

E-ticketing Pothole Road System

By

POH XIAO HUI

A REPORT

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfillment of the requirements

for the degree of

BACHELOR OF INFORMATION SYSTEMS (HONOURS)

BUSINESS INFORMATION SYSTEMS

Faculty of Information and Communication Technology

(Kampar Campus)

JUNE 2023

## REPORT STATUS DECLARATION FORM

**Title:**     \_E-ticketing pothole Road System\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Academic Session:** \_JUNE 2023\_

I             \_\_\_\_\_POH XIAO HUI\_\_\_\_\_

**(CAPITAL LETTER)**

declare that I allow this Final Year Project Report to be kept in  
Universiti Tunku Abdul Rahman Library subject to the regulations as follows:

1. The dissertation is a property of the Library.
2. The Library is allowed to make copies of this dissertation for academic purposes.

Verified by,



\_\_\_\_\_  
(Author's signature)



\_\_\_\_\_  
(Supervisor's signature)

**Address:**

2367, jalan sekyen 2/10  
31900 Kampar, Perak

\_\_\_\_\_  
\_Miss Ana Nabilah\_\_\_\_\_

Supervisor's name

**Date:** \_11-September-2024\_

**Date:** 15 September 2023



## DECLARATION OF ORIGINALITY

I declare that this report entitled “**E-ticketing Pothole Road System**” is my own work except as cited in the references. The report has not been accepted for any degree and is not being submitted concurrently in candidature for any degree or other award.



Signature : \_\_\_\_\_

Name : \_\_\_\_\_ Poh Xiao Hui \_\_\_\_\_

Date : \_\_\_\_\_ 11/09/2023 \_\_\_\_\_

## **ACKNOWLEDGEMENTS**

I would like to extend my heartfelt gratitude and appreciation to my supervisor, Miss Ana Nabilah who have provided me with this wonderful opportunity to participate in this e-ticketing pothole road system project. And to conclude, I am grateful to my family and parents for their endless affection, assistance, and support throughout my journey.

## **ABSTRACT**

This project intricates on the chosen research which is E-ticketing Pothole Road System. It is an application that helps users on report potholes in a systematic way where user can upload their photos, receive notifications updated about the status of the report they made. The target audience is for road users so that they can be aware of the road conditions and make a report whenever they are on the road or in anywhere else.

The problem faced by road users is there is lack of effective communication between the road users and authorities. Road users cannot receive feedback when they make a report. Road authorities cannot store and manage users' report history in an organized way.

The proposed system for this project is an android application system because it is the best fit for this project due to the process of retrieving users' location and photos from gallery and snap photo function. Method used in this project is a computer to develop and design for the application. Compare between the existing systems and enhance it, then implement on the proposed system.

# TABLE OF CONTENTS

<b>TITLE PAGE</b>	<b>i</b>
<b>REPORT STATUS DECLARATION FORM</b>	<b>ii</b>
<b>FYP THESIS SUBMISSION FORM</b>	<b>iii</b>
<b>DECLARATION OF ORIGINALITY</b>	<b>iv</b>
<b>ACKNOWLEDGEMENTS</b>	<b>v</b>
<b>ABSTRACT</b>	<b>vi</b>
<b>TABLE OF CONTENTS</b>	<b>vii</b>
<b>LIST OF FIGURES</b>	<b>xi</b>
<b>LIST OF TABLES</b>	<b>xiv</b>
<b>LIST OF ABBREVIATIONS</b>	<b>xv</b>
<b>CHAPTER 1 INTRODUCTION</b>	<b>1</b>
1.1 Introduction	1
1.2 Research Background	1
1.3 Problem Statement and Motivation	1
1.4 Objectives	2
1.5 Project Scope and Direction	4
1.5.1 User Registration and Login Module	4
1.5.2 User Create Report Module	4
1.5.3 Report History Module	4
1.5.4 User Profile Module	4
1.5.5 Report Retrieval System Module	5
1.5.6 Report Management System Module	5
1.5.7 Create Contractor Functionality Module	5
1.5.8 Task Assigned System Module	5
1.6 Contributions	6
1.7 Report Organization	6
<b>CHAPTER 2 LITERATURE REVIEW</b>	<b>7</b>
2.1 Introduction	7
2.2 Review on Previous Research	7
❧ 1 Online Complaint registration and management system to the municipality	7
❧ Pothole Tracking System Using Android	7
2.3 Review on Prototyped System	8

21	Gap Trap	8
22	PotAlert Tracking System	8
2.4	Review on Existing System	9
21	Waze	9
22	i-Tegur	10
23	Street Bump	12
2.5	List of Strengths,Weaknesses and Limitations	13
2.6	Comparison between existing system and proposed system	15
2.7	Limitation of Previous Studies	16
2.8	Proposed Solutions	16
2.9	Chapter Summary	16
<b>CHAPTER 3 SYSTEM METHODOLOGY /APPROACH</b>		<b>17</b>
3.1	Introduction	17
3.2	Methodology	17
3.2.1	Process 1: Planning	17
3.2.2	Process 2: Design	18
3.2.3	Process 3: Develop	18
3.2.4	Process 4: Test	18
3.3	Use Case Diagram	19
3.4	Activity Diagram	20
3.4.1	Activity Diagram for user when login	22
3.4.2	Activity Diagram for user to request reset password	23
3.4.3	Activity Diagram for user to change password	24
3.4.4	Activity Diagram for user to edit their profile	25
3.4.5	Activity Diagram where gets user’s location	26
3.4.6	Activity Diagram when users create a report	27
3.4.7	Activity Diagram where authority assign task when receive new report	28
3.4.8	Activity Diagram for contractor to receive task and upload proof	29
3.5	Wireframe	30
3.6	System Architecture	37
3.6.1	Development Applications and Languages Used	37
3.6.1.1	Android Studio	37
3.6.1.2	Firebase	37
3.6.1.3	Java	37



3.6.2 Tools and Software Used	37
3.6.2.1 JDK 11	37
3.6.2.2 Android SDK	37
3.6.2.3 Figma	37
3.6.2.4 Drawio	38
3.6.2.5 Laptop Hardware	38
3.6.2.6 Android Phone (Software)	38
3.7 Summary of Hardware and Software Usage	39
3.8 Verification Plan	40
3.9 Implementation Issues and Challenges	43
3.10 Timeline	43
<b>CHAPTER 4 SYSTEM DESIGN</b>	<b>45</b>
4.1 System Block Diagram	45
<b>CHAPTER 5 SYSTEM IMPLEMENTATION</b>	<b>47</b>
5.1 Introduction	47
5.2 Software Setup	47
5.2.1 Installation of Android Studio	47
5.3 Project Configuration	48
5.3.1 Creation of Google Firebase	48
5.4 Implementation	53
<b>CHAPTER 6 SYSTEM TESTING AND EVALUATION</b>	<b>78</b>
6.1 Unit Testing	78
6.1.1 Authentication Module	78
6.1.2 Map Module	80
6.1.3 Report Module (User)	81
6.1.4 Profile Page (User)	82
6.1.5 Report History Page	83
6.1.6 Add Contractor Page	85
6.1.7 Contractor Manage Task	86
6.1.8 Task status changed	87
6.2 Project Challenges	88
6.3 Concluding Remark	88
<b>CHAPTER 7 CONCLUSION AND RECOMMENDATION</b>	<b>89</b>
7.1 Conclusion	89

7.2 Future Work	90
<b>REFERENCES</b>	<b>91</b>
<b>APPENDIX</b>	<b>93</b>
A.1 Survey Questionnaire For User	93
A.2 Survey Questionnaire for Contractor	98
<b>WEEKLY REPORT</b>	<b>101</b>
<b>POSTER</b>	<b>106</b>
<b>PLAGIARISM CHECK RESULT</b>	<b>107</b>
<b>FYP 2 CHECKLIST</b>	<b>111</b>

# LIST OF FIGURES

<b>Figure Number</b>	<b>Title</b>	<b>Page</b>
Figure 1	PotAlert Report Page	9
Figure 2	Waze Report Page	10
Figure 3	Icon to Record	11
Figure 3.1.1	Select pothole icon & Snap photo	11
Figure 3.1.2	i-Tegur Record Page	11
Figure 3.2	Receive Noti and View Report	11
Figure 4	Record Trip	12
Figure 4.1	Record Page	12
Figure 5	Agile Development Process	17
Figure 6	Use Case Diagram	19
Figure 7	Overall Activity Diagram	20
Figure 7.1	Activity Diagram (Login and Sign Up Module)	22
Figure 7.2	Activity Diagram (Reset Password Module)	23
Figure 7.3	Activity Diagram (Change Password Module)	24
Figure 7.4	Activity Diagram (Edit Profile Module)	25
Figure 7.5	Activity Diagram (Get User Location)	26
Figure 7.6	Activity Diagram (Create Report)	27
Figure 7.7	Activity Diagram (Authority Assign Task)	28
Figure 7.8	Activity Diagram (Contractor Receive Task)	29
Figure 8.1	Sign Up and Login	30
Figure 8.2	Create Report and Get Location Page (User)	30
Figure 8.3	Profile Page	31
Figure 8.4	Change Info	31
Figure 8.5	Forget Password	31
Figure 8.6	Change Password	31
Figure 8.7	Report History Page	32
Figure 8.8	Report Details Page	32
Figure 8.9	Contractor's Profile Page	32
Figure 8.10	Contractor's Task Page	32

Figure 8.11	Contractor View Task Details Page	33
Figure 8.12	Submit Task Page	33
Figure 8.13	View Past Submitted Task Page	33
Figure 8.14	Admin Verify Task Page	33
Figure 8.15	Admin View Ongoing Task Page	34
Figure 8.16	Verify Task Details	34
Figure 8.17	Feedback layout	34
Figure 8.18	Admin's Profile Page	35
Figure 8.19	Create Contractor Page	35
Figure 8.20	View Report Page	35
Figure 8.21	Admin View Details & Assign Task	35
Figure 8.22	Show Proof Pictures Page	36
Figure 9.1	Gantt Chart I	44
Figure 9.2	Gantt Chart II	44
Figure 9.3	Transition between Project 1 and Project 2	44
Figure 9.4	Gantt Chart III	45
Figure 10	Block Diagram	46
Figure 11	Android Studio Homepage	48
Figure 11.1	Android Studio Setup Completely	48
Figure 12.1	Project Setup	49
Figure 12.2	Google Firebase Creation II	49
Figure 12.3	Firebase Creation III	50
Figure 12.4	Register Android App	50
Figure 12.5	Firebase Authentication Homepage	51
Figure 12.6	Select Sign-in Method	51
Figure 12.7	Enable Sign-in Method	51
Figure 12.8	Successfully Enabled	52
Figure 12.9	Link Android Studio with Firebase	52
Figure 12.10	Successfully Connect app with Firebase	52
Figure 13.1	Splash Screen Page	53
Figure 13.2	Sign Up and Login Page	54
Figure 13.3	Forgot Password Page	54

Figure 13.4	Main Page (User)	55
Figure 13.5	Get Current Location Page	56
Figure 13.6	Enter Report Details	57
Figure 13.7	History Page	58
Figure 13.8	Notification of New Report Made	58
Figure 13.9	Report Details Page	59
Figure 13.10	About Page for User	60
Figure 13.11	Personal Information Page	60
Figure 13.12	Change Password Page	61
Figure 13.13	Survey Form for App Review & Bugs Report	62
Figure 13.14	Admin View Reports Page	63
Figure 13.15	Add Contractor Page	64
Figure 13.16	Assign Contractor Page	65
Figure 13.17	Notification about Processed Task	66
Figure 13.18	Profile Page (Contractor)	66
Figure 13.19	Contractor View Task Page	67
Figure 13.20	Submit Task Page	68
Figure 13.21	Task Submitted Page	68
Figure 13.22	Notification to Verify Task	69
Figure 13.23	Verify Task Page	69
Figure 13.24	Ongoing Tasks Page	70
Figure 13.25	Dialog box to Reassign Report	70
Figure 13.26	View Submitted Task Details Page	71
Figure 13.27	Send Feedback Page	72
Figure 13.28	‘Successful’	72
Figure 13.29	Status Updated in User Dashboard (Successful)	73
Figure 13.30	‘Pending Verify’	74
Figure 13.31	‘Rejected’	74
Figure 13.32	Notification When Task Rejected	75
Figure 13.33	Show Task Rejected Page	75
Figure 13.34	Show Proof Pictures Page	76
Figure 13.35	Bugs Report and Review For Contractor	77

## LIST OF TABLES

<b>Table Number</b>	<b>Title</b>	<b>Page</b>
Table 1	List of Strengths, Weaknesses and Limitations	13-14
Table 2	Comparison between existing and proposed system	15
Table 3	Specifications of laptop	38
Table 4	Specifications of mobile phone	38
Table 5	Verification Plan	40-42
Table 6.1	Authentication Module Unit Testing	78-79
Table 6.2	Map Module Unit Testing	80
Table 6.3	Report Module Unit Testing	81
Table 6.4	Profile Module Unit Testing	82
Table 6.5	History Module Unit Testing	83-84
Table 6.6	Add Contractor Unit Testing	85
Table 6.7	Contractor Manage Task Unit Testing	86
Table 6.8	Task Module Unit Testing	87

## LIST OF ABBREVIATIONS

<i>GPS</i>	Global Positioning System
<i>CMS</i>	Complaint Management System
<i>JSON</i>	JavaScript Object Notation
<i>API</i>	Application Programming Interface
<i>GPRS</i>	General Packet Radio Service
<i>IDE</i>	Integrated Development Environment

## CHAPTER 1 INTRODUCTION

### Project Background

#### 1.1 Introduction

This chapter presents the study that is necessary to constitute the research. The background covers the research background and problem statements. Upon presenting these critical research ideas, this chapter continues to justify the research's motivations and contribution to the study. The sections of this chapter are formulated to communicate the ideas of the research.

#### 1.2 Research Background

Road damage is one of the issues that cause accidents in Malaysia. Heavy rainfall and vehicle movement form potholes. In December 2020, Khairy Jamaluddin, the Minister of Science, Technology, and Innovation, sustained injuries while riding his bicycle in Selangor due to potholes. In fact, a 75-year-old man named Ho Yan Fee was murdered immediately after Khairy's tragedy when his motorcycle crashed into a pothole, and he lost control of it. Hew Yoong Le, a food delivery rider, passed away under identical circumstances the very next day [1]. These incidents show that poor road conditions are needed to take action to reduce the number of accidents happen. There is research on how to prevent potholes formation like using spray-injection methods to repair distress and improve road quality [3] but this is very costly method and only delays the formation of potholes. Since it's not possible to prevent the formation of potholes, we will focus on strategies to address them once they have already developed. [5].

#### 1.3 Problem Statement and Motivation

Most of the time citizens report potholes through phone calls and email, some of them are through WhatsApp and websites. Because of this, it is difficult to manage and does not have a systematic way to control and store the history of every complaint made before. Another key reason is some of the potholes are not being recorded and accidents keep happening, this is because ineffective communication existed between the owners



## CHAPTER 1

of the roads and the people who used them. [6]. Road users cannot have two-way communication with relevant road authorities.

The aim of the project is to propose a new application where road users can utilize the e-ticketing way to report potholes and authorities can easily collect information about the potholes and assign contractors to work on the potholes in a proper format. Many people have mentioned about potholes are a persistent issue and according to an estimate, there were over 52,000 potholes just in the state of Selangor alone between 2019 and 2020[4]. Potholes is hazardous to drivers and pedestrians alike, causing accidents and injuries. By developing a e-ticketing pothole road system that allows user to report and quick and efficient repairs, the risk of accidents can be reduced, leading to improve road safety. Whenever drivers saw potholes, some of them may shift to avoid them and led to accidents. This is the truth—potholes are the 19th most common reason for car accidents. Reporting potholes as soon as possible could reduce the extent of damage they cause. [5]. By using this application, road users can mark their locations in Google Maps when they are on-the-road. Besides that, they will also be getting notifications on the status updated after they successfully register the complaints. The authority will also get notified whenever there is a new complaint made. By quickly identifying and repairing potholes, the e-ticketing system can help reduce the long-term costs associated with road maintenance. Potholes that are left unaddressed can worsen over time, leading to more extensive repairs and even road reconstruction where it can be much more costly than regular maintenance.

### 1.4 Objectives

The aim of the project is to:

- 1. Propose a new application to let road users have a way to report the potholes no matter where they are**

Aim to create a system where users can report in anywhere at anytime whenever they meet a pothole

- 2. To notify relevant road authorities about the potholes and assign road crews to manage the potholes**

## CHAPTER 1

Authorities can have notification which notify them whenever there is user make a report so they can manage the potholes and assign road crews to it.

### **3. To develop a e-ticketing pothole road system where increase efficiency of the process**

The system would aim to increase efficiency by providing a streamlined process for reporting and repairing potholes, reducing the time and resources required for maintenance.

### **1.5 Project Scope and Direction**

The main scope is to solve the problems stated in the problem statement before existing systems have and improve it. The scopes of the project include send notifications towards users and road authority about the updates of potholes or have successfully make a complaint, report the potholes when on the road and able to report the potholes by uploading photos from their gallery or snap the photos to report the potholes. The project will focus on the usability of the application in terms of user interface, navigation and functionality covered. It is an e-ticketing system which allows user to record the potholes like filling the information in an e-form mode. Users first can register and login into the application or they can even sign-in as guest to make a report. The road authority will act as Admin to update the status of the potholes made by each user. There would be several modules in the proposed system.

#### 1.5.1 User Registration and Login Module

In this module, user will need to provide their information such as username, email and password in order to register. After submit their information, the information will be stored into the Firebase Firestore.

#### 1.5.2 User Create Report Module

This module requires user to sign in their account and they will be redirect to the main page where they can report a pothole. User will need to provide information such as photo of the pothole by retrieving photos from their phone or directly snap photo, location, and description of the situation.

#### 1.5.3 Report History Module

This module shows the history of the report that user had made. It allows user to check for the status and keep track on it.

#### 1.5.4 User Profile Module

This module allows user to change their information such as email, password and username. Users can also add their phone number if they want too. Besides that, user

## CHAPTER 1

can delete their account in this module. There will be some terms and conditions stated in the future and they can logout the application.

### 1.5.5 Report Retrieval System Module

This module is used by the authority, and it allows the authorities to retrieve customers' reports from the database and display in a list form.

### 1.5.6 Report Management System Module

This module is used by authority where they can manage the report and assign the report to contractor to be work on the pothole. Authority will also use this module to update the pothole status and display to the users. There will be a search function provided to authority to view specific report quickly. This is important where they can perform the operation more efficiently.

### 1.5.7 Create Contractor Functionality Module

This module provided to authority where they can manually create contractor's account to be used by the contractor to receive the orders in future.

### 1.5.8 Task Assigned System Module

This module allows contractor to receive the assigned task that assign by the authority where they will need to carry out the operation to repair on it. The contractor will see the information provided such as location, photo of the pothole and description.

### **1.6 Contributions**

By having this application, users can have simpler and more effective ways to complain or report the potholes they noticed about. They can communicate with the relevant road authority and stay informed about the status of the report they made. It is unique compared to the existing systems in terms of the user interface, functionalities and features given to the users. Users need to sign in as users in order to make a report. Notification is one of the key features of this application as it will help to notify users, the authority, which means Admin, and the contractor. Upon receiving a user's report, the authority will be notified, and the contractor will inform the authority once the work has been completed. This will enable the authority to verify and update the pothole status for the users.

### **1.7 Report Organization**

The report is organized into 5 chapters. Chapter 1 is an introduction where in this chapter introduce about the background, problem statement, motivation and contribution. In chapter 2, I do some research on previous work done and analyze some of the similar systems. Then, compare it with our proposed system. Chapter 3 shows the proposed methodology. Chapter 4 describes the system design and for Chapter 5 is system implementation. Then, in Chapter 6 describes the testing plan and results. Lastly, the conclusion for the project will be written in Chapter 7.

## CHAPTER 2 LITERATURE REVIEW

### 2.1 Introduction

In this chapter, we review on previous research, prototyped system and existing system to have a clear view of the system. Next, an investigation is carried out on the similar-designed system and works related to the proposed system by comparing the weaknesses, strengths and limitations of the system and ideas on further enhancement of potential areas. Then, the proposed solution will be listed to show what are the features that need to be improved and work on the system.

### 2.2 Review on Previous Research

#### 2.2.1 Online Complaint registration and management system to the municipality

This paper proposed their ideas of changing manual CMS to android application. This proposed system is a system that wants to help the citizens in a way they can complain about road reconstruction, street light problems and others so it is notified by the officer to take relevant actions about it. It enables users to post their complaints, view complaint status, and give feedback and has a profile page for every user. Users also can mark locations in google map too [8]. However. user does not have an option on retrieving photos or snap a photo directly in the application while posting the complaint.

#### 2.2.2 Pothole Tracking System Using Android

This study [9] investigates a mobile application for monitoring the state of a road's surface by helping drivers to avoid potholes on the road. To determine the road conditions, this system evaluates data from users photos and locations. Users need to register and log in to make complaints. The GPS and GPRS and the geotagged photo are used to upload to a server so that location of the users can be stored due to user engagement. The advantages of this system is it makes the potholes report process easy and users can upload their photos on their phone to report it. The admin and contractor's work are easy to manage too. A simulator is used to identify the potholes video footage which captured by a black-box camera. However, the study makes no mention of how these recordings were used to identify the potholes.

### **2.3 Review on Prototyped System**

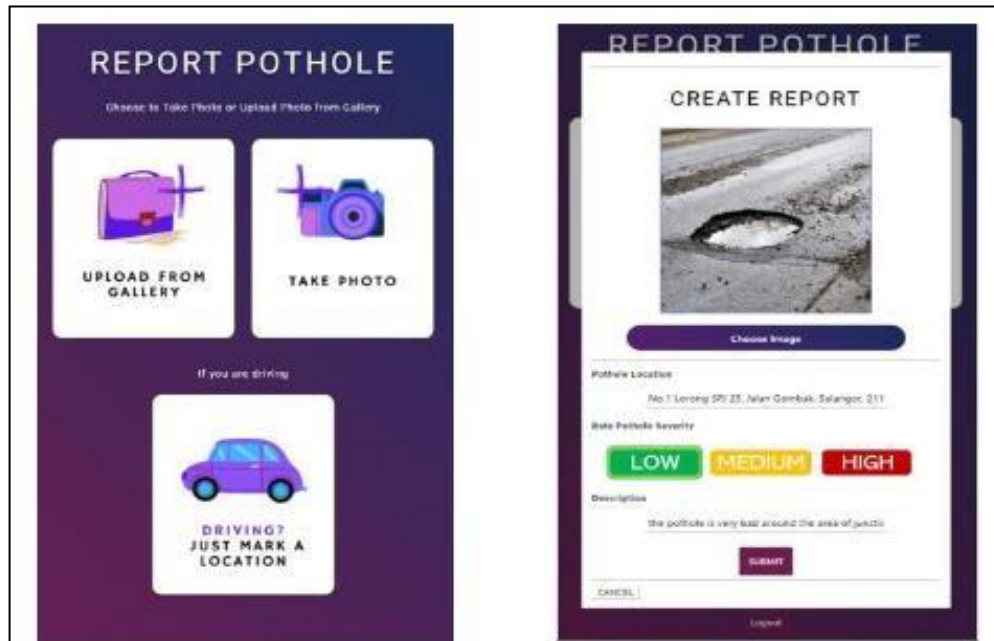
#### 2.3.1 Gap Trap

Gap Trap [5] is an application that helps to report potholes automatically using sensors on smartphones once the potholes have been detected. The system server retrieves the report using JSON format. The user can view the markers which they previously reported and view all other users that mark the potholes before at the map fragment since it uses the Google Maps API. The Android smartphone utilizes an accelerometer sensor that constantly generates x, y, and z variables in meters per second squared, indicating the acceleration force experienced on its three dimensions. However, right now, finding information on potholes is neither extremely simple nor complex [6].

#### 2.3.2 PotAlert Tracking System

The PotAlert system [6] is a web-based tracking system that employs a progressive web application. A prototype of the system was developed using the Figma application, as illustrated in Figure 1. PotAlert allows users to record the potholes by uploading the photo or mark their location. User can give their special instruction and mention the importance level of the regarding potholes which shows in Figure 1. User will view the feedback updates they made. Authority will manage the progress of the potholes and assign relevant road crews to fix the potholes.

However, PotAlert does not provide other functions which road crew and admin has not yet built completely. The road crew is unable to provide progress updates on the potholes to the authority[6].



