I-BOX

(INTELLIGENT MAILBOX)

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SESSION OF JUNE 2019

DECLARATION OF ORIGINALITY AND COPYRIGHT

TITLE   : I-BOX (INTELLIGENT MAILBOX)

SESSION   : JUNE 2019

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ABSTRACT

This project was implemented based on monitoring of current methods of mailboxes, mail sent and placed in mailboxes often lost and abandoned by users. The objective of this project is to design a handy mailbox to help solve this problem. The scope of the research that has been set for this project is condominiums, apartments, high-rise office buildings and shopping mall lot. Due to Industrial Revolution 4.0 phase (IR4.0), there are several solutions to this problem which are users will be alert of the presence of mail or letter and receives notifications through their phone. This project uses " ARDUINO MEGA " material as a connector between sensors and battery. In addition, the battery is used to supply electrical energy for the mailbox to function. Next, the sensor used to detect the presence of the letter. When a letter is inserted into the mailbox, the sensor will detect the letter entry. The sensor alerts the Arduino cloud to send the user a message through the application – 'blynk apps' on the user's phone. As the results, the I-Box has fully functioned and achieved the objectives discussed. Based on the survey that has been conducted, the I-Box helps users to solve the problems stated.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This report describes the design and analysis involved in developing the "I-Box" (Intelligent Mailbox) to help users to be more alert or sensitive with the presence of important notices and mails in the existing mailbox especially the centralized mailbox. The purposes of this project are to design, assist users and test the effectiveness of this project on solving problem. Users tend to forget on checking their physical mailbox due to the existence of electronic mail (e-mail) besides due to their bustle life, users do not have time to check their mailbox regularly. These situations have been one of the causes of the loss of important notices or mails and cause them to experience other difficulties as insensitive to the presence of such notices in the first place. Furthermore, due to the result of the survey that has been conducted on residents in residential areas around Shah Alam, particularly at the apartments, condominiums and shopping mall lots admitted that they often experience loss of mails and not alert with the presence of it in the mailbox. In view of these problems, the I-Box is equipped with high sensitivity of sensor and arduino mega.

1.2 BACKGROUND OF RESEARCH

Along with the passage of time, people become busier with everyday affairs due to their own specific reasons and commitment, but some of them are not be able to rest at all which lead them to stress. According to the study, stress often impacts focus and attention more than memory. But this can lessen men ability to recall new information. In fact, the mind will be distracted with other concerns and thoughts then later forget. For this reason clearly an adverse impact on individuals and could have the side effects on other things. Due to forgetfulness habit, men need be reminded at all time and in most cases people need a lot of pushing at first but eventually build up enough momentum that doing what needs doing becomes a habit not an exception.

As technology has become so ingrained in society, people love things to be easier and that is why people are more difficult to disengage with their technology. According to research from RescueTime, one of several apps for iOS and Android created to monitor phone use, people generally spend an average of three hours and 15 minutes on their phone every day, with the top 20% of smartphone users spending upwards of four and a half hours. In addition, on average people pick up their phones 58 times a day purposely to send a quick text or inbox check. The existence of smartphones equipped with applications (apps) helps users to optimize their productivity.

Next, the residential places in urban area around Shah Alam are mostly condominiums, high rise apartment buildings and shopping mall lots. On average, people influences on housing preferences are based on their lifestyle. Influences on lifestyle include age, family type, family size, stage in the life cycle, social class, income, occupation, education and values. Most of the residents who live in this area are among the millennial and some who have small families. These residential area usually installed with a cluster mailbox or a cluster box unit (CBU), is a form of centralized communal mail delivery equipment. The types of mailboxes are freestanding and pedestal-mounted, blend in with any community decorations and they are convenient for users as well.

1.3 PROBLEM STATEMENT

Based on studies and observations conducted focusing primarily at the targeted area such as apartments, condominiums and shopping mall lots in Shah Alam, Selangor most of the residents (80%) have been experienced the same problem. The problems are they faced loss of important mails, bills, document and even missed the important deadline due to their carelessness and forgetful habit on checking their mailbox. This happens because of the residents do not have a new solution or updated technology that can solve the problem they experienced.

The traditional method door-to-door mail delivery meant a lot of standing around and waiting on the part of the postman, it shows the inefficiencies delivery companies. Moreover, traditional mailbox exposed to erratic weather pattern which could damage the mails and torn especially in Malaysia the climate is equatorial; it's hot, humid and rainy throughout the year. Rainfall is abundant and frequent; in fact it is difficult to find an area where it is lower than 2000 millimetres (79 inches) per year, or a month when it is lower than 100 mm (4 in). This scenario has led door-to-door mail delivery coming to an end.

Not to mention, traditional mailboxes were not designed with today's deliveries realities. As e-commerce has boomed, more valuable items delivered to your door. It can be annoying if mails, documents and etcetera to turn up missing or it were stolen. Couriers lose time and money on repeated delivery attempts, vendors have to deal with angry customers or replacing stolen property and have to cope with more delivery drivers on the road adding the traffic around the city. As for some people, old school mailboxes are suiting their needs just fine.

Regardless the problem stated, it encourage the progress to carry out a research to design a mailbox or system, named "I-Box" (Intelligent Mailbox). This mailbox is suitable to those that have a busy work schedule that does not allow them to be home during deliveries, keep forgetting to check on their mailbox and really into high technology things.

1.4 STUDY OF OBJECTIVES

The objectives of implement this project is to find out the problem facing by the residents around Malaysia especially around Shah Alam, Selangor with their current mailbox. After finding out the problem occur is trying to brainstorm the solution to overcome the problems and helps users to gain their productivity throughout the day.

- To design a mailbox that attached with sensor.
  The I-Box (Intelligent Mailbox) installs with a sensor that will detect the presence of mails, bills etc whenever the mails contacts with it.

- To assist users by providing an immediate alert by sending notifications.

  The alert notification helps users to be more alert and works as a reminder to remind users regularly on checking their mailbox.

- To test the effectiveness of the product on solving problems.
  Testing is an important stage after assembling process because this method helps to test product's performance. Besides, the aim is to test whether it helps users on solving problems in the first place.

1.5 SCOPE OF RESEARCH

The scope of review that we use throughout the production process until completion included the following:

- Designs various projects to be produced and make a decision.
- Make a sketch of the concept design selected.
- Make a proposal of the project to be implemented.
- Improve the concept of idea design.
- The division of work duties.
- Monitoring survey and questionnaire for the analysis and simulation of the project concept.
- Materials listing and financial budget needed in form of project to be implemented.
- Safety policies.
- The design is mainly focus to high-rise residential area such as condominiums, apartments and shopping mall lots.

1.6 IMPORTANCE OF RESEARCH

This project is an important process to prepare graduates to be ready for the next stage of studies and be able to deal with commitment throughout the completion journey, whether in academic or non-academic with the spirit of professionalism and good performance in the future.

- To improve work skills.
- To improve communication skills and cooperation in group.
- To recognize the important issue in daily basis.
- To benefit users in developing a project based on Industrial Revolution 4.0 (IR 4.0) technologies.
- To learn on how to confront, resolve, rectify any problem encountered previously.
- To take advantage of hi-tech for problem resolving.
- Brainstorming on how to overcome problems that exists.

1.7 SUMMARY OF CHAPTER

The I-Box (Intelligent Mailbox) is a product that assists users to be more sensitive or alert with the presence of mails in the mailbox. To put it another way, the I-Box may help them to overcome their forgetful habit and checking their mailbox as a habit. Besides the other problem that has been occur can be overcome with the technology applied in the I-Box. By all the research and survey, I-Box is the product that relevantly could help users. It is useful for all residents in their daily life and makes their life more convenient.

CHAPTER 2
LITERATURE REVIEW

CHAPTER 2
LITERATURE REVIEW
PREPARED BY: ALYA AFIFA BINTI FAISAL

The term "literature" means a research article that is referred to understand and study the research problem. The literature review is used to provide the context of the study by looking at the research that has been conducted in the field of research and not just summarizing the research conducted by other researchers. The contents of this chapter may contain a brief introduction to the subject of the study, concept or theory, previous studies related to the field of study and summary of this chapter.

2.1 INTRODUCTION OF CHAPTER

A literature review also focuses on the knowledge and ideas established on a topic as well as their strengths and weakness. Nowadays, technology is getting better and better to replacing the traditional system to speed up the process by introducing the computerized system. Before we start this Intelligent Box project, we have to analysis and choose the need of the project such as program and circuits we should use for this project. Besides, the physical prototype also needs to be tested before we make the real one. This is a safe process to avoid the damages of this project.

This chapter also to study aims to figure out how to resolve the problem when facing the loss of parcel or letter which is important if users did not check their own mailbox. To prevent this problem from getting worse, the project to helps user to be more alert with the presence parcel or letter is created because we know users are now rarely checking their mailboxes and sometimes they just checking their mailboxes by week. As a result, they are missing their important parcel or letter and also may miss an important date of the letter.

