ELECTRICAL ENGINEERING DEPARTMENT

SESSION 2 2022/2023

SMART PROTECTIVE LAGGUGE WITH GPS

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This project is submitted in partial fulfillment of requirements for the award of Diploma in Electrical Engineering (Control)

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CONFIRMATION OF THE PROJECT

The creative "Smart Luggage" idea uses IOT, ESP8266, fingerprint recognition, and GPS technology to transform travel. It seeks to increase convenience and security for travelers with features like real-time tracking, secure access with fingerprint verification, and seamless connectivity.

Checked by : 

Supervisor's name :**WAN MOHD ZAMRI BIN WAN AB.RAHMAN**

Supervisor's signature :

Date : 2/6/2023

Verified by :

Project Coordinator name :

Signature of Coordinator :

Date :

"I acknowledge this work is my own work except the excerpts I have already explained to our source"

1. Signature : *SAFWAN*

Name : **MUHAMMAD SAFWAN HARIZ BIN SHAHRAN**

Registration Number : **08DJK20F2024**

Date : 2/6/2023

DECLARATION OF AUTHENTICATION AND OWNERSHIP

TITLE : SMART PROTECTIVE LAGGUGE WITH GPS

SESSION : 2 2022/2023

1. I,m **MUHAMMAD SAFWAN HARIZ BIN SHAHRAN** and my number matrics is **08DJK20F2024** the final year student of **Diploma in Electrical Engineering (Control)**,**Politeknik Sultan Salahuddin Abdul Aziz Shah ,** located **Persiaraan Usahawan , 40150 Shah Alam, Selangor**

2. We verify that **SMART PROTECTIVE LAGGUGE WITH GPS** and its intellectual properties are our original work without plagiarism from any other sources.

3. We agree to release the project's intellectual properties to the above said polytechnic in order to fulfil the requirement of being awarded **Diploma in Electrical Engineering (Control).**

ACKNOWLEDGEMENT

I put effort on this project. However, it would not have been feasible without the assistance and support of numerous people and groups. I want to sincerely thank each and every one of them. I owe a great deal to (WAN MOHD ZAMRI BIN WAN AB.RAHMAN) for his constant monitoring, advice, and provision of the necessary information regarding the Project, as well as for their assistance in seeing the Project through to completion. I want to thank the industry and convey my gratitude for giving me their time and attention.

My gratitude and appreciation also go out to my colleagues who helped me build the Project and those who are prepared to lend a hand.

ABSTRACT

The use of biometric technology in luggage systems has transformed the way people travel. Fingerprint recognition and Global Positioning System tracking have become popular features in luggage systems because of their convenience and high level of security. With these technologies, passengers can easily and securely identify and track their bags, reducing the risk of lost or stolen luggage. Fingerprint recognition technology is an effective way to ensure the security of luggage. Each user's fingerprints are unique, and only authorized users can access the bag, reducing the risk of theft or tampering. This technology eliminates the need for keys or combinations, making it easier for travelers to access their belongings. In addition, fingerprint recognition technology can be used in conjunction with other security features, such as RFID (radio-frequency identification) tags, to provide enhanced security for luggage. GPS tracking technology is another popular feature in luggage systems. GPS-enabled luggage provides real-time tracking, enabling travelers to locate their bags quickly and easily. This technology has become increasingly important as airlines have become more diligent in tracking the movement of luggage. GPS tracking enables airlines to monitor the location of luggage and quickly respond to any issues, reducing the risk of lost or delayed luggage. The integration of fingerprint recognition and GPS tracking technologies has transformed the luggage industry. By combining these two technologies, passengers can enjoy a high level of convenience and security. With fingerprint recognition, only authorized users can access the bag, reducing the risk of theft or tampering. GPS tracking enables passengers to track the location of their luggage in real-time, providing peace of mind and reducing the risk of lost or delayed luggage. In addition to the benefits for passengers, airlines also benefit from the integration of fingerprint recognition and GPS tracking technologies. These technologies enable airlines to monitor the location of luggage, reduce the risk of lost or delayed luggage, and improve the overall travel experience for their customers. In conclusion, the use of fingerprint recognition and GPS tracking technologies in luggage systems has revolutionized the way people travel. These technologies provide a high level of security and convenience for passengers, reducing the risk of lost or stolen luggage. The integration of these technologies has improved the overall travel experience for passengers and airlines alike, making it easier and more secure to travel with luggage

ABSTRAK

Penggunaan teknologi biometrik dalam sistem bagasi telah mengubah cara perjalanan orang ramai. Pengecaman cap jari dan penjejakan Sistem Kedudukan Global telah menjadi ciri popular dalam sistem bagasi kerana kemudahan dan tahap keselamatan yang tinggi. Dengan teknologi ini, penumpang boleh mengenal pasti dan menjejaki beg mereka dengan mudah dan selamat, mengurangkan risiko bagasi hilang atau dicuri.Teknologi pengecaman cap jari ialah cara yang berkesan untuk memastikan keselamatan bagasi. Cap jari setiap pengguna adalah unik, dan hanya pengguna yang diberi kuasa boleh mengakses beg tersebut, mengurangkan risiko kecurian atau gangguan. Teknologi ini menghapuskan keperluan untuk kunci atau kombinasi, menjadikannya lebih mudah bagi pengembara untuk mengakses barang-barang mereka. Selain itu, teknologi pengecaman cap jari boleh digunakan bersama dengan ciri keselamatan lain, seperti tag RFID (pengenalan frekuensi radio), untuk menyediakan keselamatan yang dipertingkatkan untuk bagasi.Teknologi pengesanan GPS ialah satu lagi ciri popular dalam sistem bagasi. Bagasi yang didayakan GPS menyediakan penjejakan masa nyata, membolehkan pengembara mencari beg mereka dengan cepat dan mudah. Teknologi ini menjadi semakin penting apabila syarikat penerbangan semakin rajin menjejaki pergerakan bagasi. Penjejakan GPS membolehkan syarikat penerbangan memantau lokasi bagasi dan bertindak balas dengan pantas kepada sebarang isu, mengurangkan risiko kehilangan atau tertunda bagasi.Penyepaduan pengecaman cap jari dan teknologi pengesanan GPS telah mengubah industri bagasi. Dengan menggabungkan kedua-dua teknologi ini, penumpang boleh menikmati tahap kemudahan dan keselamatan yang tinggi. Dengan pengecaman cap jari, hanya pengguna yang dibenarkan boleh mengakses beg tersebut, mengurangkan risiko kecurian atau gangguan. Penjejakan GPS membolehkan penumpang menjejaki lokasi bagasi mereka dalam masa nyata, memberikan ketenangan fikiran dan mengurangkan risiko kehilangan atau tertangguh bagasi.Sebagai tambahan kepada faedah untuk penumpang, syarikat penerbangan juga mendapat manfaat daripada penyepaduan pengecaman cap jari dan teknologi pengesanan GPS. Teknologi ini membolehkan syarikat penerbangan memantau lokasi bagasi, mengurangkan risiko kehilangan atau tertunda bagasi, dan menambah baik pengalaman perjalanan keseluruhan untuk pelanggan mereka.Kesimpulannya, penggunaan pengecaman cap jari dan teknologi pengesanan GPS dalam sistem bagasi telah merevolusikan cara perjalanan orang ramai. Teknologi ini menyediakan tahap keselamatan dan kemudahan yang tinggi untuk penumpang, mengurangkan risiko bagasi hilang atau dicuri. Penyepaduan teknologi ini telah meningkatkan pengalaman perjalanan keseluruhan untuk penumpang dan syarikat penerbangan, menjadikannya lebih mudah dan lebih selamat untuk melakukan perjalanan dengan

bagasi.

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CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

Travel has drastically transformed as a result of the implementation of biometric technology in luggage systems, such as fingerprint identification and Global Policy and Strategy (Global Positioning System) monitoring. These technologies have reduced the likelihood of lost or stolen luggage since they allow traveller to instantly and securely identify and track their bags at all times.

Fingerprint recognition technology should limit access to a bag to authorized individuals. This technology eliminates the need for a key or combination because each user's fingerprint is unique, making it easier for traveller to access their stuff. This technology has become a dependable method for ensuring the security of luggage and reducing the likelihood of theft or tampering.

Passengers may view the real-time location of their bags thanks to GPS monitoring technology. As airlines have gotten more vigilant in tracking the movement of bags, this technology has become more crucial. Airlines can track the whereabouts of luggage equipped with GPS and react rapidly to any problems, lowering the possibility of lost or delayed cargo.

The overall travel experience for both passengers and airlines has been enhanced by the combination of fingerprint identification and GPS tracking technologies, which offers a high level of ease and security. With the use of this technology, the possibility of lost or stolen luggage has significantly decreased, giving traveller peace of mind and enabling airlines to promptly discover and collect bags when necessary. These technologies will probably grow increasingly more sophisticated as technology develops, enhancing everyone's travel experience even more.

1.2 BACKGROUND RESEARCH

The advancement of biometric technology, notably in the area of luggage systems and the identification of biometrics like fingerprints and GPS, has had a considerable impact on the travel industry. In recent years, these technologies have been incorporated into luggage systems more and more due to their usefulness and high level of security.

