URBAN ALERT COMMUNITY FAULT REPORTING SYSTEM

MOHAMMAD ASYRAF BIN NOR ZAHID

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This report is submitted in partial fulfilment of the requirements for the Bachelor of Computer Science (Database Management) with Honours.

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2024

DECLARATION

I hereby declare that this project report entitled

URBAN ALERT COMMNITY FAULT REPORTING SYSTEM

is written by me and is my own effort and that no part has been plagiarized

without citations.

STUDENT : MOHAMMAD ASYRAF BIN NOR ZAHID Date : 24 JUN 2024

I hereby declare that I have read this project report and found

this project report is sufficient in term of the scope and quality for the award of

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SUPERVISOR : TS. FATHIN NABILLA BINTI MD LEZA Date : 31 AUG 2024

DEDICATION

I dedicate this report to my family, whose unwavering support and belief in me have been instrumental in my completion of this bachelor's degree. To my friends, who have been there every step of the way, offering encouragement and camaraderie. To my lecturers, both from my diploma and bachelor programs, whose knowledge and guidance have shaped my academic journey. And to Ts. Rosleen Abd. Samad, my academic advisor, whose invaluable support, encouragement, and guidance have been essential in my success, especially throughout my Final Year Project. Their belief in my abilities has been a constant source of motivation, and I am deeply honoured and grateful for their continuous support. I would like to express my sincere gratitude to the Fakulti Teknologi Maklumat dan Komunikasi (FTMK) and their staff who have providing a great learning experience and environment. Everyone expertise and dedication for teaching have been appreciated in my academic growth.

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Furthermore, I would like to thank my fellow classmates and friends for their support inside and outside the classroom. Their encouragement and willingness to share some knowledge, spending time have been invaluable in creating a positive and collaborative learning environment. Finally, I am deeply indebted to everyone who has contributed to my academic and personal growth during my time at UTeM. This project would not have been possible without their unwavering support and encouragement.

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ABSTRACT

The Urban Alert Community Fault Reporting System is a web-based platform designed to streamline the reporting and management of infrastructure faults in Melaka. It addresses the current challenges of inefficient manual reporting, lack of transparency, and limited data analysis capabilities. This system empowers the public to easily report faults, while providing authorities with a centralized database and analytical tools to prioritize and address issues effectively. By integrating community involvement with data-driven decision-making using PowerBI, this system aims to improve public safety, enhance infrastructure maintenance, and contribute to the success of the "Visit Melaka 2024" initiative.

Keywords: Community fault reporting, infrastructure maintenance, public safety, web application, centralized database, data analytics, PowerBI

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ABSTRAK

“The Urban Alert Community Fault Reporting System” ialah platform berasaskan web yang direka untuk menyelaraskan pelaporan dan pengurusan kerosakan infrastruktur di Melaka. Ia menangani cabaran semasa pelaporan manual yang tidak cekap, kekurangan ketelusan dan keupayaan analisis data yang terhad. Sistem ini memberi kuasa kepada orang ramai untuk melaporkan pelbagai masalah dengan mudah, sambil menyediakan pihak berkuasa dengan pangkalan data berpusat dan alat analisis untuk mengutamakan dan menangani isu dengan berkesan. Dengan menyepadukan penglibatan komuniti dengan pembuatan keputusan dipacu data menggunakan PowerBI, sistem ini bertujuan untuk meningkatkan keselamatan awam, meningkatkan penyelenggaraan infrastruktur dan menyumbang kepada kejayaan inisiatif "Visit Melaka 2024".

Kata kunci: Pelaporan kerosakan komuniti, penyelenggaraan infrastruktur, keselamatan awam, aplikasi web, pangkalan data berpusat, analisis data, PowerBI.

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LIST OF ABBREVIATIONS

Abbreviation	Definition
DBLC	Database Lifecycle
MBMB	Majlis Bandaraya Melaka Bersejarah
DFD	Data Flow Diagram
ERD	Entity-Relationship Diagram
GUI	Graphical User Interface
SISPAA	Sistem Pengurusan Aduan Awam
IDE	Integrated Development Environment
DBMS	Database Management System
XAMPP	Cross-Platform, Apache, MySQL, PHP, and Perl
CSS	Cascading Style Sheets
HTML	Hypertext Markup Language
PHP	Hypertext Preprocessor
SQL	Structured Query Language
NAVBAR	Navigation Bar

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CHAPTER 1: INTRODUCTION

1.1 Project Introduction

This system was inspired based on the theme of "Visits Melaka 2024". This system will be focusing Melaka environment's infrastructure that would be able to help Malaysia Public Works Department (Jabatan Kerja Raya) Melaka and the State Municipal Council (MBMB). The system is named as "Urban Alert" where it focused on alerting these authorities officer whenever any reports of any issues arise from the public concerns and safety such as, potholes, clogged drains, untrimmed trees, broken lamps, traffic lights etc. (Rout, S. 2022) Urban Alert is equipped with data virtualization reporting tool which is a dashboard using PowerBI to help authorities in decision making. There are many environment flaws such as pothole, uncut trees, broken roadside lamp and many other flaws that can be dangerous to public people. As Melaka is one of the states that are currently promoting "Visit Melaka 2024" it is require to authorities to be quick on resolving the problems to keep the safety of the locals and the visitors including tourists. The target user of this system are public people, admins, and the related authorities. To get accurate data to solve every problem, the data need to be captured from the accurate location as the system also need to store its location using latitude and longitude of where the reports were lodges. In addition, the system also ask user to upload a picture as a reference if needed by the authorities. The system will be expecting to give a visualization using heatmap on the PowerBI dashboard. It will give a quick analysis and help the authorities to take a next step (Gu, Z. 2022).

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1.2 Problem Statement

Urban Alert Community Fault Reporting System could be a great tool to lodge report regarding environmental or infrastructure's fault and able to capture accurate analysis of geolocation of the reports (Gatti, Paul, et al, 2021). The data provided by the public only require the user to access the website for the system to capture the data and visualize the report. The problem with the current process is that manual reporting channels to the respective authorities or councils are tedious and time-consuming causing delay of information. Another significant issue is the lack of public awareness regarding the status of their complaints. This often stems from a lack of transparency within the complaint handling. This lack of information can lead to misunderstandings, delays in resolution, and erode public trust process (Harijanti, S. D. 2020) Then, the reported data will be sent to PowerBI dashboard to interpret the visualization using data analytics and heatmap. The data is extracted from the centralized database to record and manage all users' activities. This could help to overcome the problem of lack of analysis and predictive analysis for certain issue-prone areas that may cause higher risk to the public safety.

1.3 Objective

i. To capture and lodge fault report seamlessly via web-application that can capture geolocation in real-time when the report is done.
ii. To increase the efficiency and transparency of the process to the completion of the project when a task is assigned as well able to track progress of the report.
iii. To analyse and leverage report for further analysis and able to make inform decision-making for upper management for potential and high-risk areas.

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1.4 Scope

Target User:

1. Public
   - To use the system and uploading the picture, and make a report/complaints
2. Authorities
   - To view assigned task and update task progress to completion.
3. Staff/Admin
   - To assign every report to the designated authority.
   - To administer and assign the task to the respected authorities.
   - To generate reports.

Modules:

1. Complaint Module
   - User need to fill some basic information and upload the picture of the report/complaints.
2. Admin Module
   - To create new user authorities account, update, and delete
   - To generate and visualize reports
3. Staff Module
   - To assign every report to the designated authority
   - To view and update reports
   - To generate and visualize reports
4. Authorities Module
   - To view and update reports completion progress
5. Reporting Module
   - To virtualize analytics reports in Power BI dashboards

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1.5 Project Significance

Urban Alert Community Fault Reporting System is a system that can help Malaysia Public Works Department (Jabatan Kerja Raya) Melaka, and the State Municipal Council (MBMB) focuses on alerting authorities' officers whenever any reports of any issue reported by the locals and community such as, potholes, clogged drains, untrimmed trees, broken lamps, traffic light, etc. This system should implement a centralized database to store all fault reports, including relevant details such as location, type of fault, and date of report submission. This system will include community involvement to updating any issue arises from the public concerns and safety. To fulfil this, a web-based system with a user-friendly interface where publics can easily submit any fault reports. This ensures that the system is accessible to all members of the public, including those without technological knowledge. Every report from the community must quickly reach the attention of the authorities, so the authorities can start planning their works to resolving the problems before it becomes worse and to make sure the safety of the locals and the visitors including tourist. The Urban Alert Community Fault Reporting System can be a valuable tool for improving community engagement with the authorities, with the hope that it can be more responsive and efficient in managing public infrastructure and interests.

