear micro 0-180 degree and MG 996 metal gear micro 0-180 degree.

Figure 3.9 Servo Motor

3.7.6 Buzzer

Piezo buzzers are low-cost devices that emit simple beeps and tones. It makes use of a piezo crystal, which is a kind of material that changes shape when exposed to electricity. When a crystal collides with a diaphragm, such as a small speaker cone, a pressure wave is

produced that the human ear recognises as sound. Simply adjusting the frequency of the voltage given to the piezo will cause it to produce sounds by quickly changing its shape. Piezo buzzers with a voltage of 1.2220 V and a current of 20 mA have a greater maximum sound pressure level (SPL) capability. It should be noted, however, that the increased SPL of piezo buzzers needs bigger footprints. Piezo buzzers are available in various sizes, frequencies, and sound production. Buzzers are classified into three types: self-oscillating with signal generators, buzzers without signal generators, and multi-tone sound generators/sirens. Likewise, it is low-cost yet produces much sound and can be installed on printed circuit boards. This gadget may be used as an alarm, a computer device, a telephone, or a toy. In this project, we will utilise a buzzer to increase the buzzer volume when the student scans their ID card to the RFID scanner.

Figure 3.10 Buzzer

3.7.7 LED

LED is an abbreviation for light-emitting diode, a semiconductor device that produces light when an electric current is passed through it. Light is produced when current-carrying electrons and holes clash inside a semiconductor material. LEDs are solid-state devices because the light is formed inside the solid semiconductor material. The term "solid-state lighting," which includes organic LEDs (OLEDs), distinguishes it from other types of lighting that use heated filaments (incandescent and tungsten halogen lamps) or gas discharge (fluorescent lamps). LEDs come in various colours, including blue, green, red, and yellow. Indium gallium nitride (InGaN) is used to produce blue, green, and ultraviolet high-brightness LEDs, aluminium gallium indium phosphide (AlGaInP) is used to produce yellow, orange, and red high-brightness LEDs, aluminium gallium arsenide (AlGaAs) is used to produce red and infrared LEDs. Gallium phosphide (GaP) is used to produce yellow and green. In this project, we utilised a red LED to prevent an unregistered ID card from being read by an RFID scanner and a green LED to prove a registered ID card.

Figure 3.11 LED

3.8 Software

The software used in this project will be explained in this section.

3.8.1 Arduino IDE

The Arduino Software (IDE) includes a text editor for writing code, a message area, a text terminal, a toolbar with buttons for basic operations, and menus. It communicates with the Arduino and Genuino devices by connecting and uploading code. Sketches are programmes created with the Arduino Software (IDE). These drawings were created with a text editor and saved with the '.ino' file extension. Cutting/pasting, as well as searching/replacing text, are all available in the editor. The message section indicates errors and provides feedback while storing and exporting. The Arduino Software (IDE) outputs

text to the console, including detailed error messages and other information. The configured board and serial port are displayed in the window's bottom righthand corner. You may validate and upload programmes, generate, save, and save drawings, and open the serial monitor using the toolbar buttons.

3.8.2 Gmail

Gmail is a free e-mail service offered by Google. Gmail is typically accessed using a web browser or the official mobile app. For e-mail clients, Google also supports the POP and IMAP protocols. Gmail is an easy-to-use, efficient, and successful e-mail service. Gmail is an e-mail service provider that offers various services such as spam filtering and virus scanning. Other built-in features, such as Google Talk, incorporated into Gmail as an immediate discussion option, are available. Gmail has 15 GB of storage space, automated e-mail filters and categories, smart compose and thoughtful reply, e-mail nudges and high-priority alerts, locate and manage your travels in Gmail, event data used to make calendar events and writing, and intelligent search recommendations. After the IR sensor identifies the received report, we will utilise Gmail to notify student assignment submission.

3.8.3 Blynk App

Blynk creates smartphone apps that can interface with microcontrollers, such as the ESP32. The fundamental purpose of the Blynk platform is to make building mobile phone applications as easy as possible. To construct a mobile app that can connect with your Arduino, drag a widget and specify a pin. Blynk enables you to control an LED or a motor from your phone without programme it. Blynk is a sophisticated and scalable tool used by both amateurs and pros. Blynk is only an app editor that can create one or more projects.