2.2 THEORY

Mailbox rule in the United States, known as the "postal rule" or "deposited acceptance rule" which is an exception to the general rule of contract law in common law countries that acceptance of an offer takes place when communicate. Under the posting rule, that acceptance takes effect when a letter is posted which is dropped in a post box or handed to a postal worker. In plain English, the "meeting of the minds" necessary to contract formation occurs at the exact moment word of acceptance is sent via post by the person accepting it, rather than when that acceptance is received by the person who offered the contract.

The rules of contracts by postal rules are such as an offer made by post is not effective until received by the offeree. Second, the acceptance is effective as soon as it is posted. Then, for revocation to be effective, it must be received by the offeree before they post their letter of acceptance. One rationale given for the rule is that the offeror nominates the post office as his or her implied agent, and thus receipt of the acceptance by the post office is regarded as receipt by the offeror. The main effect of the posting rule is that the risk of acceptance being delivered late or lost in the post is placed upon the offeror.

From that rules, the offeror nominates need to accept the risk if the letter or parcel being delivered late or lost when they already making decision which the post office as their implied agent. Because of this, sometimes users will do not know whether their letter has arrived or not in the mailbox. If users didn't check the mailbox, their letters may be lost due to weather factors such as strong winds or maybe disturbance by people who intentionally take or damage their letters. So, in order to minimize the case of missing letters, users or recipient should be reminded more often about the presence of letters.

2.3 LITERATURE RESEARCH

The solution about the case of missing letter can be resolves by reminded more often the users about the presence of letter. So to make that solution, sensor will be added in the mailbox, so that the users will know there has a letter in the mailbox. To choose the sensor which will be use to be placed in the mailbox, literature research about some sensor has been studied.

2.3.1 Arduino Based Smart Home Planning

Many facilities are automatically designed to assist human activities in controlling the safety of the environment or rooms requiring stricter security. Especially at home if you want to avoid crime such as theft, robbery, and other criminal acts, as well as other disasters such as fires. The advancement of electronic technology also helps in the development of reliable security systems.

One of these is security system application for home security. Many electronic devices used for home security systems. The main advantage of Arduino-based security systems compared to conventional security systems is having the ability to operate continuously and can be automatically linked to other devices. Home security problems can be overcome with a security system that can alert homeowners via SMS notification (Short Message Service) when a pyroelectric sensor detects a person who enters the room when the room is locked.

The system is in standby and the alarm will ring and the camera is plugged in. The camera will take a picture of the room condition at that time. Then, the camera will move towards the position of the active sensor. A video record from the room will be stored on the computer with data type 'AVI'. The result of this recording can be used as a reference in finding a thief or a party entering the room without permission. In this case research using the Arduino microcontroller module as a system controller.

2.3.2 Hand Tools Using Adjustable Range Infrared Sensor Based On Microcontroller

The impact of this technology development can help human labour, because of the limitations of human and equipment used today; its development is very fast. So, one of the ways to overcome time problem is to make a hand wash that can help when washing hands. Hopefully with this tool, it will facilitate hand washing automatically and practically without having to turn on the pipe first. This handheld device has hardware using ATMega16 microcontroller, multi-adjustable infrared sensor and software using C programming language.

Prior to this, hand-washing devices were made by Anggraini Eka Hastriananda and Rina Susanti Gultom who took the title "Automatic Hand Washing Equipment with PIR Sensor Using Basic Programmer". This hand-washer is using PIR sensors. The PIR sensor is a sensor that detects the presence of infrared rays. PIR sensors are passive because these sensors do not emit infrared light but only receive infrared radiation from the outside. Outside the wavelength the sensor will not detect. The distance the distance generated by the PIR sensor is very small and the distance cannot be adjusted, so according to the author of the PIR sensor is not effective when used for this automatic hand-washing device.

Hand-washers made by them are use ATMega8535 microcontroller. Based on its capability, ATMega8535 has a small capacity, and the microcontroller is less stable when used in the use of this hand wash. Therefore, the design of this handheld device uses an adjustable multi-infrared sensor, ATMega16 microcontroller and programming language C.

2.3.3 Application Wireless Sensor ESP8266 For Smart Home Automation

The IoT in the Smart Home Automation system is used to view electricity consumption and room humidity at any time. In this paper, we propose an IoT-based wireless sensor network that we can build using raspberry pi, ESP8266, ADC ADS1115, DHT 22, ACS712 and ZMPT101B. This wireless sensor network will automatically read for current and voltage along with temperature and humidity.

The process of this IoT is current data is read by ACS712 sensor, voltage data is read by ZMPT101B transformer sensor. The analogue data is digitally converted using the ADC ADS1115 which is then read ESP8266. Temperature and humidity data are read by DHT 22 which is sent directly to ESP8266. The read data is sent to the web server by ESP8266 using the MQTT (Message Queuing Telemetry Transport) protocol. Data will be updated continuously on the Raspberry Pi web server.

The introduction of Internet of Things Technology will make the conventional home a smart home, where all devices are effectively connected to other devices. Electronic devices, especially sensors, are evolving to work better with human needs. For example, this smart home system can control and monitor humidity, power consumption, home appliances, heating and ventilation, and more. This smart control significantly improves the quality of life and life, and leads to more efficient use of energy.

Efficiency and energy savings are major issues as a result of increased consumption, prices and environmental changes. Research on household electricity is an important topic in the field of energy consumption research. Excessive electricity consumption can be controlled with this smart home system. Users can monitor current conditions, temperature voltage and humidity through internet networks.

2.4 SUMMARY OF CHAPTER

From this chapter discussion, the purpose of this is to explain the perspective of the sensor that is used in previous research or project and to classify how much this project is related to those research and theory. Moreover, this chapter will show the theory and concept used to solve problem. Theoretical is very important as a guidelines in doing any kind of research.

As a result of this chapter, we had chosen infrared sensor (IR sensor) for detection of the letter in the mailbox. It is because their low power requirements make them suitable for most electronic devices such as laptops, telephones and PDAs. Other than that, they are capable of detecting motion in presence or absence of light almost with same reliability and also do not require contact with object to for detection. Besides, the best part of this sensor is it easy to find at any electronic shop and cheap.

CHAPTER 3
METHODOLOGY

CHAPTER 3

METHODOLOGY

PREPARED BY: MUHAMMAD ASYREEN BIN HALIM

3.1 INTRODUCTION OF CHAPTER

Methodology is a method and technique for designing, collection and analyzing data to produce evidence that can support a research. Methodology describes how a problem being research can be solved with the best method. The methodology aims to help you better the application of the method by describing the process of the research.

Methodologies can also be a reference to a group the implementation of the project that they want to do. A methodology is also required to update the progress the project. With the methodology, implementation of the project will be more organized and can be complete in a timely manner. Project supervisor will also be aware of the work done by the students in completing the project.

In this methodology, there is a more in-depth description of the use of material used to carry out project. Also included are the operating procedures of the work and the procedures used to carry out the project. This methodology is important for every project implementation or improvement of an existing project in the market.

3.2 METHOD OF COLLECTION DATA

At the discussion level, our project is the mailbox with sensor that uses Arduino mega as the main component to carry out this project. The function of the Aduino mega is to connect it to your computer via USB cable or power connected to an AC-DC adapter or battery to start charging it. The Arduino Mega2560 is compatible with most shields designed for the Arduino Duemilanove or Arduino Diecimila. The Arduino Mega2560 is the latest version that replaces the Arduino Mega version.

Next, Wi-Fi shield are one of the key components of this project. Wi-Fi Shield protects the entire web surfing session; secure your connection to both your home internet connection& the Internet Internet (both wired and wireless). Wi-Fi Shield protects your identity by ensuring that all web transactions (shopping, forms, downloads) are secured via HTTPS. Wi-Fi Shield also keeps you private online making your identity invisible to third party websites and ISPs. Unless you choose to sign in to a particular site, you will be anonymous for the entire Web session with Wi-Fi shield.

IR sensor or PIR has two main parts. The first part is the infrared transmitter, and the second part is the receiver. When this sensor is passed the transmitter will send a signal or signal to the receiver. The recipient will then direct the other tool. For example, when a letter is inserted into the mailbox, the sensor alerts because there is a letter presence in the mailbox.

Then, the component placed inside the sensor mailbox is the buzzer. Buzzer series or commonly referred to as message and alarms alarm alerts, have often been found on some electronic devices. In this era of modern technology, alarms are already available on some electronic devices. Starting from the mobile phone and also the alarm clock has a warning sign. And of course this buzzer or alarm network is one of the support lines on some of these electronic devices. But rarely does this series often stand alone as a single electronic device. And you can create your own network using some of the components you can easily find.