**Figure 1 PotAlert Report Page**

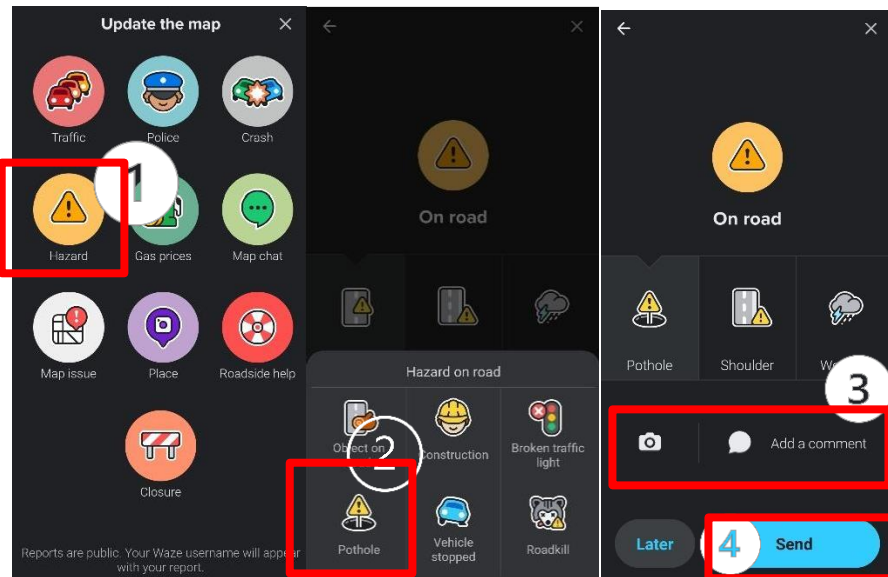
## 2.4 Review on Existing System

### 2.4.1 Waze

Users of the app Waze can report potholes on the road by using this feature. It has its own website, and it is available at Google Play Store and Apple Store. 50k reports on potholes have been reported and recorded on Waze in Selangor [2]. Waze main function is act as a GPS navigation where helps users on getting the best route to their destination. Road conditions such as potholes and traffic are additional features that users can report to the community. Nowadays, the Public Works Department (JKR) and local authorities maintain the database system on local roads [6].

The ways user can report the potholes on Waze is the passenger beside the user need to help it to press the report button in the app and select hazard icon then select pothole category and finally submit the report to the road authority which shows in Figure 2 [11]. When there are same reports sent more than four to five times, the system will detect it and consider it as valid report [6]. The limitation for this application is that Waze does not give any feedback on the reports made by users [7].





**Figure 2 Waze Report Page**

#### 2.4.2 i-Tegur

i-Tegur developed under the Malaysian Ministry of Housing and this application also available in both Google Play Store and Apple Store. It allows the sending of complaints regarding road conditions with pictures and location via mobile thus, also provide feedback of every complaint made efficiently. Users need to tap on the icon which is shows in Figure 3 in red square box. Users must select the category of road conditions before they take a photo of the regarding issue to make a complaint which in Figure 3.1.1. Then, user can provide a description about the complaint. Location of the user is detected by the application automatically and users can change location if they want to record when they are not on the scene which shows in Figure 3.1.2. They will receive a notification once the report is submitted which in Figure 3.2. The complaint made by user will received by the relevant road authorities to verify.

However, for this application, there is no feedback status update given to the user. This makes the user not known about how the road conditions was after the users submitted the report. Based on certain user reviews on the Google Play Store, there appears to be no option for users to access photos from their phone gallery while driving on the road or from any other location. This gives a bad user experience since it complicates things.

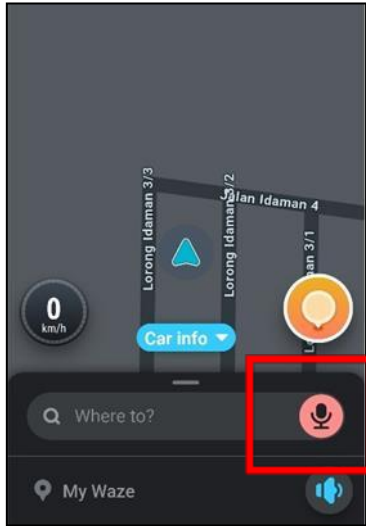


Figure 3 Icon to Record

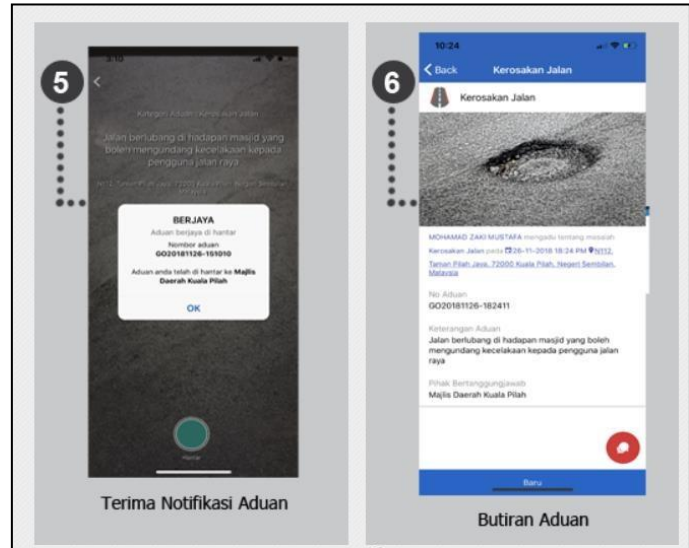


Figure 3.2 Receive Noti and View Report

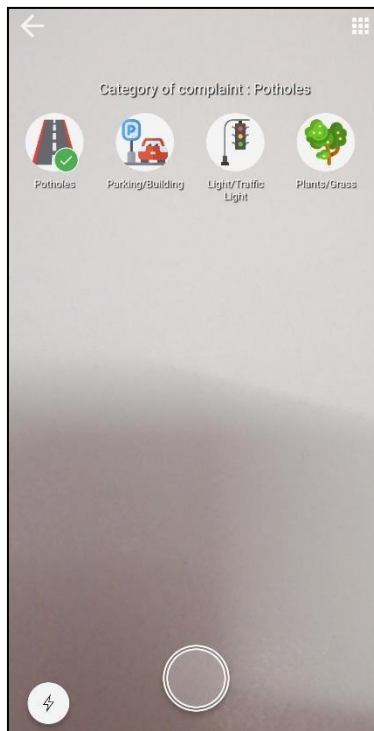


Figure 3.1.1 Select pothole icon & Snap photo

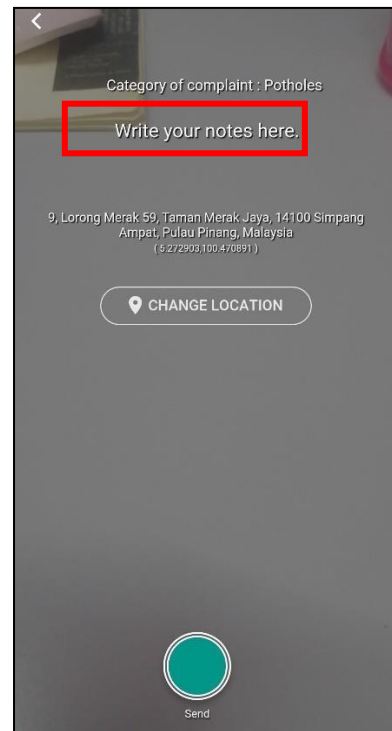
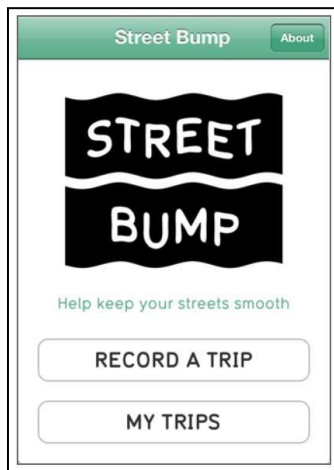


Figure 3.1.2 i-Tegur Record Page

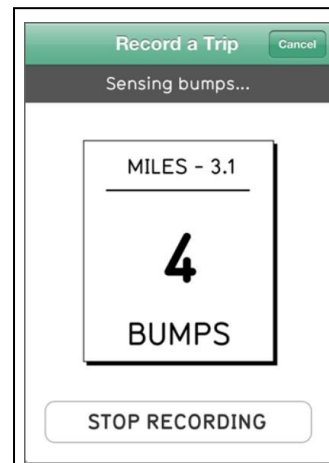
## CHAPTER 2

### 2.4.3 Street Bump

Street Bump ,a programme of the Mayor's Office of New Urban Mechanics in Boston, assists locals in enhancing their community streets. It is available in Apple App Store before. Citizens download the app and will start to collect the condition of the road when they drive along the road.Then, the Boston will gathers all user's data to plan on fix the potholes. User first need to hit the 'Record the Trip' button to record and hit 'End Trip and Upload' when the journey ends to submit their data which shows in Figure 4 and 4.1 .They also can press 'Cancel Button' to delete the record that made to not upload it.User will receive a push notification when the potholes has been fixed. However, because of Street Bump using accelerometer and GPS sensors to collect data, users cannot run it in the background which they cannot use other apps or take any other actions outside the app[10].



**Figure 4 Record Trip**



**Figure 4.1 Record Page**

**2.5 List of Strengths, Weaknesses and Limitations**

<b>App/Research</b>	<b>Strengths</b>	<b>Weaknesses</b>	<b>Limitations</b>
Online Complaint registration and management system to municipality	-Complaint at any time -can provide feedback and post requirements -greater efficiency which minimizes manual data entry [8]	-no option for users to retrieve photos from phone gallery -no road crews assigned for authority	N/A
Pothole Tracking System Using Android	-By sending photo on phone, road crew will be working on it -providing authority, a detailed areas with potholes that has requested by many citizens [9]	-no road crews assigned for authority	-able to upload photos only with real time basis -need to have android phone with GRPS connections [9]
Gap Trap	Identify and report automatically with sensors on phone	-profiling potholes can be more properly [5] -no navigation-like interface	Search for pothole data is difficult [6]
PotAlert Tracking System	-support PWA for development -alert authorities about the conditions seamlessly [6]	-no features for automatically detect duplicate report data -no road crews assigned for authority	-No options for users to edit report after submitting it -lack of authority to enter new report
Waze	- primarily functions as a navigation application, with integrated pothole reporting capabilities [6]  -allows hand-free reporting	-no road crews assigned for authority	-Users will not receive response after they made report
i-Tegur	-can make complaints	-users cannot retrieve photos from phone gallery	-lack of feedback status

## CHAPTER 2

	regarding other road conditions	-difficult to use which many functions in it [6] -no road crews assigned for authority	-application took too long to launch
Street Bump	Detect potholes using accelerometer and GPS sensors [5]	Users cannot run the app in background -no road crews assigned for authority	N/A

**Table 1 List of Strengths, Weaknesses and Limitations**

## CHAPTER 2

### 2.6 Comparison between existing system and proposed system

App	Online Complaint registration and management system to municipality	Pothole Tracking System Using Android	Gap Trap	PotAlert Tracking System	Waze	i-Tegur	Street Bump	Proposed System
retrieve photos from gallery	X	✓	X	✓	✓	X	X	✓
Direct snap photo	X	✓	X	✓	✓	✓	X	✓
Users able to view status	✓	✓	✓	✓	X	✓	X	✓
Road crew's functions	X	X	X	✓	X	X	X	✓
Notification given to the users	X	✓	X	X	✓	✓	✓	✓
Notification to alert authority	X	✓	✓	X	X	✓	✓	✓
Giving feedback to users	✓	✓	X	✓	X	X	X	✓
Mark location on google map	✓	X	✓	✓	X	✓	X	✓

**Table 2 Comparison between existing and proposed system**

Table 2 above shown the comparison between existing system and proposed system. In the proposed system, it will integrate all the functions and features that exists in the existing systems. All the users will need to sign in as users in order to make a report. Several other functions like timeline for the authority to process a report, sign in as guest will be further add on in system's future development.

### **2.7 Limitation of Previous Studies**

Previous studies did not cover on the given feedback to the users regarding the report they made and more uploading photos options like retrieve photos from their gallery. Bad user experiences given to users. It is time consuming for all process since it does not provide sign-in as guest function to users, and they are no contractor assigned added to the system. Feature like contractor can upload the status and verify by the road authorities to update the status to the users is missing.

### **2.8 Proposed Solutions**

This project aims to develop an e-ticketing form of pothole road system and enhance the previous similar systems. The users can report the potholes by using this android application. Road users can upload their photo either by retrieving photos from their phone gallery or directly snap the photo using the camera function. They will also receive notifications updated status regarding the reports they made before. Road authorities can retrieve data of every report easily and receive notifications whenever there is a new report on potholes made by users. Users can mark their location using Google Map while they are reporting the complaint whenever they are on the road. Road authorities will assign the contractor about the potholes related. Users can sign in as guests to make their report too.

### **2.9 Chapter Summary**

In conclusion, there are no option for uploading photos such as retrieving photo from phone gallery, no feedback given to the user and no contractor module and verification feature provided that found in previous studies and existing systems. Therefore, the proposed system is to be address and enhance the existing system by improving the weaknesses of the system. [OBJ]

## CHAPTER 3 SYSTEM METHODOLOGY /APPROACH

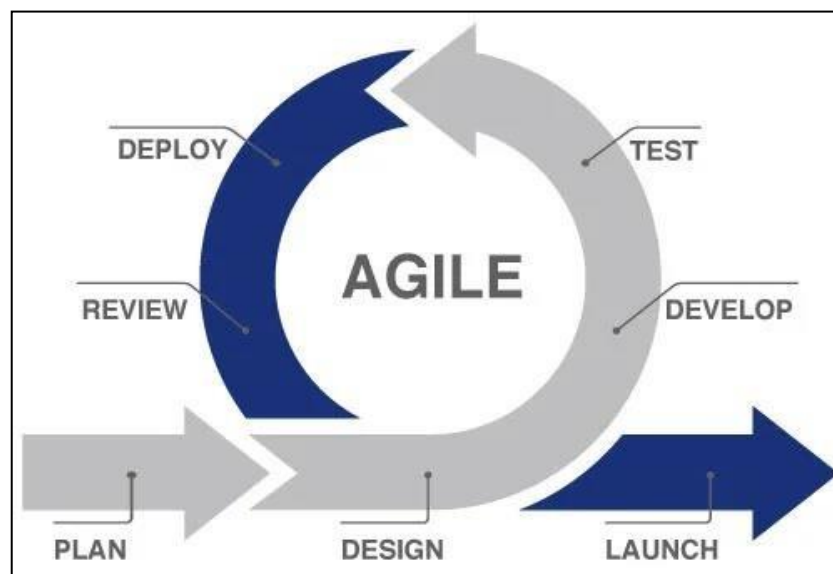
### Proposed Method/Approach

#### 3.1 Introduction

In this chapter, we discuss the methodology used and its process of the methodology in the subsection. Other than that, system design and system architecture that will be used to develop and test the system later are also included.

#### 3.2 Methodology

The method that is used throughout the process of development is Agile methodology which focuses on the development rather than in documentation. Agile development emphasis on simple, iterative application. All of the processes like planning, analysis, design and implementation are all done in parallel which is shown in Figure 5. It is an elastic methodology where changes can be reflected on the system in a short time [12]. We can focus on delivering the system quickly and test the software in terms of quality easily by using this methodology throughout the development process.



**Figure 5 Agile Development Process**

##### 3.2.1 Process 1: Planning

In the planning stage, we gather the functional requirements and quality requirements first and analyze it. Then, we plan on the time and effort we need to do in order to reach



## CHAPTER 3

the goal. We also done the feasibility analysis in terms of technical, economic and organizational to know the proposed system is an achievable goal. In here, we use the document analysis technique by evaluating the past research and existing system. This enabled us to identify the strengths and weaknesses of the existing systems. Subsequently, the collected data was organized and used to formulate the proposed system requirements [6].

### **3.2.2 Process 2: Design**

This step is important where it defines the overall system it should be. We done some use case diagram and activity diagram in this stage. Use case diagram is designed and visualized first to identify the actors involved and interaction between the actors and the system shown in Figure 6. In addition, activity diagrams were created for both road users and authorities, as depicted in Figure 7 and user interface also been designed in this stage to have a clearer way to develop on it. Wireframe design also added as shown in Section 3.5 to have a brief idea on the user interface when develop.

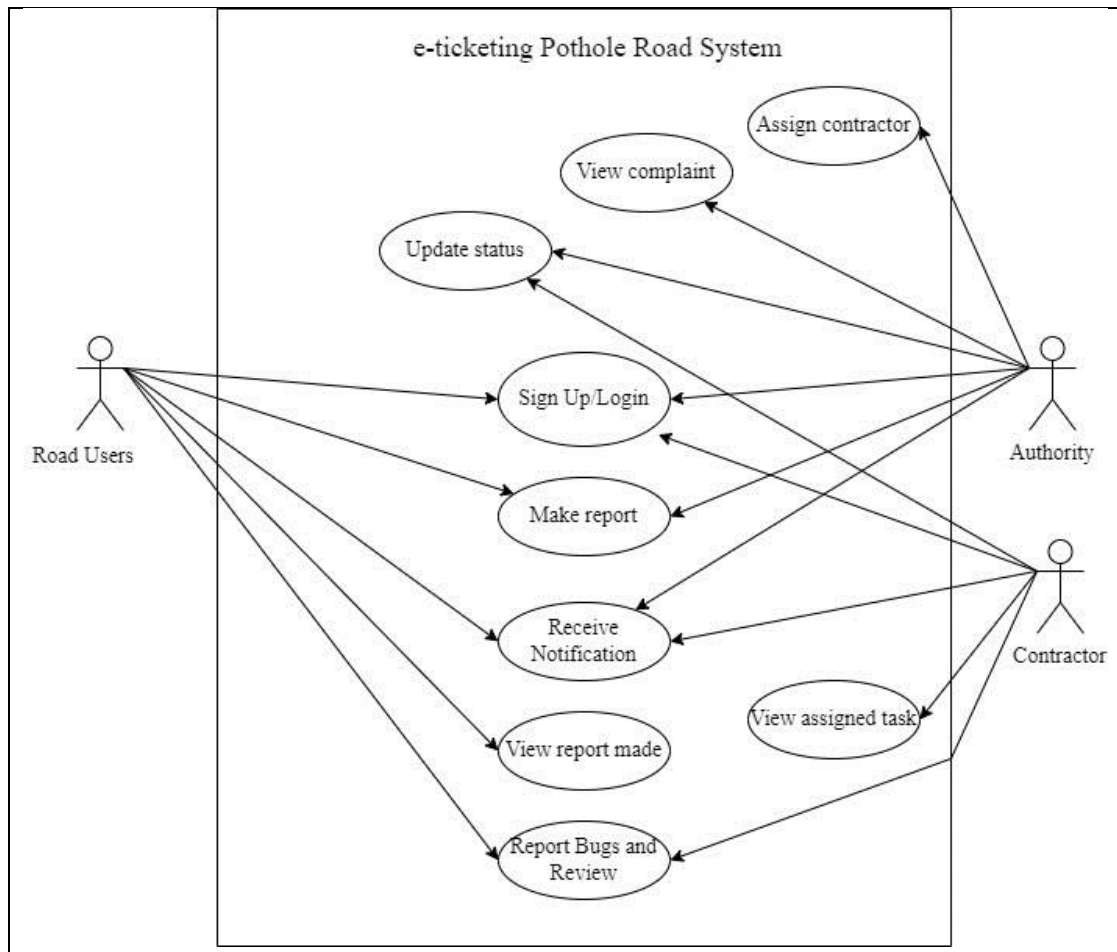
### **3.2.3 Process 3: Develop**

In this stage, the developer starts to develop on the functions given to the users and road authority using the tools and languages shown in Section 4.3. The system developed according to the requirements that analysis in the previous stages.

### **3.2.4 Process 4: Test**

The testing phase was focused on identify the scope of the testing and to make sure that the system designed at that stage was meet the requirements of the users. The results of the test will be recorded and fixed if there are any problems faced. Only functional requirements will be tested.

### 3.3 Use Case Diagram



**Figure 6 Use Case Diagram**

In Figure 6, shown that there will be three actors involved in the proposed system which is road users, authority and contractor.

#### **Road User:**

Road user can sign up and login into the system. They also can make the report then view the report history they made before. Besides that, they will receive notification whenever they made a report successfully and there is an update on the report pothole made. Other than that, user can report bugs and do app review to provide feedback to let the application improve better.

#### **Authority:**

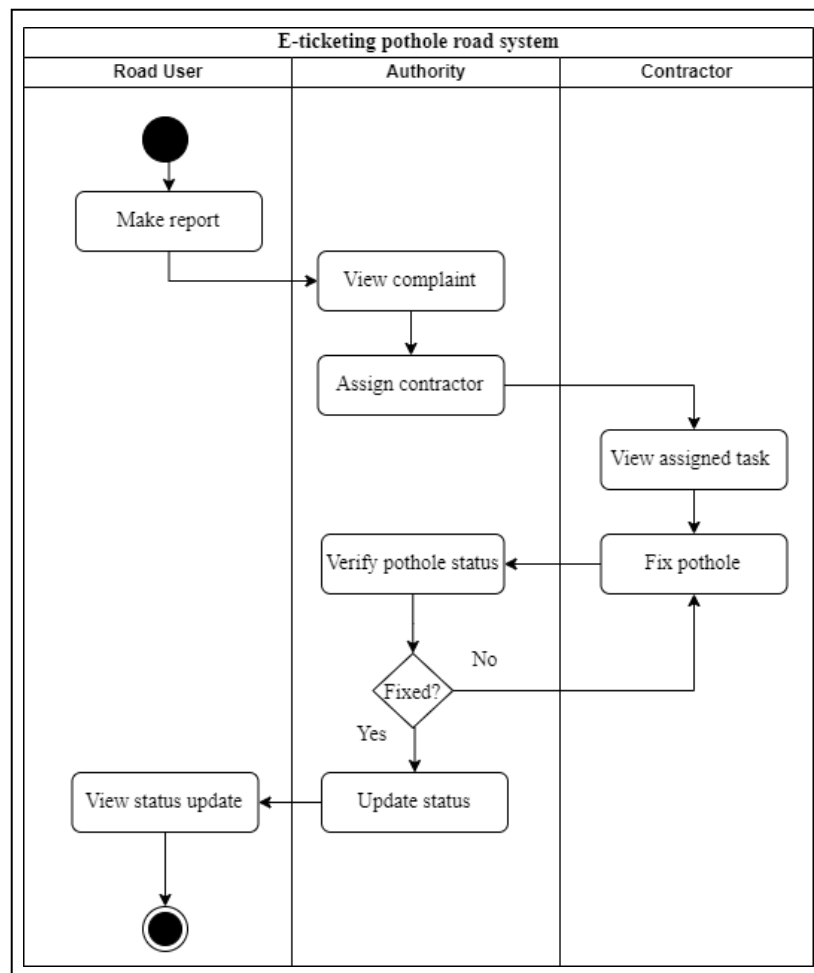
## CHAPTER 3

Authority can view the complaint users made and receive notification whenever there is a user made a report. Authorities may also assign a contractor to work on the pothole report and update its status. They can enter a new report too.

### Contractor:

Contractor can sign up and login into the system and receive notification whenever there is a task assigned to them by the authority and they can view the assigned pothole information. They can also update the pothole status too. Contractor also can report bugs and do app review too.

### 3.4 Activity Diagram



**Figure 7 Overall Activity Diagram**

Step 1: User make a report and submit to the system.

## CHAPTER 3

Step 2: Authority in charge will view the complaint whenever user make a new report.

Step 3: Then, authority will assign the contractor to work on it.

Step 4: The contractor will view the assigned task given by the authority.

Step 5: Contractor will fix the pothole and submit the status and proof to the system.

Step 6: Authority will verify the status of the pothole that is submitted by the contractor.

Step 7: If the pothole has been fixed, authority will then update the status to the system.

Step 8: User then will receive notification on the updated status of their report made before.