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1.6 Expected Output

i. A user-friendly and accessible reporting system that can be used to lodge a report with ease.
ii. A system that will be able to help authorities making decisive decision by viewing an analytic report generated with all the data provided using the system.
iii. A solution in managing reports or complaint from the publics and it can help the authorities to improve their ways to act to every complaint.

1.7 Conclusion

Urban Alert Community Fault Reporting System is a new system designed to improve how the Melaka authorities manage reports of infrastructure problems like potholes, broken lights, and clogged drains. It aims to make reporting these issues easier and faster for the public while providing authorities with better data to analyse and prioritize repairs. The system includes a user-friendly web application for citizens to submit reports with pictures and locations, as well as a dashboard for authorities to track progress and allocate resources. The goal is to create a more transparent and efficient process that leads to faster resolution of problems and, a safer and more enjoyable environment for both residents and visitors to Melaka. By leveraging technology and community involvement, Urban Alert hopes to make a significant contribution to the "Visit Melaka 2024" initiative and enhance the overall quality of life in the region.

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CHAPTER 2: METHODOLOGY

2.1 Introduction

In this chapter, we will be discussing about the methodology used when finishing this project.

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2.2 Project Methodology

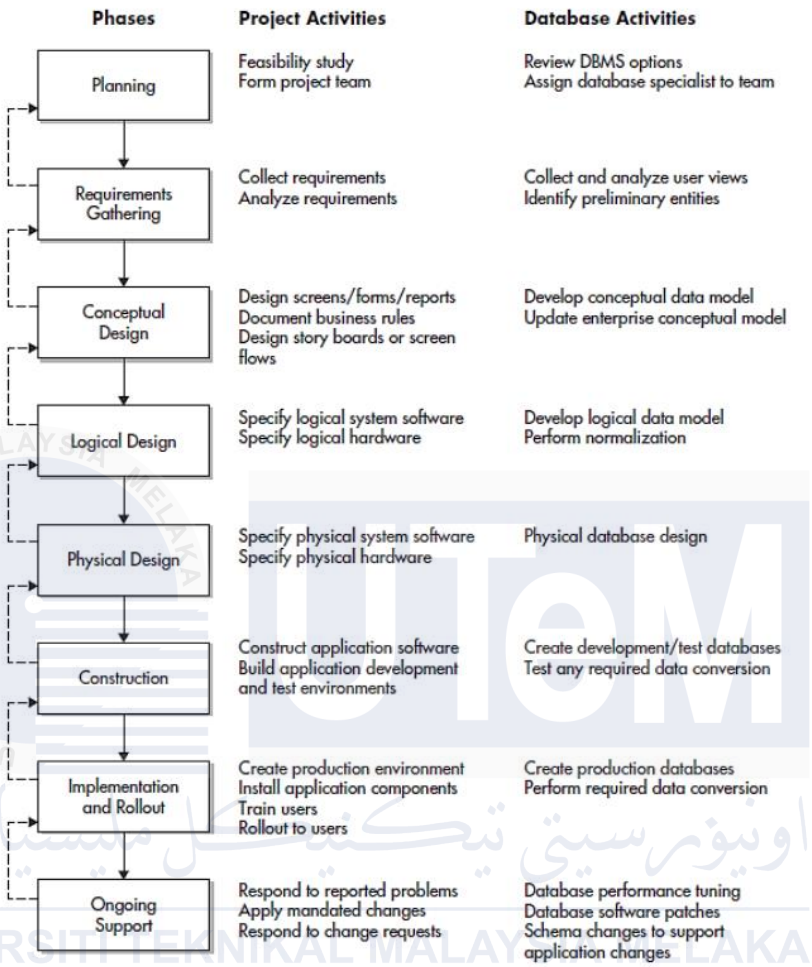

Figure 1: Database Life Cycle (DBLC)

i. Planning

On this stage is where we will be planning how the system and database will be developed. It is include performing feasibility studies on this topic.

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ii. Requirement Gathering

On this stage, all the require information is gathered to help fulfil this project. It focuses on understanding the business rules and entities involved in the database. The techniques use are document review and observation. (Savelios, A. (2021)

iii. Conceptual Design

During this phase, we will be focusing on designing the conceptual design for the layout for each page including viewing data stored in database and any inserting data page. It is documented using flowchart and screen flow diagram that can help to understand the concept better. For the database, an ERD will be prepared to understand the relationship between each entity.

iv. Logical Design

In logical design, it focuses on logic of the system. It requires listing all the user requirements to fulfil the purpose of the system. Other than that, the ERD will help to understand the logic of the database.

v. Physical Design

Physical Design phase will focus on specify the database that will going to use for this project. Then, we need to consider the configuration of the database the database supports the software been used. (Savelios, A. 2021)

vi. Construction

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This is the phase where the system is coded, and the database is built individually. Then the code is assembled with the database and other configurations. Next step is testing the system that will be integrated together. This is included to ensure the quality of the code, system, and database itself. During this stage, the flow of process is evaluated and trained to ensure it achieves the expected user experience.

vii. Implementation

Implementation will focus on preparing the system to publics. This system will place on a public domain so that users can access to the system.

viii. Ongoing Support

When the system is live on the domain, a continuous evaluation is needed to maintain the system. It can be continuous feedback received from the users. These changes also can be a scheduled maintenance or upgrading the system to improve the functionality. (Savelios, A. (2021)

2.3 Project Schedule and Milestones

Table 1: Gantt Chart

Duration	Duration (Week)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Planning														
Requirement Gathering														
Conceptual Design														
Logical Design														
Physical Design														
Construction														
Implementation														
Ongoing Support														

2.4 Conclusion

In conclusion, this chapter outlines an entire process to developing a working database system. It started with a thorough planning process and gathering every requirement that could make the system have a great functionality. Then, it continues with designing phase that includes conceptual, logical, and physical design ensuring that the system will be user-friendly and efficiently working. In addition, the construction and implementation stages will making the system to life. These stages will be focusing on write the code of the system, testing and integration for both coding and database. Lastly, the ongoing support is to ensure the system can be working without any problems and improving the system day by day.

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CHAPTER 3: ANALYSIS

3.1 Introduction

In this chapter, we will discuss on practical analysis of the existing and future system that will be developed.

3.2 Problem Analysis

There are a lot of research, projects that focusing on the public interest but there are few have been well-developed, especially in Malaysia. For example, there are a system that can track and alert authorities when there are increasing on water level in some rivers in Malaysia. That system is managed by the Department of Irrigation and Drainage (Jabatan Pengairan dan Saliran). In addition, Air Pollutant Index Management System by Department of Environment (Jabatan Alam Sekitar) is used to track the air quality in Malaysia. But the difference with this project and the system that will be developed is the Urban Alert Community Fault Reporting System will include reports from the public user.

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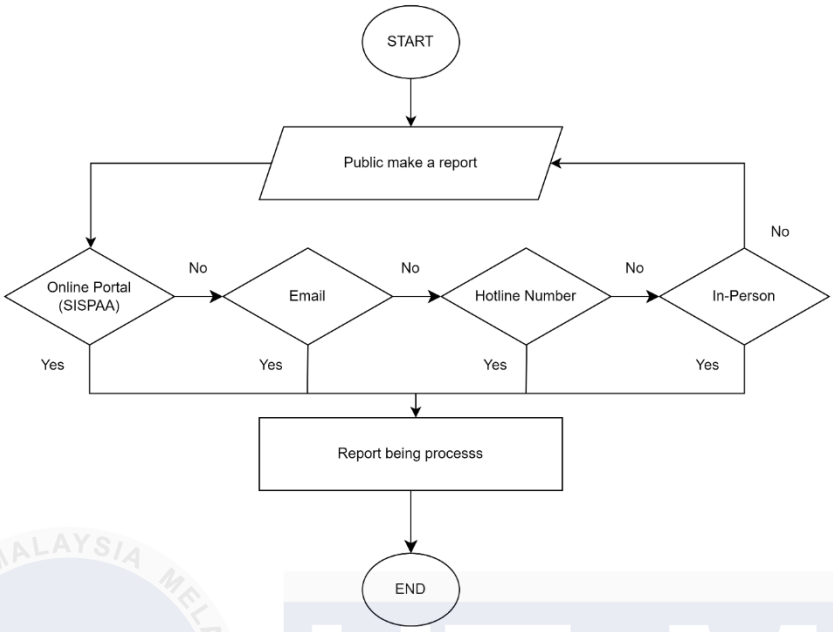

Figure 2: Current Process Scenario

There are some ways to lodge a report to the local government that responsible to those complaints such as potholes, untrimmed trees, and others environmental and public concerns. Figure 2 shows the ways to make a complaint through some channels such as Sistem Pengurusan Aduan Bersepadu (SISPAA) as shown in Figure 3 using URL http://melaka.spab.gov.my or an email to aduan@mbmb.gov.my. The other channels are by calling their hotline number and lodge a complaint in-person to the authorities, state's councillors, or people's representatives.