In addition, lithium polymer battery used to make the project work perfectly. Lithium Polymer (LiPo) rechargeable battery was initially designed for RC toys but eventually becomes so popular in robotic sector due to its small-size and lightweight. But it is relatively hard to maintain and may explode if being misused [9]. Just as with other lithium-ion cells, LiPos work on the principle of intercalation and de-intercalation of lithium ions from a positive electrode material and a negative electrode material, with the liquid electrolyte providing a conductive medium.

Finally, the most important component of making a mailbox with sensor is Blynk apps. BLYNK is a platform for Mobile OS (iOS and Android) applications aimed at control of the Arduino, Raspberry Pi, ESP8266, WEMOS D1 modules and similar modules over the Internet. Drag and drop widget. It is very easy to set up and takes less than 5 minutes to complete. Blynk is not tied to a specific board or module. From this application platform we can control everything remotely, wherever we are and at any time. With the records connected to the Internet with a stable connection and this is what is called the Internet of Things (IOT) system.

Figure 3.1: Wi-Fi shield

Figure 3.2: Arduino Mega

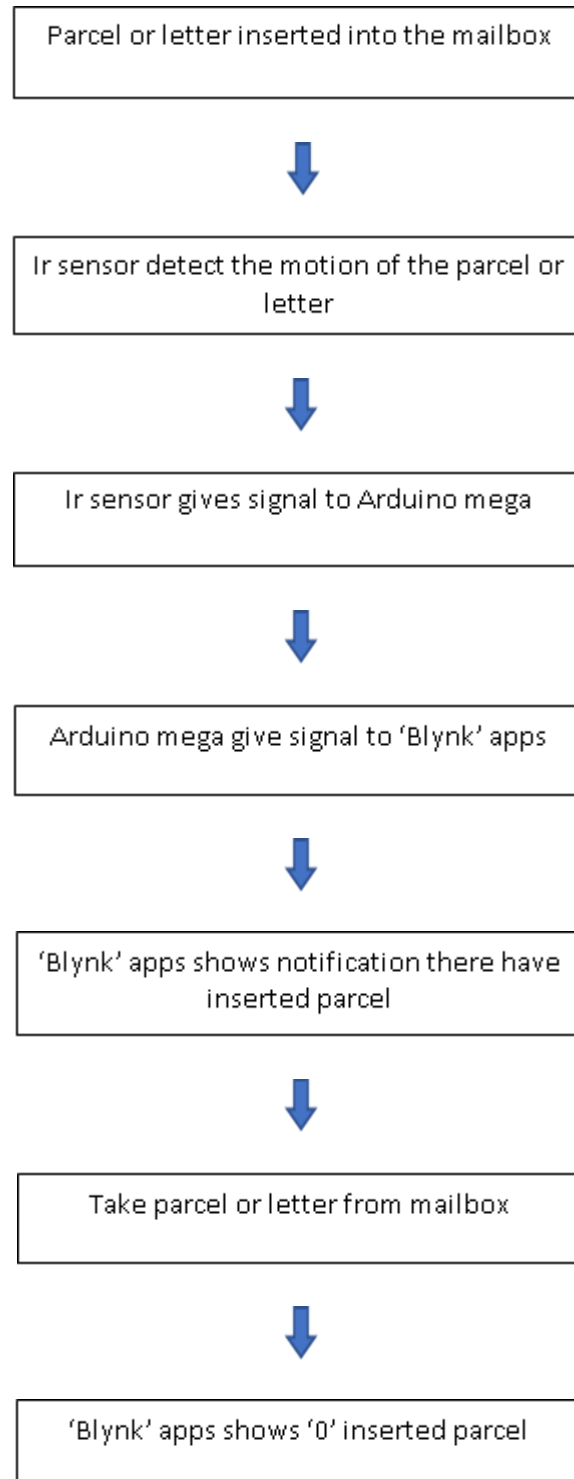**Figure 3.3**: IR sensor

Figure 3.4: Battery Lipo 11V

Figure 3.5: Buzzer

Figure 3.6: Blynk Apps

3.3 TESTING METHOD

Parcel or letter inserted into the mailbox

↓

Ir sensor detect the motion of the parcel or letter

↓

Ir sensor gives signal to Arduino mega

↓

Arduino mega give signal to 'Blynk' apps

↓

'Blynk' apps shows notification there have inserted parcel

↓

Take parcel or letter from mailbox

↓

'Blynk' apps shows '0' inserted parcel

3.4 SUMMARY OF CHAPTER

In conclusion, we can conclude that human sometimes can be forgetful. They need to always be remind so that, something which is important will not be forgotten. By proposing I-Box (Intelligent Mailbox) project, this mailbox will help user reducing the loss of important parcel or letter. The assemble of sensor in the I-Box will helps user to be more alert with the presence bills or letter. This is because this mailbox will send a notification to mobile application which will remind user of their parcel or letter. Intelligent mailbox will function with a good connection of Wi-Fi and then it will sendnotifications through 'Blynk' apps. As shown in our survey, most of the respondents agree with the addition of sensor in the mailbox and mobile application that linked to user mobile phone will helps user to be more alert with the presence bill or letter. Apart from that, the testing that we had conducted also shows a positive result where the sensor detect the motion of incoming parcel in the mailbox and notifications will shows on 'Blynk' apps. The objectives discussed prove that this project gives a positive result and due to the survey that has been conducted, this project is well accepted.

CHAPTER 4
RESULT AND ANALYSIS

CHAPTER 4
RESULT AND ANALYSIS
PREPARED BY: ERNIE ROSNIZAR BINTI HUSSAIN

4.1 INTRODUCTION OF CHAPTER

The process of build up a project can apply the knowledge that we have learned before into reality. For example, the knowledge had used in this project was function of Arduino mega, ir sensor, lithium polymer battery, limit switch and circuit board and so on. The project had built is not possible to promote and sales on market, except the project is after a lot of testing. For example, if product wants to export and sales in international stage, the product must have get certificate from International Organization for Standardization (ISO).

International Organization for Standardization (ISO) is an international standard-setting body composed of representatives from various national standards organizations. ISO creates documents that provide requirement, specifications, guidelines or characteristics that can be used consistently to ensure that material, products, processes and service are fit for their purpose. Normally product will receive a ISO9000 series certificate when the working environment, quality control and product quality have achieved a certain level.

While the project created still cannot get certificate from proper organization, but we can use some tester to find out the result come out by the product. The result come out from testing need to be analyzed. Testers are used to find out how well the mailbox with sensors can helped users from losing their mail.

4.2 RESULT OF EXPERIMENT

Testing is an important stage after assembling process, because we didn't know the performance of the product (Intelligent Box) without testing. By running a test, we can determine if our product is polluting the environment or not. So, we know the products we design don't pollute the environment because we only use apps and programming.

We used Blynk application that easy to control by smart phone. The function of Blynk apps is to receive alerts in the event of a letter in the mailbox. When a letter is entered into a mailbox, the IR sensor detects the mail's presence and amount, and Blynk apps alert the user to the letter's presence via notification. So users will know that there is a letter in the mailbox and that the mail loss will decrease.
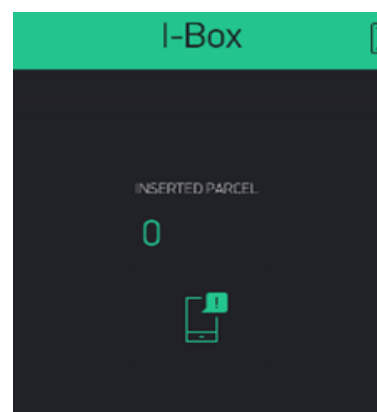

Figure 4.1: Blynk Apps
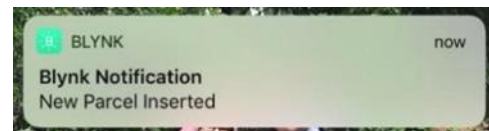
Figure 4.3: Notifications that appears on users phone screen
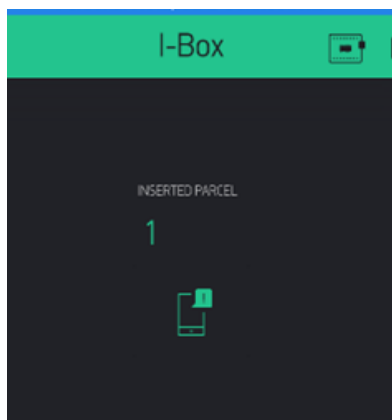
Figure 4.2: Blynk app shows notification there have inserted parcel

Figure 4.4: 'Blynk' apps shows '0' inserted parcel

Arduino is a programmable Microcontroller platform for 1001 electronic applications. The application is as easy as plugging in complex LED lights to a smart phone. By simply inserting certain program into the Arduino Microcontroller, and being able to read Arduino input information of specific sensors such as sound, light, movement and so on. To process that such of information, move an output such as a lamp, motor, or other web and computer applications. Furthermore, this mailbox uses programming that controls the movement of each component contained in the mailbox with sensors. This programming is also connected to the Blynk application because if there is no mail programming connection in the mailbox it cannot be notified via notification.

```
#include <Wire.h>
#define BLYNK_PRINT Serial
#include <ESP8266_Lib.h>
#include <BlynkSimpleShieldEsp8266.h>

char auth[] = "JtmWyDK1uzNsj2U74UHvpDNgTzueX6b0";
char ssid[] = "iPhone";
char pass[] = "yayaulala";

#include <SoftwareSerial.h>
SoftwareSerial EspSerial(12,13); // RX, TX

#define ESP8266_BAUD 9600

ESP8266 wifi(&EspSerial);

BlynkTimer timer;

int buttonState = 0;
int buttonState_2 = 0;
int speakerOut = 8;
int spin = 0;
int count = 0;
int i = 0;
bool check = false;
bool flag = false;
bool buzz = false;

void myEvent(){
  Blynk.virtualWrite(V0, count);
}

void setup() {
  Serial.begin(9600);

  EspSerial.begin(ESP8266_BAUD);
  delay(10);
```

Figure 4.5: Programming for this product.