Since many years ago, access control, security systems, and law enforcement have all used fingerprint recognition technology. It has made it more secure to guarantee that only authorized people may access a bag thanks to its application in luggage systems. This method is based on the distinct fingerprint patterns that each person has, which are challenging to duplicate. With the use of fingerprint recognition technology, traveller can access their stuff more easily while maintaining the security of their bags. They no longer have to worry about misplacing keys or forgetting security codes.

Additionally, GPS tracking technology has been applied in a number of sectors, including logistics and transportation. GPS tracking has emerged as a vital element in the world of luggage systems for guaranteeing the security and safety of goods. This technology lowers the possibility of lost or delayed luggage by enabling users to follow the position of their bags in real-time. Additionally, GPS tracking enables airlines to keep tabs on the movement of baggage, enabling them to address any problems as soon as they arise and enhancing passengers' overall travel experiences.

The safety and ease of travel have been further enhanced by the use of GPS tracking and fingerprint recognition technologies in luggage systems. A more secure and streamlined travel experience is provided by GPS tracking and fingerprint identification, which restrict access to the bag to authorized users only. With the use of this technology, the possibility of lost or stolen luggage has significantly decreased, giving traveller peace of mind and enabling airlines to promptly discover and collect bags when necessary.

1.3 PROBLEM STATEMENT

The following issue statement can be used to explain why consumers should utilise luggage equipped with fingerprint and GPS technology:

Even while air travel has become more common and practical, issues with mishandled, lost, or stolen bags continue to plague the industry. This not only inconveniences and stresses out traveller, but it also costs airlines a lot of money. The present techniques of identifying, tracking, and retrieving luggage rely on human processes that can be time-consuming and error-prone and are not always precise or reliable. As a result, there is an increasing need for more advanced luggage management systems that can improve the precision, dependability, and efficiency of luggage handling.

Technologies like GPS and fingerprints have been mentioned as potential fixes for these issues. Passengers and airlines can precisely and dependably identify, monitor, and reclaim luggage using fingerprint recognition and GPS tracking technologies. By giving real-time information on the position and status of the luggage, these technologies can help lower the likelihood that it will be mishandled, stolen, or lost.

The implementation of these technologies in luggage management is currently rather slow, thus further research is required to determine the efficacy, efficiency, and usability of luggage systems that use fingerprint and GPS technology. Additionally, there are worries about how new technologies will affect economics and businesses, as well as how they will affect security and privacy. In order to meet the needs of both passengers and airlines, it is necessary to address these concerns and create a reliable system for bag luggage employing fingerprint and GPS technology.

1.4 OBJECTIVE OF THE PROJECT

This product's system is said to increase user productivity, comfort, and safety. Fingerprint systems can stop theft, restrict access to only authorised people, and safeguard user privacy. GPS can assist customers in locating their bags when they are misplaced or altered, enhancing comfort and expediting travel.

1.5 SCOPE OF THE PROJECT

The "Smart Luggage" project, which uses the Internet of Things, ESP8266, fingerprint identification, and GPS for travel, has as its research focus the discovery and creation of cutting-edge functionality and applications. Investigating effective IOT integration, enhancing ESP8266 functionality, improving fingerprint recognition algorithms, and utilizing GPS for precise tracking are some examples of this. The study's objectives include enhancing luggage security, streamlining travel arrangements, and offering personalized features that improve consumers' overall travel experiences.

1.6 CONTRIBUTION OF THE PROJECT

As the world is moving forward with Industrial Revolution 4.0, it is a necessary to have technology in innovation and invention to boost economic growth. Eventhough there is a lot of project to measure the turbidity and pH in water but our project has included a component of IoTwhich is by providing sensors.

1.7 SUMMARY

In order to improve security, real-time tracking, and individualist access control, this chapter examines the use of IoT, ESP8266, fingerprint recognition, and GPS technologies in smart luggage for travel.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

The purpose of this project is to use previously conducted research and internet-based discoveries to concentrate on the ergonomics of creating a SMART Luggage system that combines IoT, fingerprint recognition, and GPS technologies for travel. The project aims to ensure that user comfort, ease of use, and practicality are prioritised in the design and functionality of the SMART Luggage by analysing and utilising current expertise. This all-encompassing strategy will involve researching human factors, ergonomics, and user experience issues to develop a travel bag that prioritises user comfort and convenience throughout their travels while also offering enhanced security, real-time tracking, and personalised access control.

2.2 HISTORY

The SMART Luggage project's origins may be related to the rising desire for novel solutions that improve convenience, security, and tracking capabilities in the travel sector. It uses IoT, fingerprint recognition, and GPS technologies for travel.There has been a shift towards incorporating connectivity and intelligence into common things with the introduction of IoT and the rising popularity of smart devices. As a result, the concept of creating smart luggage that may provide cutting-edge functions beyond conventional suitcases was born.In order to provide

increased security and individualized access management, the concept of "smart luggage" was developed with fingerprint recognition technology integrated. The risk of theft or unauthorized access is decreased since fingerprint identification, a trustworthy biometric authentication method, makes sure that only authorized people may access the luggage.Incorporating GPS technology into smart luggage also solves the frequent problem of missing or lost luggage while travelling. By using GPS, travelers can monitor the current whereabouts of their luggage, giving them piece of mind and enabling quick retrieval in the event of any disasters.This project's history also includes developments in IoT device miniaturization and efficiency, which made it possible to incorporate IoT functionality into small baggage designs. The overall travel experience is improved by IoT capabilities including remote monitoring, data synchronization, and access to mobile applications or entranced systems.The design, usability, and functionality of smart luggage have all been improved throughout time as a result of research and development initiatives. The development of ergonomic designs that put user comfort and convenience first has been greatly influenced by research in ergonomics, human factors, and user experience. Smart luggage solutions that not only offer cutting-edge technology features but also satisfy the practical requirements and preferences of travelers have evolved as a result of this iterative process.

2.3 PREVIOUS RESEARCH ON SMART PROTECTIVE LAGGUGE WITH GPS

- high-tech suitcase comes with biometric lock, built-in power bank, Bluetooth speakerphone

Figure 2.1: high-tech suitcase comes with biometric lock, built-in power bank, Bluetooth speakerphone

This smart bag, which boasts a host of cutting-edge technologies, is dubbed the "world's most high-tech" suitcase.With the Planet Traveller app on your smartphone, you can operate Space Case 1's capabilities, which include a digital biometric lock, worldwide tracker, digital lift-less weighing system, power bank, Bluetooth speakerphone, proximity sensor / anti-theft alarms, and a personal concierge.With its

integrated 12,000 mAh power bank, the luggage enables users to charge their phone more than seven times. Two external USB charging outlets and a USB charging port in the front pocket are both present on the suitcase.Users can also use a biometric scanner or the Planet Traveller app to open the suitcase with the touch of a finger print. They can also use the Global Tracker programme to track the whereabouts of their bags at all times.Furthermore, the bag offers a slew of useful features that will make your trip experience a lot smoother. Check out the video below to see what it can achieve.

- Safe dome Smart Fingerprint Lock Charging Backpack, Anti-Theft Biometric Secure Lock Laptop Bag

FIGURE 2.3: Safedome Smart Fingerprint Lock Charging Backpack, Anti-Theft Biometric Secure Lock Laptop Bag

Securely unlock the anti-theft bag with just one touch thanks to the fingerprint biometric lock. Your finger needs to be on the special biometric pad in order for the bag to unlock. Up to 10 fingers may be programmed into the bag lock.Internal cable for charging To charge your laptop or other devices, use an internal charging cable that is accessible through an external USB connection.long-lasting battery The backpack's biometric lock can resist 1,000 fingerprint attempts. You can easily recharge the lock for enduring anti-theft security with the supplied USB cord.The bag has a strap pocket, a padded laptop case that fits a 15-inch laptop, and five inner pockets. Additionally, it contains internal and external compartments.The bag includes five interior pockets, a strap pocket, and a padded laptop pouch that can accommodate a 15-inch laptop. It also has exterior and internal pockets.POWERFUL AND LASTINGcomposed of PVC and 300D polyester. Internal is 210D polyester. This bag is sturdy enough to serve as your ideal travel, business or back-to-school bag and is water resistant up to 1 metre.

- Fingerprint Sensor With Arduino

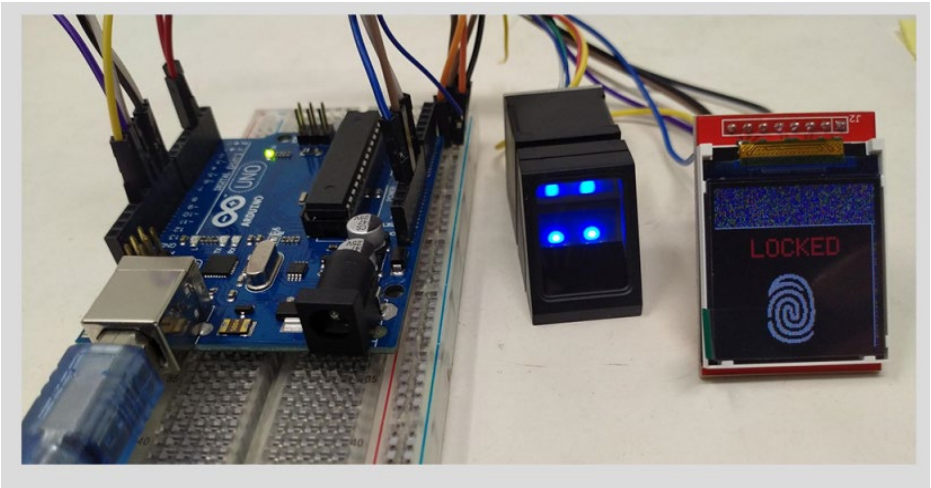

FIGURE 2.3: Fingerprint Sensor With Arduino

Typically, optical beams are used to operate the fingerprint scanner. The optical and captive fingerprint sensors are the two different varieties. The optical fingerprint will illuminate the finger with a strong light. Additionally, a digital image of the finger is captured.The source code for that fingerprint is then generated when the finger pattern has been observed and converted into logic 0 or 1. The fingerprint's source code serves as its identification key. The sensor will provide access to a system if they match, at which point.In a captive scanner, a captive array circuit keeps track of every little detail on the finger. The conductive plates are covered with the fingerprint's ridges, which change the charge on the capacitor while leaving the charge on the capacitor unchanged.An operational amplifier circuit follows, which records each and every aspect of the fingerprint. Then, using an analogue to digital converter, this data is recorded. Additionally, the ADC converter analyses it.