Each project might feature graphical widgets such as virtual LEDs, buttons, value displays, and even a text terminal and the capacity to connect with one or more devices. Using the Blynk library, it is possible to control ESP32 pins directly from a phone without writing code. It is also possible to share a project with friends or even customers, enabling them to access but not change the attached devices. Consider developing a smartphone app that enables users to control lighting, window blinds, and room temperature directly from their phone. The Blynk App is used in this project to operate the servo motor for the lecturer to pick up the student assignment and get notice of submission.

3.8.4 Firebase Database

Firebase Google's mobile platform makes it simple to create high-quality apps. Firebase is a NoSQL database service that uses JSON-like documents to store data. It accepts passwords, phone numbers, Google, Facebook, and Twitter for authentication. Data is synchronised in real-time across all clients and is accessible even when no apps are available. Firebase Hosting is a fast web app hosting solution that caches content across global content delivery networks. Google's data centres are being utilised to test the app on virtual and physical devices. Notifications may be sent using Firebase without the need for any extra code. If you're a newbie, start with fire. The services are cloud-based and scalable, requiring little to no work from the developer. For example, the Firebase Realtime Database is a cloud-hosted No SQL database that enables you to store and sync data across users in real time.

3.9 Implementation

After all the software and hardware have been validated, the process moves on to implementation. This project's performance ensures that the software and hardware are

working properly and successfully. The goal must be met by completing this project to develop and construct an intelligent submission box that uses an ESP32 as a microcontroller.

3.10 Summary

The proposed methodology for developing a realistic intelligence submission box with apps notification through IoT to the recipient that uses an ESP32 as a controller is presented in this chapter. To build this system, both hardware and software are essential and valuable. Blynk App is the program that was used. It has been demonstrated that the programming language can run the application. It also allows users to customise their experience according to their preferences. This development will generate a wide range of data; a programming language will be required. The mr522 RFID scanner is the next piece of hardware used. It is an ideal scanner to use for this project. It has a high scanning efficiency and can increase production.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Introduction

The project's intended outcome, an intelligence submission box with apps that alert the recipient through IoT, will be discussed in this chapter. To demonstrate the result, a diagram will be utilised. The project's software and hardware implementation will be detailed in order to get a better result. The planning phase for the project must proceed successfully.

4.2 Software Implementation

This section will show the software result of this project.

4.2.1 Programming Language

Programming is the most important aspect of constructing a comprehensive project. The Arduino IDE was used to create this intelligent submission box. Some code examples are shown below. In this project, three ID cards and one ID tag are provided. First, two student ID cards with their names and matric numbers: 'NURIN FADLHLIN ADLINA BINTI AWANG TAGHIB B081810435' and 'MOHAMAD ASHAMMIL BIN ABDULLAH B081810436'. Second, an ID card has not been registered for this project. Finally, an ID tag with the lecturer's name 'PUAN ELIYANA RUSLAN'.

```
content.toUpperCase();
if (content.substring(1) == "9A B9 59 B3")
{
  Serial.println("");
  Serial.println("Authorized access...");
  lcd.setCursor(0, 0);
  lcd.clear();
  lcd.print("Get Access");
  delay(100);
  digitalWrite(kuning, HIGH);
  digitalWrite(busser, HIGH);
  delay(500);
  digitalWrite(busser, LOW);
  digitalWrite(kuning, LOW);
  char a [] = "NURIN FADLHLIN ADLINA BINTI AWANG TAGMIB B081810425";
  Serial.println(a);
  lcd.setCursor(0, 0);
  lcd.clear();
  lcd.print("NURIN FADLHLIN");
  lcd.setCursor(0, 1);
  lcd.print("ADLINA BINTI AWANG");
  lcd.setCursor(0, 2);
  lcd.print("TAGMIB B081810425");
  delay(300);
  json.set("/Student",a);
  Firebase.pushJSON(firebaseData, "/Name", json);
  lcd.setCursor(0, 0);
  lcd.clear();
  lcd.print("Please Insert");
  lcd.setCursor(0, 1);
  lcd.print("Assginment...");
  delay(100);
  motor.write(180);
  delay(7000);
  if (bacaan >= 600) // BILA SENSOR TAK KESAN BARANG
  {
    counter++; // COUNTER AKN NAIK
    Blynk.notify(a);

    if(counter > 0) // KALAU COUNTER LEH BESAR DR 0
    {
      json2.set("/Jumlah", counter); // FIREBASE JUMLAH +1
      Firebase.updateNode(firebasedata, "/Report", json2); // UPDATE DEKAT FIREBASE REPORT
    }
    lcd.setCursor(0, 0);
    lcd.clear();
    lcd.print("Report receive"); // LCD DISPLAY
  }
  else
  {
    lcd.setCursor(0, 0);
    lcd.clear();
    lcd.print("Not receive");
  }
  delay(5000); // BG DELAY 5 SAAT
  motor.write(0); // MOTOR TUTUP
  digitalWrite(kuning, LOW); // BG LED KUNING PDM
  lcd.clear();
}
```