4.3 PRODUCT DESIGN

The design we have created is in the agreement of each member of the group. We have organized each component in the proper order. Each component is attached to prevent it from being pulled or removed during the testing phase. Before putting the components the mailbox, we test whether the components work or not. The components are positioned in their proper place so that they function properly in accordance with the position of the component.
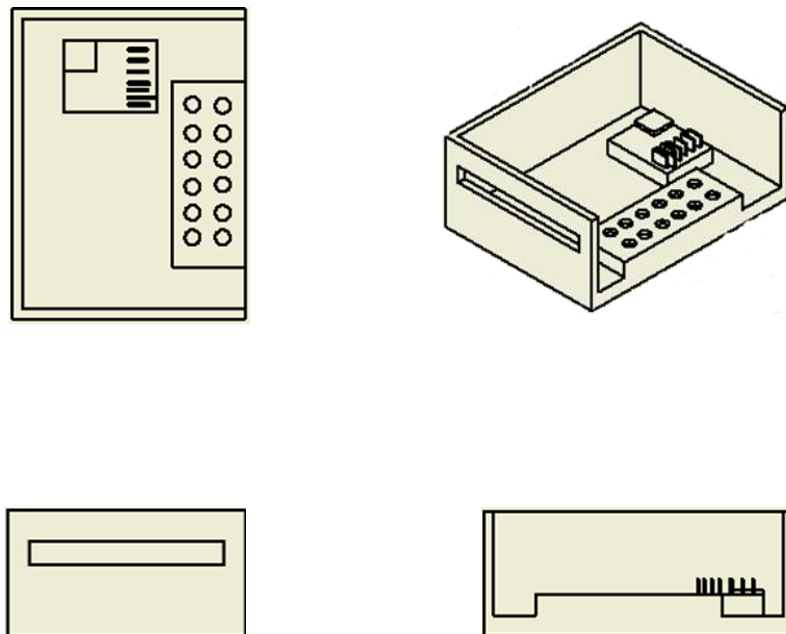

Figure 4.6: Design Concept

4.4 SURVEY FINDING

Based on the survey finding after development, there are about 20 responded give their respond on the survey. The responded of this survey are among residents in apartment, condominium, high-rise office building and shopping mall lot. To get the results of this survey, it took about a week to get a complete survey result.

Table 4.1: The Number of Responded in Survey Finding (After development)

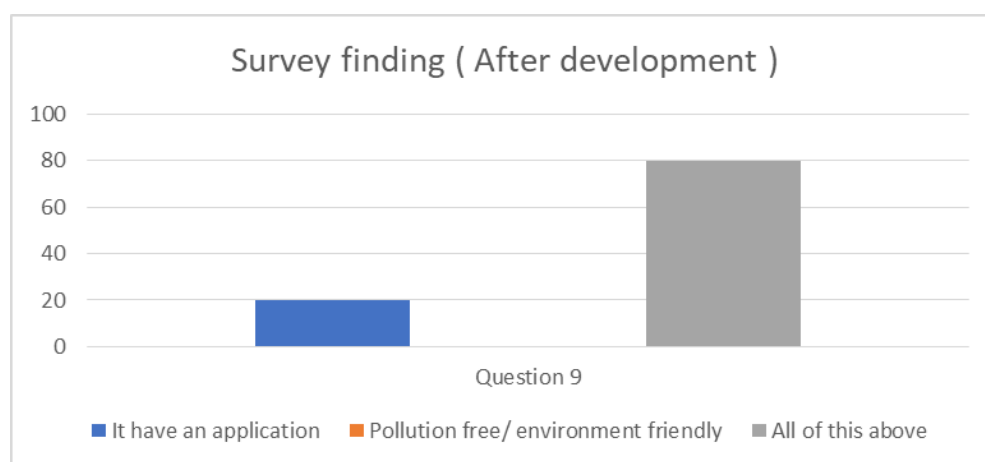| The Number of Responded in Survey Finding (After development)				
No	Question	Strongly agree	Agree	Disagree
1	Are you satisfied with this product?	1	18	1
2	Does this product help you to be more alert with the presence of mails?	2	17	1
3	Does it make your everyday life more convenient?	3	16	1
4	Does this product helps to save your time?	2	16	2
5	Is it user-friendly?	1	17	2
6	Does this product made an impact on your life?	3	16	1
7	Do you feel that this product should be recommended to other people?	2	17	1
8	Do you think that this product should be commercialized in the market?	1	18	1
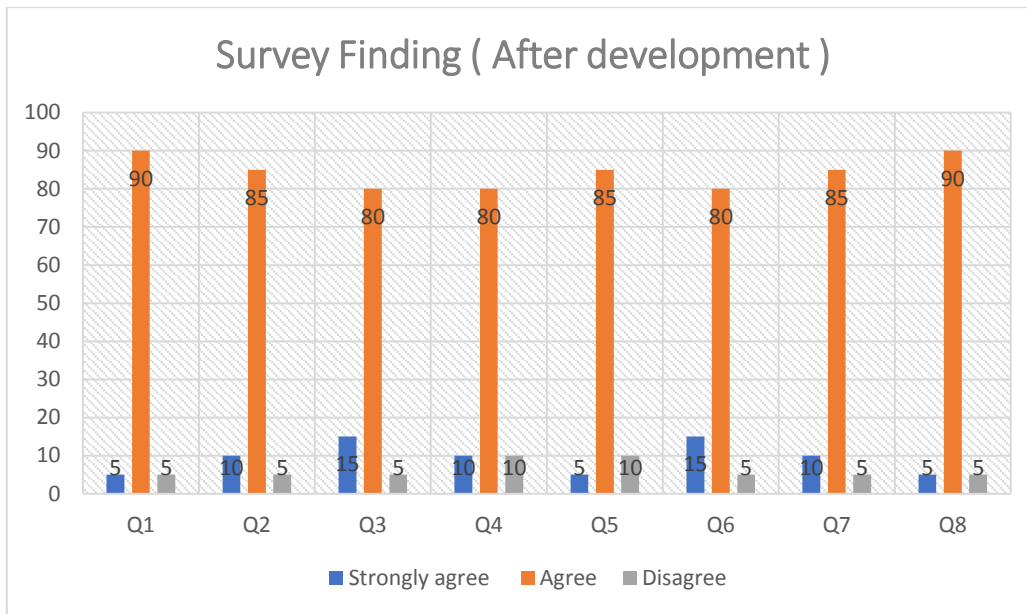
Figure 4.7: Survey Finding (After development) Graph

Based on the table and the graph, the survey shows that 18 respondents are agree about the satisfied of this product. They are also a respondent strongly agree and a respondent disagree about it. The question observed whether this product helps the users to be more alert with the presence of mails, there are 17 respondents were agree, 2 respondents are strongly agree and the rest there is a respondent was disagree. Next, 16 respondents had agree that this product make their everyday life more convenient. The 3 responded are strongly agree and 1 responded disagree about it. The survey are also shows that 16 respondents are agree, 2 respondents were strongly agree and 2 respondents disagree that this product help to save their time. The 17 respondents agree and 1 respondent strongly agree which they think that this product are user-friendly but there are also 2 respondents disagree about it.

Then, the question which ask if this product made an impact on their life are in about 16 respondents agree, 3 respondents strongly agree and the rest 1 are disagree. In addition, the 17 respondents agree that this product should be recommended to other people. Another 2 respondents strongly agree about it and 1 respondent disagree. The question that this product should be commercialized in the market or not are in about 18 respondents agree and 1 respondent strongly agree which this product should be commercialized in the market but the another 1 respondent disagree about it.