3.4.1 Activity Diagram for user when login

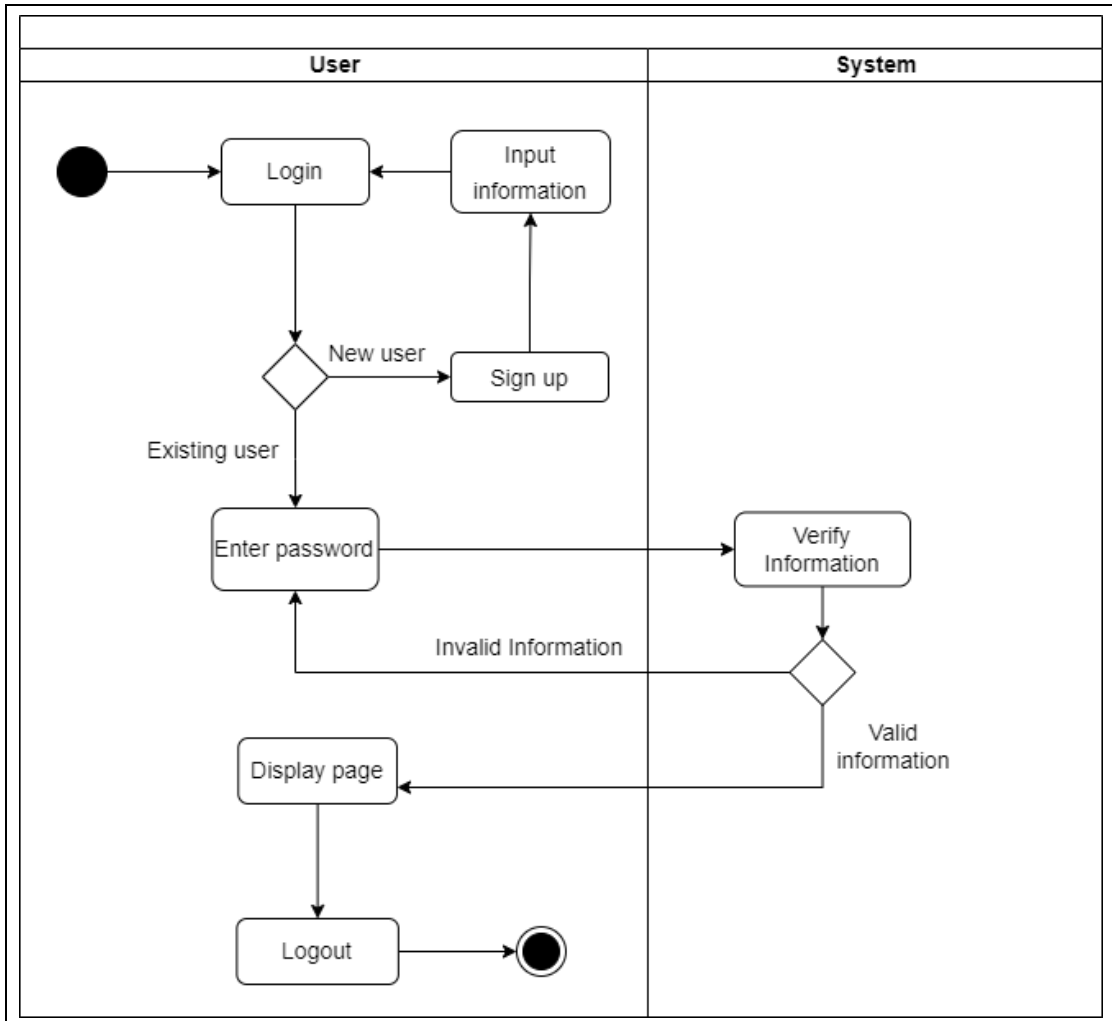


Figure 7.1 Activity Diagram (Login and Sign-Up Module)

3.4.2 Activity Diagram for user to request reset password

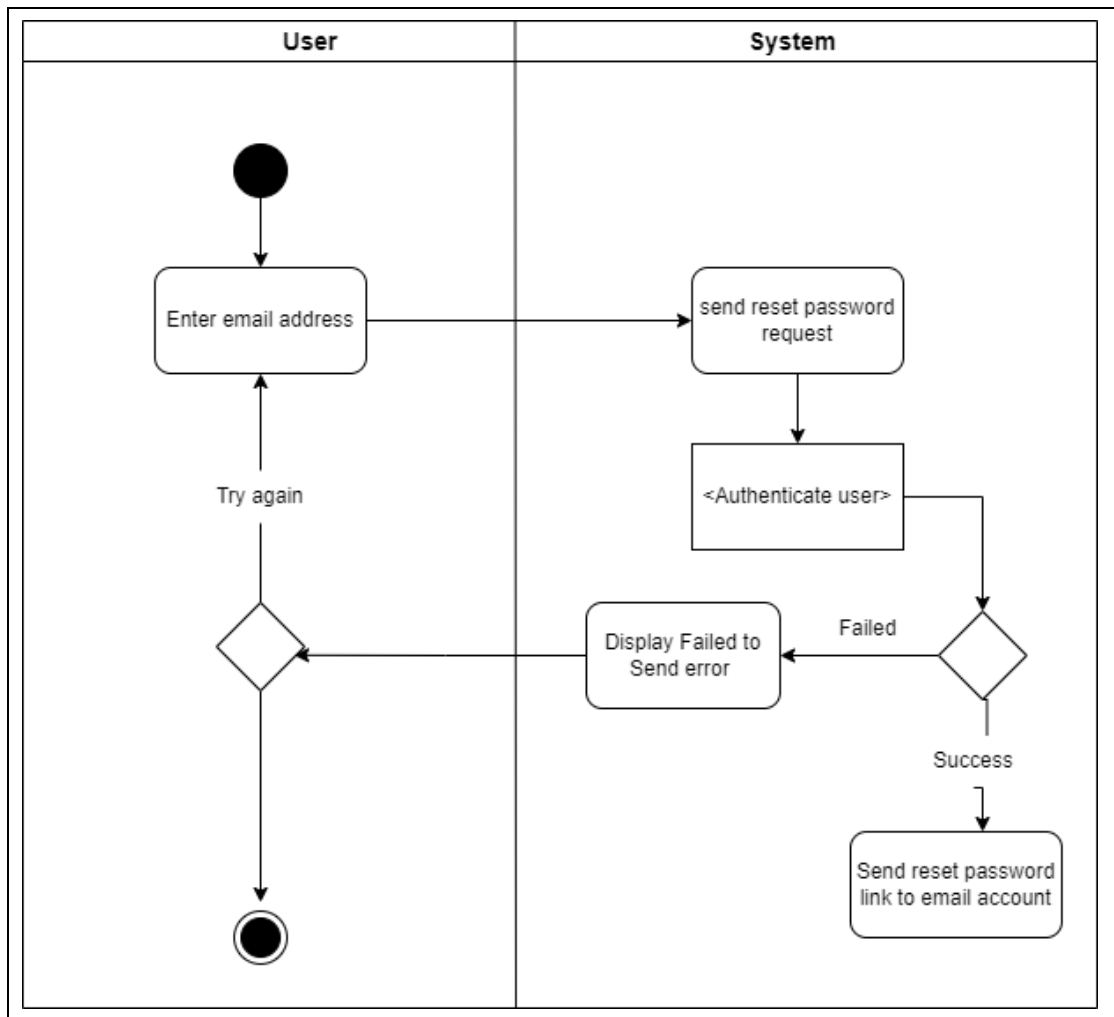


Figure 7.2 Activity Diagram (Reset password module)

3.4.3 Activity Diagram for user to change password

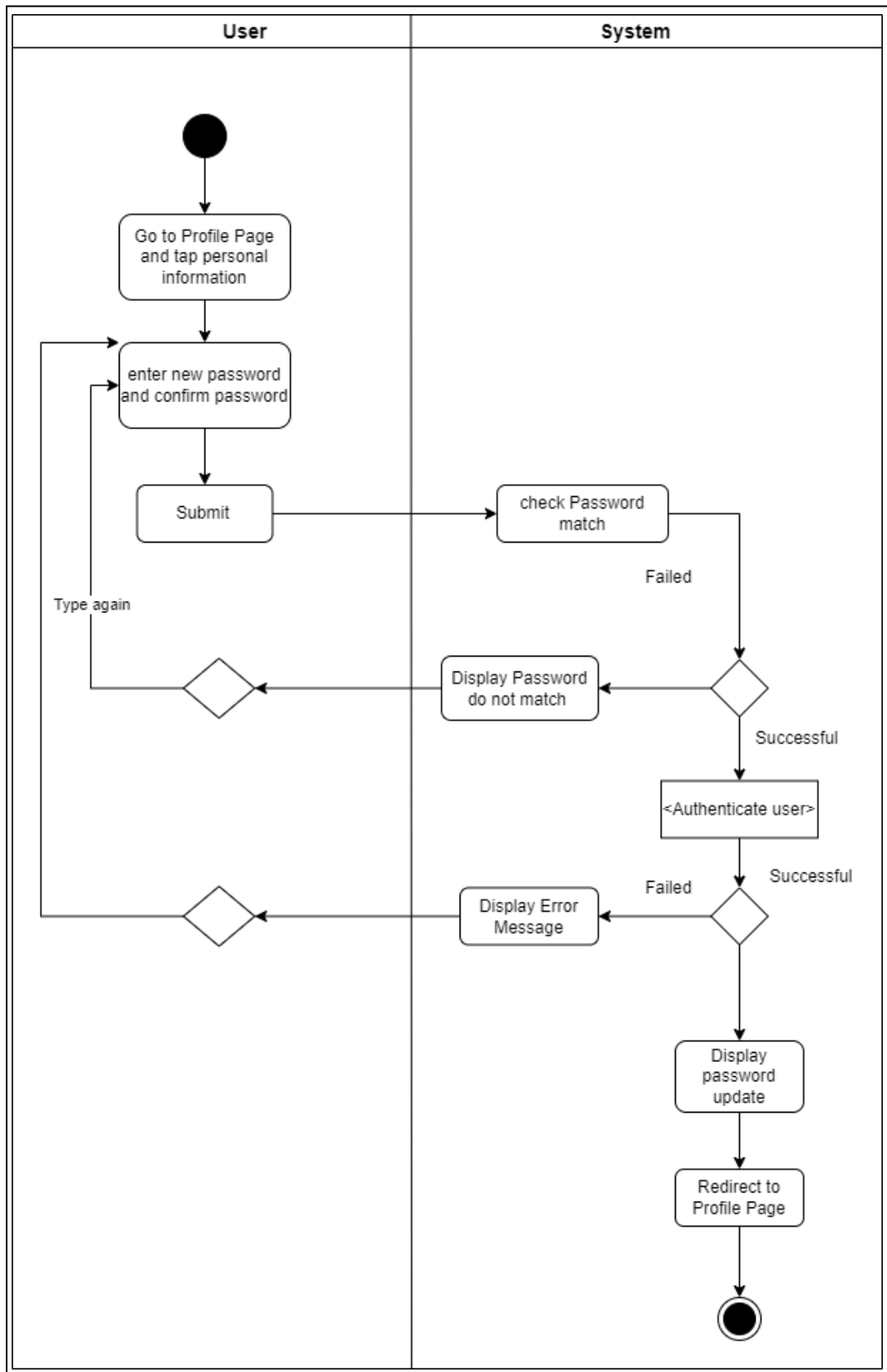


Figure 7.3 Activity Diagram (Change password module) [OB]

3.4.4 Activity Diagram for user to edit their profile

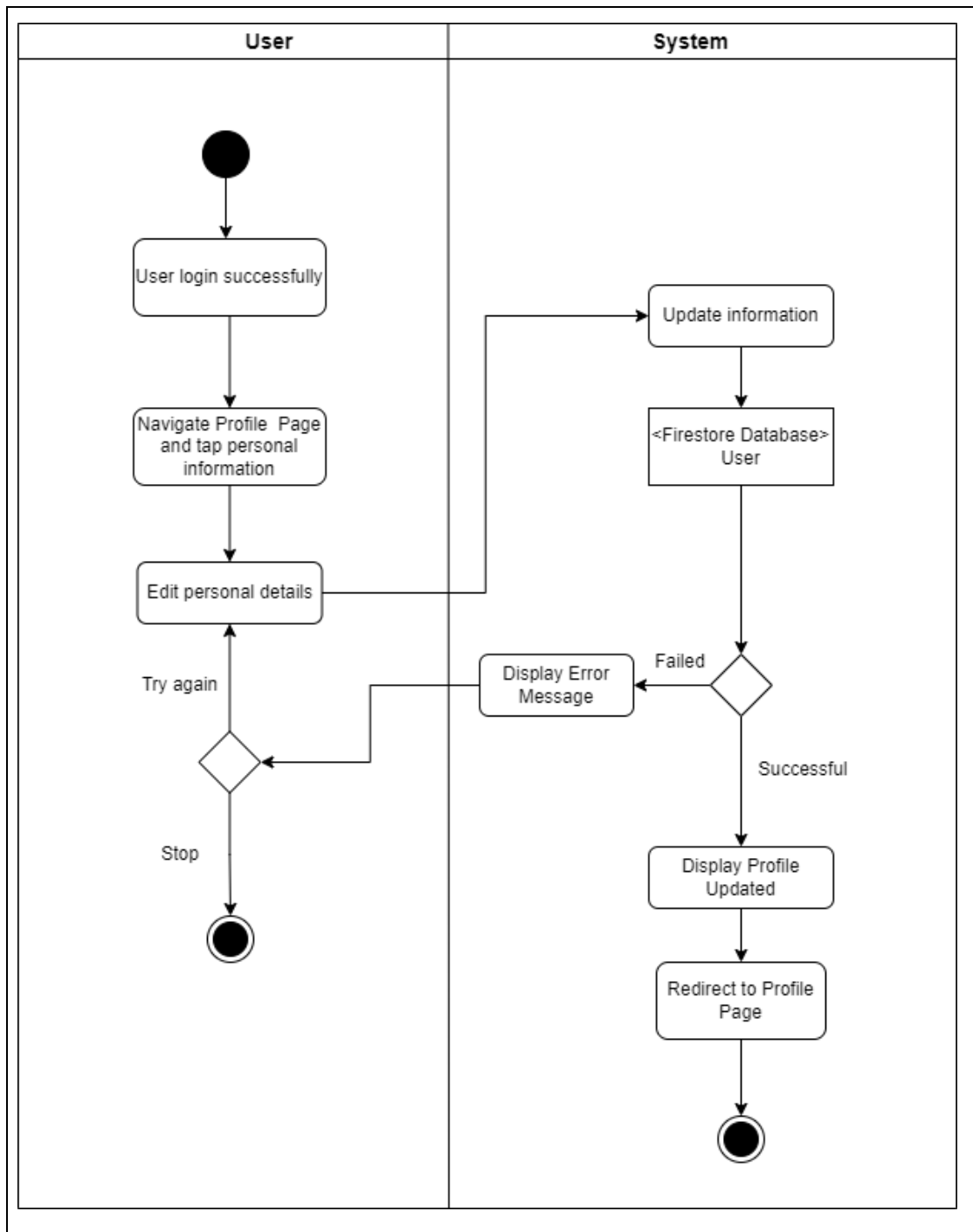


Figure 7.4 Activity Diagram (Edit Profile Module)



3.4.5 Activity Diagram where gets user's location

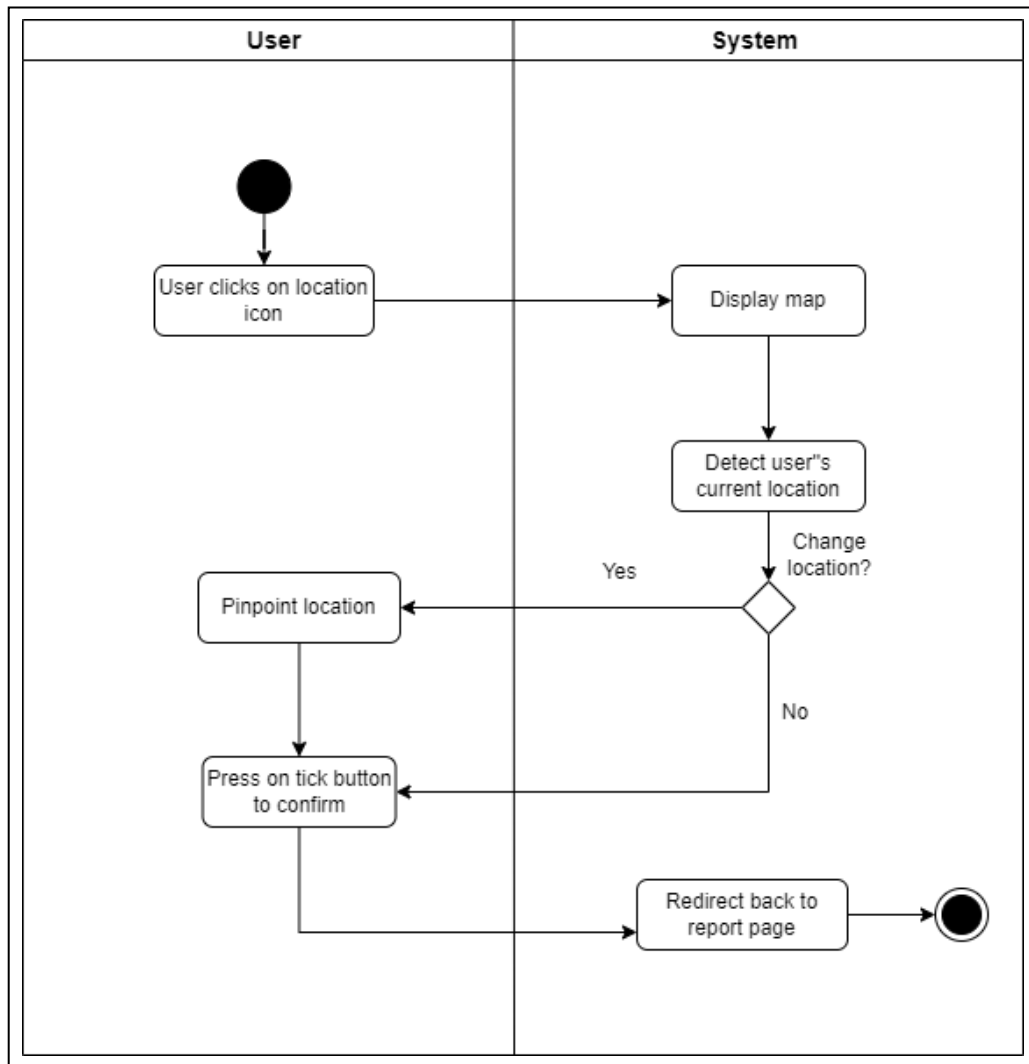


Figure 7.5 Activity Diagram (Get User Location)

3.4.6 Activity Diagram when users create a report

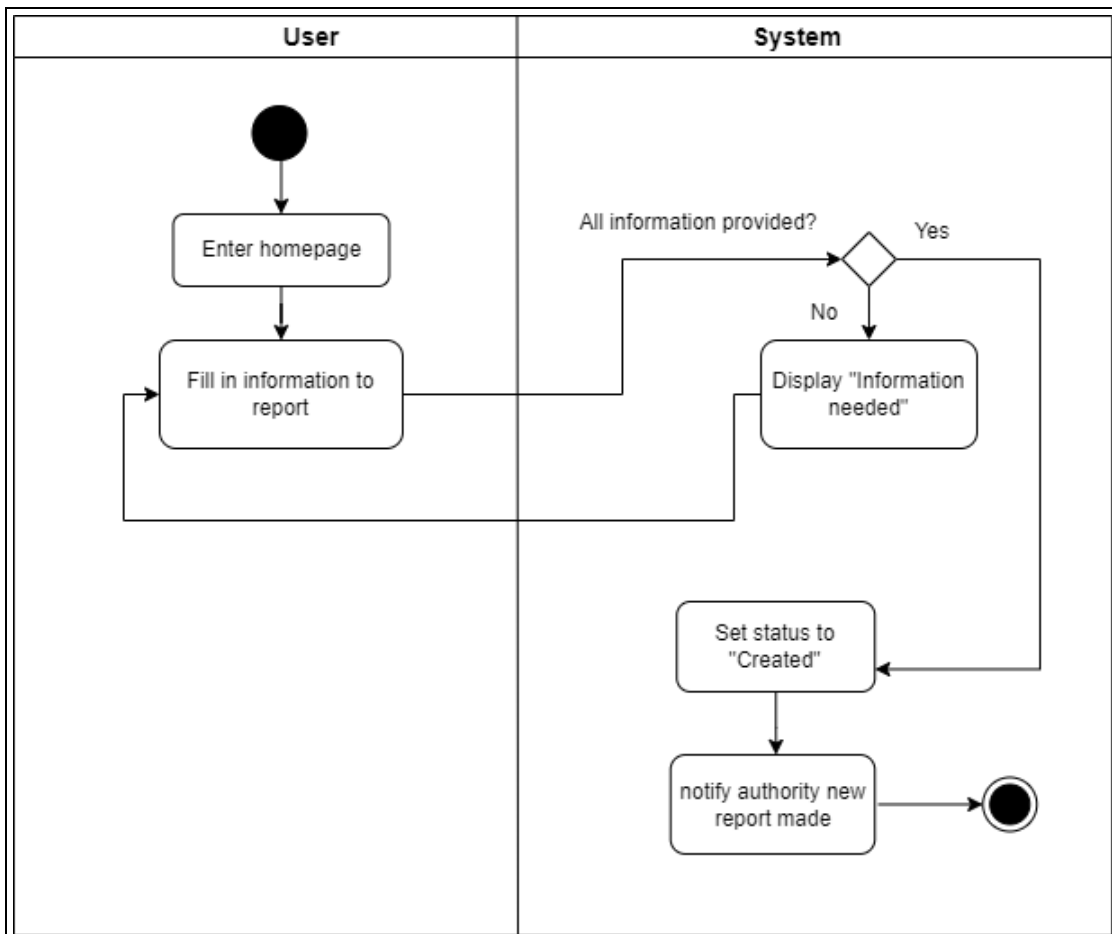


Figure 7.6 Activity Diagram (Create Report) [OBJ]

3.4.7 Activity Diagram where authority assign task when receive new report

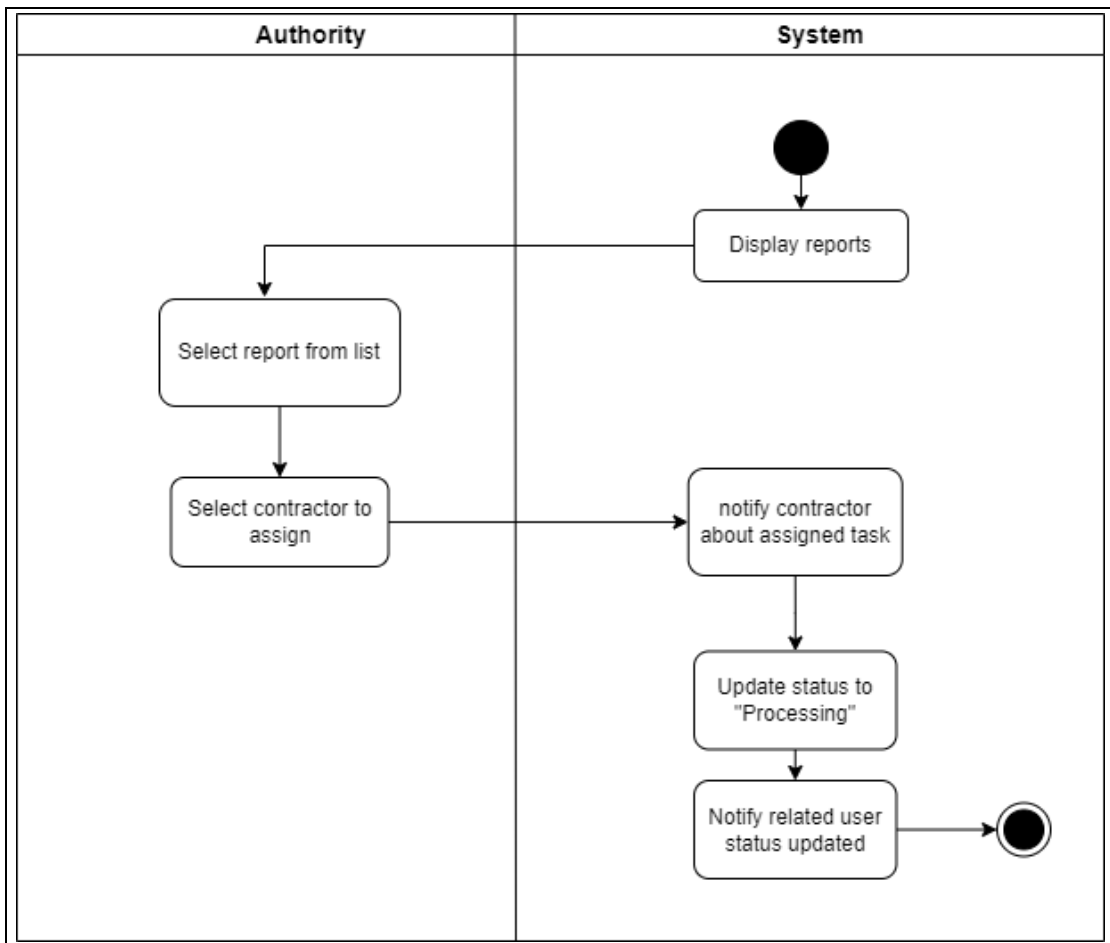


Figure 7.7 Activity Diagram (Authority Assign Task) [OBJ]

3.4.8 Activity Diagram for contractor to receive task and upload proof

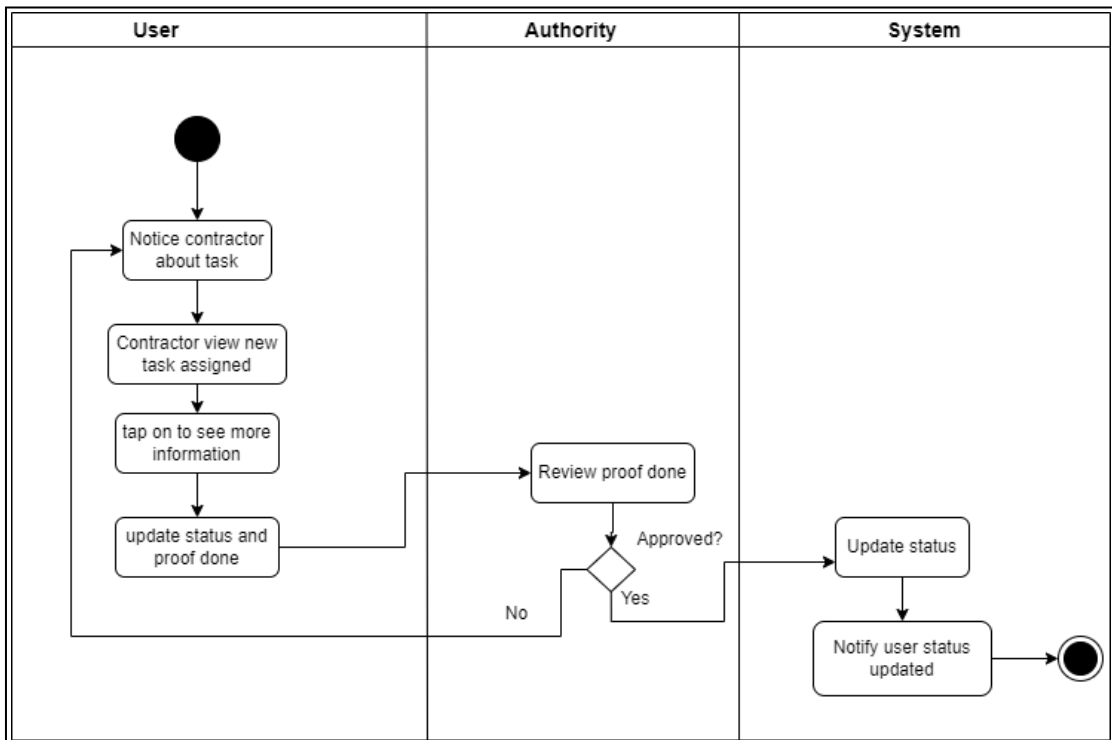


Figure 7.8 Activity Diagram (Contractor Receive Task)