Figure 3: Sistem Pengurusan Aduan Bersepadu (SISPAA)

However, the current reporting process shows that there are several weaknesses that prevent to have a better understanding of the reporting process. A major problem is the lack of ability to accurately pinpoint the exact location of the reported faults. This can lead to some future problems such as delay and misunderstanding in addressing the issue or it can be overlooked entirely.

Moreover, there is a lack of transparency regarding the status and progress of the complaints. Once a report has been submitted, there are no updates from the authority regarding the status and the progress of the complaints. This can leads to public's frustration and distrust towards the local government's accountability and public servants.

In conclusion, while SISPAA offers a channel to public to make a complaint about community faults such as potholes, untrimmed trees and malfunction of lamp but the whole process needs to be effective and responding to the publics. It should be easier to use with less bureaucracy rather than high level bureaucracy. Addressing this weakness and add up to some improvement such as the ability to pinpoint the location should level up the system to become more responsive and better system to be use by the publics.

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3.3 The Proposed Improvements/Solution

Urban Alert Community Fault Reporting System could be an efficient fault reporting system as it provides accessibility to anyone by using website. This system aims to help Malaysia Public Works Department (Jabatan Kerja Raya) Melaka and the State Municipal Council (MBMB) with help and involvement member of the publics. This system will be able to help authorities making decisive decision by viewing an analytic report generated with all the data provided using the system. There are some research that using social media data to obtain information about traffic related events. The potential use of Twitter (now known as X) to extract information from what have been the social media's user share. The system is using text-mining concept to obtain the information needed. (Zulfikar, M. T., & Suharjito 2019). Although the idea can be used, but to achieve an accessibility to all members of the publics, including those without technological knowledge, it is better to have a direct engagement with the system itself by manually send the report with the details using the system. This will ensure authorities provides an extra information before proceeding to fix and act on every report submitted. With this system, it hopes that every department involves can improve their jobs' priority, well-managed budget, and all teams or personnel involvement. With current practice, the workflows slower with some authorities may act if there is any accident occurs, or complaint from numbers of people. By using the system, authorities can view the live-data, and general report produced using the PowerBI dashboard.

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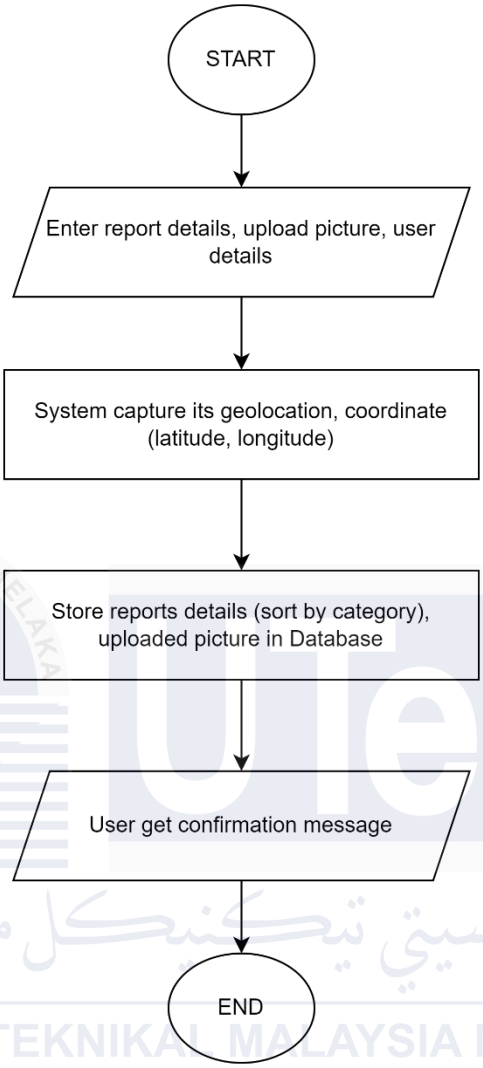

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Figure 4: Proposed flow of making a complaint

Figure 4 shows the flowchart of process when user lodge a report that does not need any sign up or registration process due to make it easier and time-consuming process. Publics only need to enter some personal information and complaint report's detail including picture of the complaint and the latitude and longitude generated using map picker.

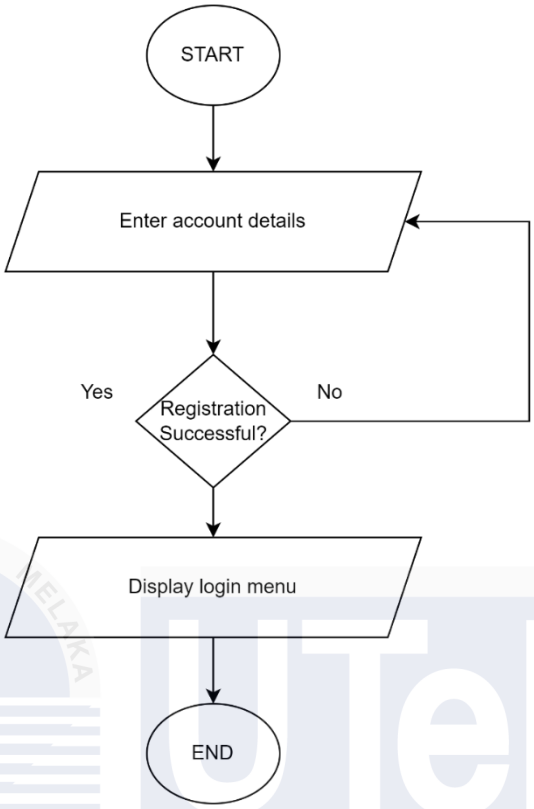

Figure 5: Proposed flow of staff registration

Figure 5 shows the flowchart of registration process. The Administrator of the system can only do it only.

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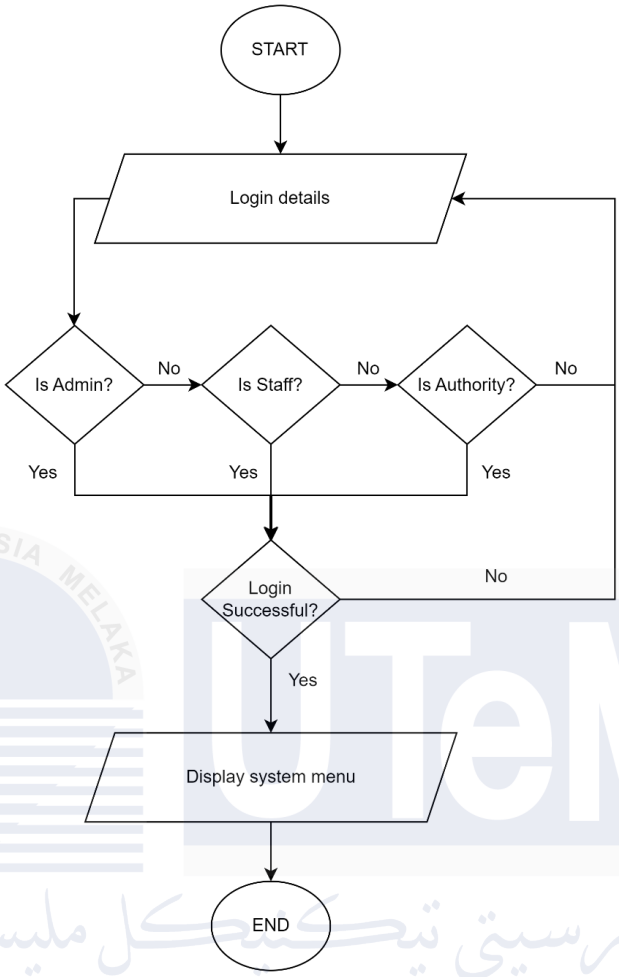

Figure 6: Proposed flow of login process

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Figure 6 shows the process when staff login into the system. There are 3 roles which is Admin, Staff and Authority. Admin can manage all the master data and views all the complaints. Staff can process the complaint by assigning the complaint to its designated authority. While Authority can update the status of the complaint. All these roles can see the generated reported in the system and PowerBI Dashboard.