Some of the responded are also give the suggestion about the improvement on this product. For the first suggestion is added the camera or CCTV to detect and know the type of letter in the mailbox. Next, use a better sensor to detect the mails in the mailbox which is not too sensitive with the surrounding condition for excellent detection. The other suggestion is use solar system as its power supply to avoid the wastage of electricity. Then, the last suggestion is use a battery which has high voltage. So, the battery can survive and have long durability.


Figure 4.8: Favorite feature about this product

Based on the graph by the survey finding after development, 80% of responded which is16 residents had choose the favorite feature about this product are both in the choices. The choices are this product has an application and it pollution free and also environment friendly. But there are also 4 responded only choose their favorite feature about this product is it have an application.

4.5 DETAIL DRAWING OF PRODUCT
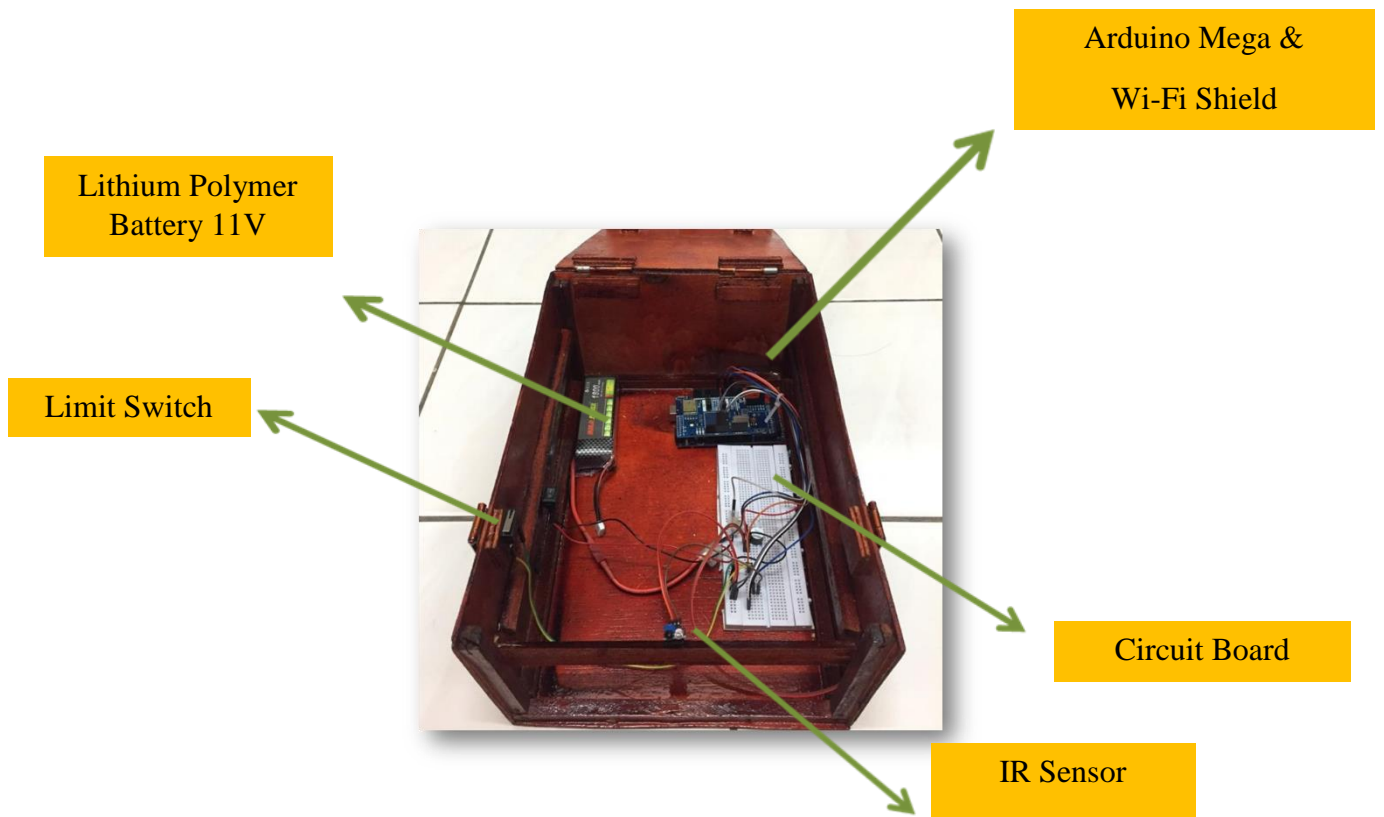
Figure 4.9: Draft of the main component in the project
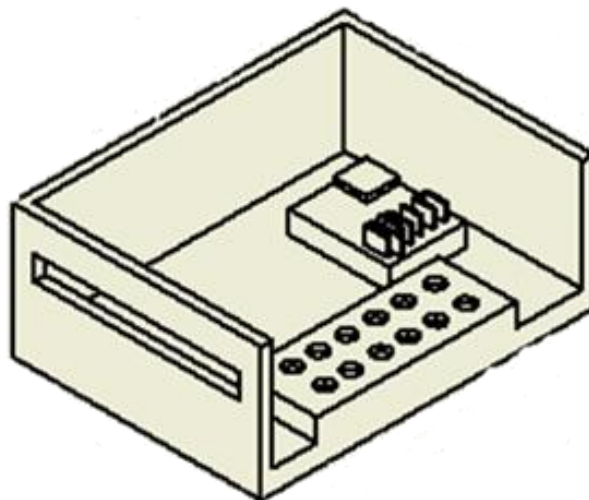
Figure 4.10: The 3D drawing

4.6 ESTIMATED COST

List of components	Price (RM)
Arduino Mega	45.00
Battery Li-po 11v	47.00
IR sensor	30.00
Limit Switch	2.00
Buzzer	2.00
Wi-Fi Shield	2.00
TOTAL	128.00

4.7 SUMMARY OF CHAPTER

From the testing result, we can know that the Intelligent Box is a functional system to reduce the pollution to the environment and help people to become more alert about the presence mails. While the result still not perfect, but if we have completed it by improvement and modification, it will become a good product to protect our lovely earth.

Beside that, we have learned how to complete the testing on the project and the choosing the testing need to do. From the survey and choosing the selective place to be use on the testing process to find out the result, until the result had been find out, we were spending a lot of spirit and time to make this done. We have learned a lot of knowledge during this process, the knowledge includes how to create programming and how to make an apps.

CHAPTER 5
DISCUSSION AND CONCLUSION

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 DISCUSSION

Thought the practical of the final year project, a conclusion can be done was that the motive of this course is to test the ability and knowledge of the student. This course also teaches to work between team members as a team during doing all the process including the report of the project. The experience during period of 2 semesters to complete the project let student learn to be patient and effort when doing a task. Besides that, this subject also make us grown become more mature, responsibility and ready to venture into the working environment in the future.

Creation of Intelligent Box (I-Box) is related with IoT. As we know, IoT is all about something like internet and electronic. To create this project, we need to study about IoT, components, programming and circuit. The study of objective of the Intelligent Box is to minimize the probability of missing the letter in the mailbox and makes it easier for the user to know the presence of the letter in the mailbox.

To achieve the study of objective, simplify for users to know the presence of mail in the mailbox, we designed mailbox with sensor to determine the presence of mail. When the postman sends a letter when the user is not at home, the sensor will detects the presence of letter and send the notification to the user through 'Blynk' apps, thus facilitating the user from following the traditional way of checking the mailbox by itself.

5.2 CONCLUSION

In conclusion, we can conclude that human sometimes can be forgetful. They need to always be remind so that, something which is important will not be forgotten. By proposing I-Box (Intelligent Mailbox) project, this mailbox will help user reducing the loss of important parcel or letter. The assemble of sensor in the I-Box will help users to be more alert with the presence bills or letter. This is because this mailbox will send a notification to mobile application which will remind user of their parcel or letter. Intelligent mailbox will function with a good connection of Wi-Fi and then it will send notifications through 'Blynk' apps.

As shown in our survey, most of the respondents agree with the addition of sensor in the mailbox and mobile application that linked to user mobile phone will helps user to be more alert with the presence bill or letter. Apart from that, the testing that we had conducted also shows a positive result where the sensor detect the motion of incoming parcel in the mailbox and notifications will shows on 'Blynk' apps. The objectives discussed prove that this project gives a positive result and due to the survey that has been conducted, this project is well accepted.

Along the process of this project, we have learned a lot of knowledge about the process and the solution of this project which are useful for our future. The knowledge about IoT will open our mind to know how much this IoT is important to our daily life. IoT is truly the next step in the information age. The Internet of Things could change our everyday lives, our everyday work and our everyday communities. IoT seeks to give your day back by bringing everything under your control to a single location.

The technology will put your life at your fingertips as your smartphone becomes the main hub for the rest of your world. IoT is not just a simple idea, but is already a major part of our lives. The industry will jump to new heights with this technology and will allow for fair and equal access to the inherent around the world. So, we know that IoT is very important things to all of us and based to this project, it will help us in our future one day.