- IoT system architecture of the proposed system.

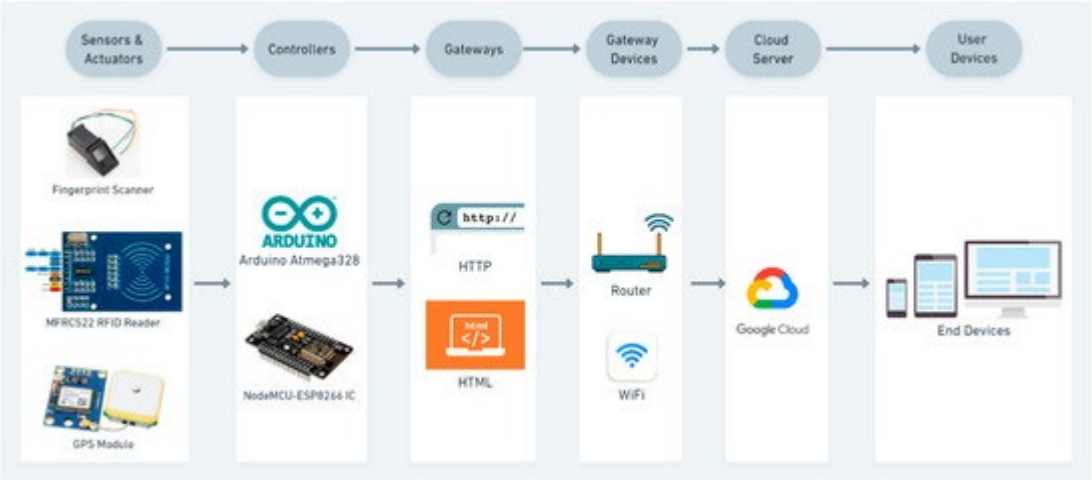

FIGURE 2.3: IoT system architecture of the proposed system.

Depicts the IoT system architecture used in this study: The sensors responsible for the input

of data are the MFRC522 RFID reader, fingerprint scanner, and Neo 6M GPS module. The ESP8266 IC controls the data flow from the sensors to the database, whereas the Atmega controller of Arduino controls the data coming from the fingerprint sensor. The gateways used were HTTP and HTML, the data were sent over HTTP to Google spreadsheets from the NodeMCU, and live location visualization was performed using HTML. The Wi-Fi module of the NodeMCU sends data to the cloud over the Internet. These data can then be visualized on end devices such as PCs and mobile phones.

- 4-in-11 Luggage Bag

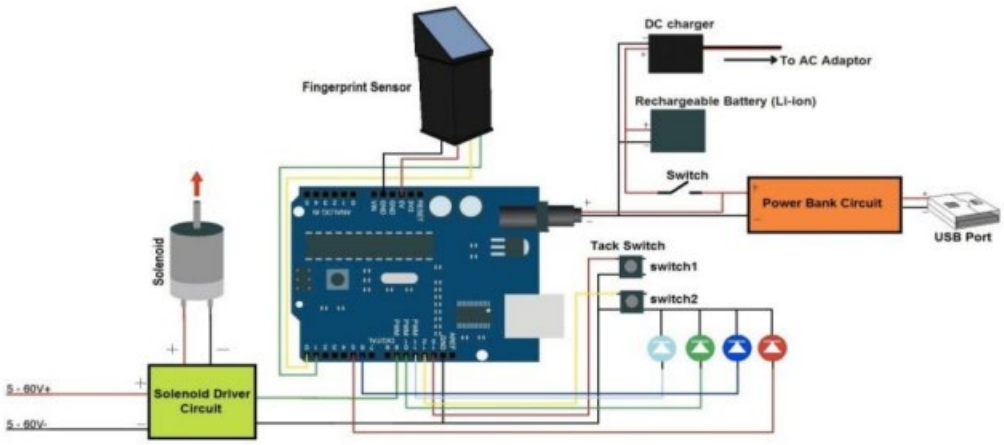

FIGURE 2.3: 4-in-11 Luggage Bag

He process flow of the 4-in-1 Luggage Bag, the luggage bag has a power switch that controls some of the luggage bag's components. If the power switch is ON, the Arduino Uno and a 5v power bank activates. When the Arduino Uno activates, the fingerprint and two tack switch also activates. The fingerprint sensor/module is set to a default program which is ready to identify the registered fingerprint, if the inputted fingerprint does not match the current registered fingerprint, it will automatically return to the default program which is the "identification".

2.4 SUMMARY

The SMART Luggage project's history shows how IoT, fingerprint identification, and GPS technologies were incorporated in response to the growing demand for improved travel options. The project's goal is to offer travelers a smart luggage solution that combines convenience, security, and real-time tracking capabilities for a smooth and joyful travel experience through ongoing research, development, and user-eccentric design methods.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

The approaches utilized to complete this project will be explained in this chapter. The functions of each installed component in this project are also covered in this chapter. By the end of this chapter, the project's total budget is displayed.

3.2 FLOW CHART

In the accomplishment of the **SMART PROTECTIVE LAGGUGE WITH GPS** , the flow chart below assists us to completethe project.

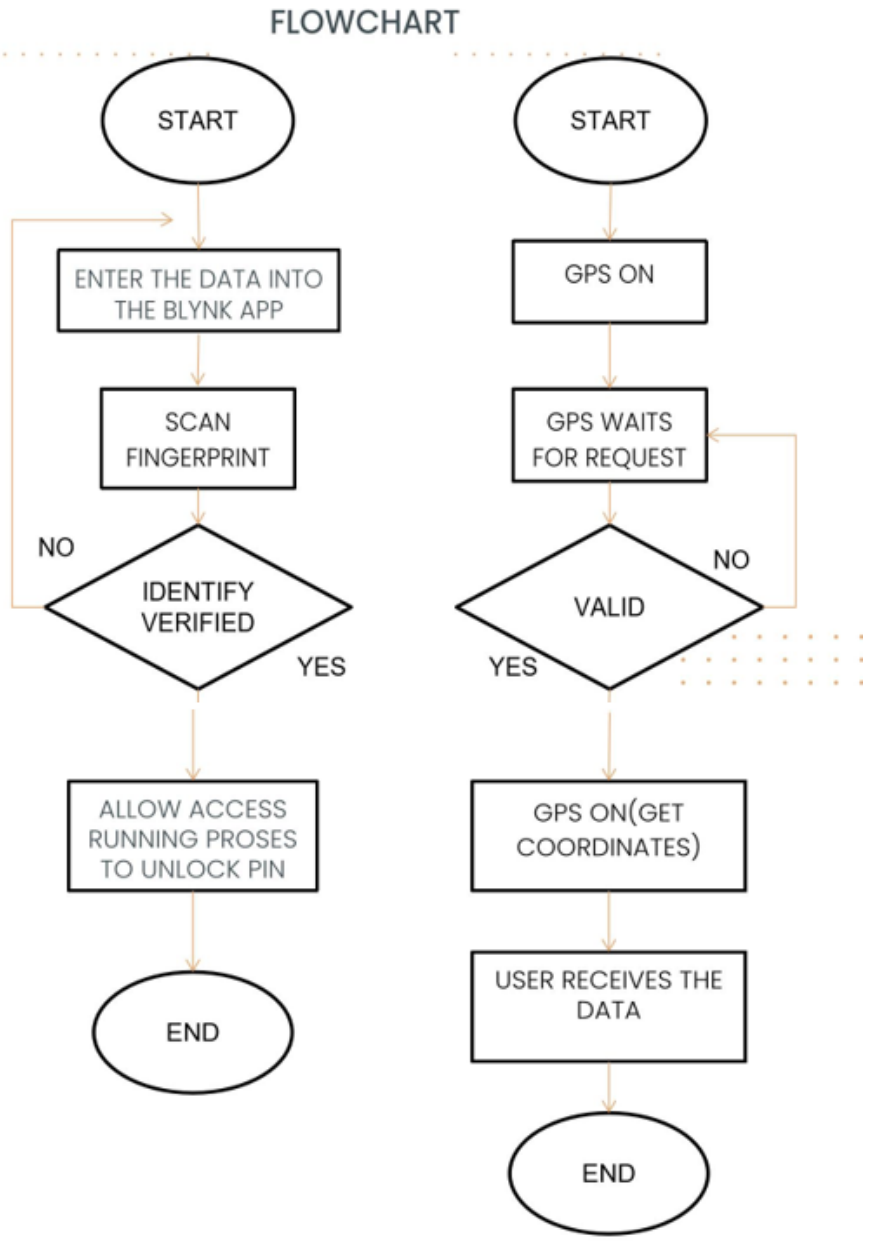

FIGURE 3.3.1: Flow chart

3.3 Project Description

The goal of the extensive project "SMART Luggage" is to develop a cutting-edge travel bag by combining a number of new cutting-edge technologies, such as the Internet of Things (IOT), the ESP8266 module, fingerprint identification, and GPS. With improved security, seamless real-time tracking, and individualized access control capabilities, this smart luggage system aims to revolutionize the travelling experience.