Figure 4.1 Registered Student ID Card

This figure 4.1 shows, after successfully scanning the ID card into RFID-RC522, this is an example of coding for a student card. It will then display to the LCD the words 'authorised

access...' and 'get access...' The green led and the buzzer will then switch on for 500 milliseconds. LCD will display the student's name. The student's name will then be added to the database. The servo motor will open the hole allowing the student to insert the assignment efficiently. The LCD will display "Assignment Received" if the student inserts the assignment via the smart box and the IR sensor detects it, but "Assignment Not Received" if the student does not input the assignment through the smart box. Finally, the hole will close by itself.

```
else if (content.substring(1) == "17 D7 A6 D6")
{
  Serial.println("");
  Serial.println("Authorized access...");
  lcd.setCursor(0, 0);
  lcd.clear();
  lcd.print("Get Access");
  delay(100);
  digitalWrite(kuning, HIGH);
  digitalWrite(buzzer, HIGH);
  delay(500);
  digitalWrite(buzzer, LOW);
  char b [] ="PUAN ELIYANA RUSLAN";
  Serial.println(b);
  lcd.setCursor(0, 1);
  lcd.clear();
  lcd.print("PUAN ELIYANA RUSLAN");
  json2.set("/Data", b);
  Firebase.updateNode(firebaseData, "/Lecturer", json2);
  motor1.write(180);
  delay(15000);
  motor1.write(0);
  counter = 0;
  Firebase.deleteNode(firebasedata, "/Report");
  Firebase.deleteNode(firebaseData, "/Name");
  digitalWrite(kuning, LOW);
  lcd.clear();
}
```

Figure 4.2 Registered Lecturer ID Tag

Figure 4.2 above shows the lecturer's code for collecting all students' assignments. When the lecturer successfully scans their ID tag into RFID-RC522, it will first display 'authorised access...' and 'get access...' on the LCD. The green led and the buzzer will then switch on for

500ms. The name of the lecturer will be shown on the LCD. The servo motor will automatically open the lecturer's door to collect the assignment. Finally, after 15 seconds, the door will automatically close. Full coding had been attached at Appendix A.

```
  else // button AC C3 94 17
  {
    motor.write(0);
    motor1.write(0);
    lcd.clear();
    lcd.print("Access Denied");
    digitalWrite(merah, HIGH);
    digitalWrite(buzzer, HIGH);
    delay(3000);
    digitalWrite(buzzer, LOW);
    digitalWrite(merah, LOW);
    digitalWrite(kuning, LOW);
    lcd.clear();
  }
}
```


Figure 4.3 Unregistered Student ID Card

The coding of an unregistered student card is seen in figure 4.3. Scan the ID card into RFID-RC522 if the card is successful. Both servo motors will remain '0,' and the LCD will display 'Access Denied.' For 3 seconds, the buzzer and the red led will turn on.

4.2.2 Database

Figure 4.4 Database Student

The database connected with the project is shown in figure 4.4. If a student scans their ID card into the RFID-RC522, the student's database will be updated.

Figure 4.5 Lecturer Database

Figure 4.5 shows after the lecturer scans the ID tag to collect the assignment, the database will be immediately deleted. However, the lecturer may still use Gmail to track down the student's name.