5.3 SUGGESTION

Along the process of developing a new product to overcome the problems of insensitiveness and not alert with the presence of mails have let us think out some better idea that can be applied on the I-Box (Intelligent Mailbox). The result of discussion comes out with some new recommendations to improve the project in the future.

First and foremost, the I-Box needs solar energy as its power supply other than Li-Po battery or power adapter that has been used in the first place throughout this project development. Solar power is obviously more practical and environment friendly as it is pollution free. Besides, it causes no greenhouse gases to be emitted after installation. It is also a renewable clean power that is available every day of the year; even cloudy days produce some power.

Next, attach a close circuit television (CCTV) in the mailbox to monitor activities, primarily for surveillance and security purposes. CCTV relies on strategic placement of cameras, and observation of the camera's input on monitors somewhere. Because the cameras communicate with monitors and/or video recorders across private coaxial cable runs or wireless communication links, they gain the designation "closed-circuit" to indicate that access to their content is limited by design only to those able to see it.

Last but not least, other than sending notifications whenever there is a presence of mails, the I-Box should concern on sending notifications about Li-Po battery health and percentage, also the other components condition. Quick action when there is damage can prevent more serious complications and can always ensure that the components are in good condition.

Hopefully these recommendations would be able to improve the I-Box productivity and become more convenient in the future.

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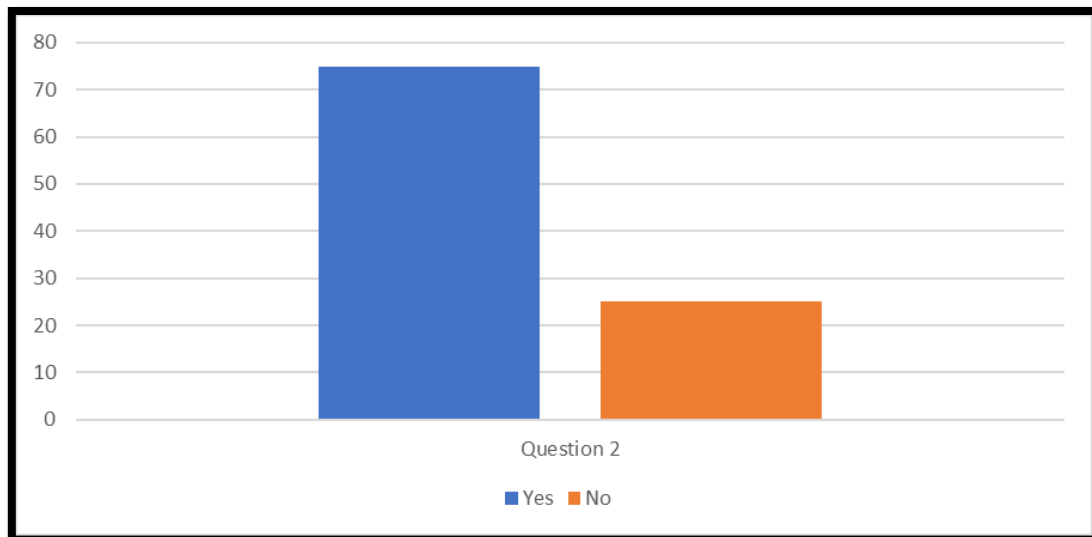18. Fungsi mengenal aplikasi blynk. Retrieved from https://www.nyebarilmu.com/

APPENDICES

THE SURVEY FINDING BEFORE DEVELOPMENT

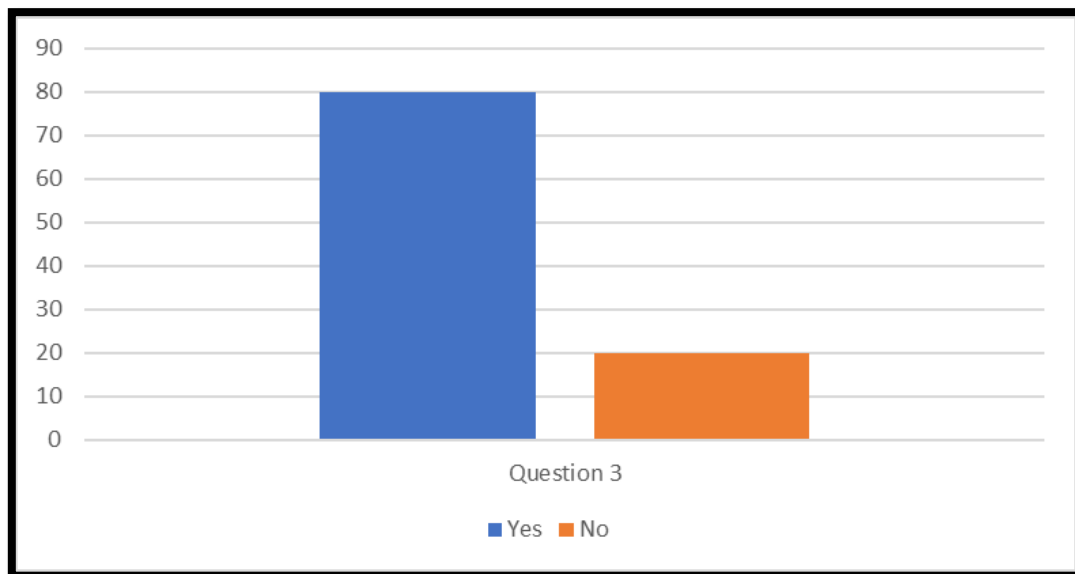Q1. How many times in a week do you check your mailbox?
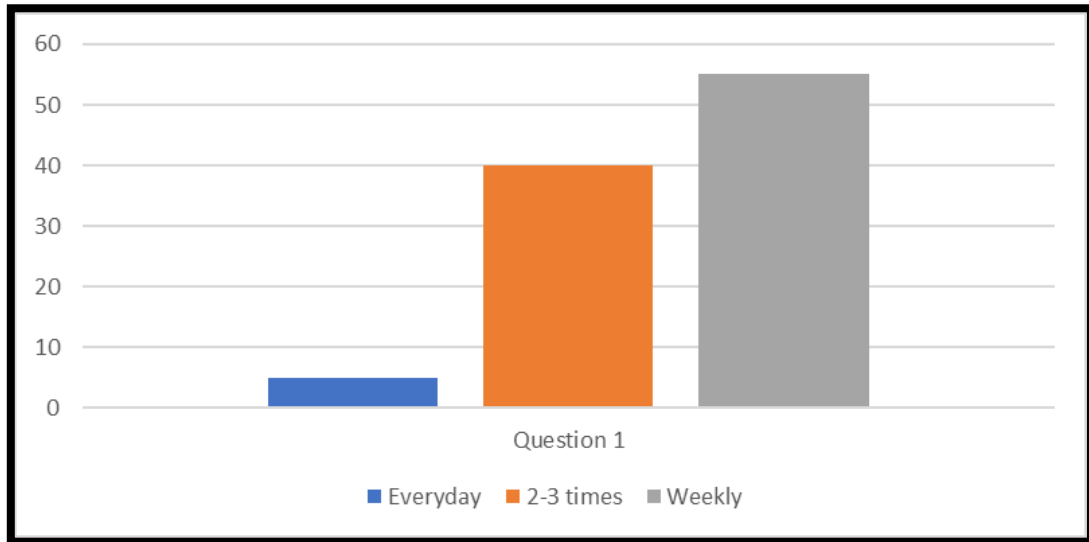
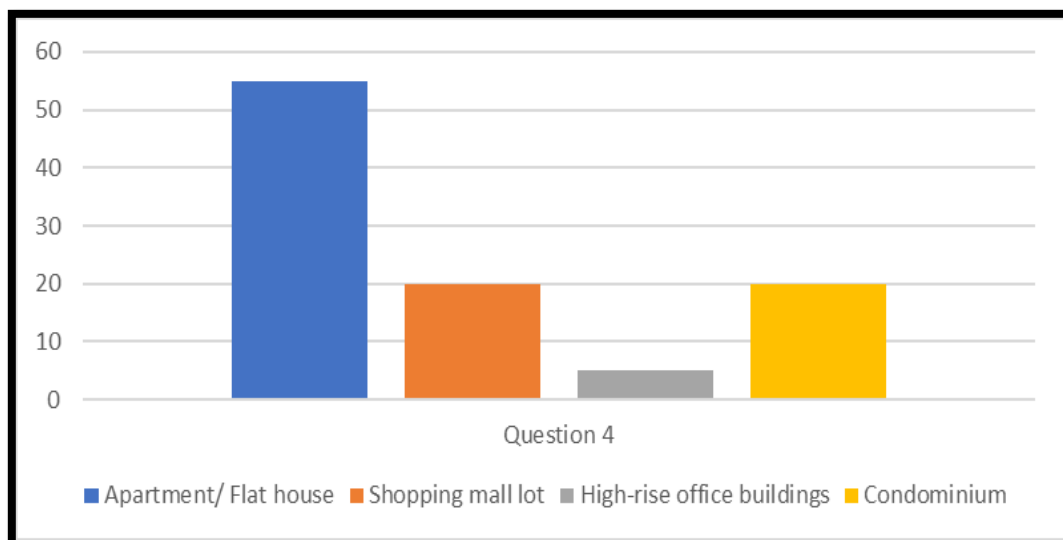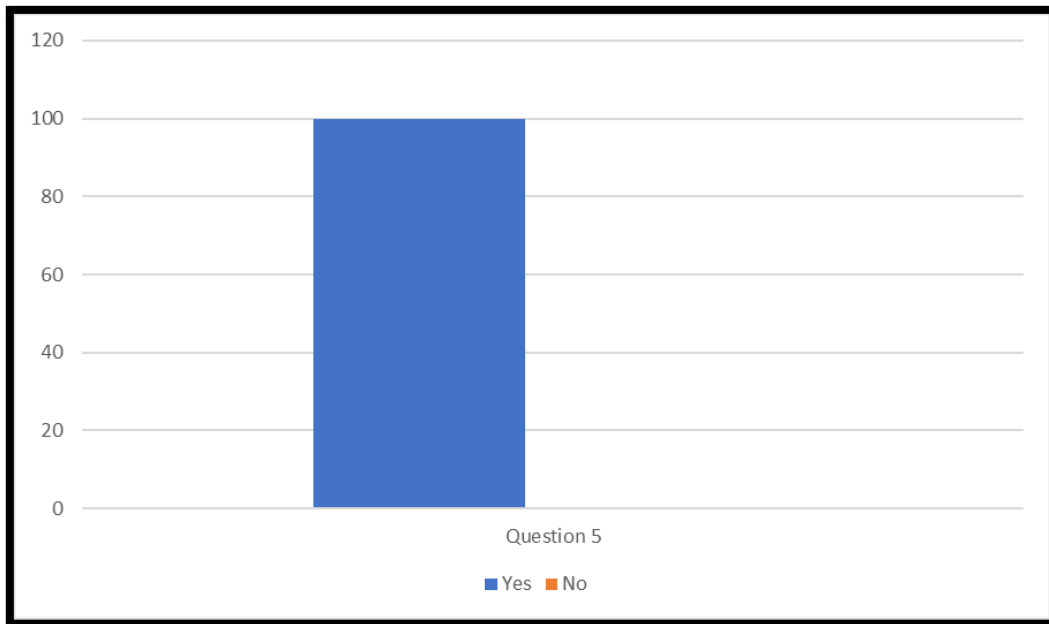Q2. Have you ever forgotten to check your mailbox?