The SMART Luggage can interface with other devices and platforms thanks to the incorporation of IOT capabilities, providing features like remote monitoring, data synchronization, and effortless internet connectivity. By enabling the suitcase to connect to Wi-Fi networks and offering wireless connectivity, the ESP8266 module serves a significant role in facilitating data transfer, remote control, and communication with a centralized system or mobile application

The concept uses fingerprint recognition technology to guarantee a high level of security and individualist access control, enabling traveller to securely identify their identity and access their bags. By doing away with traditional keys or passwords, this biometric authentication function ensures that only people with the proper authorization can open the suitcase.

Additionally, the SMART Luggage's integration of GPS technology provides precise and real-time tracking of the suitcase's whereabouts. Through a mobile application or centralized system, traveller may keep track of the whereabouts of their bags, giving them peace of mind and lowering the possibility of theft or misplacement while travelling.

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3.4 Project Hardware

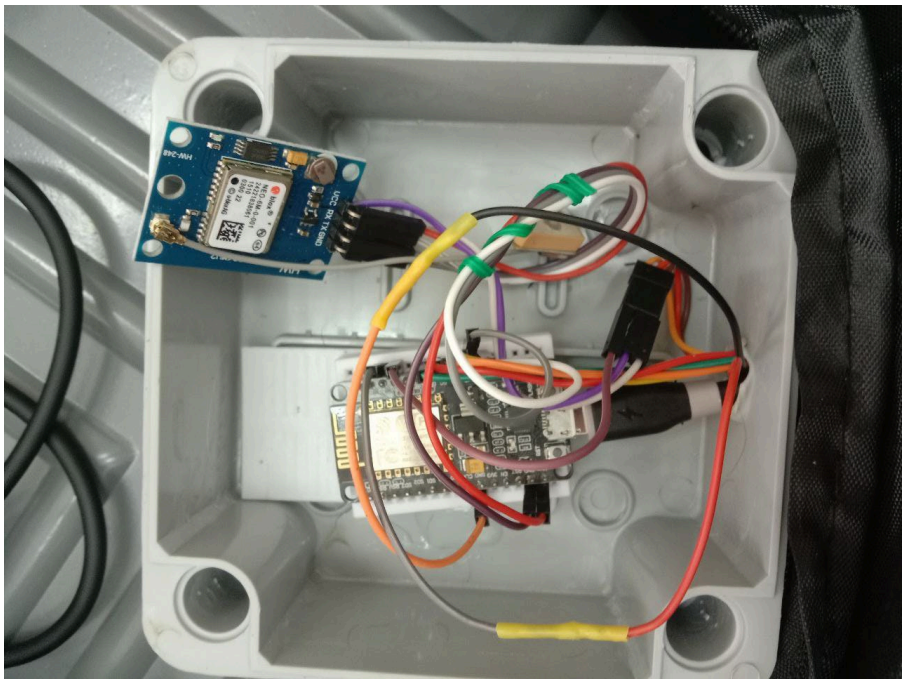


FIGURE 3.5: Project Hardware

3.5 Schematic Circuit

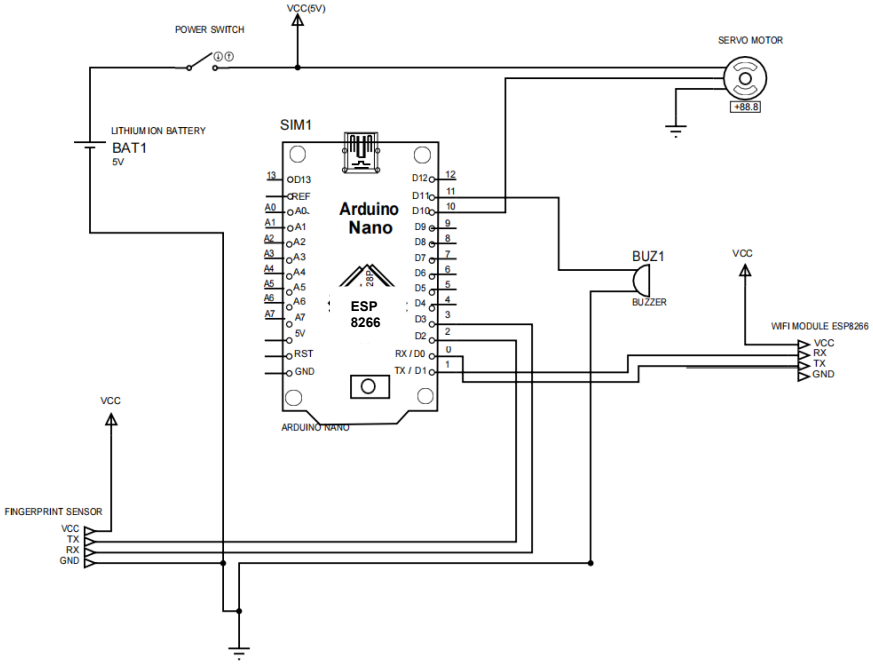


FIGURE 3.6: Schematic Circuit

3.6 Description of Main Component

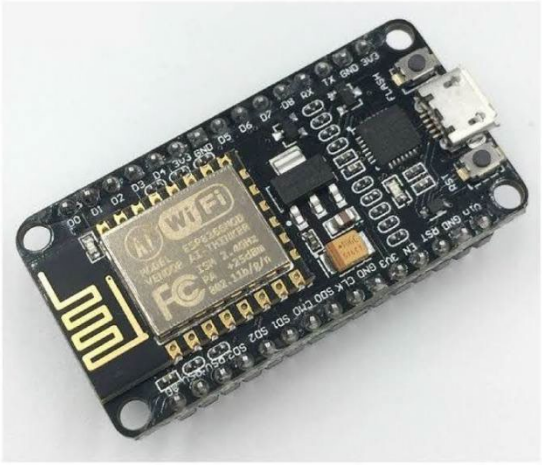


FIGURE 3.7.1: ESP8266 Wi-Fi module

A SOC microprocessor called an ESP8266 Wi-Fi module is mostly utilized for the creation of end-point Internet of Things (IOT) applications. It is known as a standalone wireless transceiver and is very inexpensive. It is utilized to make it possible for various embedded system applications to connect to the internet.

FIGURE 3.7.2: SERVOMOTOR

The angular or linear position, velocity, and acceleration can be precisely controlled by a servomotor, which is a rotary actuator or linear actuator. It consists of an appropriate motor connected to a position feedback sensor.

FIGURE 3.7.3: FINGERPRINT SENSOR

When granting access to information or approving transactions, a fingerprint scanner is a sort of electronic security system that employs fingerprints for biometric authentication.

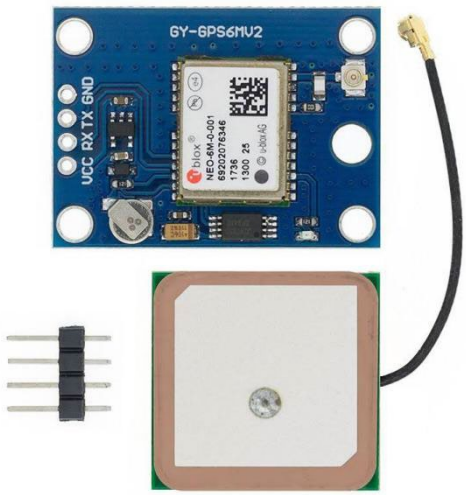


FIGURE 3.7.4: NEO 6M GPS MODULE

Although it is tiny, this has a lot of features. It operates between 2.7 and 3.6 volts, can track up to 22 satellites across 50 channels, and only uses 45 mA of current. This module's power-saving mode is among its most intriguing characteristics.

FIGURE 3.7.5:BUZZER

A buzzer or beeper is a mechanical, electromechanical, or piezoelectric (short for piezoelectric) auditory signalling device. Buzzers and beepers are frequently used as alarm clocks, timers, and to validate human input such a mouse click or keyboard.

3.7 PROJECT EXECUTION

3.5 PROJECT STRUCTURE BUILDING

i. Wiring Connection

Make wire connections for each component by according to the proposed schematic diagram.