3.5 Wireframe

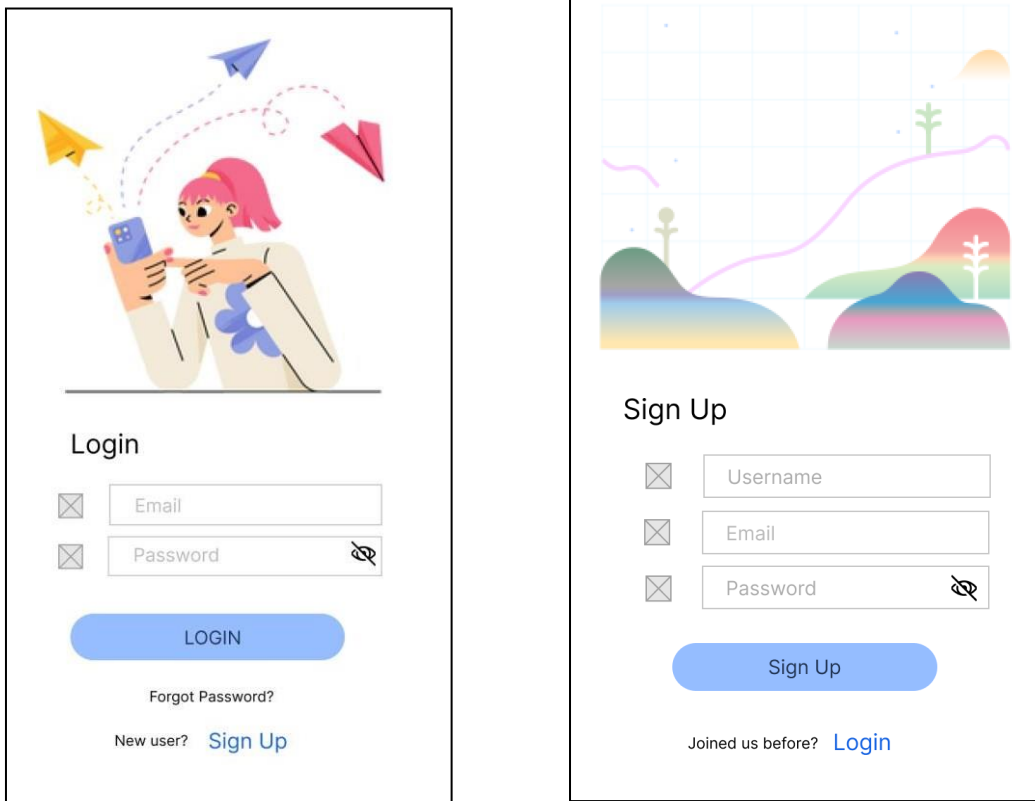


Figure 8.1 Sign Up and Login

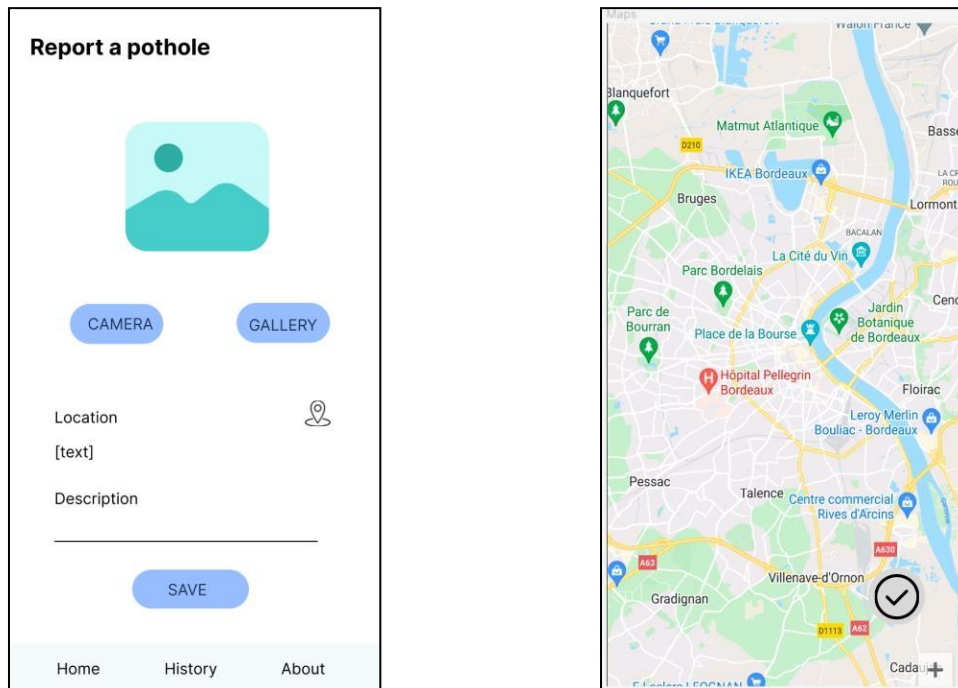
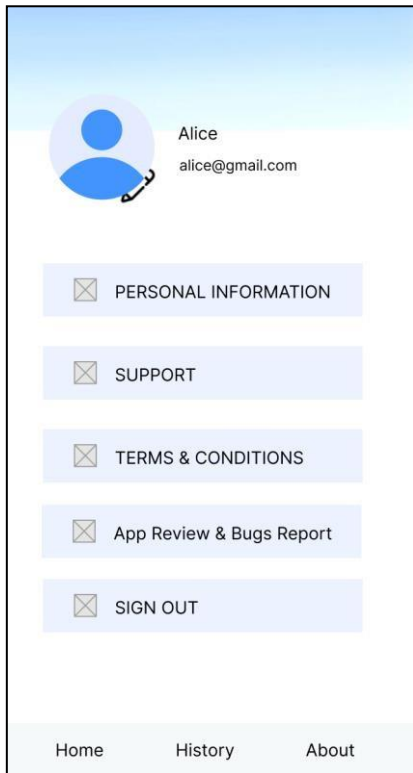
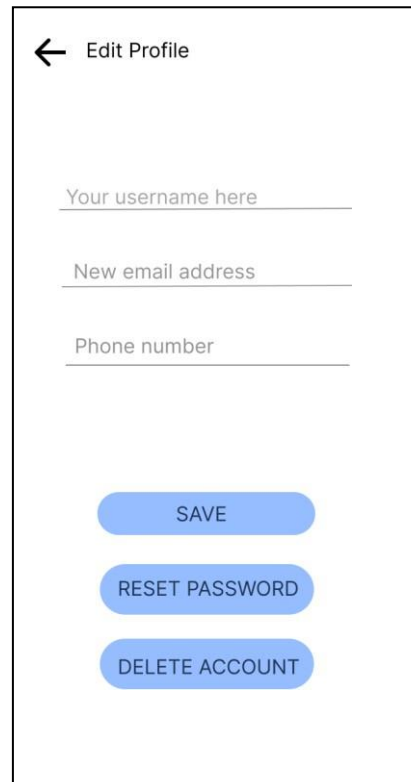


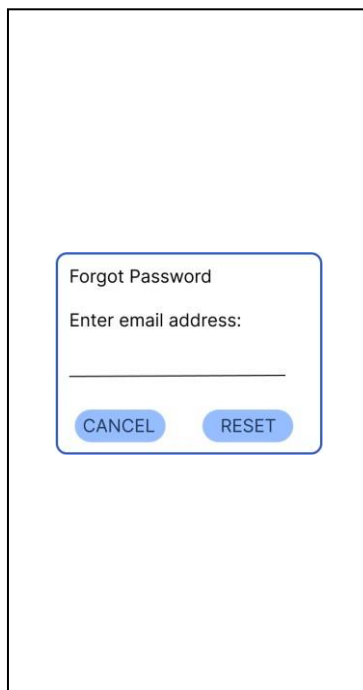
Figure 8.2 Create Report and Get Location Page (User)



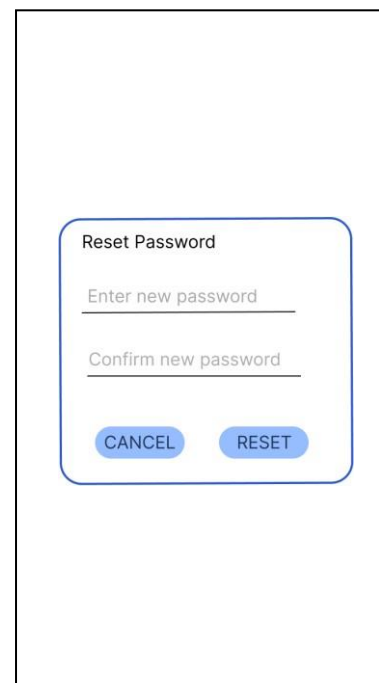
**Figure 8.3 Profile Page**



**Figure 8.4 Change Info**



**Figure 8.5 Forgot Password**



**Figure 8.6 Change Password**

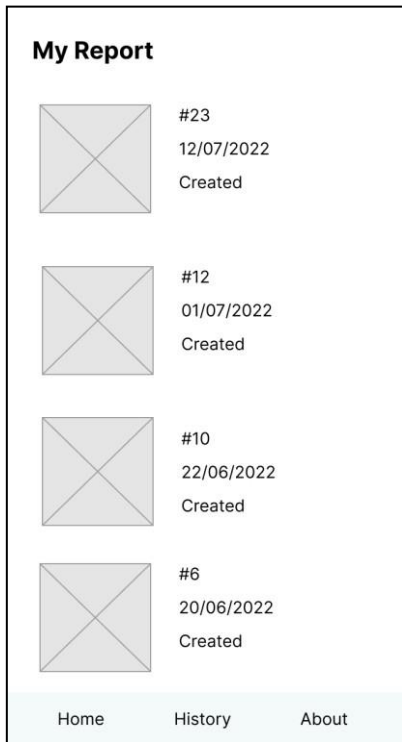


Figure 8.7 Report History Page

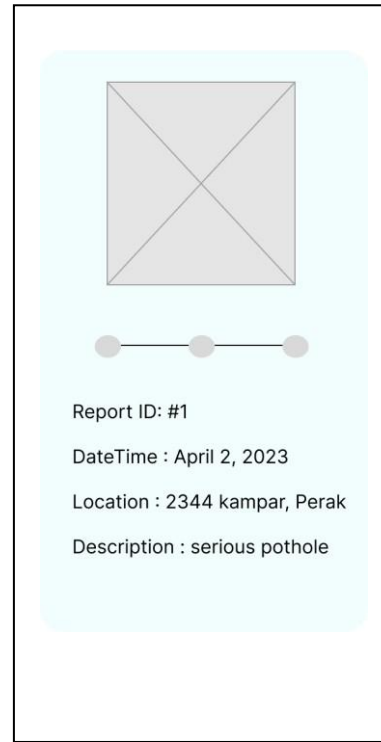


Figure 8.8 Report Details Page

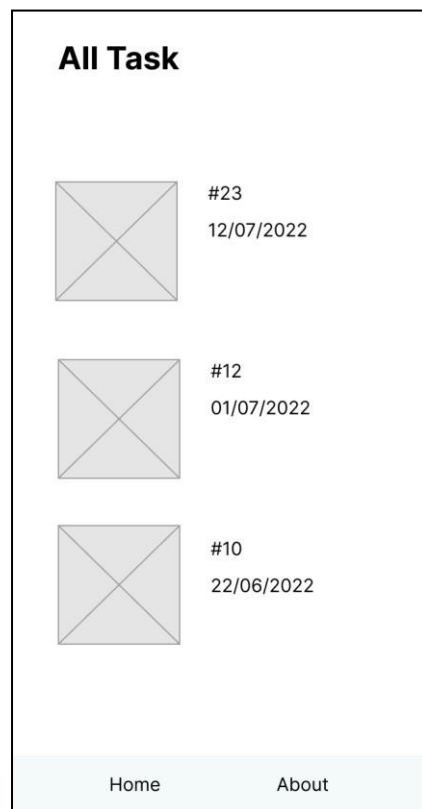
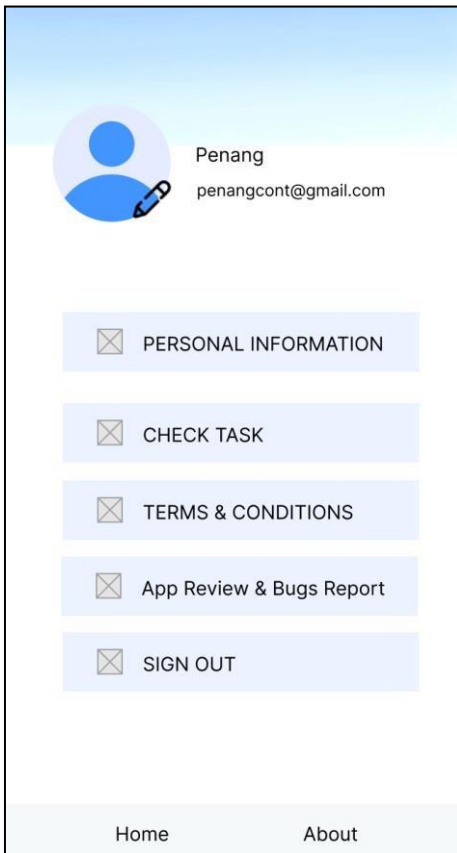


Figure 8.9 Contractor's Profile Page



Figure 8.10 Contractor's Task Page

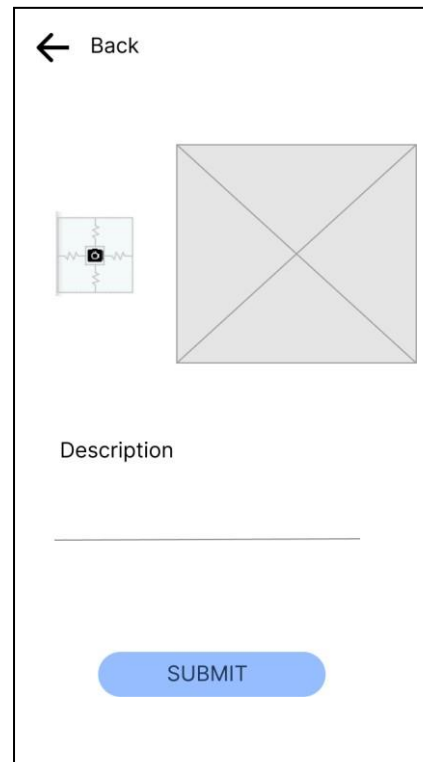


Figure 8.11 Contractor View Task Details Page



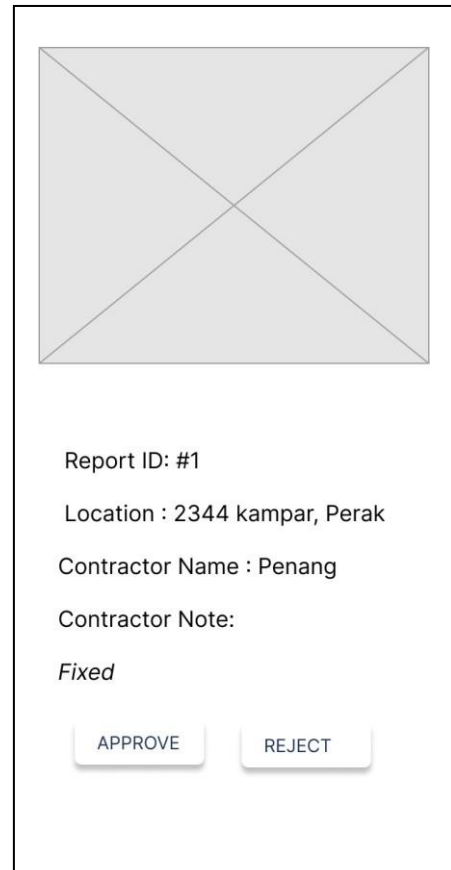
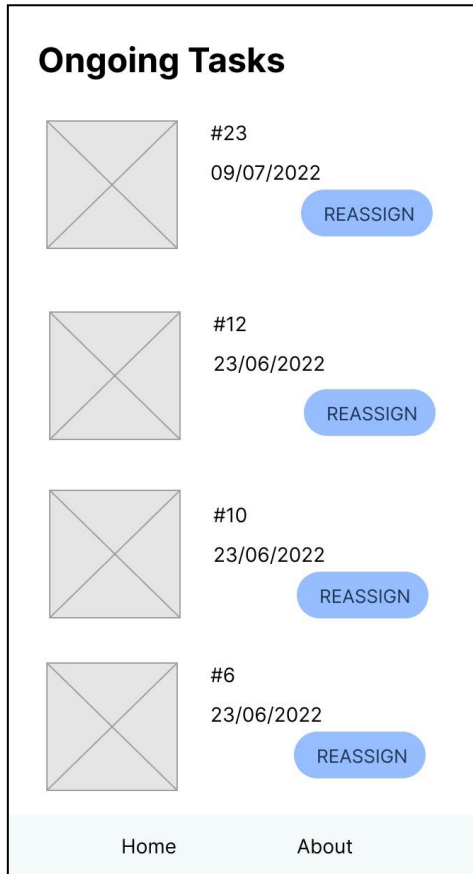
Figure 8.12 Submit Task Page



Figure 8.13 View Past Submitted Task Page

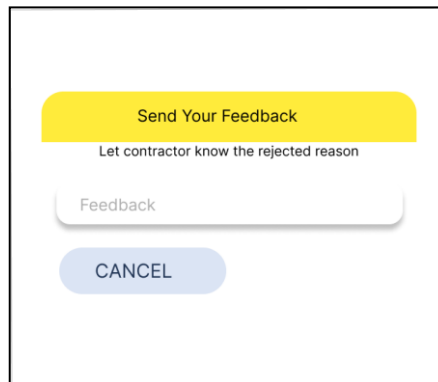
Figure 8.14 Admin Verify Task





**Figure 8.15 Admin View Ongoing Task Page Figure 8.16 Verify Task Details**

**Page**



**Figure 8.17 Feedback layout after admin rejected task work done by contractor**

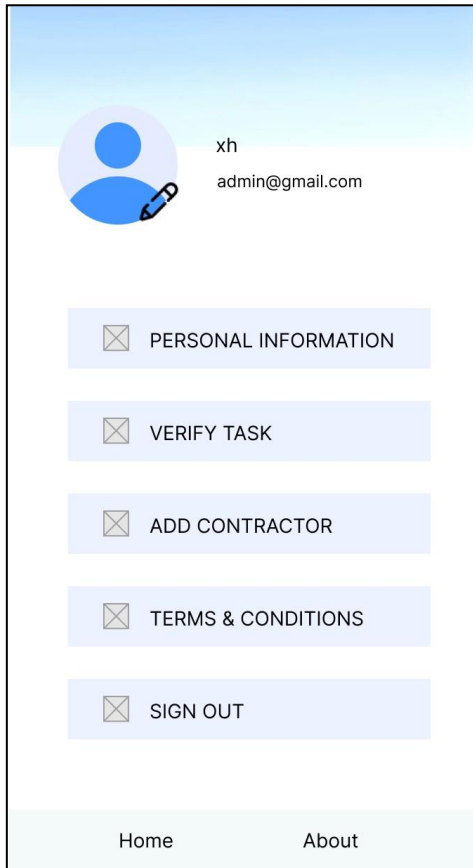


Figure 8.18 Admin's Profile Page

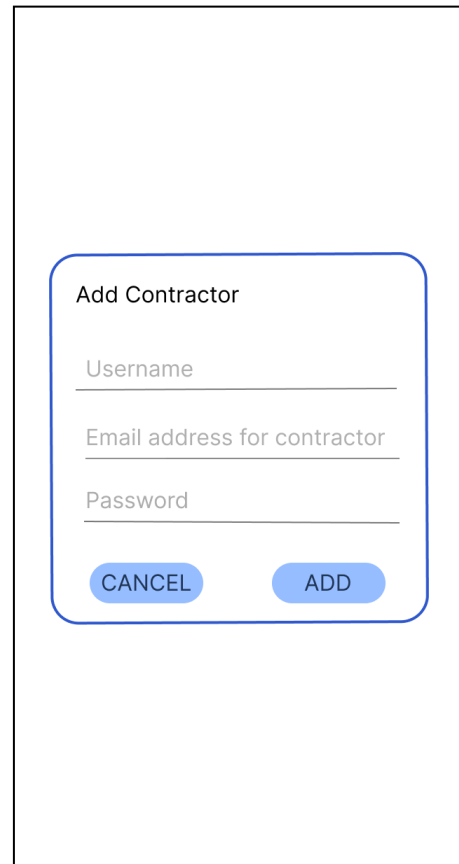
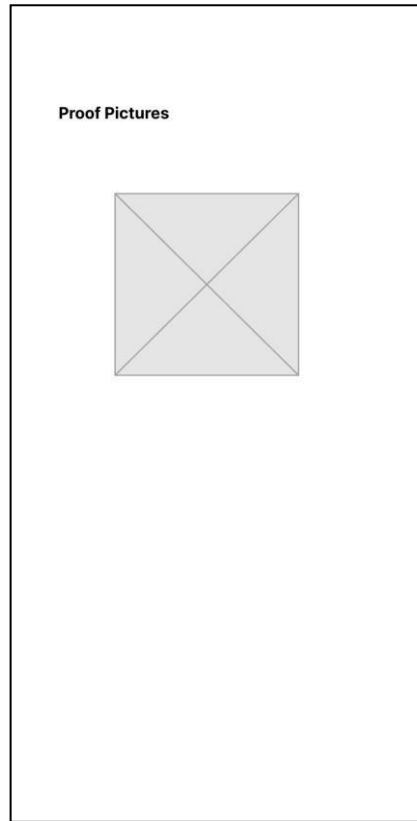


Figure 8.19 Create Contractor Page



Figure 8.20 View Report Page Figure 8.21 Admin View Details & Assign Task



**Figure 8.22 Show Proof Pictures Page**

### **3.6 System Architecture**

The proposed system plan to use the development applications and languages has been listed below. Other than that, the software and tools that we plan to use to develop are also listed below and followed by the description of each tool included.

#### **3.6.1 Development Applications and Languages Used**

##### 3.6.1.1 Android Studio

Android Studio is a development platform that enables developers to create Android applications. It is an integrated development environment (IDE) to the flutter software and flutter relies on it in order to supply android dependencies. It uses JAVA in the development phase.

##### 3.6.1.2 Firebase

Firebase is utilized for storing user information, submitted reports, and performing database operations. It acts as a backend to the application and provides real time hosting of databases, authentication features and notifications.

##### 3.6.1.3 Java

Java programming language is the language used in coding which is implemented in the development phase since android studio supports this language.

#### **3.6.2 Tools and Software Used**

##### 3.6.2.1 JDK 11

Java Development Kits version 11 is included in order to work and let the application function well using JAVA language.

##### 3.6.2.2 Android SDK

This is the important tool that is needed in this project where it helps with debugging, testing and running the coding in order to build the applications successfully. It assists with creating android applications and provides a user interface in it with the functions of Android Virtual Device Manager.

##### 3.6.2.3 Figma

Figma is a web application that supports development design as it helps on creating and designing user interface. It acts as a platform to edit and create high quality designs. It

## CHAPTER 3

is a lightweight and convenient application that supports streamlining the design processes together with coding. There are many tools available for the developers to implement into their design too.

### 3.6.2.4 Drawio

It is an open-source platform where developers can create diagrams such as flowcharts. Use as a tool to visualize the activity diagram, use case diagram and others diagram needed in analysis and design phase.

### 3.6.2.5 Laptop Hardware

The hardware required for this project includes a computer. The computer is used for developing and integrating code, such as Java programming and other programming languages.

Description	Specifications
Model	Inspiron 13 5300
Processor	Intel Core i5-10210U
Operating System	Windows 10
Graphic	Intel® UHD Graphics
Memory	8GB DDR4 RAM
Storage	512GB PCIe NVMe, SSD

**Table 3 Specifications of laptop**

### 3.6.2.6 Android Phone (Software)

Description	Specifications
Model	Huawei Nova 3i
Operating System	Android 9
Chipset	Kirin 710 (12 nm)
Memory	4GB RAM
Storage	128GB
CPU	Octa-core (4x2.2 GHz Cortex-A73 & 4x1.7 GHz Cortex-A53)
GPU	Mali-G51 MP4

**Table 4 Specifications of mobile phone**

### **3.7 Summary of Hardware and Software Usage**

To develop this project, there is a need with a laptop or a computer with sufficient processing power and RAM for developer to work and code on it. Android Studio development kit is required for this project to develop the system. It takes a lot of processing power when developing it. Therefore, having a good laptop which meets specifications is required. Moreover, an android-based mobile device is needed to use and install the application for testing purpose. Internet connection needed for storing the information needed and retrieve it from the Firebase Firestore database.