Q3. Have you ever experienced loss of important mails/bills?

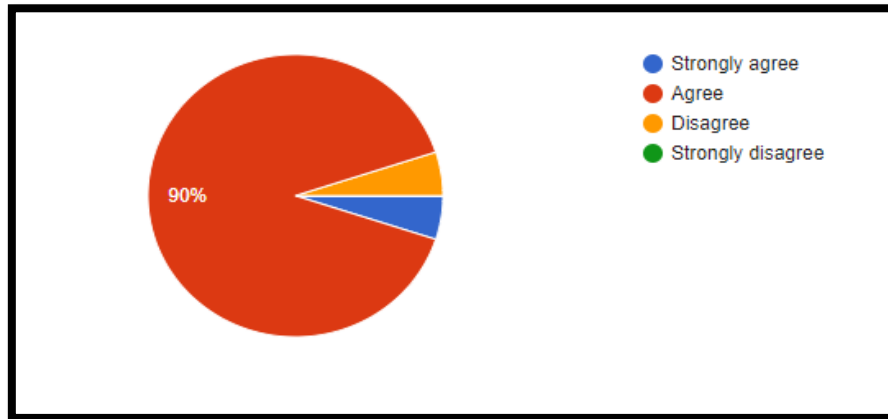Q4. Which is the most suitable place to use this method?

Q5. Do you think that with the addition of sensor in the mailbox and mobile apps that linked to notify helps user to be more alert with the presence of mails/bills?
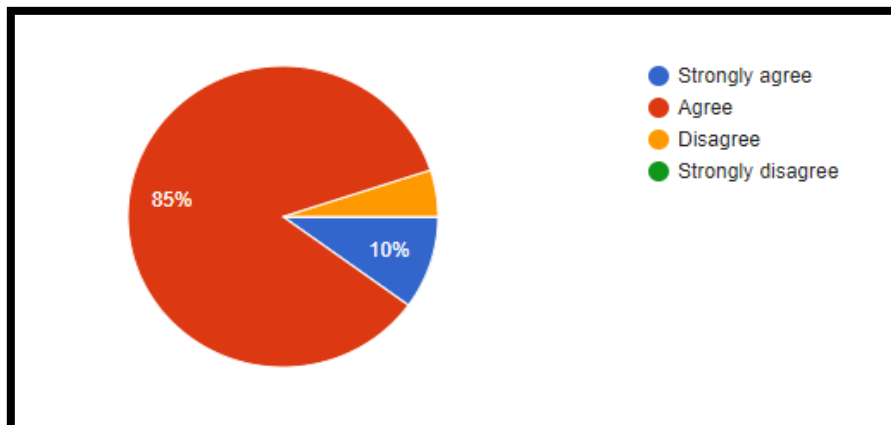
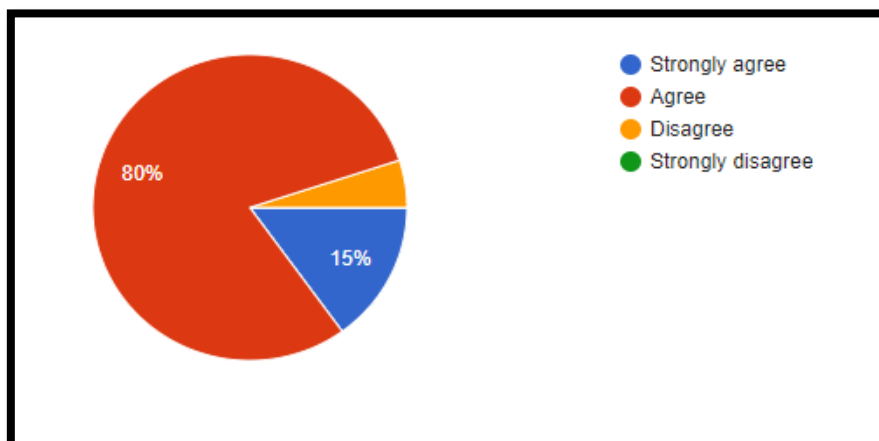THE SURVEY FINDING AFTER DEVELOPMENT

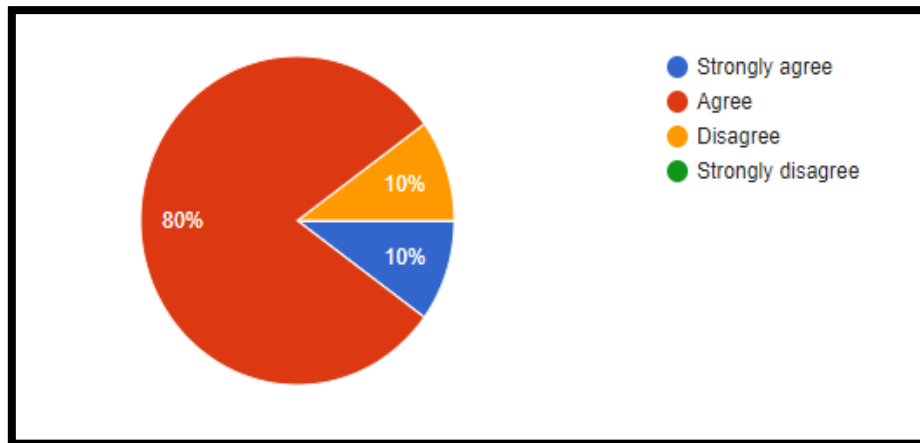Q1. Are you satisfied with this product?