4.2.3 Blynk Apps

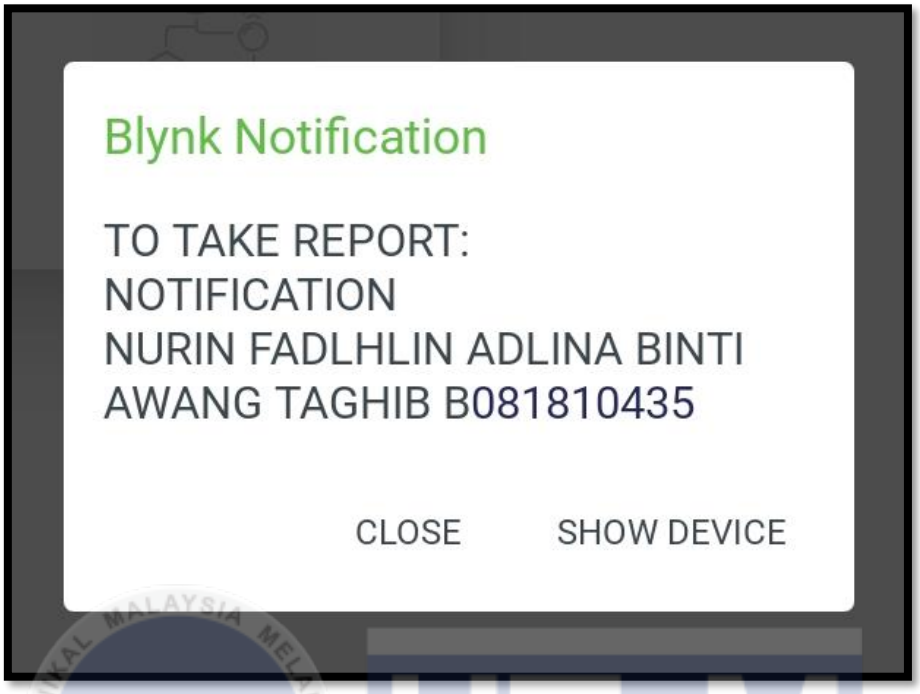

Figure 4.6 Blynk Notification

Figure 4.1 shows the notification received when the student successfully submitted the assignment. If the student inserts the assignment and the IR sensor detects it, it will appear. This project only utilises two student names: 'NURIN FADLHLIN ADLINA BINTI AWANG TAGHIB B081810435' and 'MOHAMAD ASHAMMIL BIN ABDULLAH B081810436'.

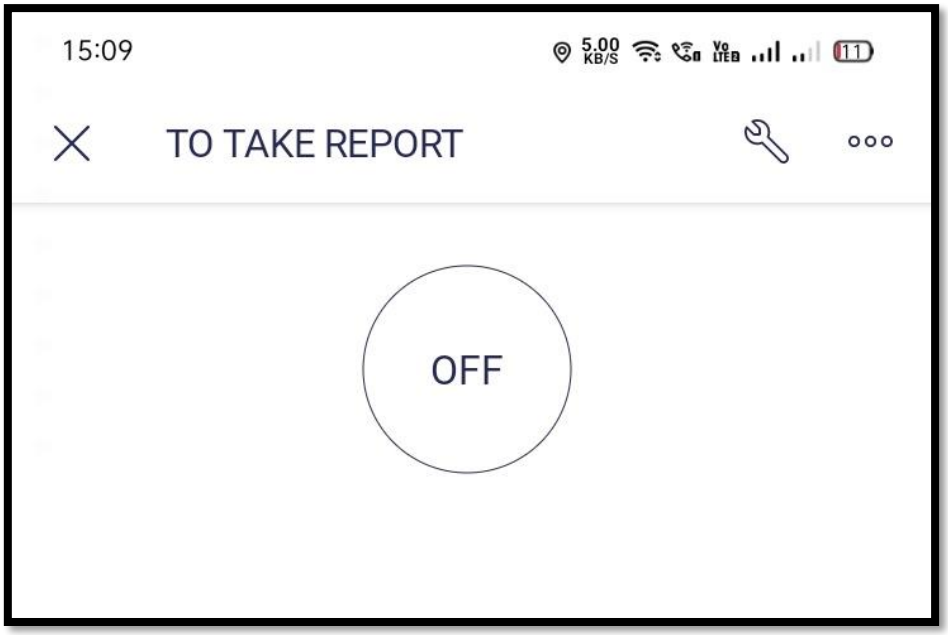

Figure 4.7 OFF Button

Figure 4.7 shows the Blynk Apps OFF Button. This button serves as an automated door closing. If the lecturer presses that button, it will switch to the ON position, and the servo motor will open the door automatically, allowing the lecturer to pick up the submitted assignment.

Figure 4.8 ON Button

Figure 4-8 above show the Blynk Apps ON Button. This button is functioning as automatic door opener. If the lecturer pushes that button, it will switch to OFF Button and servo motor will automatically close the door after pickup the submitted assignment.