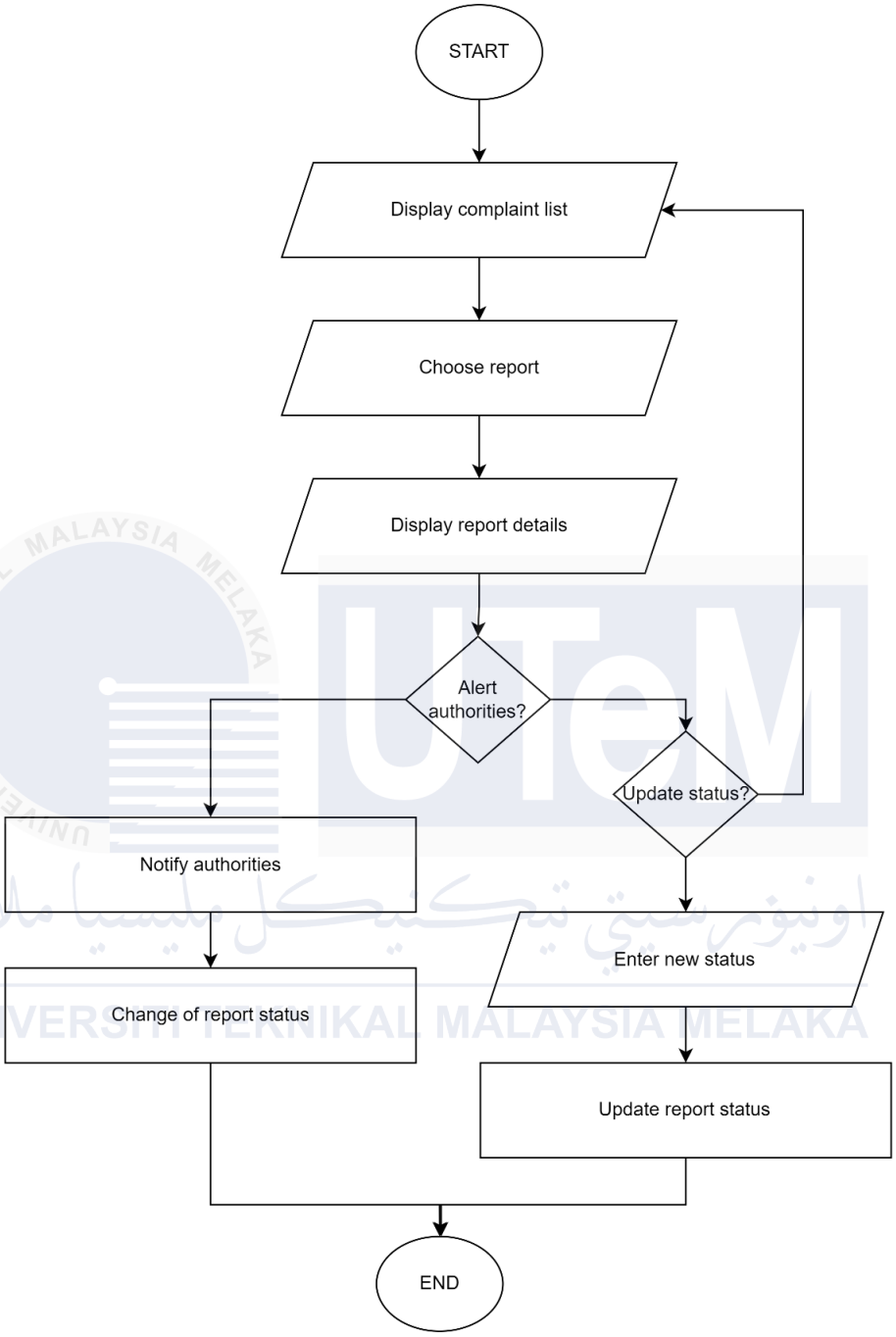

Figure 7: Proposed flow of assigning complaint to authority

Figure 7 shows the process for staff to update staff by assigning the complaint to the responsible authority.

3.4 Requirement Analysis of The To-Be System

3.4.1 Functional Requirement

Table 2: Functional Requirement

No.	Functional Requirement Statement
1.	The system will allows user to make a complaint without need to register or login into the system.
2.	The system will allow user to view their report using the complaint ID provided by the system.
3.	The system allows Admin to register the staff with 3 types of roles including Admin, Staff and Authority.
4.	Admin, Staff and Authority can view the list of complaint.
5.	Admin, Staff and Authority can update the status of the complaint.
6.	Staff can assign the complaint to the designated responsible authority based on the location provided.
7.	Authority can update the complaint after being assigned the complaint to its authority.
8.	Only Admin and Staff can delete the complaints.
9.	Admin, Staff and Authority can see the generated reports provided in the system.
10.	Admin, Staff and Authority can edit their profile and change password.

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3.4.2 Non-Functional Requirement

Table 3: Non-functional requirement

No	Type of NFR	Requirement Statement
1.	Usability	Ensure the app is intuitive and easy to navigate for users.
2.	Performance	The app should load quickly and respond promptly to user interactions.
3.	Reliability	Ensure the app operates reliably without frequent crashes or errors.
4.	Availability	The app can be accessible anytime, anywhere, with minimal downtime.
5.	Compatibility	Ensure the app is compatible with various devices and operating systems commonly used by UTeM students.
6.	Security	Implement measures to protect user data and ensure secure transactions.

3.5 Conclusion

To conclude, based on the idea and analysis, the system has a new potential solution in managing reports or complaint from the publics and it can help the authorities to improve their ways to act to every complaint. Using analytic reports can help making decisive decision that can only achieve by using some technology that can provide analytical report such as PowerBI dashboard.

CHAPTER 4: DESIGN

4.1 Introduction

On this chapter 4, we will be discussing about the designing phase during the whole project. It is includes the architecture design, database design and graphical user interface (GUI) of the system.

4.2 Introductory Preview to This Chapter

Figure 8: Three-tier architecture

Figure 7 shows the 3-tier architecture in web development. By separating it's to specifics parts, make it easier to manage and improve times by times. Each part has their own roles and jobs which will be need each other to integrate and works well. The explanation is discussed on the table 4 below.

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Table 4: Three-tier architecture explanation

Layer	Purpose
Presentation	Handles user interaction and display • Displaying complaint forms • Display complaints status updates
Business Logic	Doing the core application logic • Validating complaint details • Process the complaint to its designated authority
Data/Database	Manage interaction between the database • Store all the complaint details • Retrieve complaint details

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4.3 Database Design

On this section, we will be focusing on conceptual, logical, and physical design of the database. All the design phase is based on the analysis work that has been done.

4.3.1 Conceptual Design

4.3.1.1 Data Flow Diagram (DFD)

4.3.1.1.1 Context Diagram

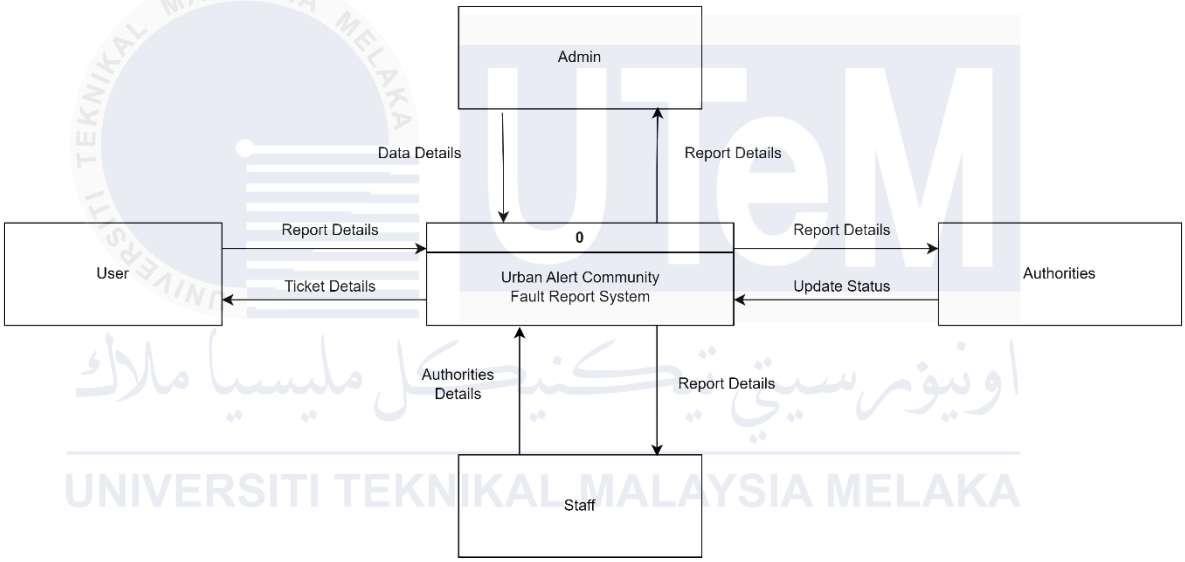

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Figure 9: Context Diagram

Figure 9 shows the Context Diagram or DFD level 0 for this system where the whole system is represented as a single process.