Q2. Does this product helps to make you more alert with the presence of mails?
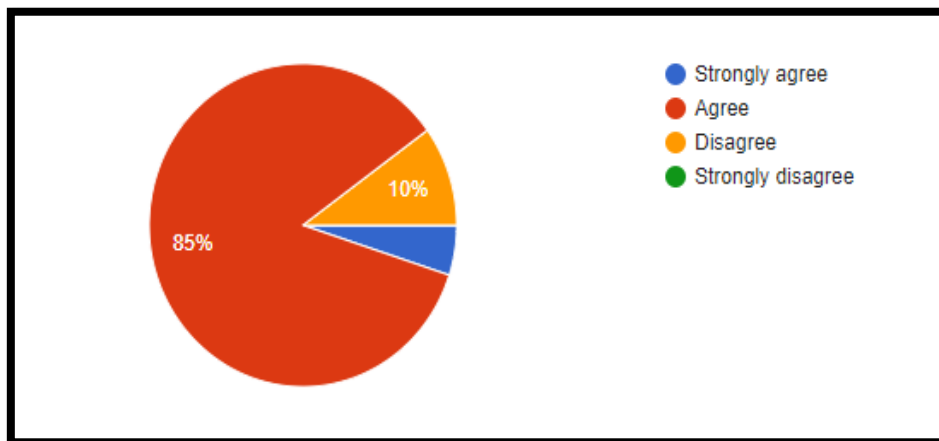

Q3. Does it make your everyday life more convenient?

Q4. Does this product help to save your time?

Q5. Is it user-friendly?

Q6. Does this product made an impact on your lifestyle?
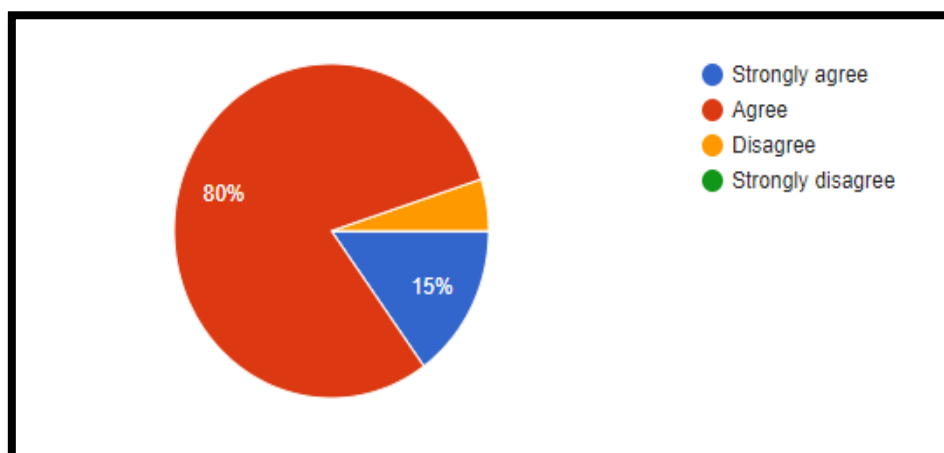
Q7. What is your favourite feature about our product?
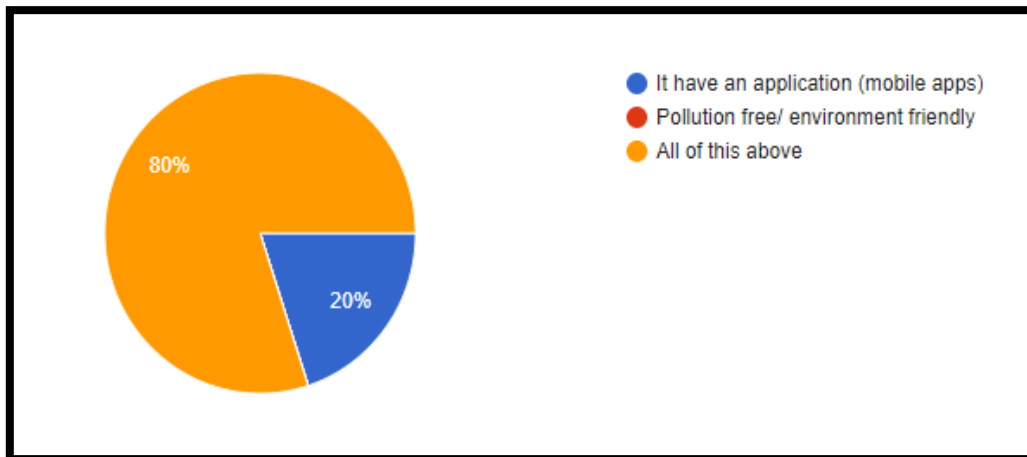
Legend:
- It have an application (mobile apps)
- Pollution free/ environment friendly
- All of this above

80%

20%

Q8. Do you feel that this product should be recommended to other people?

Legend:
- Strongly agree
- Agree
- Disagree
- Strongly disagree

85%

10%

Q9. Do you think that this product should be commercialized in the market?

Legend:
- Strongly agree
- Agree
- Disagree
- Strongly disagree

90%
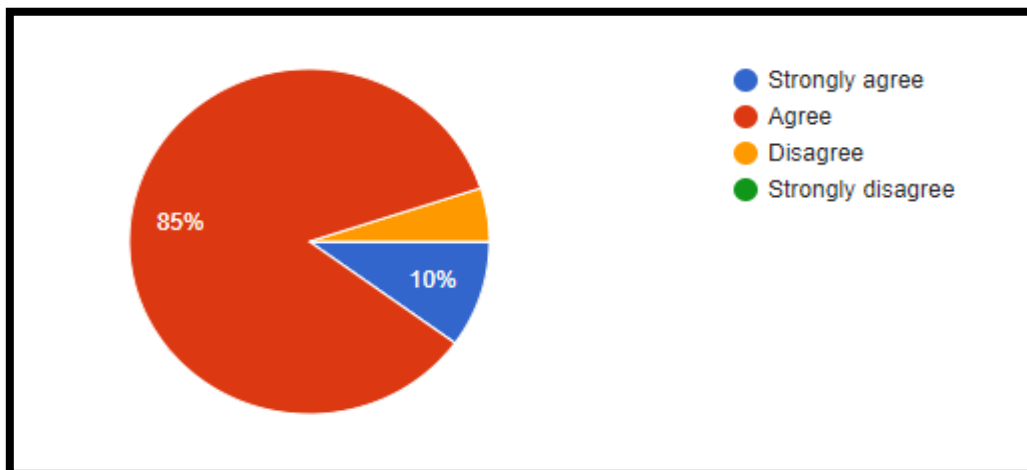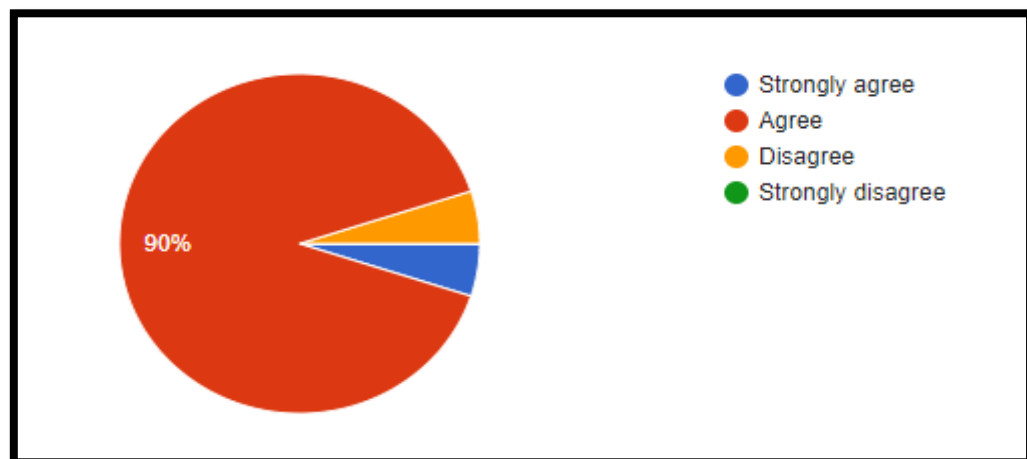
GANTT CHART 1 (DECEMBER-JUNE)

Week/Activities project	Status	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15
Project Clarification	P	▣	▣													
	C	▣	▣													
Presentation of ideas project	P			▣	▣											
	C			▣	▣											
Preparing proposal	P				▣	▣										
	C				▣	▣										
Literature review	P					▣	▣									
	C					▣	▣									
Methodology	P						▣	▣	▣							
	C						▣	▣	▣							
Writing proposal	P								▣	▣	▣					
	C								▣	▣	▣					
Correction proposal	P										▣	▣				
	C										▣	▣				
Presentation Skill	P												▣	▣		
	C												▣	▣		
Presentation proposal	P														▣	
	C														▣	
Submission proposal	P															▣
	C															▣

P	PLANNING
C	COMPLETE

GANTT CHART 2 (JULY-OCTOBER)

Week/Activities project	Status	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15
Project Fabrication	P	▣	▣	▣	▣											
	C	▣	▣	▣	▣											
Project Assembly	P					▣	▣	▣	▣							
	C					▣	▣	▣	▣							
Complete Project and Testing	P								▣	▣						
	C									▣	▣					
Complete Draft Report	P									▣						
	C										▣					
Complete Report	P											▣	▣			
	C											▣	▣			
Final Project Presentation	P												▣	▣		
	C												▣	▣		
Final Report Submission	P														▣	▣
	C															▣

P	PLANNING
C	COMPLETE