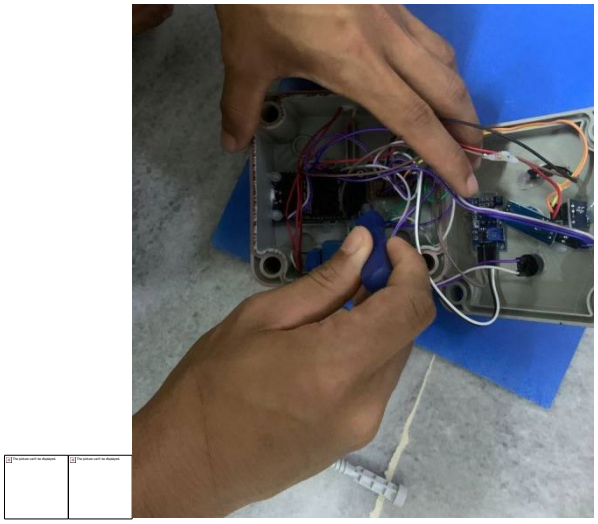


FIGURE 3.5.1: Wiring Connection

ii. Casing

Put every component inside the case and use adhesive to make it look neater.

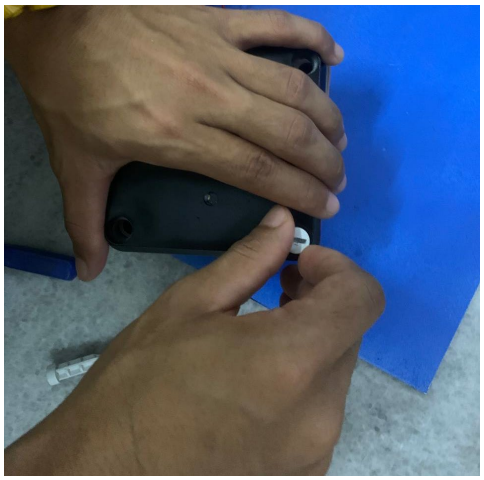


FIGURE 3.5.2: Casing Process

3.5.1 PROJECT MOVING MECHANISM

i. ESP 8266 board

The ESP8266, a low-cost Wi-Fi microprocessor with integrated TCP/IP networking software and microcontroller capabilities. Maker of the ESP8266 microchip is ESP8266.

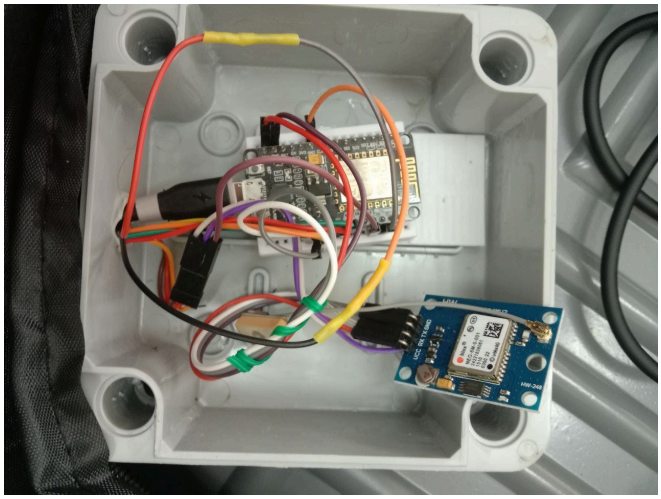


FIGURE 3.5.3: ESP 8266 board

3.5.2 CODING AND PROGRAMMING

Coding is the process of converting codes between different languages. It can also be regarded as a subset of programming because it executes the initial stages of programming. It necessitates writing programmers as directed in a range of languages. The machine can only understand machine code, also referred to as binary language, and cannot communicate with people. The primary responsibility of a coder is to translate requirements into language that computers can understand. Coders must be fluent in the working language of the project. They do, however, generally write their code in compliance with the requirements and guidelines of the project. The process of creating a software product starts here. Programming is the process of creating a machine-level executable programme that can be executed without mistake.To keep human inputs and machine outputs in sync, formal coding is the practise that is used.

Writing code is the initial step, which is then examined and put into practise to produce the desired machine-level result. Additionally, it takes into account all of the significant factors, including debugging, compilation, testing, and implementation. To create the required machine outputs, programmers analyse and comprehend the numerous communication components. The Arduino Integrated Development Environment (IDE) is used to develop Arduino programming. You may create sketches (Arduino jargon for programmers) for several Arduino boards using the Arduino IDE, an application that runs on your computer. Processing, a very basic hardware programming language akin to C, is the foundation of the Arduino programming language.The sketch must be uploaded to the Arduino board for execution after being created in the Arduino IDE.