4.3.1.1.1.1 DFD Level 1

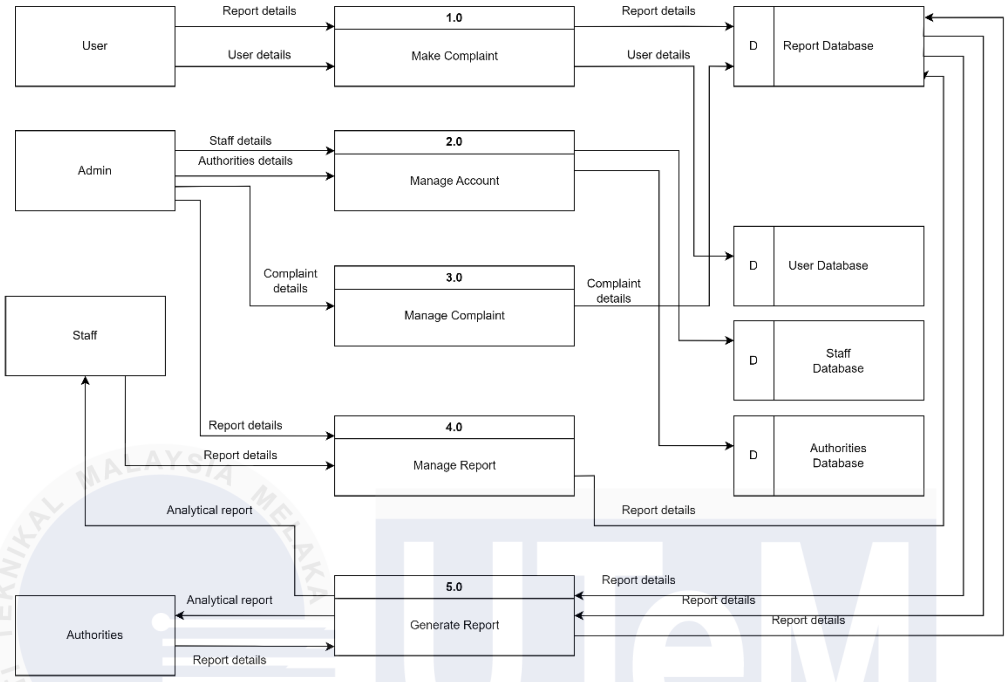

Figure 10: DFD Level 1

Figure 10 shows the DFD Level 1 that dive into each module and its data flow, process and data storage.

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DFD Level 2

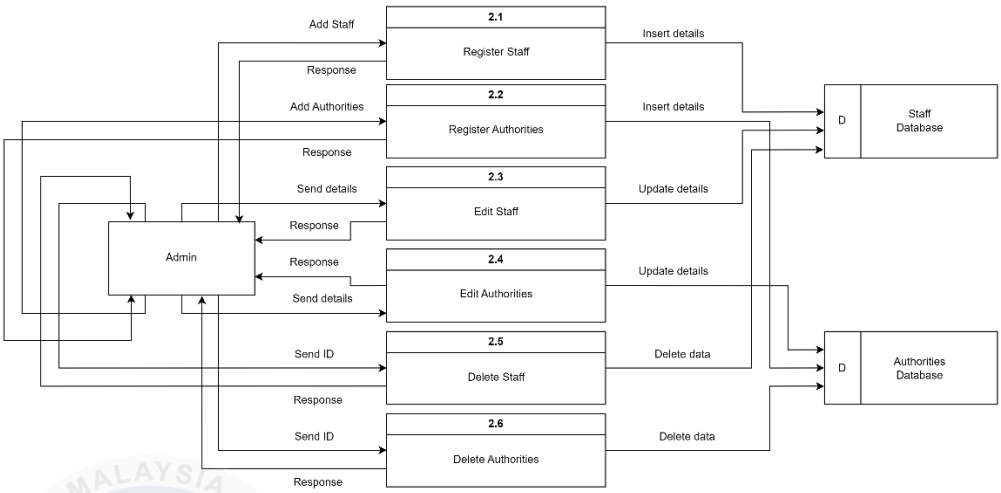

Figure 11: DFD Level 2

DFD Level 2 as shown in Figure 11 is focusing on the second module which is the manage account module.

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4.3.1.2 Business Rules

Table 5: Business Rules

No.	Business Rules
1.	One user can submit one or many complaints.
2.	Each complaint submitted by one user.
3.	A complaint must has one complaint category.
4.	A complaint must has one sub-complaint category.
5.	A complaint must has one location.
6.	A complaint must has one status.
7.	Each complaint category must have one or many sub-complaint categories.
8.	Each sub-complaint category must have one complaint category.
9.	Each staff must have one and only roles.
10.	Each role can have one or many staffs.
11.	An Authority member must belong to one authority.
12.	Each authority must has one and only staff.
13.	Tickets is associated to one complaint.
14.	A complaint can have zero or one ticket.

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4.3.2 Logical Design

4.3.2.1 Entity Relationship Diagram (ERD)

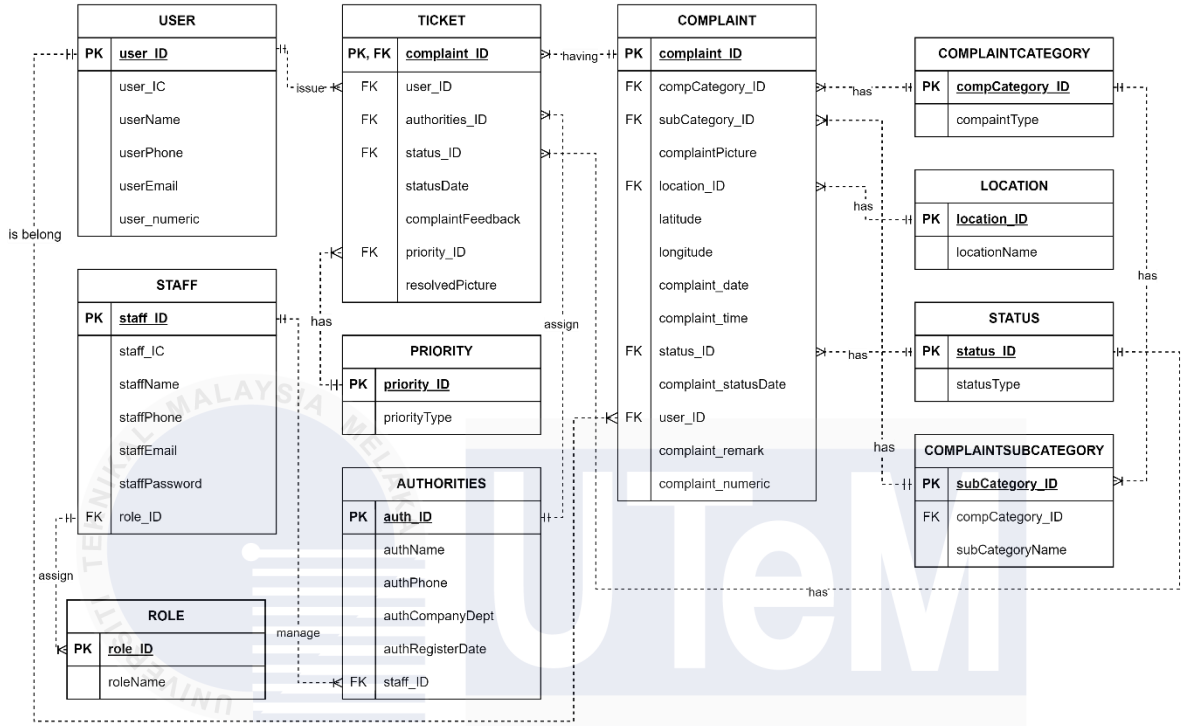

Figure 12: Entity Relationship Diagram

Figure 12 shows Entity Relationship Diagram for all tables in the database.