**3.8 Verification Plan**

1	Verify user authentication	<ul style="list-style-type: none"> <li>• Users make sure email and password is correct and valid</li> <li>• User can login into the system</li> </ul>
2	Verify firebase firestore store the information	<ul style="list-style-type: none"> <li>• Firebase Firestore stores the information provided by the User</li> </ul>
3	Verify user register account successfully	<ul style="list-style-type: none"> <li>• User inputs the username, email and password correctly</li> <li>• All the information needed should not be null when submit</li> </ul>
4	Verify user can view the report interface layout and made a report	<ul style="list-style-type: none"> <li>• User needs to make sure the input fill into the form is correct</li> <li>• User needs to make sure there is internet connection</li> <li>• User needs to confirm the layout interface shown in the screen</li> <li>• User needs to make sure getting the location they want when pressing location icon</li> <li>• User needs to make sure the map got pinpoint function</li> <li>• User needs to make sure the information needed fill in before submitting</li> <li>• User needs to make sure they can view the map when they press location icon</li> <li>• User needs to make sure they can access to their phone gallery to retrieve image</li> <li>• User needs to make sure they can directly snap the photo after pressing camera button</li> </ul>

## CHAPTER 3

		<ul style="list-style-type: none"> <li>• Authority receive notification when new report made</li> </ul>
5	Verify user can view the report history they made	<ul style="list-style-type: none"> <li>• User can view the layout shown in the screen</li> <li>• User can view the report details when they tap on the report</li> </ul>
6	Verify user can view their profile	<ul style="list-style-type: none"> <li>• User can view the profile when enter the profile page</li> <li>• User can edit their profile image</li> <li>• User can edit their personal information</li> </ul>
7	Verify user can reset their password	<ul style="list-style-type: none"> <li>• User needs to make sure fill in the input needed before submitting</li> <li>• User needs to make sure the information provided is correct</li> <li>• User needs to make sure they receive reset password link from their registered email</li> </ul>
8	Verify user can change their password successfully	<ul style="list-style-type: none"> <li>• User needs to make sure the new password is correct and is not blank</li> <li>• User needs to make sure there is internet connection</li> </ul>
9	Verify user can report bugs and do app review	<ul style="list-style-type: none"> <li>• User able to fill in and submit google form provided</li> </ul>
10	Verify user logout successfully	<ul style="list-style-type: none"> <li>• User can logout</li> <li>• User needs login again after logout</li> </ul>
11	Verify authority's interface	<ul style="list-style-type: none"> <li>• The main page for authority is different from other users</li> </ul>
12	Verify authority can view reports made by users	<ul style="list-style-type: none"> <li>• Authority can see list of reports made by all users</li> <li>• Authority can tap on the report to see details</li> </ul>



13	Verify search function for authority to search report	<ul style="list-style-type: none"> <li>• Authority needs to enter report id into search bar</li> <li>• Application shown the search results</li> <li>• Authority needs to make sure the search result is matched</li> </ul>
14	Verify authority can assign task to contractor successfully	<ul style="list-style-type: none"> <li>• Authority can assign task to specific contractor</li> <li>• Authority can view list of contractors when assign</li> <li>• Contractor receives notification about assigned task</li> <li>• Contractor can view task assigned</li> </ul>
15	Verify authority can create account for contractor	<ul style="list-style-type: none"> <li>• Authority needs to make sure the username, email and password correct</li> <li>• Authority needs to make sure the information needed not null when submit</li> <li>• Contractor can login into the application</li> </ul>
16	Verify contractor can upload proof	<ul style="list-style-type: none"> <li>• Contractor can upload proof and status to authority</li> <li>• Contractor needs to make sure the proof is uploaded before submitting</li> </ul>
17	Verify contractor can report bugs and do app review	<ul style="list-style-type: none"> <li>• Contractor able to fill in the google form and submit</li> </ul>
18	Verify user can receive status updated about the report they made	<ul style="list-style-type: none"> <li>• User can have notification when there is status updated about the report they made before</li> </ul>

**Table 5 Verification Plan**

### 3.9 Implementation Issues and Challenges

One of the challenges is that to create a smooth navigation when user clicks on the map to detect location and after that return back to the report page, In this part, it needed to ensure the information that input by the user before return and stated in the text view so that user no need to enter again just because they redirect to another page and redirect back from it.

Another challenge is notification feature. It is difficult and needed to do a lot of configurations in order to receive the token needed and send to specific user. When user clicks on it, the system will also need to navigate it to the relevant page. This needed to be controlled well in the system. [08]

### 3.10 Timeline

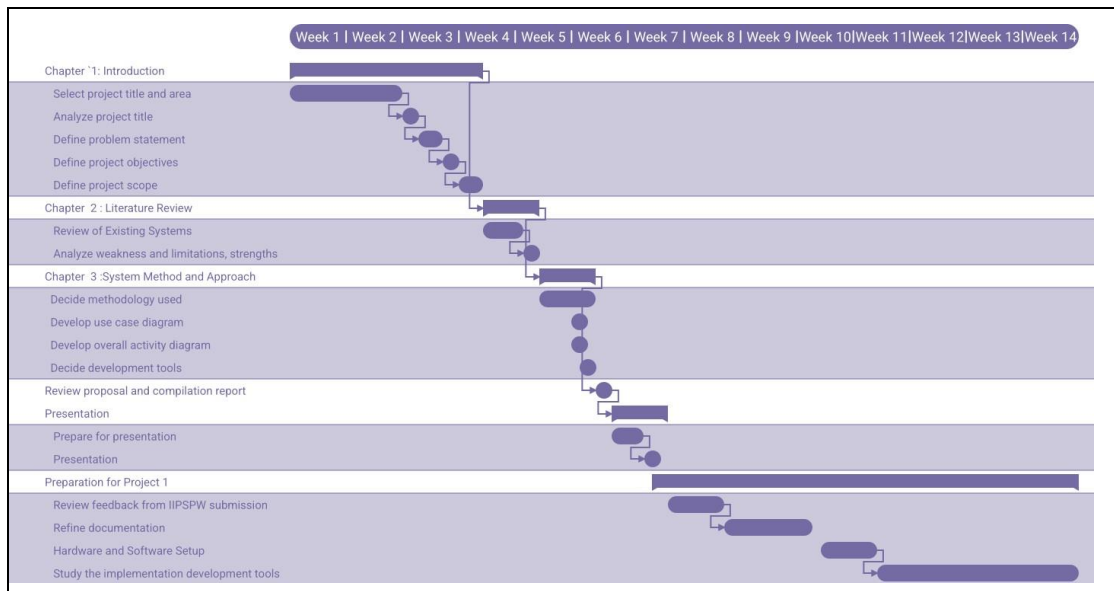
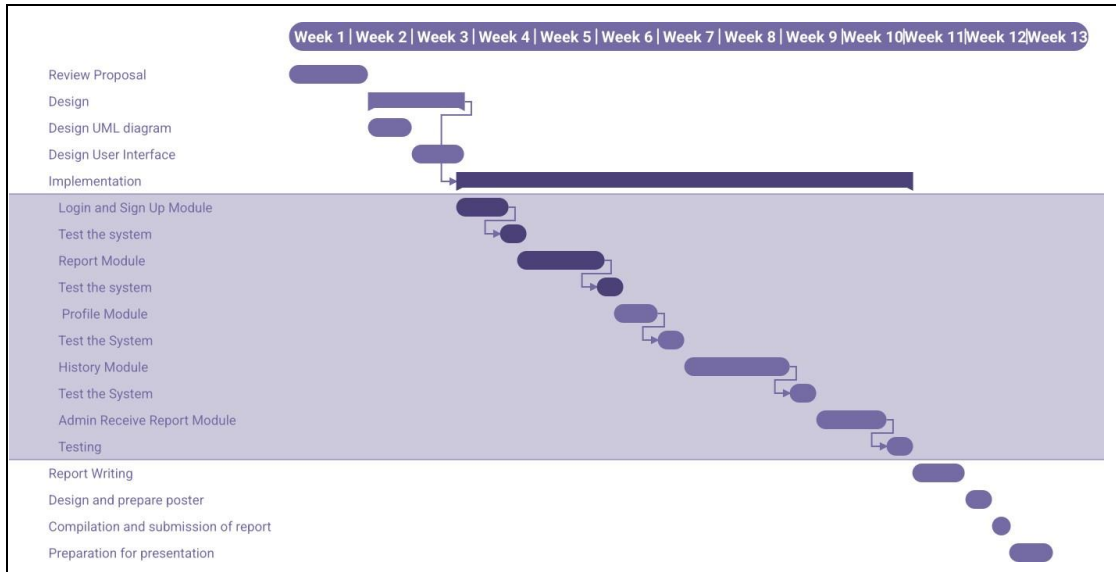
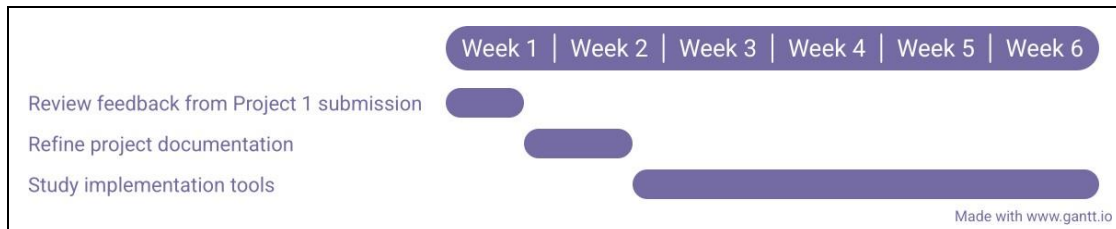


Figure 9.1 Gantt Chart I

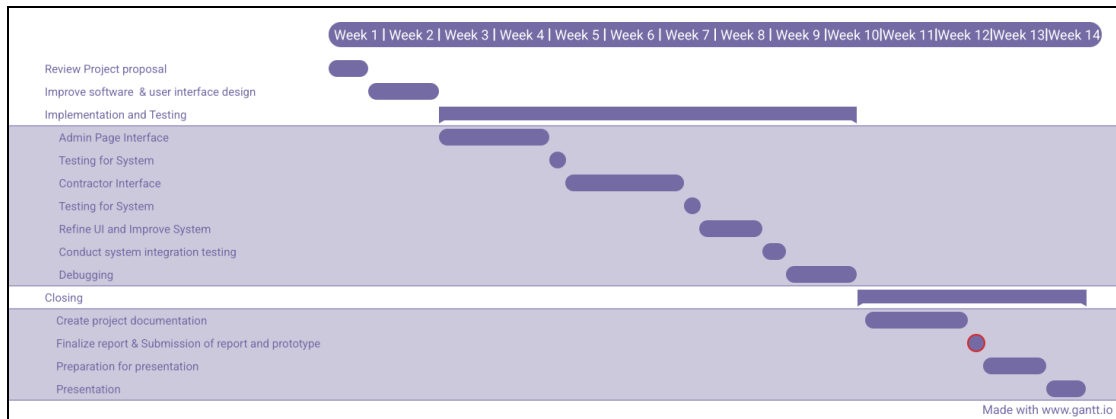
# CHAPTER 3



**Figure 9.2 Gantt Chart II**



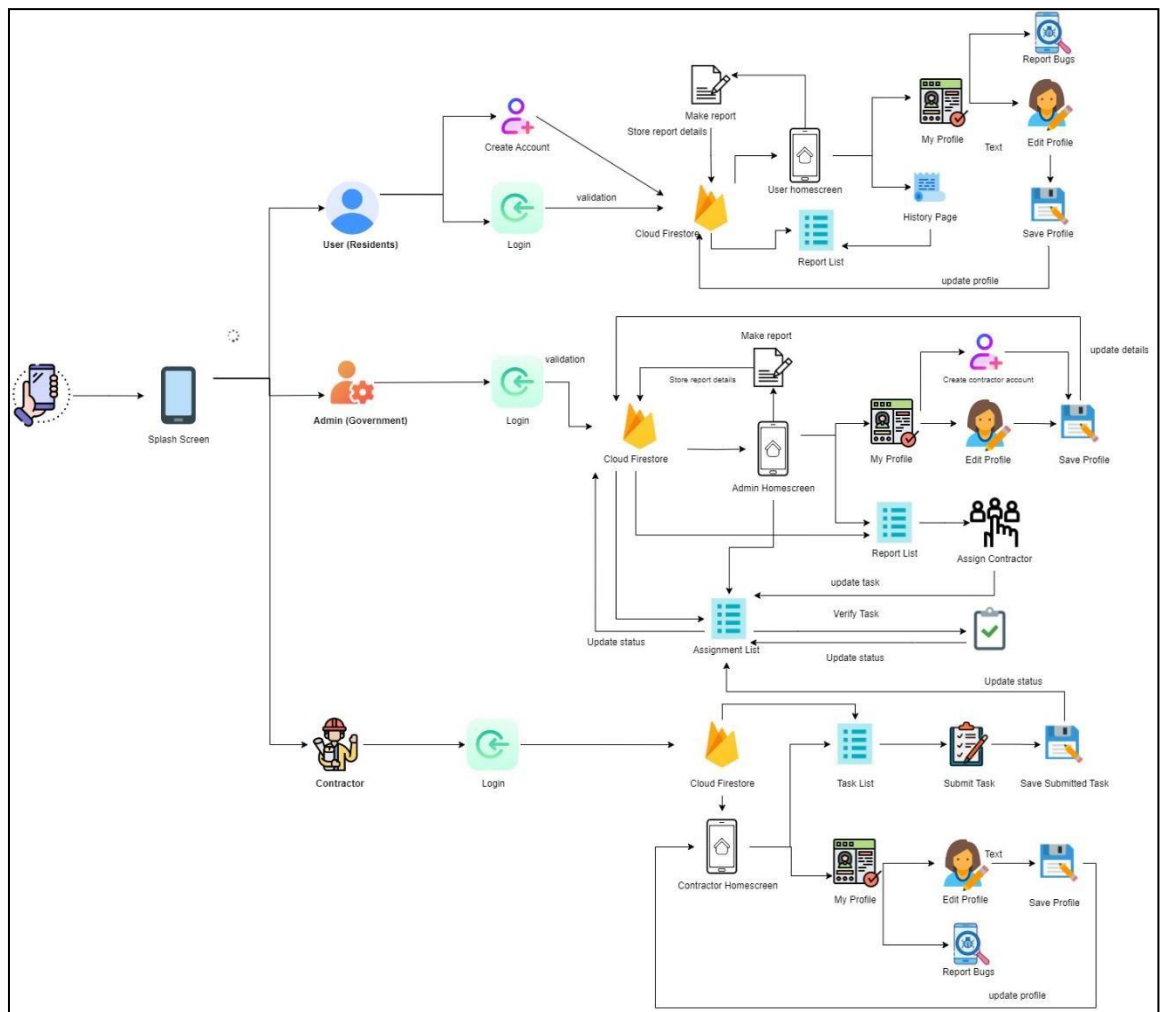
**Figure 9.3 Transition between Project 1 and Project 2**



**Figure 9.4 Gantt Chart III**

## CHAPTER 4 SYSTEM DESIGN

### 4.1 System Block Diagram



*Figure 10 Block Diagram*

First, user need to register an account and login into the system. The system will validate each users' account when they login. For normal users' side, system will redirect them into the user homescreen page which user can make report and when they save the report, the report details will store into the Firestore. User can view their report list made before User can edit their profile by going to profile page. Inside the profile page, admin can manually create account for contractor to log into the account and work onto it. The edited information will store into Firestore too. Other than that, user can provide feedback of the application by enter Profile page. For admin user side, they will use the registered account to login into the application. Admin also can edit their profile

## CHAPTER 4

and manually enter report details too. Admin can view all reports made by retrieving reports from our Cloud Firestore. By tapping specific report, admin can assign contractor via a list of contractor list. After confirm selection, the system will add assignment report into assignment list and notify contractor about the task. For contractor users' side, they will use the registered account created by admin to login. After login successfully, they will go into the homescreen which they able to view a list of assignment reports. They will work onto it and when they work done, contractor can submit the task to be verified by admin whether the work done is approved or rejected. Same, the contractor can edit their email and password afterwards and report bug identified and do app review by enter the profile page.

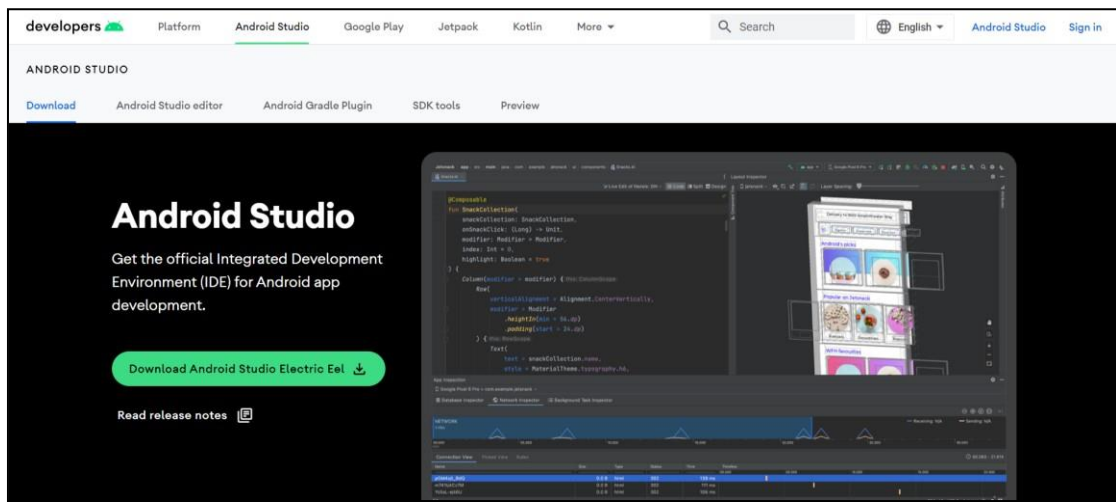
## CHAPTER 5 SYSTEM IMPLEMENTATION

### 5.1 Introduction

In this chapter, there will be discussions about what step and process before the actual implementation of coding such as software setup and project configuration including Google Firebase creation.

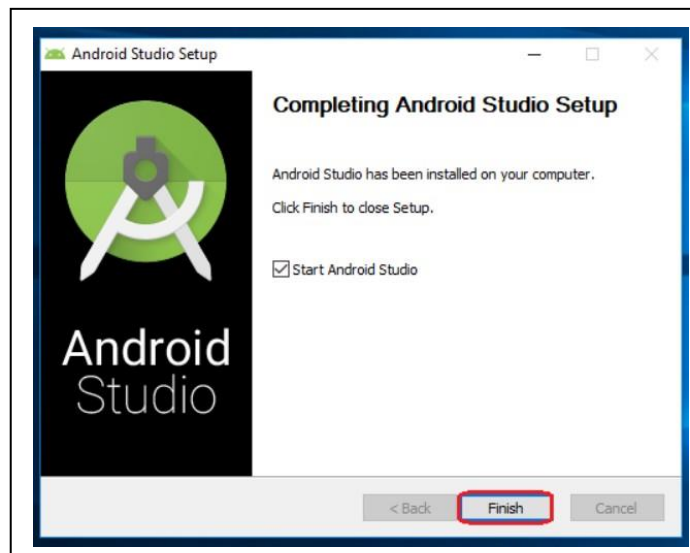
### 5.2 Software Setup

#### 5.2.1 Installation of Android Studio



**Figure 11.1 Android Studio Homepage**

First, enter Android Studio Homepage and click on 'Download Android Studio'.



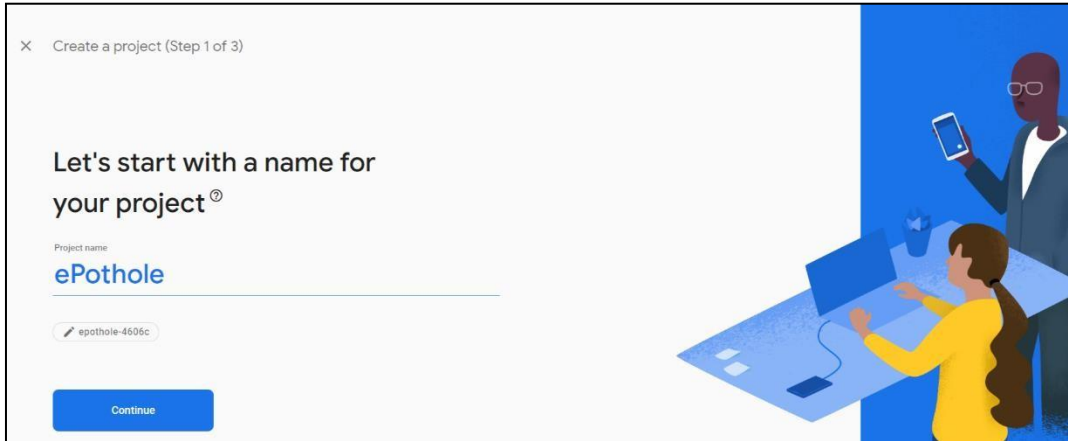
**Figure 11.2 Android Studio Setup Completely**

## CHAPTER 5

After installation successfully, configure it and in the end, it will show successfully complete android studio setup.

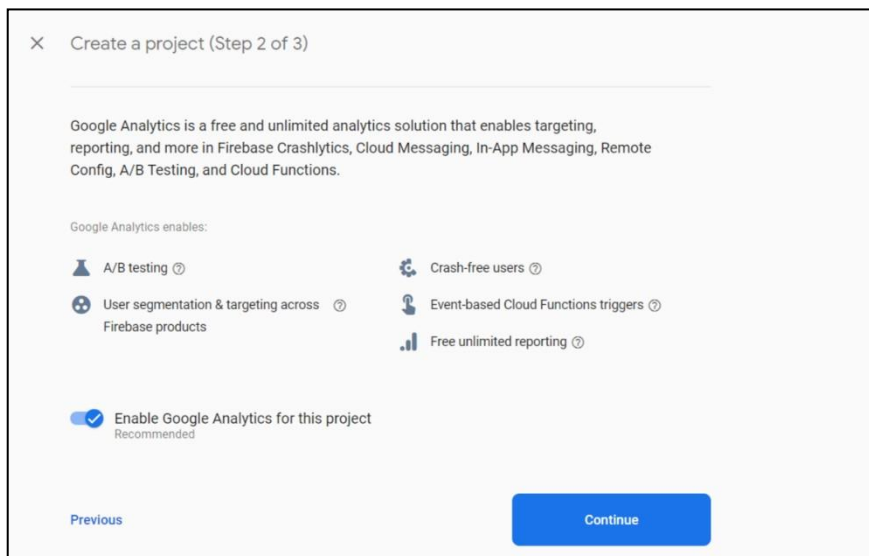
### 5.3 Project Configuration

#### 5.3.1 Creation of Google Firebase



**Figure 12.1 Project Setup**

The initial step is to provide it with a name and subsequently click on "continue."



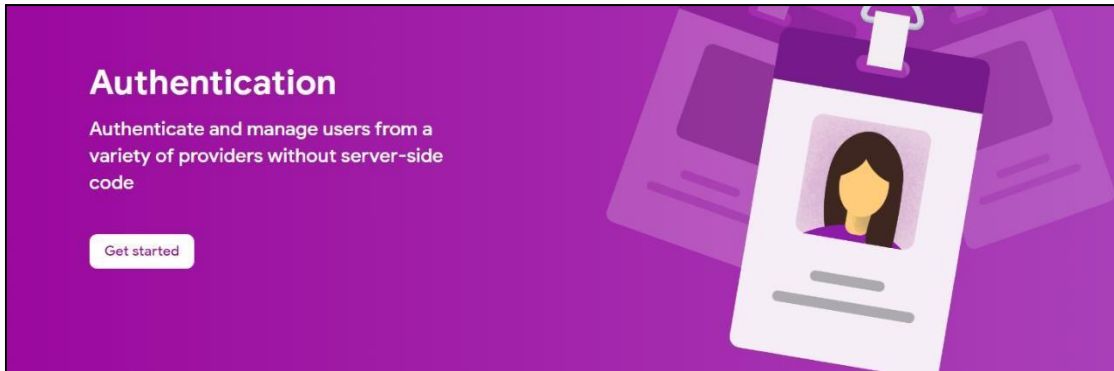
**Figure 12.2 Google Firebase Creation II**

Next step is to enable google Analytics, so it helps on further usage such as notification functions. Then, click on Continue.



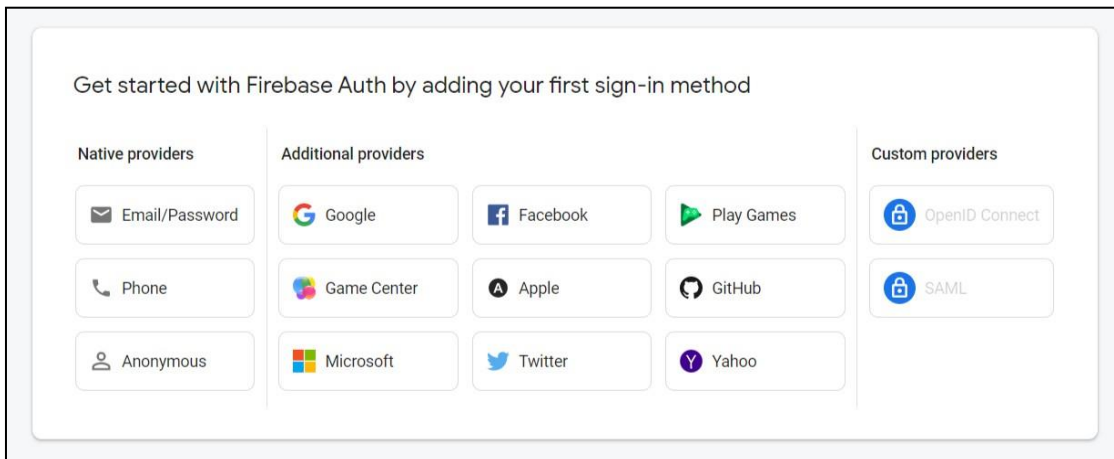


application. Package name should be same with the android studio project package name. Then, click register app.