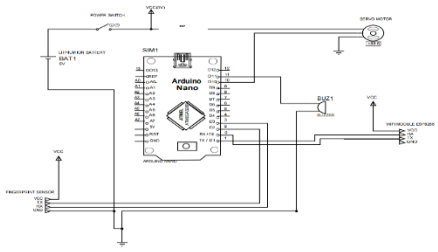


FIGURE 3.5.3: Schematic Diagram

FIGURE 3.5.3: Arduino Software

```
#define  BLYNK_TEMPLATE_ID "TMPL6jPyAIydT"
#define  BLYNK_TEMPLATE_NAME "Smart Protective Luggage With GPS"
#define  BLYNK_AUTH_TOKEN "u4ZmOphRJQLw8u1muk9ZYsu9Fz6Y7rJD"

#define  BLYNK_PRINT Serial
#include  <ESP8266WiFi.h>
#include  <BlynkSimpleEsp8266.h>
#include  <Servo.h>
#include  <TinyGPS++.h>
#include  <SoftwareSerial.h>
#include  <Adafruit_Fingerprint.h>

char auth[] = BLYNK_AUTH_TOKEN;
char ssid[] = "5G DJK";
char pass[] = "DJK5agempak";

int speaker = 4;
String link;
int con = 0;
int con1 = 0;
int fingerCon = 0;

TinyGPSPlus gps;
SoftwareSerial ss(13, 15);
SoftwareSerial mySerial(14, 12);
Servo myservo;
WidgetMap myMap(V5);
BlynkTimer timer;

Adafruit_Fingerprint finger = Adafruit_Fingerprint(&mySerial);
double latitude = 3.085901;
double longitude = 101.559559;

BLYNK_WRITE(V0)
{
int pinValue = param.asInt();
Serial.println(pinValue);
```

```
if(pinValue == 1){
digitalWrite(speaker, HIGH);
}
else{
digitalWrite(speaker, LOW);
}
}

BLYNK_WRITE(V1)
{
int pinValue = param.asInt();
Serial.println(pinValue);
if(pinValue == 1){
myservo.write(180);
}
else{
myservo.write(0);
}
}

void setup() {
myservo.attach(0);
pinMode(speaker, OUTPUT);
digitalWrite(speaker, LOW);
Serial.begin(115200);
ss.begin(9600);
finger.begin(57600);
delay(5);
if (finger.verifyPassword()) {
Serial.println("Found fingerprint sensor!");
} else {
Serial.println("Did not find fingerprint sensor :(");
while (1) {
delay(1);
}
}
finger.getTemplateCount();
```

```
Serial.print("Sensor contains "); Serial.print(finger.templateCount); Serial.println("
templates");
Serial.println("Waiting for valid finger...");
Blynk.begin(auth, ssid, pass);
timer.setInterval(1500L, myTimerEvent);
timer.setInterval(2000L, gps1);
timer.setInterval(50L, fingerr);
myservo.write(0);
}

void fingerr() {
getFingerprintID();
}

void myTimerEvent() {
Blynk.virtualWrite(V5, longitude, latitude);
}

void gps1() {
if (gps.location.isUpdated()) {
latitude = gps.location.lat();
longitude = gps.location.lng();
link = "location = " + String(latitude, 6) + "," + String(longitude, 6);
Serial.println(link);
}
}

uint8_t getFingerprintID(){
uint8_t p = finger.getImage();
switch (p) {
case FINGERPRINT_OK:
Serial.println("Image taken");
break;
case FINGERPRINT_NOFINGER:
Serial.println("No finger detected");
return p;
case FINGERPRINT_PACKETRECIEVEERR:
```

```
Serial.println("Communication error");
return p;
case FINGERPRINT_IMAGEFAIL:
Serial.println("Imaging error");
return p;
default:
Serial.println("Unknown error");
return p;
}

// OK success!

p = finger.image2Tz();
switch (p) {
case FINGERPRINT_OK:
Serial.println("Image converted");
break;
case FINGERPRINT_IMAGEMESS:
Serial.println("Image too messy");
return p;
case FINGERPRINT_PACKETRECIEVEERR:
Serial.println("Communication error");
return p;
case FINGERPRINT_FEATUREFAIL:
Serial.println("Could not find fingerprint features");
return p;
case FINGERPRINT_INVALIDIMAGE:
Serial.println("Could not find fingerprint features");
return p;
default:
Serial.println("Unknown error");
return p;
}

// OK converted!
p = finger.fingerFastSearch();
if (p == FINGERPRINT_OK) {
```

```
con = 1;
if(fingerCon == 0){
myservo.write(180);
fingerCon = 1;
}
else{
myservo.write(0);
fingerCon = 0;
}
Serial.println("Found a print match!");
} else if (p == FINGERPRINT_PACKETRECIEVEERR) {
Serial.println("Communication error");
return p;
} else if (p == FINGERPRINT_NOTFOUND) {
con1 = 1;
Serial.println("Did not find a match");
return p;
} else {
Serial.println("Unknown error");
return p;
}

// found a match!
Serial.print("Found ID #"); Serial.print(finger.fingerID);
Serial.print(" with confidence of "); Serial.println(finger.confidence);

return finger.fingerID;
}

void loop()
{
Blynk.run();
timer.run();
while (ss.available() > 0) {
gps.encode(ss.read());
}
}
```

```
/***************************************************
This is an example sketch for our optical Fingerprint sensor

Designed specifically to work with the Adafruit BMP085 Breakout
----> http://www.adafruit.com/products/751

These displays use TTL Serial to communicate, 2 pins are required to
interface
Adafruit invests time and resources providing this open source code,
please support Adafruit and open-source hardware by purchasing
products from Adafruit!

Written by Limor Fried/Ladyada for Adafruit Industries.
BSD license, all text above must be included in any redistribution
****************************************************/

#include  <Adafruit_Fingerprint.h>


// #if  (defined(__AVR__) || defined(ESP8266)) && !defined(__AVR_ATmega2560__)
// For UNO and others without hardware serial, we must use software serial...
// pin #2 is IN from sensor (GREEN wire)
// pin #3 is OUT from arduino (WHITE wire)
// Set up the serial port to use softwareserial..
SoftwareSerial mySerial(14, 12);

// #else
// On Leonardo/M0/etc, others with hardware serial, use hardware serial!
// #0 is green wire, #1 is white
```

```
// #define  mySerial Serial1

// #endif


Adafruit_Fingerprint finger = Adafruit_Fingerprint(&mySerial);

uint8_t id;

void setup()
{
Serial.begin(9600);
while (!Serial); // For Yun/Leo/Micro/Zero/...
delay(100);
Serial.println("\n\nAdafruit Fingerprint sensor enrollment");

// set the data rate for the sensor serial port
finger.begin(57600);

if (finger.verifyPassword()) {
Serial.println("Found fingerprint sensor!");
} else {
Serial.println("Did not find fingerprint sensor :(");
while (1) { delay(1); }
}

Serial.println(F("Reading sensor parameters"));
finger.getParameters();
Serial.print(F("Status: 0x")); Serial.println(finger.status_reg, HEX);
Serial.print(F("Sys ID: 0x")); Serial.println(finger.system_id, HEX);
Serial.print(F("Capacity: ")); Serial.println(finger.capacity);
Serial.print(F("Security level: ")); Serial.println(finger.security_level);
Serial.print(F("Device address: ")); Serial.println(finger.device_addr, HEX);
Serial.print(F("Packet len: ")); Serial.println(finger.packet_len);
Serial.print(F("Baud rate: ")); Serial.println(finger.baud_rate);
}
```

```
uint8_t readnumber(void) {
uint8_t num = 0;

while (num == 0) {
while (! Serial.available());
num = Serial.parseInt();
}
return num;
}

void loop() // run over and over again
{
Serial.println("Ready to enroll a fingerprint!");
Serial.println("Please type in the ID # (from 1 to 127) you want to save this finger
as...");
id = readnumber();
if (id == 0) {// ID #0 not allowed, try again!
return;
}
Serial.print("Enrolling ID #");
Serial.println(id);

while (! getFingerprintEnroll() );
}

uint8_t getFingerprintEnroll() {

int p = -1;
Serial.print("Waiting for valid finger to enroll as #"); Serial.println(id);
while (p != FINGERPRINT_OK) {
p = finger.getImage();
switch (p) {
case FINGERPRINT_OK:
Serial.println("Image taken");
break;
case FINGERPRINT_NOFINGER:
Serial.println(".");
```

```
break;
case FINGERPRINT_PACKETRECIEVEERR:
Serial.println("Communication error");
break;
case FINGERPRINT_IMAGEFAIL:
Serial.println("Imaging error");
break;
default:
Serial.println("Unknown error");
break;
}
}

// OK success!

p = finger.image2Tz(1);
switch (p) {
case FINGERPRINT_OK:
Serial.println("Image converted");
break;
case FINGERPRINT_IMAGEMESS:
Serial.println("Image too messy");
return p;
case FINGERPRINT_PACKETRECIEVEERR:
Serial.println("Communication error");
return p;
case FINGERPRINT_FEATUREFAIL:
Serial.println("Could not find fingerprint features");
return p;
case FINGERPRINT_INVALIDIMAGE:
Serial.println("Could not find fingerprint features");
return p;
default:
Serial.println("Unknown error");
return p;
}
```

```
Serial.println("Remove finger");
delay(2000);
p = 0;
while (p != FINGERPRINT_NOFINGER) {
p = finger.getImage();
}
Serial.print("ID "); Serial.println(id);
p = -1;
Serial.println("Place same finger again");
while (p != FINGERPRINT_OK) {
p = finger.getImage();
switch (p) {
case FINGERPRINT_OK:
Serial.println("Image taken");
break;
case FINGERPRINT_NOFINGER:
Serial.print(".");
break;
case FINGERPRINT_PACKETRECIEVEERR:
Serial.println("Communication error");
break;
case FINGERPRINT_IMAGEFAIL:
Serial.println("Imaging error");
break;
default:
Serial.println("Unknown error");
break;
}
}

// OK success!

p = finger.image2Tz(2);
switch (p) {
case FINGERPRINT_OK:
Serial.println("Image converted");
```

```
break;
case FINGERPRINT_IMAGEMESS:
Serial.println("Image too messy");
return p;
case FINGERPRINT_PACKETRECIEVEERR:
Serial.println("Communication error");
return p;
case FINGERPRINT_FEATUREFAIL:
Serial.println("Could not find fingerprint features");
return p;
case FINGERPRINT_INVALIDIMAGE:
Serial.println("Could not find fingerprint features");
return p;
default:
Serial.println("Unknown error");
return p;
}

// OK converted!
Serial.print("Creating model for #"); Serial.println(id);

p = finger.createModel();
if (p == FINGERPRINT_OK) {
Serial.println("Prints matched!");
} else if (p == FINGERPRINT_PACKETRECIEVEERR) {
Serial.println("Communication error");
return p;
} else if (p == FINGERPRINT_ENROLLMISMATCH) {
Serial.println("Fingerprints did not match");
return p;
} else {
Serial.println("Unknown error");
return p;
}

Serial.print("ID "); Serial.println(id);
p = finger.storeModel(id);
```

```
if (p == FINGERPRINT_OK) {
Serial.println("Stored!");
} else if (p == FINGERPRINT_PACKETRECIEVEERR) {
Serial.println("Communication error");
return p;
} else if (p == FINGERPRINT_BADLOCATION) {
Serial.println("Could not store in that location");
return p;
} else if (p == FINGERPRINT_FLASHERR) {
Serial.println("Error writing to flash");
return p;
} else {
Serial.println("Unknown error");
return p;
}

return true;
}
```

3.5.3 APPLICATION SOFTWARE

Blynk is a mobile application created for Internet of Things (IOT) applications that allows users to remotely manage and monitor connected devices and sensors. It was developed to make it easier to build Internet of Things applications and to give non-programmers an easy-to-use platform. The graphical interface offered by Blynk can be used to design unique dashboards to manage and monitor linked devices. Buttons, sliders, graphs and display widgets, as well as others, can be dragged and dropped by the user onto the dashboard. These widgets can then be connected to related hardware or sensors. After setting up the dashboard, customers can access their devices from anywhere in the world using the Blynk app.Blynk can interface with a wide variety of hardware platforms, including Arduino, Raspberry Pi, ESP8266 and Particle, using a variety of communication protocols, including Wi-Fi, Bluetooth and Ethernet. Additionally, it offers a cloud-based service that can be used to securely store and access linked device data.Overall, Blynk is a robust and user-friendly IOT tool that makes it simple to build IOT apps and allows anyone to easily create personalize dashboards to manage connected devices.

FIGURE 3.5.4: Application Software

3.8 THE FINISHING PROJECT

FIGURE 3.6: Project's Final Look

3.9 PROJECT BUDGET

Table below shows the amount of money spent to purchase the materials needed to produce the project.

Items	Units	Price (per unit)
Esp 8266 wifi module	1 unit	RM 10.70
Fingerprint sensor	1 unit	RM 45.00
Buzzer	1 unit	RM 3.00
Powerbank	1 piece	RM 57.00
Neo 6m GPS module	1 unit	RM 14.50
Servomotor	1 unit	RM 14.30
TOTAL		RM 144.50

TABLE 3.7.1: Project Budget

3.10 SUMMARY

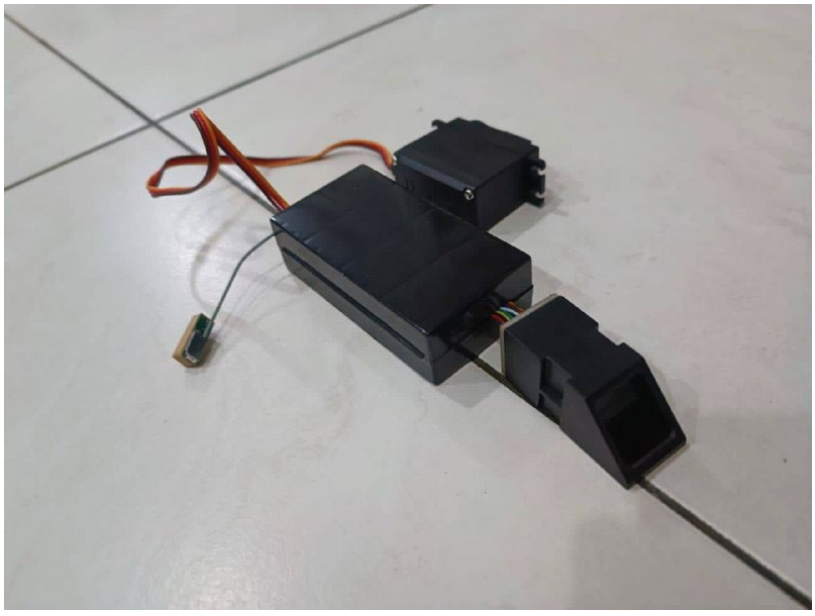
A detailed illustration of how I created the Smart Protective Luggage with GPS is provided at the conclusion of this chapter.Before choosing the equipment and materials from Shopee, Lazada, and other hardware stores, we conducted a poll to ensure that we were getting the best goods for the project's budget.