4.2.4 Gmail

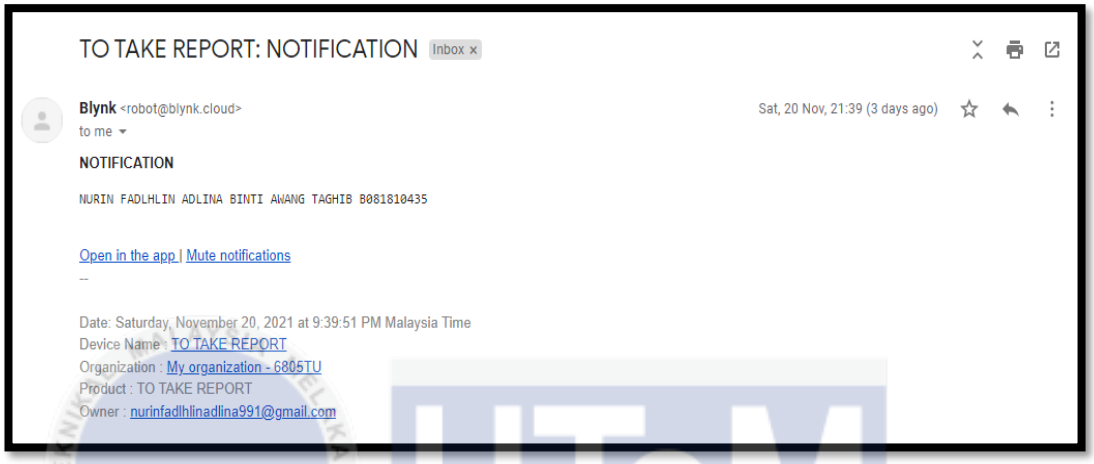

Figure 4.9 Gmail Notification

The figure 4.9 above shows the notification received once the student successfully inserts the student assignment into the smart box. The gmail will indicate the student's name and matric number, making it easy for the lecturer to notice the student assignment using any device, such as a laptop, tablet, or smartphone. The rationale for utilising Gmail is to track the date and time the student entered the assignment.

4.3 Hardware Implementation

This section will discuss on hardware result of this project.

4.4 Prototype Project

Figure 4.10 Prototype Project

This project's prototype can be discuss in figure 4.10. RFID RC522, LCD, buzzer, led red, led green, and servo motor 1 were mounted at the front of box. The lecturer will use servo motor 1 to collect the student assignment. The ESP-32, servo motor 2, and IR sensor were all mounted inside of the box.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

In conclusion, the results obtained from this project that fullfill the objectives will be concluded in this chapter. The process and outcomes for developing an intelligence submission box through IoT to the recipient were successful. The first objective is to create an intelligence submission box with a sensor that detects the existence of an assignment and sends out an alert by using Arduino IDE as a streamlined code editor. Furthermore, having this intelligence submission box will help the lecturer become more aware of the submission of the student's assignment. The lecturer also can check the student's name who has already submitted the assignment through the pigeonhole.

Moreover, this system is functioning very well with the RFID scanner. Instead of typing the student's name onto a keypad, the student need to scans the ID card that contains the name and matric number.

5.2 Future Works

After a very efficient discussion with the supervisor, two recommendations need to be made into this outing system. Firstly, the Blynk Apps can be replaced with MIT App Inventor or Kodular. Building own application can be more accessible for the lecturer to look at just one app. Next, put a sensor that detects if the mail is fully inserted.