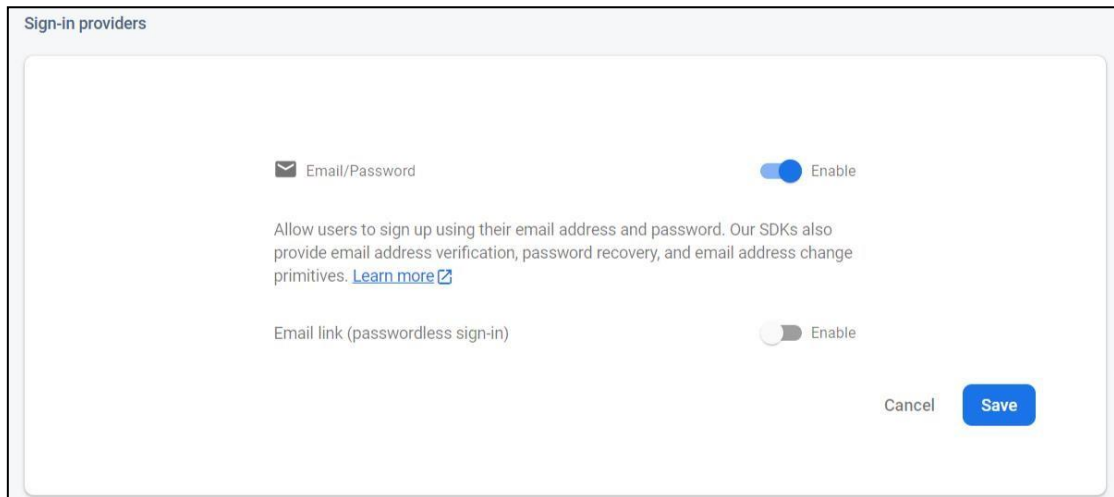
**Figure 12.5 Firebase Authentication Homepage**

Click on get started on the authentication homepage so we can configure authentication for later use in creating register and login function.



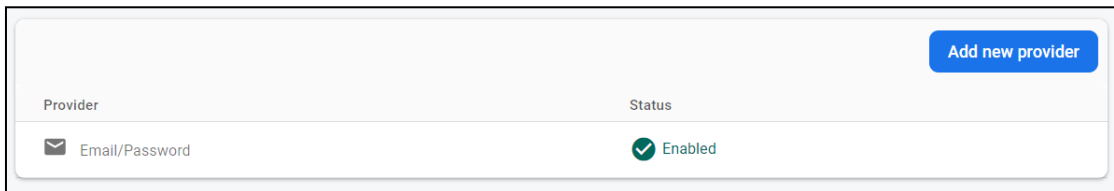
**Figure 12.6 Select Sign-in Method**

Next, select email-password sign-in method for this project.



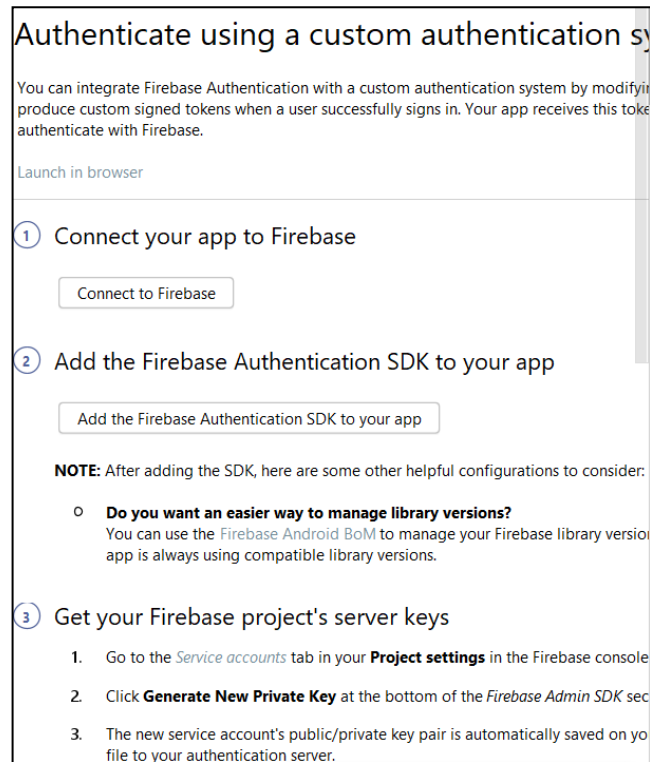
**Figure 12.7 Enable Sign-in Method**

Enable email and password to allow user to sign in using email and address by using Firebase Authentication to detect for it. Click on save button.



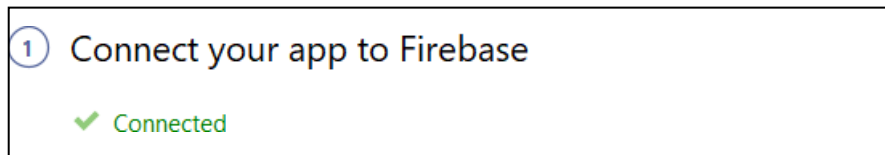
**Figure 12.8 Successfully Enabled**

After clicking on save, it will show enabled successfully with a tick.



**Figure 12.9 Link Android Studio with Firebase**

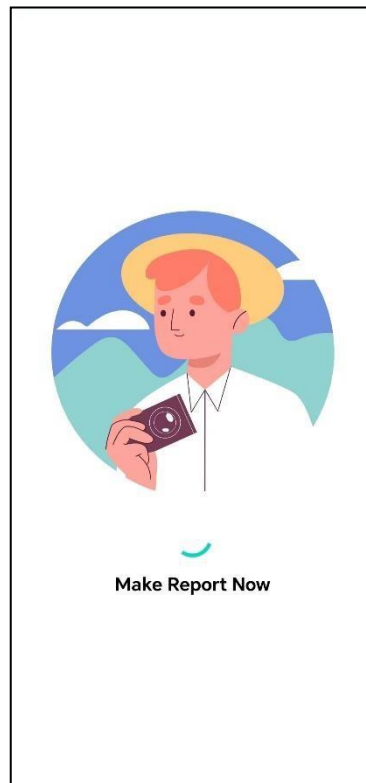
In android studio projects, click on Tools in toolbar and click on Firebase. Select the functions needed for the project and follow the instructions provided. Click on Connect to Firebase and after successfully connected then add the firebase sdk to your app.



**Figure 12.10 Successfully Connect app with Firebase**

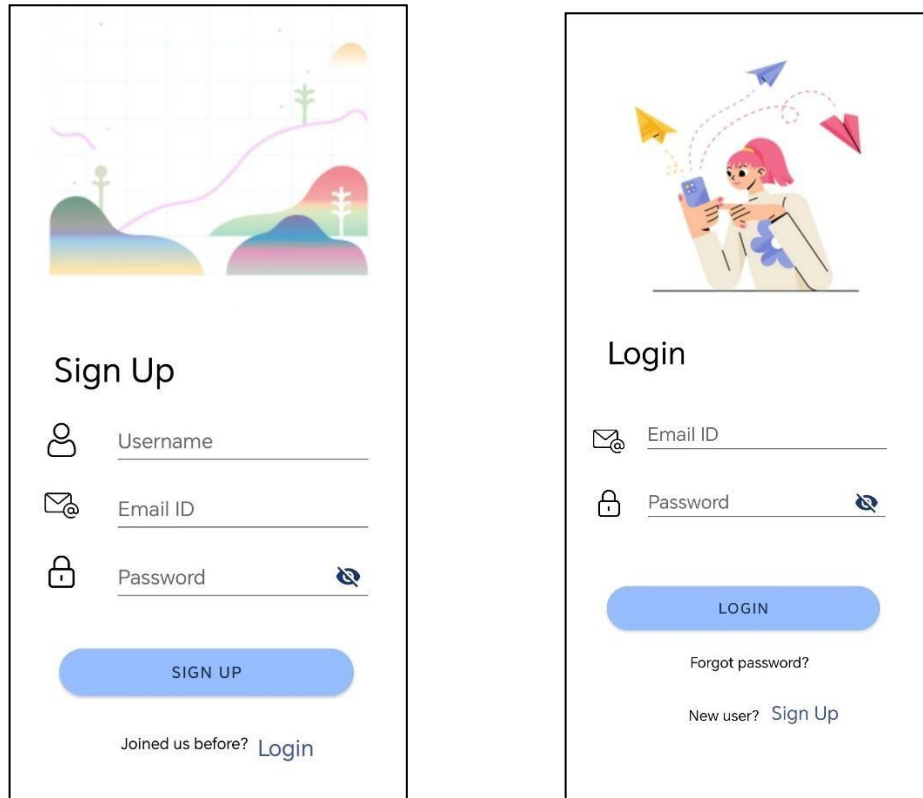
## CHAPTER 5

### 5.4 Implementation



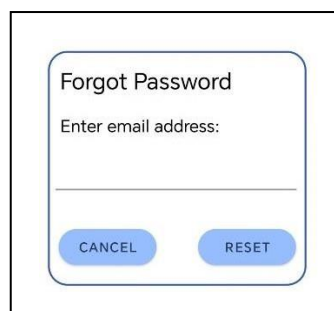
**Figure 13.1 Splash Screen Page**

When the user opens the application, this page will appear for 3 seconds. After that, it will then redirect the user to their home page respectively.



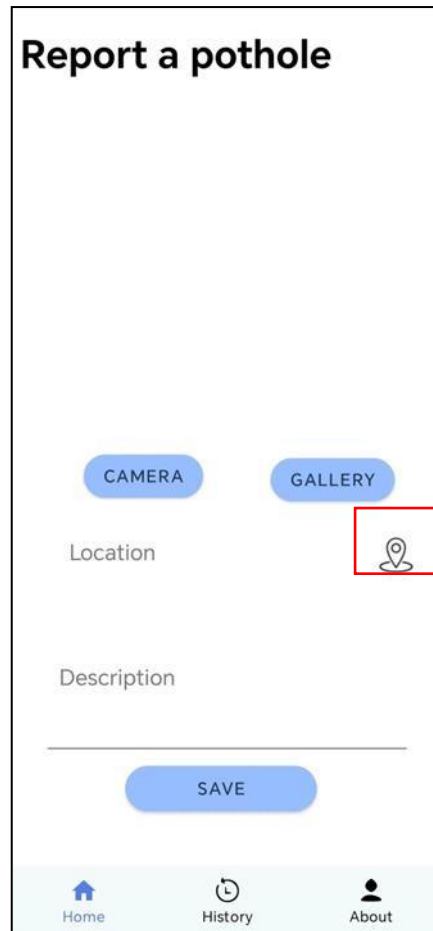
**Figure 13.2 Sign Up and Login Page**

This is the real design of sign up and login page. Press the ‘Login’ word beside the Joined us before? can let user to direct to login page to login their account if they previously created their account. Same as this, in login page, there also has ‘Sign Up’ word to let user to direct to sign up page. Users need to fill in details needed to create account or successfully login to their account. If user forgot their password, they could click on the ‘forgot password?’ to direct to the Figure to reset their password.



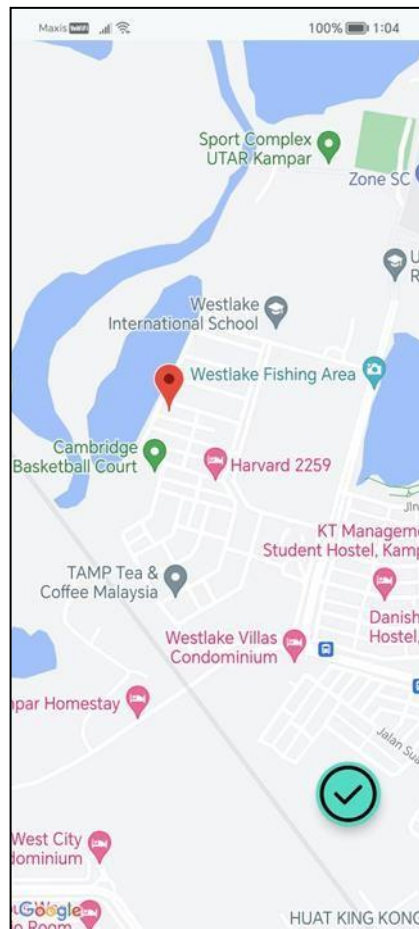
**Figure 13.3 Forgot Password page**

User needs to enter their email address and press reset button. Then, user will receive a toast message to let them check their email.



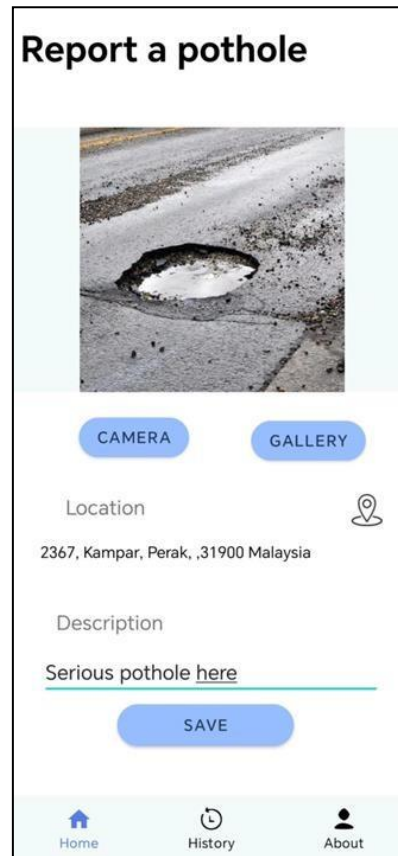
**Figure 13.4 Main page (User)**

Figure 13.4 shows the main homepage of user. User can report the pothole once they successfully login. There will be two button available for user to upload the picture of pothole which are 'CAMERA' and 'GALLERY'. Users can directly snap the photo using the 'CAMERA' while retrieve photo from their phone gallery by pressing 'GALLERY' button. User can select more than one photo to be uploaded. Clicking on the location icon which I squared it red in Figure 13.4, it will direct user to a map view which shows in Figure 13.5 to get their current location. User will need to type description to describe the pothole to let authority and contractor know more details about that pothole. After entering all the details needed, press 'SAVE', the report will submit to the database and shows in History page.



**Figure 13.5 Get Current Location Page**

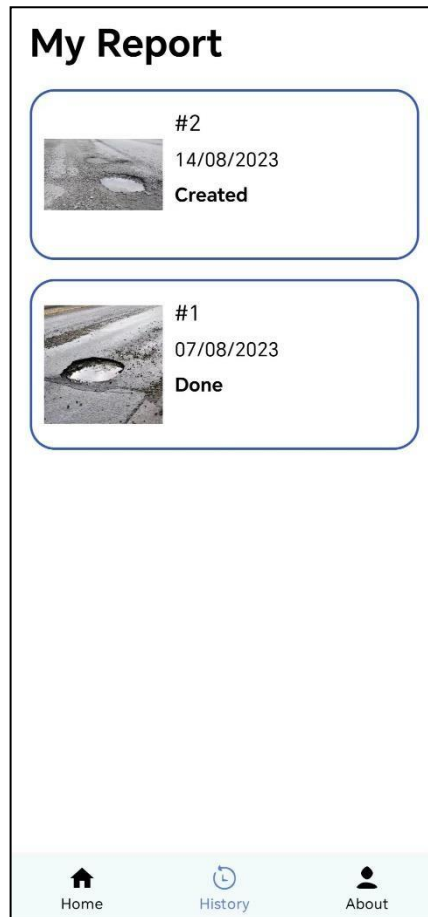
After user enables their location permission on their phone, user will get their current location address after they press the green tick button. If user needs to change the location, they can pinpoint the map too.



**Figure 13.6 Enter Details Page**

User will need to enter the location of the pothole, description and provide some photos to upload the report as shown in Figure 13.6.





**Figure 13.7 History Page**

Figure 13.7 above shows user's report history page. It will show the photo uploaded, status, the report id, and date the report made. At the same time, the admin side will receive notification about the new report made as shown in Figure 13.8.

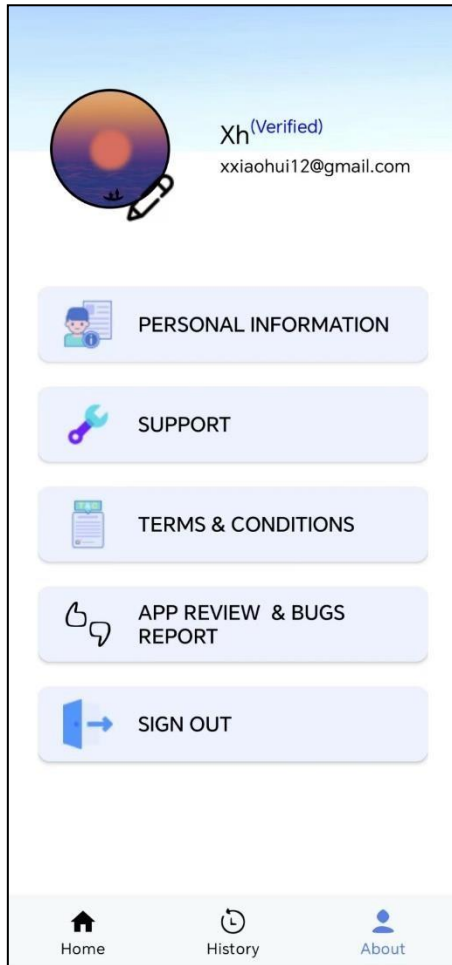


**Figure 13.8 Notification of new report made**



**Figure 13.9 Report Details Page**

Figure 13.9 above shows the report details page after pressing one of the reports shown in Figure 13.7. User can view the status in the progress bar.

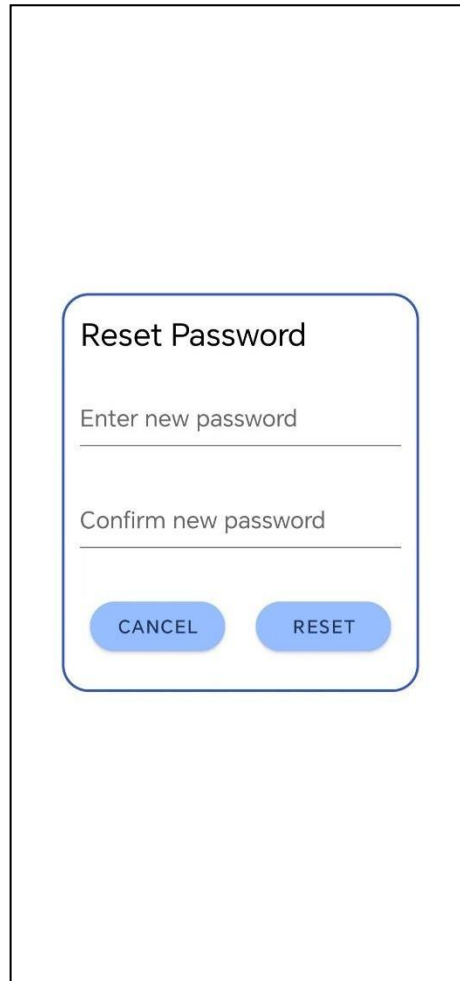


**Figure 13.10 About Page for User**



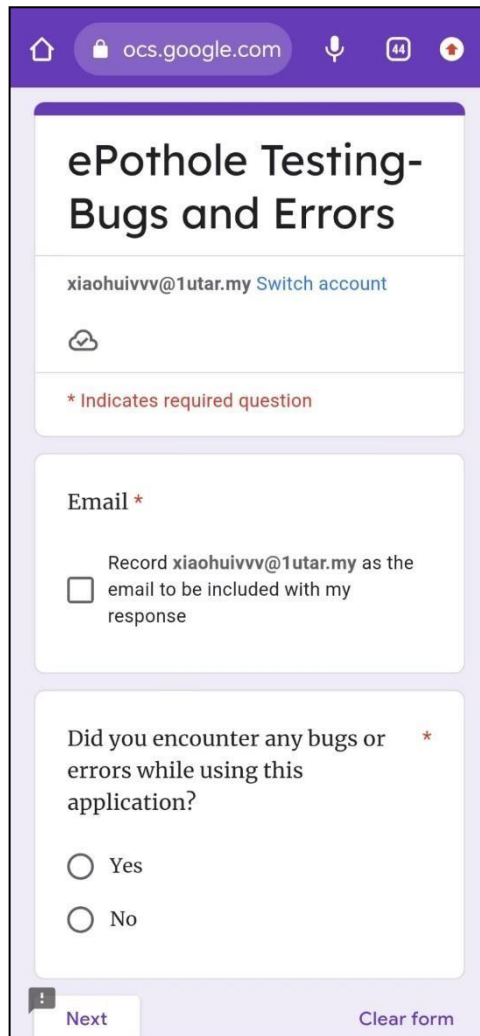
**Figure 13.11 Personal Information Page**

Figure 13.10 shows the about page of user which will have personal information, notification inbox to do later, support page, terms and conditions and logout button. User can edit their profile photo too by clicking on the pencil button beside the photo. They can see their username and email beside the photo too. Clicking on the personal information, user will be directed to Figure 13.11. User can change their username, email address, add their phone number here and save it to change. User can reset their password and delete account here by pressing respective button. There will be a status where user has verified their email or not. If yes, it will show like in Figure 13.10 with a verified word beside their username.

A screenshot of a mobile application's 'Reset Password' screen. The screen is enclosed in a thin black border. At the top, the title 'Reset Password' is displayed in a bold, black font. Below the title, there are two text input fields. The first field is labeled 'Enter new password' and the second is labeled 'Confirm new password'. Both fields have a light gray border and a horizontal line indicating the input area. At the bottom of the form, there are two blue, rounded rectangular buttons. The left button is labeled 'CANCEL' and the right button is labeled 'RESET' in white, uppercase letters.

**Figure 13.12 Change Password Page**

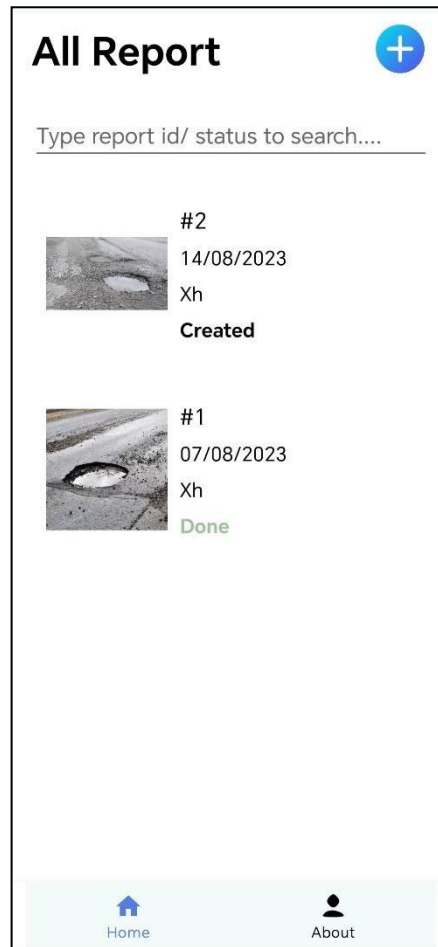
Figure 13.12 above shows the page when user clicks on the reset password button shown in Figure 13.11. They can change their password here manually by typing new password and confirm it.



The image shows a mobile browser interface displaying a Google Form. The browser's address bar shows 'ocs.google.com'. The form title is 'ePothole Testing-Bugs and Errors'. Below the title, the user's email 'xiaohuivvv@1utar.my' is displayed with a 'Switch account' link. A cloud icon is visible below the email. A red asterisk indicates a required question. The first question is 'Email \*', with a checkbox option to 'Record xiaohuivvv@1utar.my as the email to be included with my response'. The second question is 'Did you encounter any bugs or errors while using this application? \*', with radio button options for 'Yes' and 'No'. At the bottom, there are 'Next' and 'Clear form' buttons.

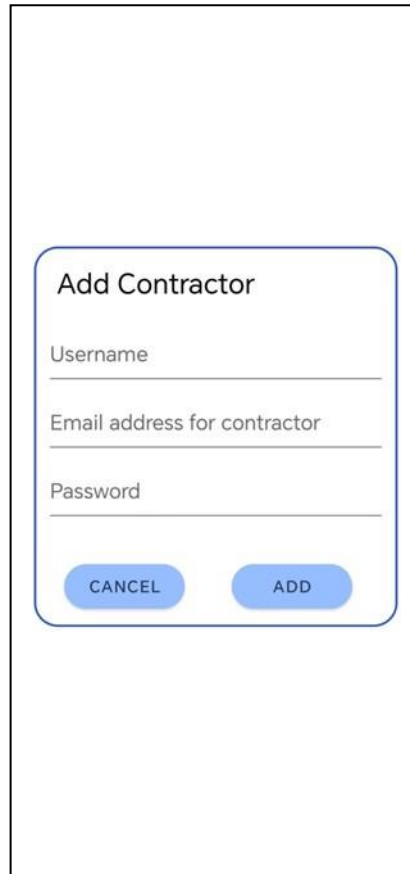
**Figure 13.13 Survey Form for App Review & Bugs Report**

This is the page where user press on the 'App Review and Bugs Report' section on About page. It will be redirected to the google form above to let user fill in the information about their overall experience and they can provide recommendations to the app inside too.