4.3.2.2 Data Dictionary

i. USER

Table 6: Data Dictionary - USER

Field Name	Data Type	Data Format	Field Size	Description	Constraint	Key
user_ID	VARCHAR		10	Auto-generated ID. For example, US000	Not Null	Primary Key
user_IC	VARCHAR		12	Identification Number	Not Null	
userName	VARCHAR		50	User's name	Not Null	
userPhone	VARCHAR		12	User's Phone Number	Not Null	
userEmail	VARCHAR		50	User's Email	Not Null	
User_numeric	INTEGER		10	Keep numeric user ID	Not Null	

ii. STAFF

Table 7: Data Dictionary - STAFF

Field Name	Data Type	Data Format	Field Size	Description	Constraint	Key
staff_ID	VARCHAR		10	Auto-generated ID. For example, ST000	Not Null	Primary Key
staff_IC	VARCHAR		12	Staff's Identification Number	Not Null	
staffName	VARCHAR		50	Staff's name	Not Null	
staffPhone	VARCHAR		12	Staff's phone number	Not Null	
staffEmail	VARCHAR		50	Staff's email	Not Null	
staffPassword	VARCHAR		20	Staff's password	Not Null	
Role_ID	VARCHAR		10	Staff's role ID. Refer to table ROLE.	Not Null	Foreign Key

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iii. AUTHORITIES

Table 8: Data Dictionary - AUTHORITIES

Field Name	Data Type	Data Format	Field Size	Description	Constraint	Key
authorities_ID	VARCHAR		10	Auto-generated ID. For example, AU000	Not Null	Primary Key
authName	VARCHAR		255	Authorities's Name	Not Null	
authPhone	VARCHAR		12	Authorities's phone number	Not Null	
authCompanyDept	VARCHAR		255	Authorities's Department	Not Null	
authRegisterDate	DATE	DD/MM/YYYY		Authorities's registration date	Not Null	
staff_ID	VARCHAR		10	Staff ID of represent the authority. Refer to table STAFF	Not Null	Foreign Key

iv. ROLE

Table 9: Data Dictionary - ROLE

Field Name	Data Type	Data Format	Field Size	Description	Constraint	Key
role_ID	VARCHAR		10	Auto-generated ID. For example, RL000	Not Null	Primary Key
roleName	VARCHAR		20	Role's name	Not Null	

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v. STATUS

Table 10: Data Dictionary - STATUS

Field Name	Data Type	Data Format	Field Size	Description	Constraint	Key
status_ID	VARCHAR		10	Auto-generated ID. For example, SS000	Not Null	Primary Key
statusType	VARCHAR		20	Status's type	Not Null	

vi. LOCATION

Table 11: Data Dictionary - LOCATION

Field Name	Data Type	Data Format	Field Size	Description	Constraint	Key
location_ID	VARCHAR		10	Auto-generated ID. For example, LC000	Not Null	Primary Key
locationName	VARCHAR		20	Location's name	Not Null	

vii. COMPLAINTCATEGORY

Table 12: Data Dictionary - COMPLAINTCATEGORY

Field Name	Data Type	Data Format	Field Size	Description	Constraint	Key
compCategory_ID	VARCHAR		10	Auto-generated ID. For example, CC000	Not Null	Primary Key
complaintType	VARCHAR		20	Category's name	Not Null	

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viii. COMPLAINTSUBCATEGORY

Table 13: Data Dictionary - COMPLAINTSUBCATEGORY

Field Name	Data Type	Field Size	Description	Constraint	Key
subCategory_ID	VARCHAR	10	Auto-generated ID. For example, CS000	Not Null	Primary Key
complaintType	VARCHAR	20	Sub-Category's type	Not Null	
compCategory_ID	VARCHAR	10	Category ID represent the sub-category. Refer table to table COMPLAINTCATEGORY	Not Null	Foreign Key

ix. PRIORITY

Table 14: Data Dictionary - PRIORITY

Field Name	Data Type	Data Format	Field Size	Description	Constraint	Key
Priority_ID	VARCHAR		10	Auto-generated ID. For example, PR000	Not Null	Primary Key
priorityType	VARCHAR		20	Category's name	Not Null	

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x. COMPLAINT

Table 15: Data Dictionary - COMPLAINT

Field Name	Data Type	Data Format	Size	Description	Constraint	Key
complaint_ID	VARCHAR		10	Auto-generated ID. For example, CM000	Not Null	Primary Key
compCategory_ID	VARCHAR		10	Link table to table COMPLAINTCATEGORY	Not Null	Foreign Key
subcategory_ID	VARCHAR		10	Link table to table COMPLAINTSUBCATEGORY		Foreign Key
complaintPicture	BLOB			Complaint's picture	Not Null	
location_ID	VARCAHR		10	Link table to table LOCATION	Not Null	Foreign Key
latitude	VARCHAR		20	Taken automated when using map picker.	Not Null	
longitude	VARCHAR		20	Taken automated when using map picker.	Not Null	
complaint_date	DATE	DD/MM/YYYY		Date of complaint.	Not Null	
complaint_time	TIME	HH:MM		Time of complaint.	Not Null	
Status_ID	VARCHAR		10	Link table to table STATUS	Not Null	Foreign Key
complaint_statusDate	DATE	DD/MM/YYYY		Date of updated complaint.	Not Null	
User_ID	VARCHAR		10	User ID who makes the complaint. Link table to table USER.	Not Null	Foreign Key
complaint_numeric	INTEGER		10	Keep numeric complaint ID		

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xi. TICKET

Table 16: Data Dictionary - TICKET

Field Name	Data Type	Data Format	Field Size	Description	Constraint	Key
Complaint_ID	VARCHAR		10	Link table to table COMPLAINT	Not Null	Primary Key / Foreign Key
User_ID	VARCHAR		10	Link table to table USER	Not Null	Foreign Key
Authorities_ID	VARCHAR		10	Link table to table AUTHORITIES	Not Null	Foreign Key
Status_ID	VARCHAR		10	Link table to table STATUS	Not Null	Foreign Key
statusDate	DATE	DD/MM/YYYY		Ticket's updated date.	Not Null	
complaint_feedback	VARCHAR		255	Feedback from staff/Authority	Null	
Priority_ID	VARCHAR		10	Link to table Priority	Not Null	Foreign Key
resolvedPicture	BLOB			Completion's image	Null	

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4.3.3 Physical Design

4.3.3.1 Data Definition Language (DDL)

i. DDL for creating table Authorities

```
CREATE TABLE `authorities` (
 `authorities_ID` varchar(10) NOT NULL,
 `authName` varchar(255) NOT NULL,
 `authPhone` varchar(12) NOT NULL,
 `authCompanyDept` varchar(255) NOT NULL,
 `authRegisterDate` date NOT NULL,
 `staff_ID` varchar(10) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4
COLLATE=utf8mb4_general_ci;
```

ii. DDL for creating table Staff

```
CREATE TABLE `staff` (
 `staff_ID` varchar(10) NOT NULL,
 `staff_IC` varchar(12) NOT NULL,
 `staffName` varchar(50) NOT NULL,
 `staffPhone` varchar(12) NOT NULL,
 `staffEmail` varchar(30) NOT NULL,
 `staffPassword` varchar(20) NOT NULL,
 `role_ID` varchar(10) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4
COLLATE=utf8mb4_general_ci;
```

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iii. DDL for creating table Complaint

```
CREATE TABLE `complaint` (
 `complaint_ID` varchar(10) NOT NULL,
 `compCategory_ID` varchar(10) NOT NULL,
 `complaintPicture` mediumblob NOT NULL,
 `complaintRemark` varchar(50) DEFAULT NULL,
 `location_ID` varchar(10) NOT NULL,
 `latitude` varchar(20) NOT NULL,
 `longitude` varchar(20) NOT NULL,
 `complaint_date` date NOT NULL,
 `complaint_time` time NOT NULL,
 `subCategory_ID` varchar(10) NOT NULL,
 `status_ID` varchar(10) DEFAULT NULL,
 `complaint_statusDate` date DEFAULT NULL,
 `user_ID` varchar(10) NOT NULL
 `complaint_numeric` int(10) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4
COLLATE=utf8mb4_general_ci;
```