CHAPTER 4

RESULT,ANALYSISDATA & DISCUSSIONS

4.1 INTRODUCTION

The significance of conducting data analysis prior to project planning will be discussed in this chapter. With the help of SMART PROTECTIVE LUGGAGE WITH GPS, we have gathered some data. Not only that, but having a discussion based on the analyses data is also highly beneficial because that's where we discover new information and advance our way of thinking about how to choose the project's material. On the other hand, making sure that safety precautions have been taken into consideration is a crucial aspect of the project.



4.2 RESPONDENT OPINION

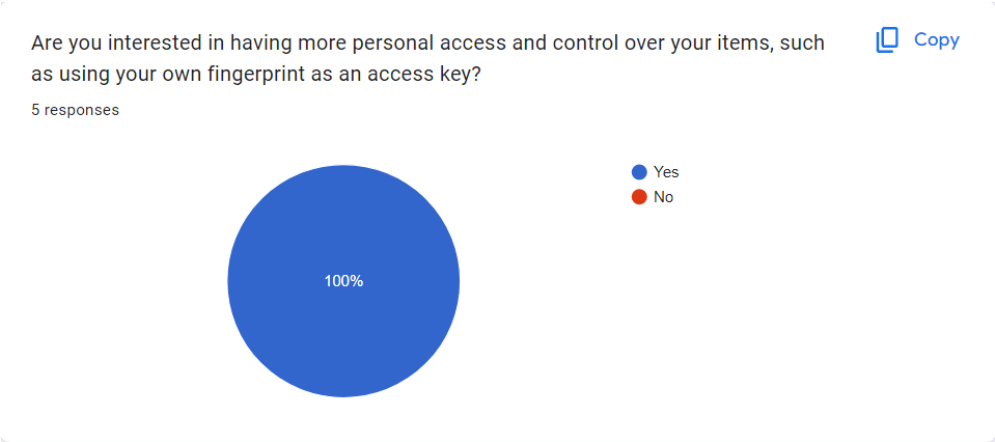


FIGURE 4.2.1:Are you interested in having more personal access and control over your items

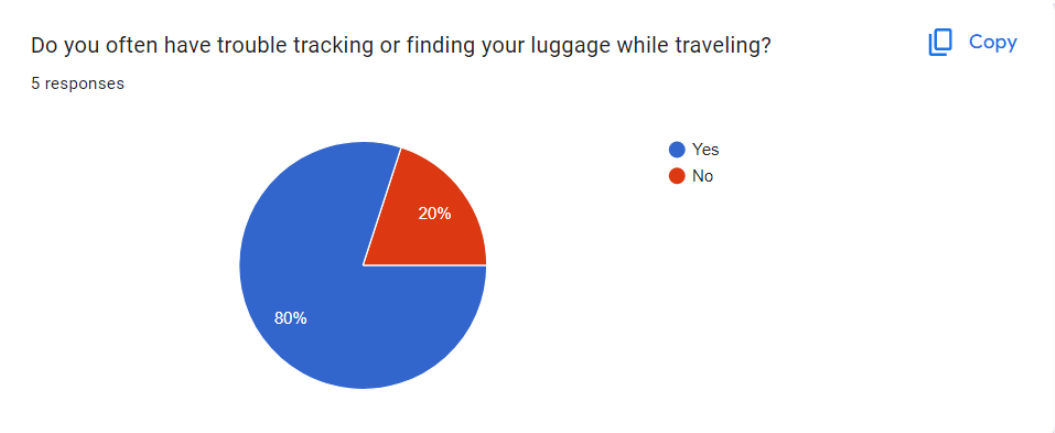


FIGURE 4.2.2: Do you often have trouble tracking or finding your luggage while traveling

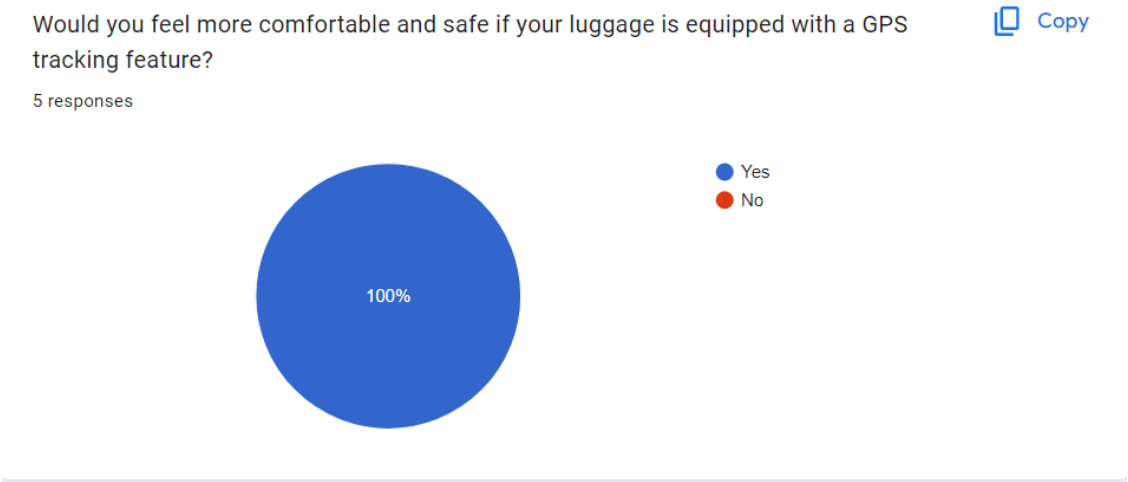


FIGURE 4.2.3:Would you feel more comfortable and safe if your luggage is equipped with a GPS tracking feature