**Figure 13.14 Admin View Reports Page**

Above figure shows how authority can view the report made by all users. There will be a search function to make authority easy to manage the reports by typing respective report id or status. In this page, authority can also press the plus icon at the top right corner to enter to add report page to manually add report.



The image shows a mobile application interface for adding a contractor. It features a central white rounded rectangle with a blue border. At the top of this rectangle is the title "Add Contractor". Below the title are three input fields, each with a horizontal line underneath: "Username", "Email address for contractor", and "Password". At the bottom of the rectangle are two blue rounded buttons: "CANCEL" on the left and "ADD" on the right.

**Figure 13.15 Add Contractor Page**

Authority will have function to add new contractor in their about page by clicking on the 'Add Contractor' section. They will create account for contractor to be used to assign reports onwards.



The screenshot displays a mobile application interface for assigning a contractor to a task. At the top, there is a photograph of a pothole on a road. Below the image, the following information is displayed:

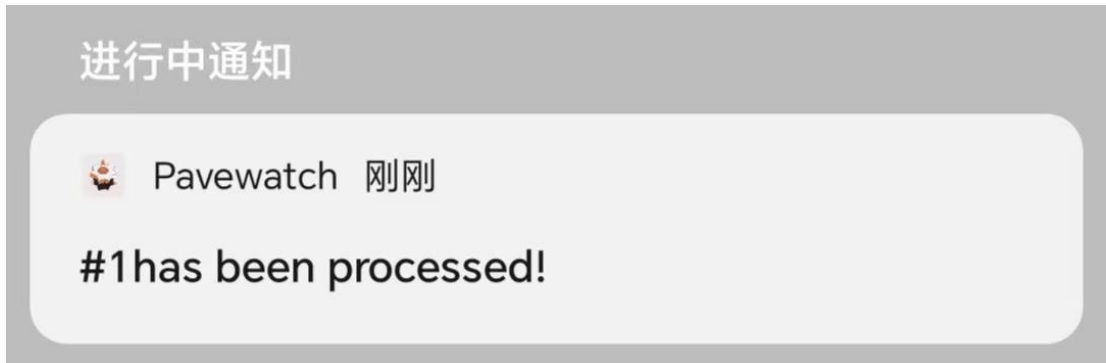
- Report ID: #1
- DateTime: 07/08/2023
- Location: 2367, Kampar, Perak, ,31900 Malaysia
- Description: Here

Below the information, there is a blue button labeled "ASSIGN CONTRACTOR". Underneath this button is a dropdown menu currently showing "Penang" with a downward arrow. At the bottom of the form is another blue button labeled "CONFIRM".

**Figure 13.16 Assign Contractor Page**

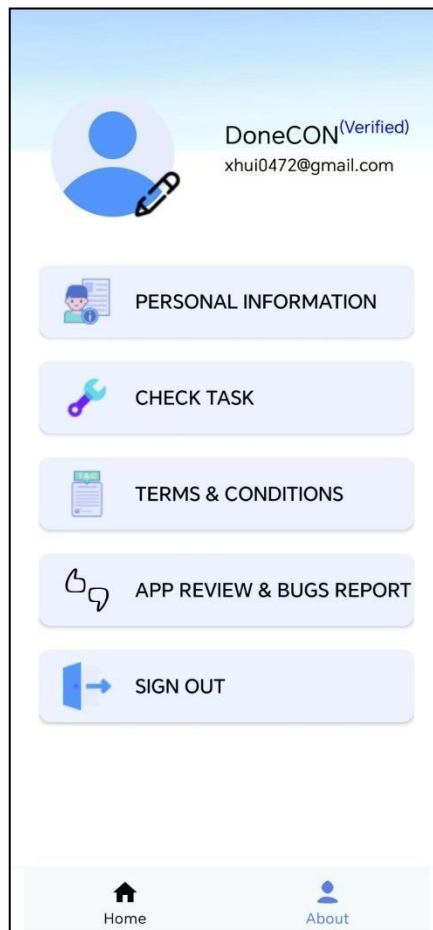
In this page, authority can assign the contractor by pressing the assign contractor first then the spinner which contains a list of contractors to be chosen will appear. After selecting one of the contractors, pressing the ‘Confirm’ button will then assign to the respective contractor to be work on the pothole. The contractor side will receive notification that one task has been assigned.





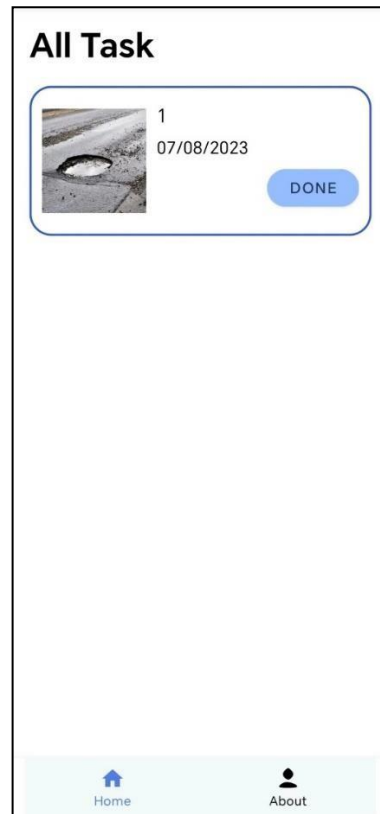
**Figure 13.17 Notification about Processed Task**

After assigned task successfully to a contractor, user side will receive notification that the report has been processed as shown in Figure 13.17.



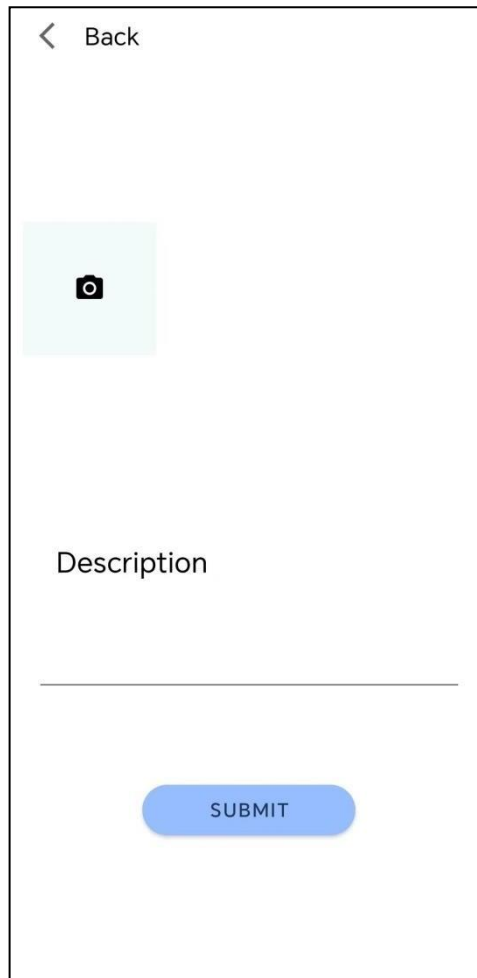
**Figure 13.18 Profile Page (Contractor)**

This is the about page of contractor. Contractor can change their personal information, check submitted task's status, provide feedback to application, and do log out.



**Figure 13.19 Contractor View Task Page**

Figure 13.19 shows contractor home page where they can view the tasks that assigned to them. The contractor can view the task details by pressing the report. Other than that, there will be a 'Done' button to let contractors submit their work.



**Figure 13.20 Submit Task Page**

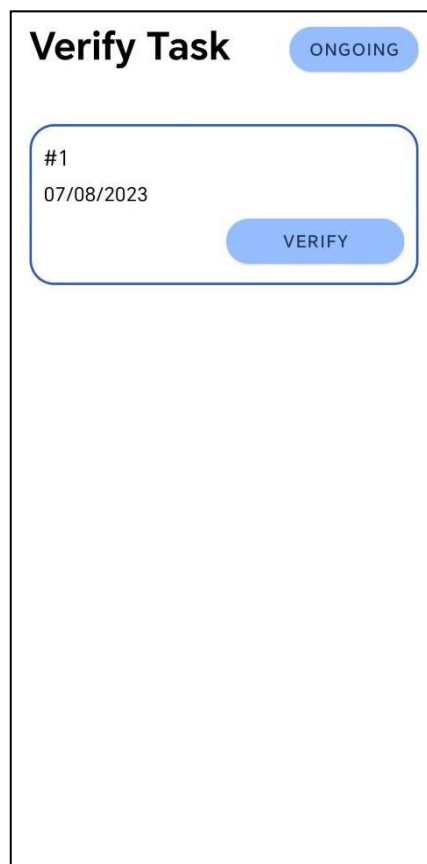
This is the page where after contractor press the ‘Done’ button. They need to provide photos as proof and enter description to be submitted to admin for verification. After submitting, it will show in the ‘Check Task’ section on profile page as shown in Figure 13.20. At the same time, admin will receive notification to verify the particular task as shown in Figure 13.21.



**Figure 13.21 Task Submitted Page**



**Figure 13.22 Notification to Verify Task**



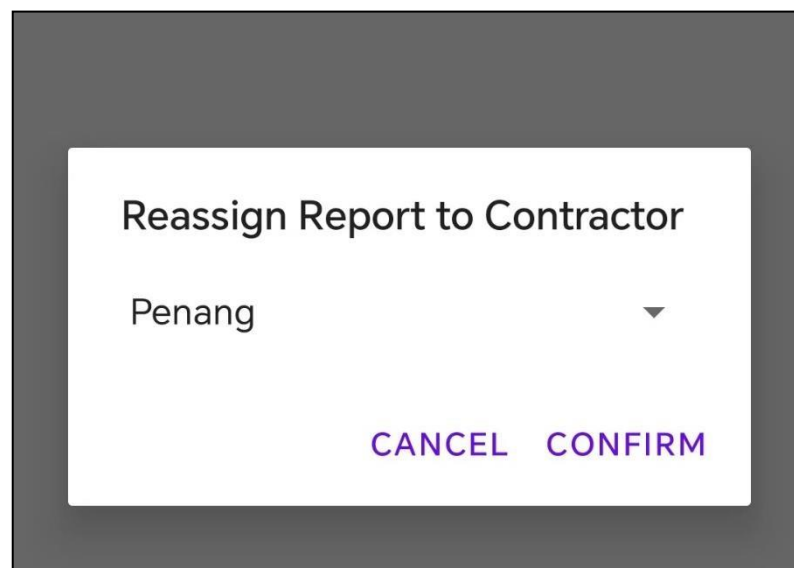
**Figure 13.23 Verify Task Page**

Figure 13.23 is the page where the admin can view tasks that have been submitted by every contractor. By clicking on the 'Verify' button, the admin will be redirected to Figure 13.25 which can view proof pictures to approve or reject the tasks.

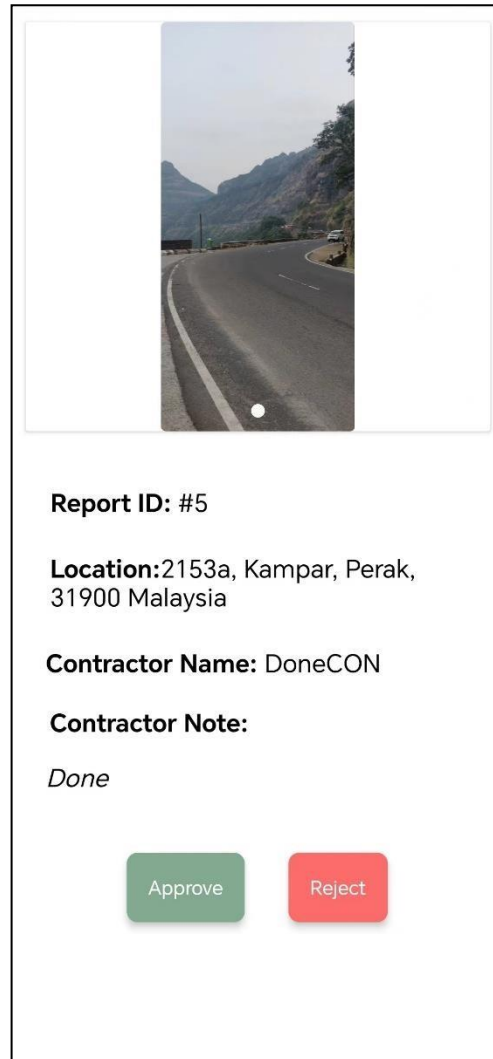


**Figure 13.24 Ongoing Tasks Page**

Pressing the Ongoing button on the top right corner of Verify Task page as shown in Figure 13.23, it will show page above where a list of processing tasks that assigned to the contractors. There will be a 'REASSIGN' button on every reports shown to let the authority to reassign the report to another contractor to process the work in case there is any emergency case. Pressing on the button will pop out a dialog box as shown in Figure 13.25 which shown a list of contractors to be chosen.

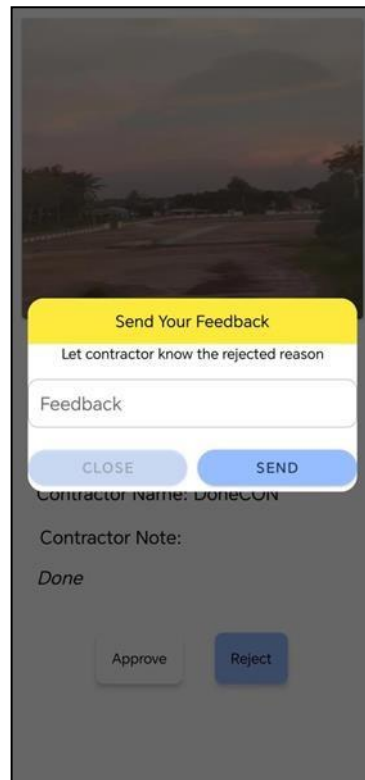


**Figure 13.25 Dialog box to Reassign Report**



**Figure 13.26 View Submitted Task Details Page**

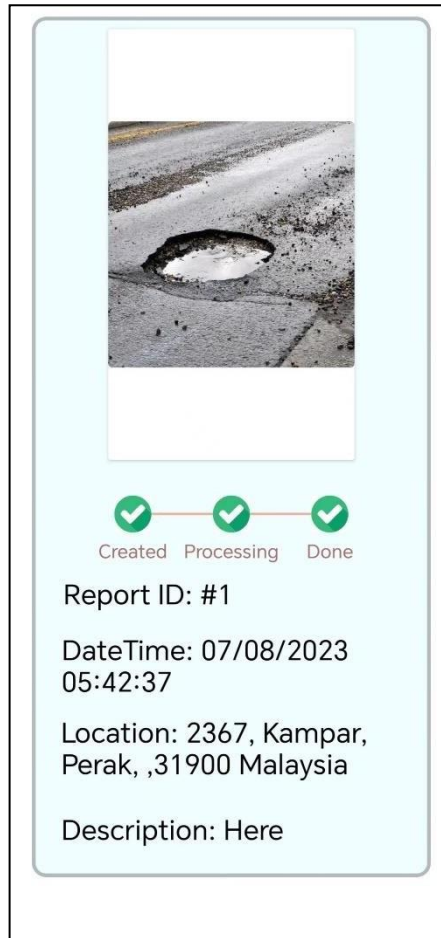
In Figure 13.26, the admin can view the task submitted details and choose to approve or reject the tasks. If you choose to approve, the status will be updated to ‘Successful’ for the contractor side and ‘Done’ for the user and admin side and send notification about the status being updated. If chosen to reject, the admin will need to give a reason as shown in Figure 13.27 to let the contractor know what to improve.



**Figure 13.27 Send Feedback Page**



**Figure 13.28 'Successful'**



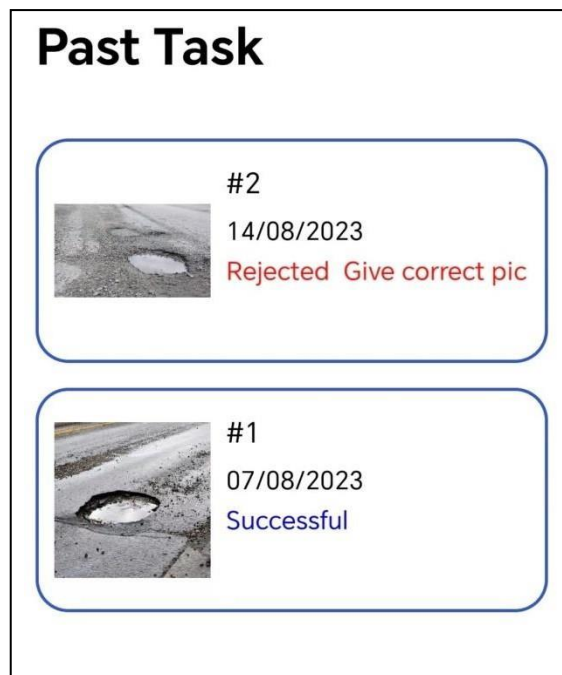
**Figure 13.29 Status Updated in User Dashboard (Successful)**

This is the report details page when the task is successfully repaired. The progress bar will change.





**Figure 13.30 'Pending Verify'**

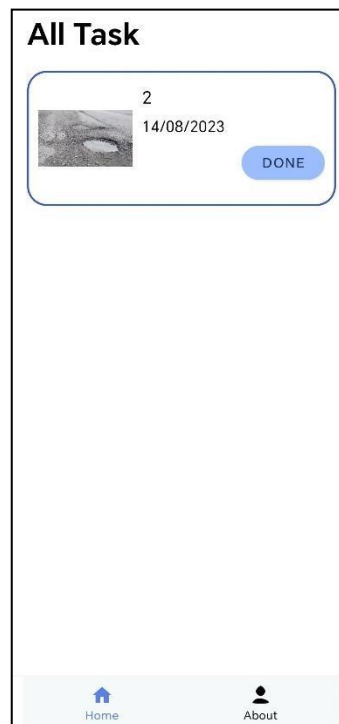


**Figure 13.31 'Rejected'**

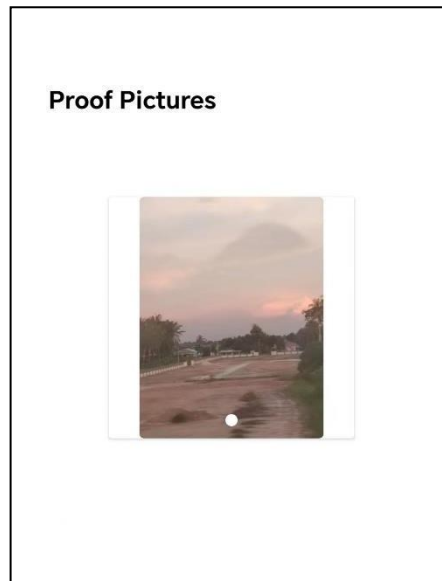


**Figure 13.32 Notification When Task Rejected**

A notification will be sent to the contractor's phone to notify the contractor about the task's status and the need to rework it. The task will then appear again on the task page as shown in Figure 13.33.

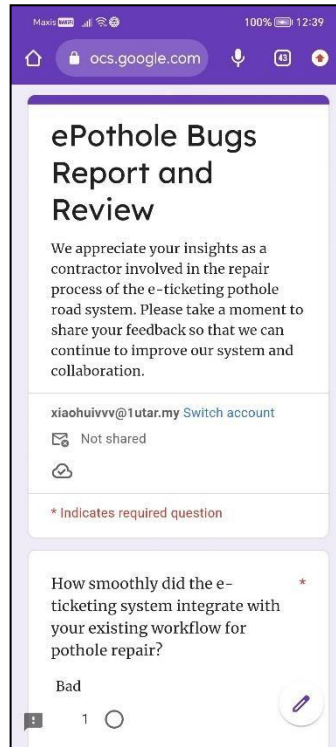


**Figure 13.33 Show Task Rejected Page**



**Figure 13.34 Show Proof Pictures Page**

Figure 13.34 above will appear when the contractor presses on the task to view the pictures that have been submitted. This page will show when the user presses on the 'View Result' button on the report details page to view the report that has been completed too.



**Figure 13.35 Bugs Report and Review for Contractor**

Figure 13.35 above shows where the contractor can provide recommendations and report bugs that have been experienced in the application by pressing on the ‘App Review & Bugs Report’ section on the about page.

## CHAPTER 6 SYSTEM TESTING AND EVALUATION

### 6.1 Unit Testing

#### 6.1.1 Authentication Module

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Pass/Fail
<b>Sign Up</b>					
1	Check when valid format email is entered during registration	Username:taylor Email: <a href="mailto:taylor@gmail.com">taylor@gmail.com</a> (valid email) Password: taylorpass (valid password)	Registration should be successful	As expected	Pass
2	Check valid account registered successfully	-	Send email verification link and redirect to login page	As expected	Pass
3	Check response when duplicate email account register	Email: <a href="mailto:alice@gmail.com">alice@gmail.com</a> (duplicate email)	Show “Sign-up Failed. The email address is in use by another account” and registration should not be successful	As expected	Pass
4	Check when invalid format email registered	Email: <a href="mailto:alice">alice</a> (invalid email)	Show “Sign-up Failed. The email address is badly formatted” and registration should not be successful	As expected	Pass
<b>Login and Forgot Password</b>					
5	Check valid account with password login	Email: <a href="mailto:xxiaohui12@gmail.com">xxiaohui12@gmail.com</a> (valid &verified email) Password: alicepass (valid password)	Show ‘Login Successfully’ and Login should be successful	As expected	Pass
6	Check when invalid email login	Email: <a href="mailto:alice1@gmail.com">alice1@gmail.com</a> (invalid email) Password: alicepass (valid password)	Show ‘Login Failed’ and Login should not be successful	As expected	Pass

CHAPTER 6

7	Check when wrong password entered when login	Email: <a href="mailto:alice@gmail.com">alice@gmail.com</a> (valid email) Password: alicepass1 (invalid password)	Show 'Login Failed' and Login should not be successful	As expected	Pass
8	Check response when user tap forgot password text	-	Redirect to forgot password page	As expected	Pass
9	Check response when user entered their valid email and press reset button	Email: <a href="mailto:alice@gmail.com">alice@gmail.com</a> (valid email)	Send reset link to the email	As expected	Pass
10	Check response when cancel button pressed	-	Redirect back to login page	As expected	Pass
11	Check invalid email address entered during forgot password	Email: <a href="mailto:alice1@gmail.com">alice1@gmail.com</a> (unregistered email)	Show 'Failed to send'	As expected	Pass
12	Check response when account not verified email	Email: <a href="mailto:alice@gmail.com">alice@gmail.com</a> (not verified email)	Should not be able to login successfully	As expected	Pass

*Table 6.1 Authentication Module Unit Testing*

CHAPTER 6

6.1.2 Map Module

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Pass/Fail
<b>Map Module</b>					
1	Check when user's device not granted location permission	-	Pop up window to let user enable permission on the location	As expected	Pass
2	Check response when user's device GPS enabled	-	Pop up window shows that need to enable GPS	As expected	Pass
3	Check response when user clicks on the tick button after select the address	-	Redirect to report page and address bar will show the location	As expected	Pass
4	Check response when user pinpoint the map	-	Able to pinpoint	As expected	Pass

*Table 6.2 Map Module Unit Testing*

## CHAPTER 6

### 6.1.3 Report Module (User)

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Pass/Fail
<b>Report</b>					
1	Check response when user tap on camera button	-	Pop up permission request and after granted, camera function works and able to snap photo	As expected	Pass
2	Check response when user tap on gallery button	-	Pop up permission request and after granted, can open gallery	As expected	Pass
3	Check when user select more than one picture	-	Able to view pictures in the slider	As expected	Pass
4	Check response when user tap on the location icon	-	Pop up permission request first time and map service enabled after granted	As expected	Pass
5	Check response when redirect back to this page from map module	-	The information that user entered before did not lose	As expected	Pass
6	Check response when user tap on save button if description were not entered	-	Able to submit report	As expected	Pass
7	Check response when user does not get location and press save button	-	Report unable to save successfully and shows an exclamation icon on location side	As expected	Pass
8	Check response when there is no picture when submit the report	-	Report unable to save successfully and shows 'Provide some images'	As expected	Pass

*Table 6.3 Report Module Unit Testing*



## CHAPTER 6

### 6.1.4 Profile Page (User)

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Pass/Fail
<b>Personal Information</b>					
1	Upload profile picture	-	Able to upload profile picture successfully and shows in the image view	As expected	Pass
2	Check response when edited email is same with the duplicate email	Email: <a href="mailto:xxiaohui12@gmail.com">xxiaohui12@gmail.com</a> (duplicate email)	Show “The email address is in use by another account” and registration should not be successful	As expected	Pass
3	Check response when same email is entered when update email	Email: <a href="mailto:xxiaohui12@gmail.com">xxiaohui12@gmail.com</a> Updated email: xxiaohui12@gmail.com	Show “Email is same with the registered email” and email will not be updated	As expected	Pass
4	Check response which user enter the new password is not same during confirmation to reset their password	New Password: 123 Confirm Password: 1234	Show “Password Do not Match” and should not be able to reset the password	As expected	Pass
5	Check response when same password is entered during forgot password	Password:123 Confirm Password: 123	Able to reset password successfully	As expected	Pass
6	Check response when only one field to update	Username:- Email:xxiaohui12@gmail.com Phone:-	Changed successfully	As expected	Pass
7	Check response when user tap on delete account	-	Pop up confirm dialog	As expected	Pass