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iv. DDL for creating table Ticket

```
CREATE TABLE `ticket` (
 `complaint_ID` varchar(10) NOT NULL,
 `user_ID` varchar(10) NOT NULL,
 `authorities_ID` varchar(10) NOT NULL,
 `status_ID` varchar(10) NOT NULL,
 `statusDate` date NOT NULL,
 `complaint_feedback` varchar(255) DEFAULT NULL
 `priority_ID` varchar(10) NOT NULL,
 `resolvedPicture` blob DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4
COLLATE=utf8mb4_general_ci;
```

4.3.3.2 Data Manipulation Language (DML)

i. DML for inserting data into table AUTHORITIES

```
INSERT INTO `authorities` (`authorities_ID`, `authName`, `authPhone`, `authCompanyDept`, `authRegisterDate`, `staff_ID`) VALUES ('AU001', 'Majlis Bandaraya Melaka Bersejarah (MBMB)', '06-285 9700', 'Pengurusan Aduan Awam', '2024-01-01', 'ST008');
```

ii. DML for updating data from table STATUS

```
UPDATE status SET statusType ='Completed' WHERE status_ID = 'SS006';
```

iii. DML for deleting data from table ROLE

```
DELETE FROM role WHERE role_ID = ‘RL002’;
```

iv. DML for calling procedure

```
CALL addComplaint('CM002', 'CT002', 0x75706c61646564496d6167652f696d675f3636373437613932376532332e6a7067, 'Membahayakan lalu lintas.', 'LC003', 2.321456, 102.345678, '2024-06-10', '17:30:00', 'CS002', 'SS005', '2024-06-11', 'US002', 2);
```

4.4 Conclusion

Chapter 4 discussed the process of designing the system beginning with an overview of system’s architecture, ERD, business rule, explaining the data dictionary, queries, and procedure of this project. It shows how the database being developed to fulfil every requirement. Lastly, this chapter also shows how the GUI of the system looks with a hope that it requires both functional requirements and non-functional requirements.

CHAPTER 5: IMPLEMENTATION

5.1 Introduction

This chapter will be discussing the implementation of Urban Alert Community Fault Reporting System that include the coding and setting up the database process.

5.2 Software Development Environment Setup

Software Development Environment Setup is focused on the local development environment which includes operating system, software, Integrated Development Environment (IDE). For operating system, Windows is chosen for the familiarity, and the version is Windows 11. Then, for local server XAMPP package is used to get both web server and database. To elaborate, Apache is used as local web server and MySQL as database and PhpMyAdmin as a graphical management tool to integrate with the database. As for IDE, Microsoft Visual Studio Code is used for the coding using language HTML, PHP, and CSS for web development with additional of JQuery and JavaScript to implement the website. In addition to all of this, Git and GitHub is used for better control to the workspace including version controls, track changes to the code and backup for any issues during the implementation (i.e. laptop or files).

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5.2.1 Graphical User Interface (GUI)

5.2.1.1 Complaint Form

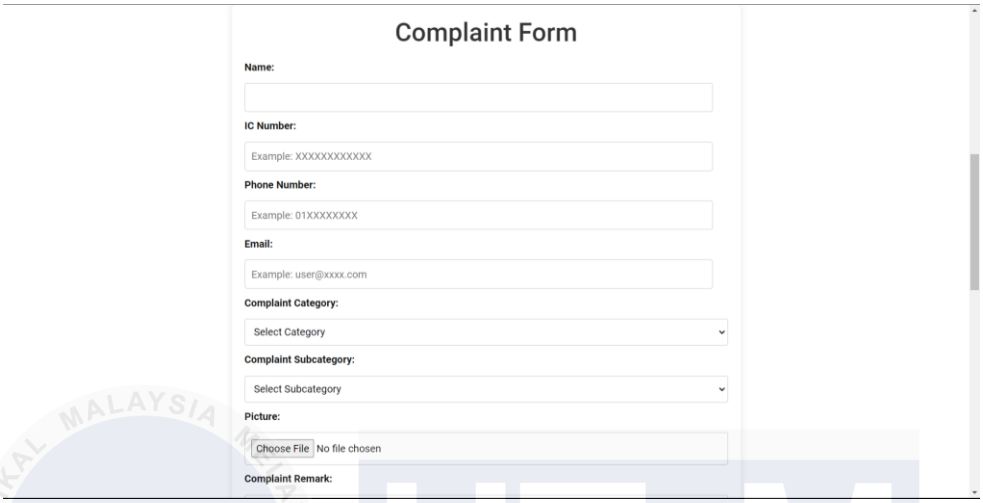

Figure 13: Complaint Form

Figure 13 shows the complaint form for user to fill in including uploading picture, map-picker and auto generated coordinate based on that.

5.2.1.2 View Report

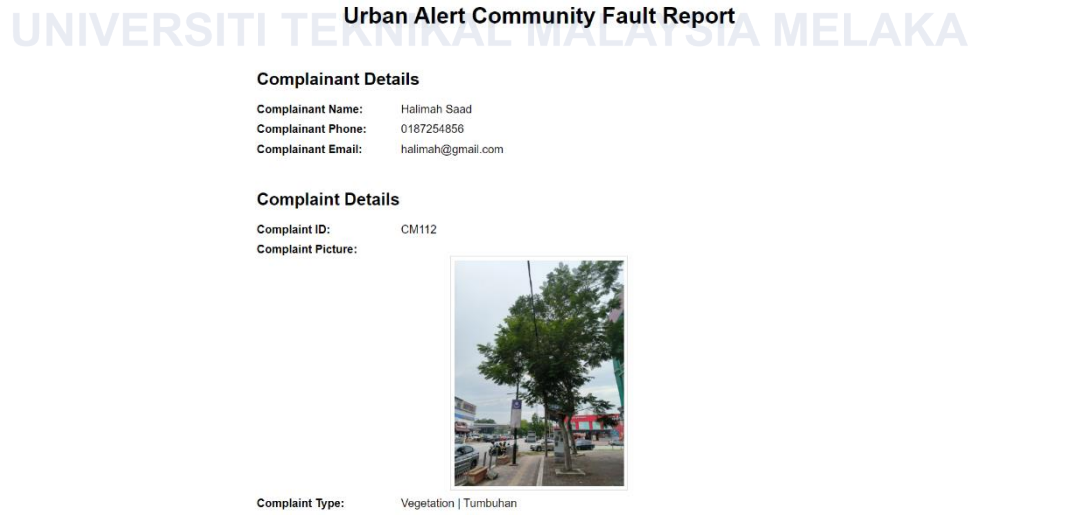

Figure 14: View Report Page

Figure 14 shows the view report page by entering the complaint ID.

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5.2.1.3 Login Page

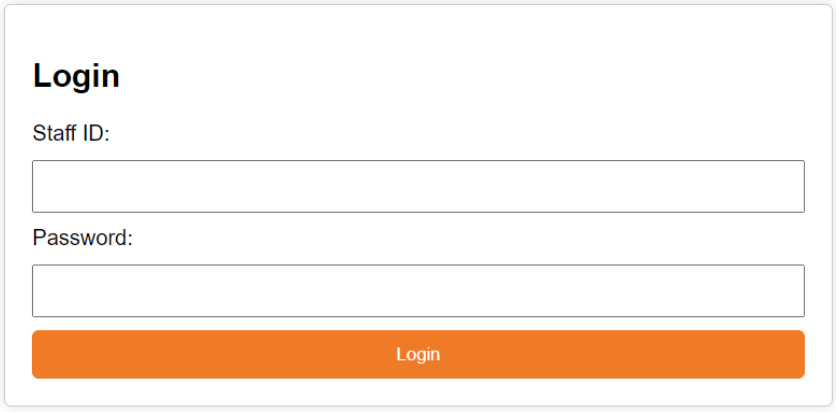

Figure 15: Login Page

Figure 15 shows the login page for any staff to enter the system.