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APPENDICES

Appendix A Full Coding IDE Arduino

Example of Coding

```
// DECLARATION

#define BLYNK_TEMPLATE_ID "TMPL-htrJmf-"
#define BLYNK_DEVICE_NAME "TO TAKE REPORT"
#define BLYNK_AUTH_TOKEN "ijb_2Kw5UsHMliTN8AMU5XMA2vb3MhoF"
#define BLYNK_PRINT Serial

#include <SPI.h>
#include <MFRC522.h>
#include <WiFi.h>
#include <WiFiClient.h>
#include <FirebaseESP32.h>
#include <BlynkSimpleEsp32.h>

#define RST_PIN 22 // KAKI RFID RST ESP 22
#define SS_PIN 21 // KAKI RFID SDA ESP 21
MFRC522 mfrc522(SS_PIN, RST_PIN);
MFRC522::MIFARE_Key key;

#include <Wire.h>
#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27, 20, 4);

#define I2C_SDA 17 // KAKI LCD SDA ESP 17
#define I2C_SCL 16 // KAKI LCD SCL ESP 16

TwoWire I2CBME = TwoWire(0); // DECLARE UNTUK LCD SDA SCL

// UNTUK BLYNK

char auth[] = BLYNK_AUTH_TOKEN;
const char* ssid = "Awang taghib@unifi";
const char* pass = "Umifatiah4697";

// UNTUK FIRERBASE

#define firebaseauth "DnPuEcEc3mkFd6k6jUV9QA6YZqqMczn865Vs4B4X" // AUTH
        TOKEN
#define firebasehost "intelligentsubmissionbox-default-rtdb.firebaseio.com/" // HOST
        WEB
```

```
// UNTUK SERVO

#include <ESP32Servo.h>
Servo motor;
Servo motor1;

// DECLARE UNTUK KAKI KOMPONEN

int buzzer = 27;
int merah = 32;
int kuning = 33;
int sensor = 15;
int counter = 0;
int irsensor = 36;

// DECLARE FIREBASE

            //student     // report
FirebaseData firebaseData, firebasedata;
FirebaseJson json, json2, json3;

// BLYNK VIRTUALPIN

#define motorpin V0

BLYNK_WRITE(motorpin)
{
  int but = param.asInt(); // ON  OFF BUTTON
  if (but == 1)// && counter > 0) // KALAU ON DAN ADE REPORT
  {
    motor1.write(180); // MOTOR BUKA
    counter = 0; // REPORT JD 0
  }
  else if (but == 0)// && counter <= 0) // KALAU OFF DAN TAKDE REPORT
  {
    motor1.write(0); // MOTOR TUTUP
    Firebase.deleteNode(firebasedata, "/Report"); // NAMA & REPORT DIPADAM
    Firebase.deleteNode(firebaseData, "/Name");
  }
}

void setup()
{
  Serial.begin(9600);   // INITIAL SERIAL 9600

  // DECLARE OUTPUT & INPUT

  pinMode(buzzer, OUTPUT);
  pinMode(merah, OUTPUT);
  pinMode(kuning, OUTPUT);
```

```
pinMode(sensor, INPUT);
pinMode(irsensor, INPUT);

digitalWrite(kuning, LOW);
digitalWrite(merah, LOW);
digitalWrite(buzzer, LOW);

// BG LCD BERFUNGSI

Wire.begin(I2C_SDA, I2C_SCL);
lcd.begin();
lcd.backlight();

// BAGI WIFI CONNECT UNTUK BEBERAPA SAAT

WiFi.begin(ssid, pass);

while (WiFi.status() != WL_CONNECTED)
{
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Connecting");
  delay(1000);
  lcd.setCursor(10, 0);
  lcd.print(".");
  delay(1000);
  lcd.setCursor(11, 0);
  lcd.print(".");
  delay(1000);
  lcd.setCursor(12, 0);
  lcd.print(".");
  delay(1000);
  lcd.setCursor(10, 0);
  lcd.print("   ");
}

lcd.clear();
lcd.setCursor(0, 0);
lcd.print("Connected to");
lcd.setCursor(0, 1);
lcd.print("wifi");
delay(2000);
lcd.clear();

Firebase.begin(firebasehost, firebaseauth);
Firebase.setReadTimeout(firebaseData, 1000 * 60); // SETKAN DATABASE UNTUK
      BACA DALAM SATU MINUTE SBB BG 60 SAAT
Firebase.setwriteSizeLimit(firebaseData, "tiny"); // UNTUK SIZE DAN MASA
      UNTUK FIREBASE UPDATE TINY (1S), SMALL (10S), MEDIUM (30S),
      LARGE (60S)
```

```
 // DECLARE SERVO MOTOR

 motor.attach(4);
 motor1.attach(5);
 motor.write(0);
 motor1.write(0);

 while (!Serial);
 SPI.begin();
 mfrc522.PCD_Init();
 delay(4);
 for (byte i = 0; i < 6; i++)
{
  key.keyByte[i] = 0xFF;