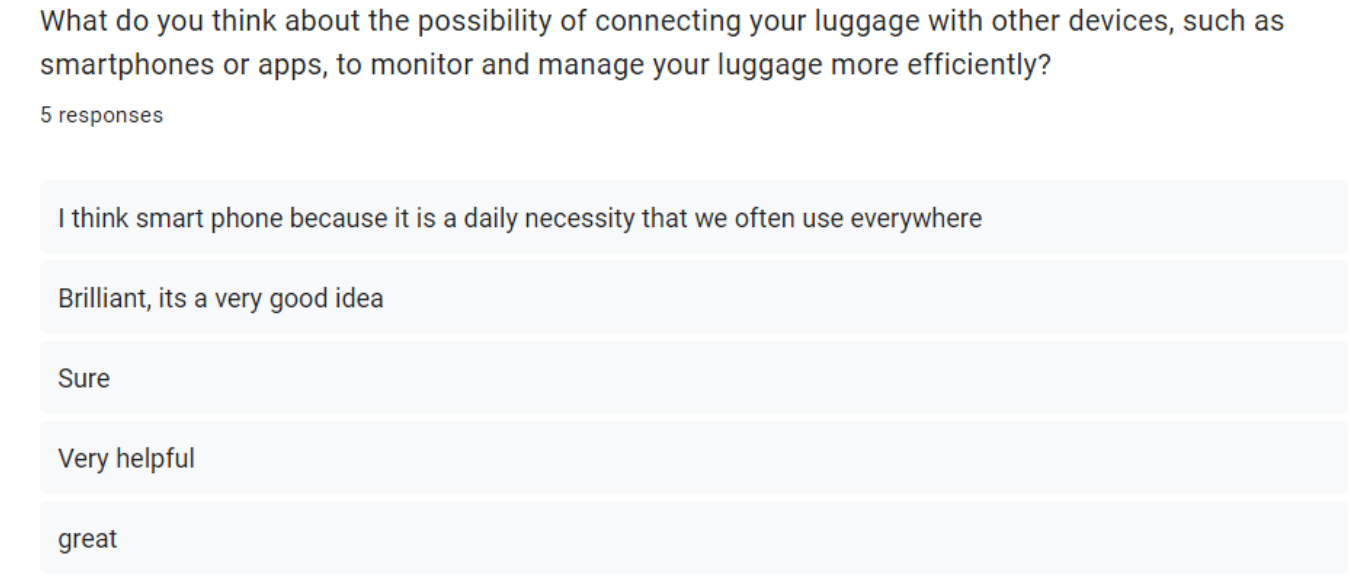


FIGURE 4.2.4: The possibility of connecting your luggage with other devices

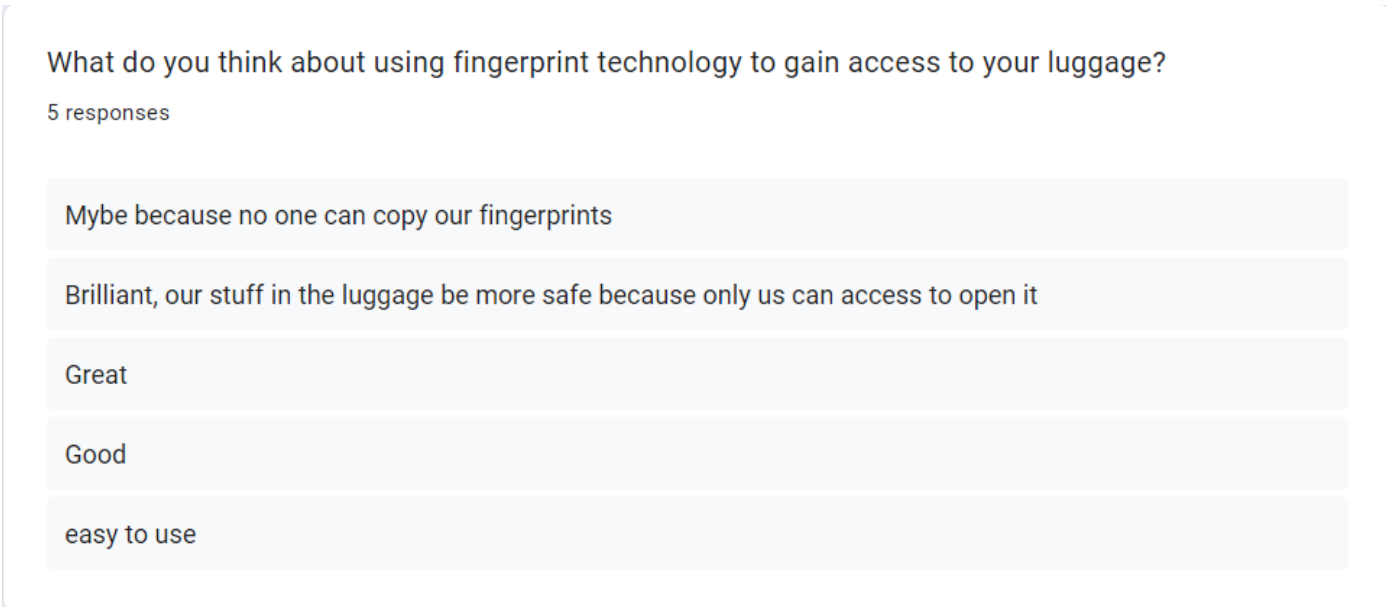


FIGURE 4.2.5: You think about using fingerprint technology to gain access to your luggage

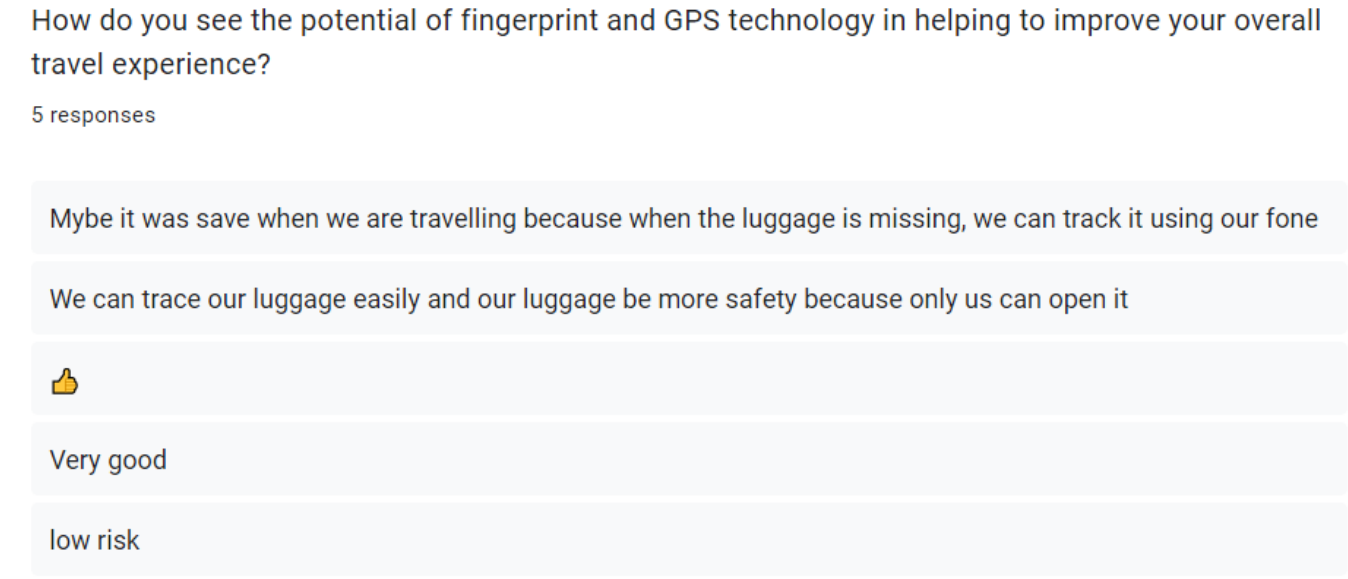


FIGURE 4.2.6: The potential of fingerprint and GPS technology in helping to improve your overall travel experience

4.3 SUMMARY

The SMART Luggage project, which integrates IoT, ESP8266, fingerprint identification, and GPS technologies for travel, has the potential to revolutionise the travel experience by offering cutting-edge functionalities, according to the analysis of the project. The idea improves security and lowers the possibility of misplacement or theft by utilising IoT capabilities to provide continuous communication, real-time tracking, and remote monitoring of the bags. Wireless connectivity is ensured by the inclusion of the ESP8266 module, allowing effective communication between the luggage and other devices or a centralised system. A further layer of security is added by using fingerprint recognition technology, which restricts access to the bags to those who are authorised. The use of GPS technology also enables precise tracking and location-based services, making it simple for travellers to find their bags.The SMART Luggage project shows how these technologies have the potential to provide ease, efficiency, and improved user experience in the travel sector.

CHAPTER 5

CONCLUSION

5.1 INTRODUCTION

In order to reach a conclusion on the project, this chapter discusses the project's existing architecture as well as its limitations and future improvement plans. The purpose of the project constraint is to make the project's capability clear. The suggestions for upgrading plans are intended to maintain the significance and advantages of our project for the intended users.

5.2 PROJECT LIMITATION

The project involving the travel-related SMART Luggage technology has the drawback that its best performance depends on reliable internet access. The functionality of the real-time tracking, remote monitoring, and synchronization services may be jeopardize in situations where dependable internet access is restricted or nonexistent. Additionally, the precision of luggage monitoring may be hampered in locations with weak satellite signal reception due to potential effects on GPS location tracking. In addition, integrating several technologies could make things more complicated and raise the chance of technical problems, necessitating careful testing and maintenance to guarantee smooth functioning.

5.3 CONCLUSION

In conclusion, the SMART Luggage project offers a complete solution that transforms the travel experience by integrating IOT, ESP8266, fingerprint identification, and GPS technologies. The initiative intends to improve suitcase security, give real-time tracking capabilities, and enable individualised access control by integrating various technologies. This novel strategy guarantees travellers' comfort and peace of mind while also showcasing the potential of smart gadgets to enhance numerous facets of the travel business.

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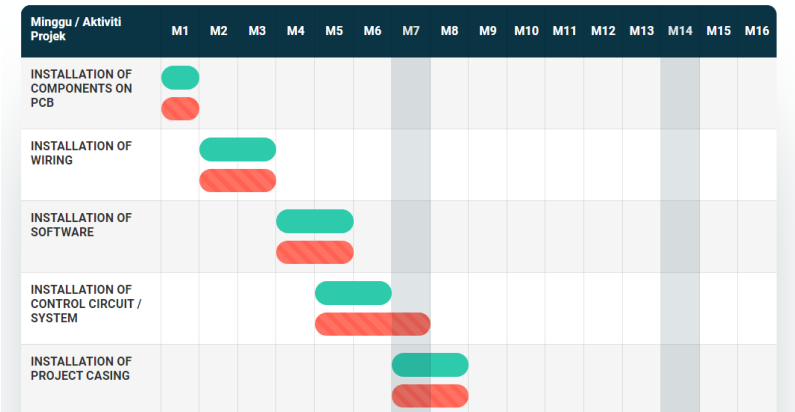
APPENDIX

APPENDIX A – GANTT CHART

CARTA GANTT : PERANCANGAN DAN PELAKSANAAN PROJEK PELAJAR

SESI : 2 : 2022/2023
JABATAN: JKE
KODKURSUS: DEE50102
TAJUK PROJEK : SMART PROTECTIVE LUGGAGE WITH GPS




TEST THE ELECTRONIC PART
TEST THE MECHANICAL PART
TEST THE OVERALL PROCESS / PROJECT
PREPARATION OF SLIDE PRESENTATION
PREPARATION OF LOGBOOK
PREPARATION OF PROJECT 2 FINAL REPORT
PREPARATION OF INSTRUCTION MANUAL
END
Perancangan
Pelaksanaan