CHAPTER 6

8	Check response when press on 'App Review & Bugs Report' section	-	Should be able to redirect to google form page	As expected	Pass
---	---	---	--	-------------	------

Table 6.4 Profile Module Unit Testing

6.1.5 Report History Page

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Pass/Fail
<b>User Side</b>					
1	Check view report history details	-	Able to view reports made before	As expected	Pass
2	Check response when the report status updated	-	Status in the report history changed and receive notification	As expected	Pass
3	Check response when user press on the 'View Task' button when the report is completed	-	Should be able to redirect to page where shows proof pictures of the work done	As expected	Pass
<b>Admin Side</b>					
1	Check response when there is new report made by user	-	Able to receive notification and show on main page	As expected	Pass
2	Check views all reports	-	Able to view all reports made by users	As expected	Pass
3	Check response when assigned button is pressed	-	Able to view a list of contractors and select it	As expected	Pass
4	Check response when submit button is pressed	Report id: #1	Receive notification "#1 has been processed"	As expected	Pass

CHAPTER 6

6	Check response when admin try to search report by report id	-	Able to view related reports	As expected	Pass
7	Check response when admin try to filter report using status	-	Able to view related reports	As expected	Pass
8	Check admin can make report	-	Able to make reports successfully	As expected	Pass
9	Check response when admin press on 'View Task' button when the report is completed	-	Should be able to redirect to page where shows proof pictures of the work done	As expected	Pass

*Table 6.5 History Module Unit Testing*

CHAPTER 6

6.1.6 Add Contractor Page

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Pass/Fail
<b>Add Contractor</b>					
1	Check response when email address is blank when add button is clicked	Username: Cally Email: Password:contractorpass	Show exclamation icon on email field and should not registered successfully	As expected	Pass
2	Check response when admin did not enter the password when register account for contractor	Username: Cally Email: <a href="mailto:callypenang@gmail.com">callypenang@gmail.com</a> Password:	Show exclamation icon on password field and should not registered successfully	As expected	Pass
3	Check response when admin did not entered username during registration for the contractor	Username: Email: <a href="mailto:callypenang@gmail.com">callypenang@gmail.com</a> Password:890	Show exclamation icon on username field and should not registered successfully	As expected	Pass
4	Check response when valid email address is entered	Username: DoneCONE Email: xhui0472@gmail.com (valid email) Password:xhui0472pass (valid password)	Registration should be successful	As expected	Pass
5	Check response when invalid email address format entered during registration	Username: Cally Email: <a href="mailto:callypenang">callypenang</a> (invalid email address) Password:890	Show “The email address is badly formatted’ and registration should not successful	As expected	Pass
6	Check response when duplication of email account entered	Username: Cally Email:xxiaohui12@gmail.com (duplicate email) Password:contractorpass	Show “The email address is already in use by another account’ and registration should not successful	As expected	Pass

*Table 6.6 Add Contractor Unit Testing*

## CHAPTER 6

### 6.1.7 Contractor Manage Task

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Pass/Fail
<b>Assignment</b>					
1	Check response when admin assigned a report	-	Contractor assigned can view the assigned report	As expected	Pass
2	Check response when contractor pressing the done button for a particular report	-	Redirected to page to submit evidence	As expected	Pass
3	Check response when user pressed a particular report	-	Show related report details	As expected	Pass
<b>Submit Task</b>					
3	Check response when description is not entered when pressing the submit button	-	Show 'Please fill in description' and should not be able to submit successfully	As expected	Pass
4	Check response when user pressing the camera icon area	-	Able to view gallery and select images	As expected	Pass
5	Check response when user selects image/images	-	Able to view in the slider	As expected	Pass
6	Check response when user did not submit any proof pictures when pressing submit button	Images: None Description: Done	Show "No images selected. Please provide image" and should not be able to submit successfully	As expected	Pass

CHAPTER 6

7	Check response when user provide images and description when pressing submit button	-	Able to submit successfully and admin side should receive notification about it	As expected	Pass
---	---	---	---	-------------	------

*Table 6.7 Contractor Manage Task Unit Testing*

6.1.8 Task status changed

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Pass/Fail
<b>Contractor Side</b>					
1	Check response when user pressed on check task section in profile page	-	If previously submitted the report should be able to view report submitted and the progress	As expected	Pass
2	Check response when admin rejected the task made by the particular contractor	-	Contractor side should receive notification and will show up in the task list	As expected	Pass
3	Check response when admin approve the task	-	Contractor side will receive notification that the task approved	As expected	Pass
<b>Admin Side</b>					
4	Check response when admin pressed the approve button	-	Status updated	As expected	Pass
5	Check response when admin pressed the reject button	-	Pop up dialog where need to submit feedback and after filling in should be able to send successfully	As expected	Pass
6	Check response when admin pressed a particular task on verify task page	-	Should be able to view submitted task list	As expected	Pass

### *Table 6.8 Task Module Unit Testing*

#### 6.2 Project Challenges

Mobile applications aspire to create a favourable initial impression on users in order to both attract and retain them effectively. In essence, the triumph of a mobile application hinges on user count and the quality of their experiences. Within this framework, the critical factor lies in the **application's compatibility** with various devices, encompassing operating systems and screen dimensions [13]. It's imperative that the application functions seamlessly across diverse devices. Addressing this challenge demands a substantial investment of time to engage in surveys or research targeting the user base, a task that might pose challenges for a student to undertake.

Apart from ensuring the application's compatibility with devices, another significant hurdle to overcome is guaranteeing its **seamless operation**, free from glitches or crashes. Simultaneously, it's essential to maintain efficient memory consumption. When the application performs well, it can attract a substantial user base, thereby fostering the growth and outreach of the business. Nevertheless, crafting an application that is entirely free of bugs isn't a straightforward endeavour for an individual developer.

#### 6.3 Concluding Remark

Based on the outcomes of the unit testing, it can be inferred that all modules are functioning seamlessly, and there are no significant or critical flaws that could disrupt the flow of these modules.

## CHAPTER 7 CONCLUSION AND RECOMMENDATION

### 7.1 Conclusion

Potholes are a common problem on roads worldwide. The formation of potholes can be attributed to a variety of factors, such as weather conditions, traffic volume, and the overall quality of the road surface. Potholes can cause damage to vehicles, increase the risk of accidents, and reduce road safety. The current process of reporting potholes through phone calls, emails, WhatsApp, and websites can be cumbersome and ineffective. There is a lack of centralized and standardized record-keeping, which can lead to a lack of accountability and difficulty in tracking the status of pothole repairs. Depending on the workload of the local authorities and the severity of the pothole, this process could take days, weeks, or even months. Lack of effective communication between road authorities and road users can lead to a lack of transparency and trust. Road users may feel that their complaints are not being heard or addressed, and road authorities may not have a clear understanding of the extent and severity of the pothole problem.

By offering a user-friendly platform for reporting and tracking pothole repairs, the e-ticketing pothole road system endeavours to tackle these issues. This system allows residents to report potholes quickly and easily through this platform. The system then generates an e-ticket for the pothole and assigns it to the authority for repair. One of the key benefits of the e-ticketing pothole road system is that it provides transparency and communication between authorities and residents. Users can track the status of their report made and receive notifications updates on the progress of repairs. This improves customer satisfaction and reduces frustration among residents. It can help local authorities to prioritize repairs and allocate resources effectively. As a result, this can optimize the utilization of resources and enhance the effectiveness of pothole repairs. Contractor function also will be the feature to be implement in this system where they can communicate with authority to update the status of the pothole after fixed more with the use of this platform. This streamlined the process of pothole repair and make it easier for authority to manage.

Overall, the e-ticketing pothole road system is a novel and successful solution to the problem of road potholes. It has the potential to improve road safety, customer



## CHAPTER 7

happiness, efficiency, cost reduction, sustainability, and give useful data for planning and decision-making.

### 7.2 Future Work

Once the development and testing of the proposed application are completed, the app will initiate a maintenance phase aimed at enhancing the user interface design. Following the refinement of the application, it will be released for free on platforms like Huawei AppGallery, aiming to draw a larger user base. This user engagement will enable the collection of valuable feedback and suggestions to further enhance and enrich the application's functionality and overall user satisfaction.

## REFERENCES

- [1] J. H. Sendut, "Why Malaysia's potholes are a human rights issue," *Medium*, 10-Jan-2021. [Online]. Available: [https://medium.com/@jhs\\_/why-malysias-potholes-are-a-human-rights-issue-715a3c65cb70](https://medium.com/@jhs_/why-malysias-potholes-are-a-human-rights-issue-715a3c65cb70). [Accessed: Nov-2022].
- [2] B. Ch'ng, "More than 50k potholes in S'gor reported on Waze," *The Star*, 03-Nov-2020. [Online]. Available: <https://www.thestar.com.my/metro/metro-news/2020/11/03/more-than-50k-potholes-in-s039gor-reported-on-waze>. [Accessed: Nov-2022].
- [3] Johnson, A M. "Best Practices Handbook On Ashphalt Pavement Maintenance" National Technical Information Service 2009 <http://trid.trb.org/view.aspx?id=648010>
- [4] N. Ng, "There are 52k potholes in Selangor alone. guess how much it'll cost to fix them?," *CILISOS*. [Online]. Available: <https://cilisos.my/there-are-52k-potholes-in-selangor-alone-guess-how-much-itll-cost-to-fix-them/>. [Accessed: Nov-2022].
- [5] S. Burgart, "Gap Trap: A pothole detection and reporting system utilizing mobile devices," 01-Jan-1970. [Online]. Available: [https://www.cs.umd.edu/sites/default/files/scholarly\\_papers/Burgart.pdf](https://www.cs.umd.edu/sites/default/files/scholarly_papers/Burgart.pdf). [Accessed: 25-Nov-2022].
- [6] A. Nordin, A. S. . Rosli, and M. Roslan, "Design and Development of a Pothole Tracking System (PotAlert) using Web Progressive Application (WPA)", *IJPCC*, vol. 8, no. 1, pp. 1–10, Jan. 2022.
- [7] D. S. Fernandez, "How to report potholes in Selangor using Waze," *DSF.my*, 15-Dec-2017. [Online]. Available: <https://www.dsf.my/2017/12/how-to-report-potholes-in-selangor-using-waze/>. [Accessed: 25-Nov-2022].
- [8] A. PRASANNA and D. A. V. SENTHIL KUMAR, *ONLINE COMPLAINT REGISTRATION AND MANAGEMENT SYSTEM TO MUNICIPALITY*, vol. 8, no. 5, pp. 1–7, May 2020.
- [9] A. Bamne, and O. Shinde. "Pothole Tracking System Using Android," *International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE)*, vol. 5, no. 6, pp. 350-354, 2016.
- [10] C. B. LLC, *Street Bump*. [Online]. Available: <http://www.streetbump.org/about>. [Accessed: 05-Dec-2022].
- [11] G. Lye, "Reporting potholes in Selangor with the Waze App," *Reporting potholes in Selangor with the Waze app*, 13-Dec-2017. [Online]. Available: <https://paultan.org/2017/12/13/reporting-potholes-in-selangor-with-the-waze-app/>. [Accessed: 05-Dec-2022].


## REFERENCES

- [12] Gonçalves, L. (2023) *What Is Agile Methodology, A Guide For Leaders, Everything You Need To Know About What is Agile Methodology*. Available at: <https://adaptmethodology.com/what-is-agile-methodology/>.
- [13] Souvik, “15 Real Challenges in Mobile Application Development,” (RS)WEBSOLS, 2021.  
<https://www.rswebsols.com/tutorials/softwaretutorials/mobile-application-development-challenges> (accessed 14-Aug- 2022)

## APPENDIX

### A.1 Survey Questionnaire For User

## ePothole Testing- Bugs and Errors

xiaohuivvv@1utar.my [Switch account](#) 

\* Indicates required question

Email \*

Record xiaohuivvv@1utar.my as the email to be included with my response

Did you encounter any bugs or errors while using this application? \*

Yes

No

[Next](#) [Clear form](#)

**Errors and Bugs**

Have you encountered any difficulties while navigating through the e-ticketing pothole road system? \*

Yes

No

Did you experience any delays or slow loading times when accessing the system? \*

Yes

No

Were you able to successfully submit a pothole report using the system? \*

Yes

No

Did you encounter any errors or glitches while uploading images of the reported potholes? \*

Yes

No

## APPENDIX

<p>Were you able to accurately specify the location of the pothole using the system's map feature? *</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
<p>Were you able to track the status of your reported pothole repair on the system? *</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
<p>Did you receive timely updates or notifications about the progress of the pothole repair? *</p> <p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p>
<p>Is there any other errors and bugs you recognized?</p> <p>Your answer _____</p>

## APPENDIX

### Review Form

I think the User Interface is easy to understand and to use. \*

1      2      3      4      5

Strongly Disagree                  Strongly Agree

How would you rate your overall experience of using the app? \*

1      2      3      4      5

Bad                  Excellent

What aspects of the system do you think we need to improve on it?

Your answer \_\_\_\_\_


[Back](#)   [Next](#)   [Clear form](#)

### Recommendation

Any Recommendations?  
We appreciate your recommendations and opinions to help us improve your report experience.

Your answer

---



Back Submit Clear form





## APPENDIX

### A.2 Survey Questionnaire for Contractor

### ePothole Bugs Report and Review

We appreciate your insights as a contractor involved in the repair process of the e-ticketing pothole road system. Please take a moment to share your feedback so that we can continue to improve our system and collaboration.

xiaohuivvv@1utar.my [Switch account](#) 

 Not shared

\* Indicates required question

How smoothly did the e-ticketing system integrate with your existing workflow for pothole repair? \*

1 2 3 4 5

Bad      Seamlessly

Were you able to receive pothole repair requests in a timely and organized manner? \*

Yes

No

Did you encounter any challenges or issues when receiving repair assignments through the system? \*

Yes

No

[Next](#) [Clear form](#)

## APPENDIX

<p>Did the system provide accurate and clear information about the location * and severity of reported potholes?</p> <p>1      2      3      4      5</p> <p><input type="radio"/>    <input checked="" type="radio"/>    <input type="radio"/>    <input type="radio"/>    <input type="radio"/></p>
<p>Were you able to promptly schedule and complete pothole repairs * through the system?</p> <p><input checked="" type="radio"/> Yes</p> <p><input type="radio"/> No</p>
<p>Did you find the system's notification and update features helpful in * keeping all parties informed about repair progress?</p> <p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p>
<p>Did you experience any technical issues, errors, or slowdowns while * using the e-ticketing system?</p> <p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p>
<p>Were there any challenges when uploading images or documentation * related to the repair work?</p> <p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p>

## APPENDIX

How would you rate the overall performance and reliability of the system? \*

1 2 3 4 5

Bad      Excellent

Were you able to provide feedback or updates on the repair progress directly within the system? \*

Yes

No

What aspects of the system worked well for you, and what areas would you suggest for improvement?

Your answer

Do you have any recommendations for enhancing the contractor's experience within the system?

Your answer

Thank you for your valuable input. Your feedback will help us enhance the system and strengthen our collaboration for more efficient pothole repairs.

[Back](#) [Submit](#) [Clear form](#)

# WEEKLY REPORT

## FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

Trimester, Year: Y3S1	Study week no.:3
Student Name & ID: Poh Xiao Hui 2001877	
Supervisor: Miss Ana Nabilah	
Project Title:E-ticketing pothole road system	

### 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Task assign module (admin can assign tasks, contractor can view task assigned, contractor can submit work done to verify, admin can approve/reject the work done by contractors, status updated)
- Fixed only single image can upload by adding viewpager and image slider to view multiple images
- Adding password show/hide feature

### 2. WORK TO BE DONE


- Send notification
- Add function for admin to manually upload report

### 3. PROBLEMS ENCOUNTERED

No problem at this stage

### 4. SELF EVALUATION OF THE PROGRESS

Progress on the track

  
\_\_\_\_\_  
Supervisor's signature  
\_\_\_\_\_  
Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Y3S1</b>	<b>Study week no.: 7</b>
<b>Student Name &amp; ID: Poh Xiao Hui 2001877</b>	
<b>Supervisor: Miss Ana Nabilah</b>	
<b>Project Title: E-ticketing pothole road system</b>	

## 1. WORK DONE

[Please write the details of the work done in the last fortnight.]

- Send notification
- Add function for admin to manually upload report

## 2. WORK TO BE DONE

Email verification for account, Implement testing

## 3. PROBLEMS ENCOUNTERED

Email verification does not pop out

## 4. SELF EVALUATION OF THE PROGRESS

Causes delay on email verification part



Supervisor's signature



Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Y3S1</b>	<b>Study week no.: 9</b>
<b>Student Name &amp; ID: Poh Xiao Hui 2001877</b>	
<b>Supervisor: Miss Ana Nabilah</b>	
<b>Project Title: e-ticketing pothole road system</b>	

## 1. WORK DONE

Finish integrating email verification  
Fix some bugs that notified during testing

## 2. WORK TO BE DONE

Continue testing

## 3. PROBLEMS ENCOUNTERED

No problem in this stage

## 4. SELF EVALUATION OF THE PROGRESS

Progress on the track



Supervisor's signature



Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Y3S1</b>	<b>Study week no.: 11</b>
<b>Student Name &amp; ID: Poh Xiao Hui 2001877</b>	
<b>Supervisor: Miss Ana Nabilah</b>	
<b>Project Title: e-ticketing pothole road system</b>	

## 1. WORK DONE

Add function which is report can reassign to another contractor

## 2. WORK TO BE DONE

Finalize report

## 3. PROBLEMS ENCOUNTERED

No problem at this stage

## 4. SELF EVALUATION OF THE PROGRESS

Progress on the track



Supervisor's signature



Student's signature

# FINAL YEAR PROJECT WEEKLY REPORT

(Project II)

<b>Trimester, Year: Y3S1</b>	<b>Study week no.: 13</b>
<b>Student Name &amp; ID: Poh Xiao Hui 2001877</b>	
<b>Supervisor: Miss Ana Nabilah</b>	
<b>Project Title: e-ticketing pothole road system</b>	

## 1. WORK DONE

- Finalize report
- Fixed bugs and enhancement

## 2. WORK TO BE DONE

-

## 3. PROBLEMS ENCOUNTERED

No problem at this stage

## 4. SELF EVALUATION OF THE PROGRESS

Progress on the track



Supervisor's signature



Student's signature



# POSTER



# E-TICKETING POTHOLE ROAD SYSTEM

Author: Poh Xiao Hui

Supervisor: Miss Ana Nabilah

## INTRODUCTION

Proposed project will be developing a e-ticketing pothole road system that let users to report a pothole in a systematic way no matter where they are and make it convenient for the report process as possible.

## CONCLUSION

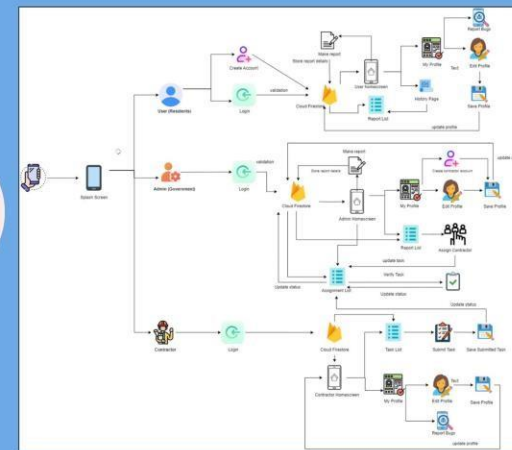
As a conclusion, the proposed application will help improve efficiency compare with current systems. In order to implement the proposed application, number of papers and prototyped systems have been researched to understand strengths and weaknesses.

## RESULTS

Proposed project will be developing a e-ticketing pothole application that provide features such as authentication, status notification, google map integration which users can pinpoint the map and post reports and manage reports, and so on.

## METHODS

Methodology:  
Agile Methodology



## DISCUSSION

Most of the time citizens report potholes through various ways such as phone calls, Whatapps, email and so on. Therefore, it makes it hard to manage the report for the authority to process afterwards in a systematic way. Other than that, road users cannot have a two-way communication with the authority to know the progress of the road they report.

## PLAGIARISM CHECK RESULT

FYP2\_IB\_Poh Xiao Hui

ORIGINALITY REPORT

8%

SIMILARITY INDEX

6%

INTERNET SOURCES

0%

PUBLICATIONS

5%

STUDENT PAPERS

PRIMARY SOURCES

1

[eprints.utar.edu.my](http://eprints.utar.edu.my)

Internet Source

2%

2

[www.papercamp.com](http://www.papercamp.com)

Internet Source

1%

3

Submitted to Universiti Tunku Abdul Rahman

Student Paper

1%

4

Submitted to Australian Catholic University

Student Paper

1%

5

Submitted to University of Westminster

Student Paper

<1%

6

Submitted to Asia Pacific University College of  
Technology and Innovation (UCTI)

Student Paper

<1%

7

Submitted to National School of Business  
Management NSBM, Sri Lanka

Student Paper

<1%

8

"Configuring Federation", Pro LCS, 2007

Publication

<1%

9

[canaltech.com.br](http://canaltech.com.br)

## PLAGIARISM CHECK RESULT

	Internet Source	<1 %
10	Submitted to University of Wales Institute, Cardiff Student Paper	<1 %
11	eprints.soton.ac.uk Internet Source	<1 %
12	Submitted to Pathfinder Enterprises Student Paper	<1 %
13	Submitted to Sir John Cass Redcost CofE Secondary & Sixth Form Student Paper	<1 %
14	ir.unimas.my Internet Source	<1 %
15	www.coursehero.com Internet Source	<1 %
16	forum.dtu.edu.vn Internet Source	<1 %
17	studentsrepo.um.edu.my Internet Source	<1 %
18	discol.umk.edu.my Internet Source	<1 %
19	rc.nida.ac.th Internet Source	<1 %
20	ethesisarchive.library.tu.ac.th Internet Source	<1 %
21	Edward Sciore. "Chapter 13 Security", Springer Science and Business Media LLC, 2020 Publication	<1 %
22	Murat Yener, Onur Dunder. "Using Android NDK with Android Studio", Wiley, 2016 Publication	<1 %

PLAGIARISM CHECK RESULT

<b>Form Title: Supervisor's Comments on Originality Report Generated by Turnitin for Submission of Final Year Project Report (for Undergraduate Programmes)</b>			
Form Number: FM-IAD-005	Rev No.: 0	Effective Date:	Page No.: 1 of 1



**FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY**

<b>Full Name(s) of Candidate(s)</b>	Poh Xiao Hui
<b>ID Number(s)</b>	2001877
<b>Programme / Course</b>	Business Information Systems(IB)
<b>Title of Final Year Project</b>	e-ticketing pothole road system

<b>Similarity</b>	<b>Supervisor's Comments (Compulsory if parameters of originality exceed the limits approved by UTAR)</b>
<b>Overall similarity index: <u>8</u></b>  <b>% Similarity by source</b> Internet Sources: <u>6</u> % Publications: <u>0</u> % Student Papers: <u>5</u> %	
<b>Number of individual sources listed of more than 3% similarity: <u>0</u></b>	
<b>Parameters of originality required, and limits approved by UTAR are as Follows:</b> (i) Overall similarity index is 20% and below, and (ii) Matching of individual sources listed must be less than 3% each, and (iii) Matching texts in continuous block must not exceed 8 words <i>Note: Parameters (i) – (ii) shall exclude quotes, bibliography and text matches which are less than 8 words.</i>	

Note: Supervisor/Candidate(s) is/are required to provide softcopy of full set of the originality report to Faculty/Institute

***Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.***

## PLAGIARISM CHECK RESULT

Signature of Supervisor

Name:

\_\_\_\_\_  
| Ana Nabilah Binti Sa'udi |  
\_\_\_\_\_

Date:

\_\_\_\_\_  
| 15 September 2023 |  
\_\_\_\_\_

Signature of Co-Supervisor

Name:

\_\_\_\_\_

Date:

\_\_\_\_\_

## FYP 2 CHECKLIST

### UNIVERSITI TUNKU ABDUL RAHMAN

#### FACULTY OF INFORMATION & COMMUNICATION

#### TECHNOLOGY (KAMPAR CAMPUS)

#### CHECKLIST FOR FYP2 THESIS SUBMISSION

Student Id	2001877
Student Name	Poh Xiao Hui
Supervisor Name	Miss Ana Nabilah

TICK (✓)	DOCUMENT ITEMS
	Your report must include all the items below. Put a tick on the left column after you have checked your report with respect to the corresponding item.
✓	Front Plastic Cover (for hardcopy)
✓	Title Page
✓	Signed Report Status Declaration Form
✓	Signed FYP Thesis Submission Form
✓	Signed form of the Declaration of Originality
✓	Acknowledgement
✓	Abstract
✓	Table of Contents
✓	List of Figures (if applicable)
✓	List of Tables (if applicable)
	List of Symbols (if applicable)
✓	List of Abbreviations (if applicable)
✓	Chapters / Content
✓	Bibliography (or References)
✓	All references in bibliography are cited in the thesis, especially in the chapter of literature review
✓	Appendices (if applicable)
✓	Weekly Log
✓	Poster
✓	Signed Turnitin Report (Plagiarism Check Result - Form Number: FM-IAD-005)
✓	I agree 5 marks will be deducted due to incorrect format, declare wrongly the ticked of these items, and/or any dispute happening for these items in this report.

\*Include this form (checklist) in the thesis (Bind together as the last page)

I, the author, have checked and confirmed all the items listed in the table are included in my report.



(Signature of Student)

Date: 11/9/2023