 }
 Blynk.begin(auth, ssid, pass);
}

// UNTUK BACA KAD DLM HEXA

void dump_byte_array(byte *buffer, byte bufferSize)
{
 for (byte i = 0; i < bufferSize; i++)
 {
   Serial.print(buffer[i] < 0x10 ? " 0" : " ");
   Serial.print(buffer[i], HEX);
 }
}

// PERANAN PENTING

void get_UID(String content)
{
 int bacaan = analogRead(irsensor);
 Serial.print("Ir: ");
 Serial.println (bacaan);

 for (byte i = 0; i < mfrc522.uid.size; i++)
 {
    content.concat(String(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : " "));
    content.concat(String(mfrc522.uid.uidByte[i], HEX));
 }
 content.toUpperCase();
 if (content.substring(1) == "9A B9 59 B3") // kad matrik  C4 FB F7 BF
 {
   Serial.println("");
   Serial.println("Authorized access...");
   lcd.setCursor(0, 0);
   lcd.clear();
```

```
lcd.print("Get Access");
delay(100);
digitalWrite(kuning, HIGH);
digitalWrite(buzzer, HIGH);
delay(500);
digitalWrite(buzzer, LOW);
digitalWrite(kuning, LOW);
char a [] = "NURIN FADLHLIN ADLINA BINTI AWANG TAGHIB B081810435";
Serial.println(a);
lcd.setCursor(0, 0);
lcd.clear();
lcd.print("NURIN FADLHLIN");
lcd.setCursor(0, 1);
lcd.print("ADLINA BINTI AWANG");
lcd.setCursor(0, 2);
lcd.print("TAGHIB B081810435");
delay(300);
json.set("/Student",a);
Firebase.pushJSON(firebaseData, "/Name", json);
lcd.setCursor(0, 0);
lcd.clear();
lcd.print("Please Insert");
lcd.setCursor(0, 1);
lcd.print("Assginment...");
delay(100);
motor.write(180);
//Blynk.notify(a);
delay(7000);
/*motor.write(0);
delay(2000);
lcd.setCursor(0, 0);
lcd.clear();
lcd.print("Report Received...");
delay(1000);
lcd.clear();
Blynk.notify(a);
digitalWrite(kuning, LOW);*/
//kira();
//int bacaan = analogRead(irsensor);
//Serial.print("Ir: ");
//Serial.println (bacaan);

if (bacaan <= 600) // BILA SENSOR TAK KESAN BARANG
{
 counter++; // COUNTER AKN NAIK
 Blynk.notify(a);

 if(counter > 0) // KALAU COUNTER LBH BESAR DR 0
 {
  json3.set("/Jumlah", counter); // FIREBASE JUMLAH +1
```

```
      Firebase.updateNode(firebasedata, "/Report", json3); // UPDATE DEKAT
         FIREBASE REPORT
    }
    lcd.setCursor(0, 0);
    lcd.clear();
    lcd.print("Report receive"); // LCD DISPLAY
   }
   else
   {
    lcd.setCursor(0, 0);
    lcd.clear();
    lcd.print("Not receive");
   }
   delay(5000); // BG DELAY 5 SAAT
   motor.write(0); // MOTOR TUTUP
   digitalWrite(kuning, LOW); // BG LED KUNING PDM
   lcd.clear();
 }
 else if (content.substring(1) == "EE C4 CD AF") // kad oku
 {
   Serial.println("");
   Serial.println("Authorized access...");
   lcd.setCursor(0, 0);
   lcd.clear();
   lcd.print("Get Access");
   delay(100);
   digitalWrite(kuning, HIGH);
   digitalWrite(buzzer, HIGH);
   delay(500);
   digitalWrite(buzzer, LOW);
   char a [] = "MOHAMAD ASHAMMIL BIN ABDULLAH B081810436";
   Serial.println(a);
   lcd.setCursor(0, 0);
   lcd.clear();
   lcd.print("MOHAMAD ASHAMMIL");
   lcd.setCursor(0, 1);
   lcd.print("BIN ABDULLAH");
   lcd.setCursor(0, 2);
   lcd.print("B081810436");
   delay(300);
   json.set("/Student",a);
   Firebase.pushJSON(firebaseData, "/Name", json);
   lcd.setCursor(0, 0);
   lcd.clear();
   lcd.print("Please Insert");
   lcd.setCursor(0, 1);
   lcd.print("Assginment...");
   delay(200);
   motor.write(180);
   //Blynk.notify(a);
```

```
  delay(7000);
  /*motor.write(0);
  delay(2000);
  lcd.setCursor(0, 0);
  lcd.clear();
  lcd.print("Report Received...");
  delay(1000);
  lcd.clear();
  Blynk.notify(a);
  digitalWrite(kuning, LOW);*/
  //kira();

  if (bacaan <= 600) // BILA SENSOR TAK KESAN BARANG
  {
   counter++; // COUNTER AKN NAIK
   Blynk.notify(a);

   if(counter > 0) // KALAU COUNTER LBH BESAR DR 0
   {
    json3.set("/Jumlah", counter); // FIREBASE JUMLAH +1
    Firebase.updateNode(firebasedata, "/Report", json3); // UPDATE DEKAT
        FIREBASE REPORT
   }
   lcd.setCursor(0, 0);
   lcd.clear();
   lcd.print("Report receive"); // LCD DISPLAY
  }
  else
  {
   lcd.setCursor(0, 0);
   lcd.clear();
   lcd.print("Not receive");
  }
  delay(5000); // BG DELAY 5 SAAT
  motor.write(0); // MOTOR TUTUP
  digitalWrite(kuning, LOW); // BG LED KUNING PDM
  lcd.clear();
 }

 else if (content.substring(1) == "17 D7 A6 D6")// && counter > 0) // card access C0 06
        E2 32
 {
  Serial.println("");
  Serial.println("Authorized access...");
  lcd.setCursor(0, 0);
  lcd.clear();
  lcd.print("Get Access");
  delay(100);
  digitalWrite(kuning, HIGH);
  digitalWrite(buzzer, HIGH);
```

```
    delay(500);
    digitalWrite(buzzer, LOW);
    char b [] = "PUAN ELIYANA RUSLAN";
    Serial.println(b);
    lcd.setCursor(0, 1);
    lcd.clear();
    lcd.print("PUAN ELIYANA RUSLAN");
    json2.set("/Data", b);
    Firebase.updateNode(firebaseData, "/Lecturer", json2);
    motor1.write(180);
    delay(15000);
    motor1.write(0);
    counter = 0;
    Firebase.deleteNode(firebasedata, "/Report");
    Firebase.deleteNode(firebaseData, "/Name");
    digitalWrite(kuning, LOW);
    lcd.clear();
  }
  else // button AC C3 94 17
  {
    motor.write(0);
    motor1.write(0);
    lcd.clear();
    lcd.print("Access Denied");
    digitalWrite(merah, HIGH);
    digitalWrite(buzzer, HIGH);
    delay(3000);
    digitalWrite(buzzer, LOW);
    digitalWrite(merah, LOW);
    digitalWrite(kuning, LOW);
    lcd.clear();
  }
}

/*void kira()
{
  int bacaan = analogRead(irsensor);
  Serial.print("Ir: ");
  Serial.println (bacaan);

  if (bacaan <= 600) // BILA SENSOR TAK KESAN BARANG
  {
    counter++; // COUNTER AKN NAIK

    if(counter > 0) // KALAU COUNTER LBH BESAR DR 0
    {
      json3.set("/Jumlah", counter); // FIREBASE JUMLAH +1
      Firebase.updateNode(firebasedata, "/Report", json3); // UPDATE DEKAT
          FIREBASE REPORT
    }
```

```
   lcd.setCursor(0, 0);
   lcd.clear();
   lcd.print("Report receive"); // LCD DISPLAY
  }
  else
  {
   lcd.setCursor(0, 0);
   lcd.clear();
   lcd.print("Not receive");
  }
  delay(5000); // BG DELAY 5 SAAT
  motor.write(0); // MOTOR TUTUP
  digitalWrite(kuning, LOW); // BG LED KUNING PDM
  lcd.clear();
}*/

void loop()
{
  Blynk.run();

  lcd.setCursor(0, 0);
  lcd.print("Please Scan Card");

  // RESET LOOP KALAU TAKDE CARD YANG SCAN

  if ( ! mfrc522.PICC_IsNewCardPresent() || ! mfrc522.PICC_ReadCardSerial())
  {
   delay(50);
   return;
  }

   // NK TUNJUK KAD UID DAN PICC

   Serial.println(F("Card UID:"));
   dump_byte_array(mfrc522.uid.uidByte, mfrc522.uid.size);
   Serial.println();
   Serial.print(F("PICC type: "));
   MFRC522::PICC_Type piccType = mfrc522.PICC_GetType(mfrc522.uid.sak);
   Serial.println(mfrc522.PICC_GetTypeName(piccType));


   // NK CHECK KESERASIAN PICC

   if (    piccType != MFRC522::PICC_TYPE_MIFARE_MINI
       &&  piccType != MFRC522::PICC_TYPE_MIFARE_1K
       &&  piccType != MFRC522::PICC_TYPE_MIFARE_4K) {
       Serial.println(F("No valid tag"));
       return;
   }
```

```
    MFRC522::StatusCode status;

    String content= "";
    get_UID(content); // BACA DEKAT GLOBAL NI
}
```