5.2.1.4 Registration Page

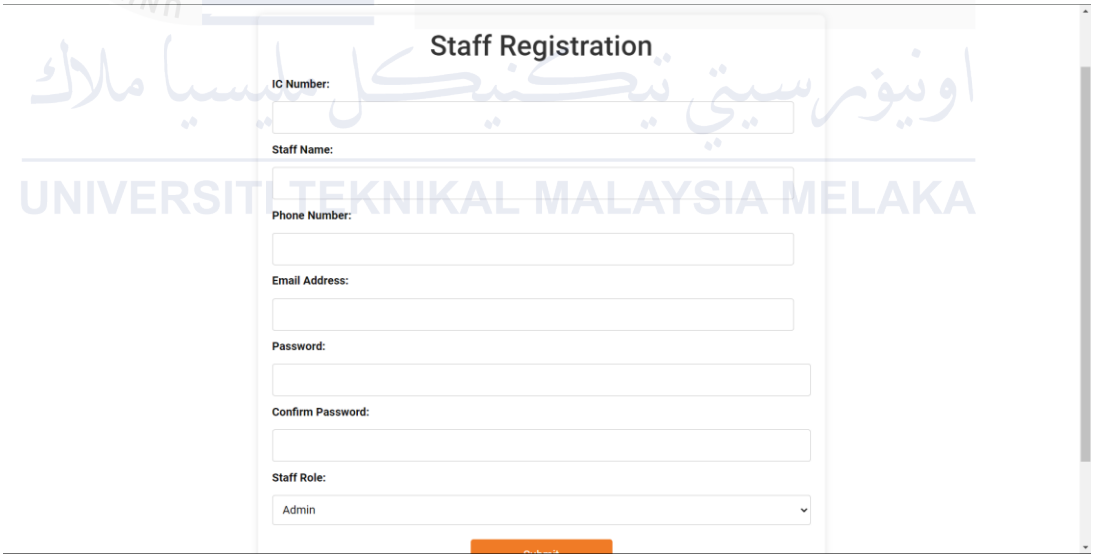

Figure 16: Registration Page

Figure 16 shows the registration form for admin to register new staff.

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5.2.1.5 List of Complaint Page

5.2.1.5.1 Admin View

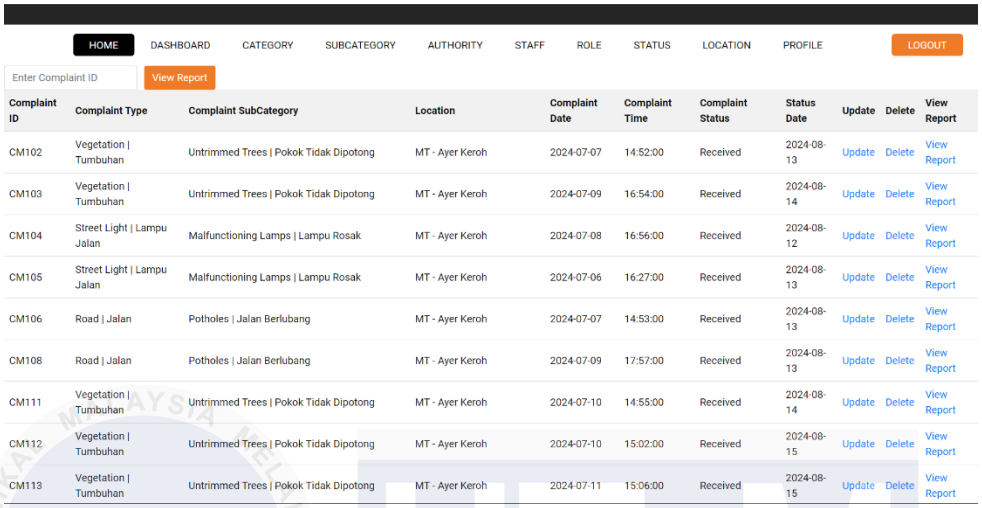


Figure 17: List of Complaint - Admin View

Figure 17 shows the list of complaint on Admin view with the functionality to update and delete.

5.2.1.5.2 Staff View

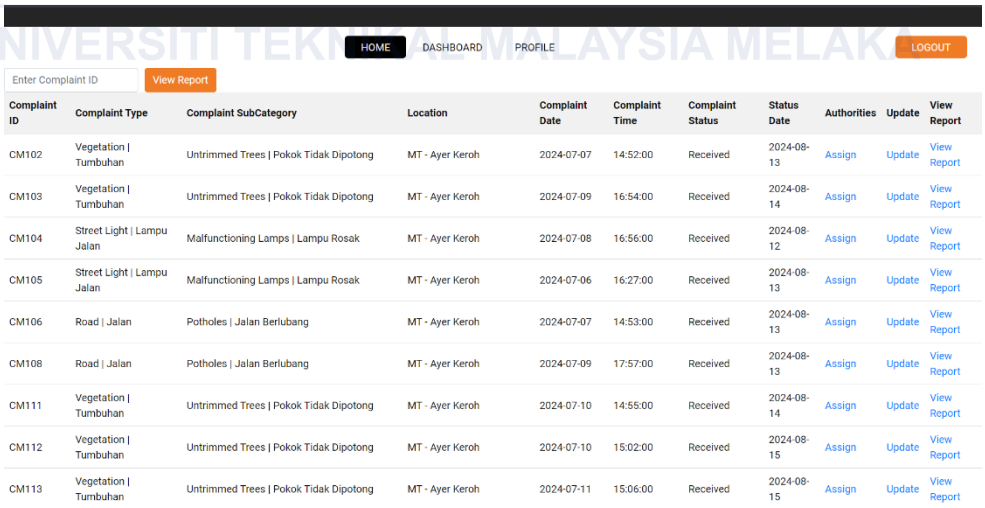
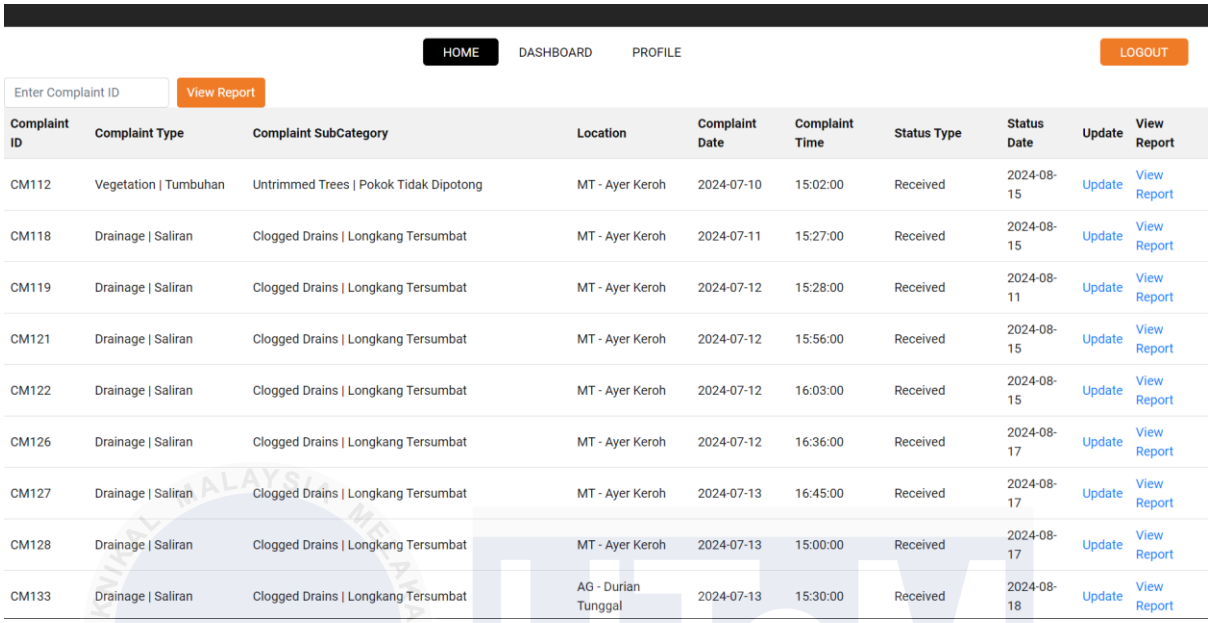


Figure 18: List of Complaint - Staff View

Figure 18 shows the list of complaint on Staff view with the functionality to update and delete. Also, the functionality to assign to the specific authority.

5.2.1.5.3 Authority View



Complaint ID	Complaint Type	Complaint SubCategory	Location	Complaint Date	Complaint Time	Status Type	Status Date	Update	View Report
CM112	Vegetation | Tumbuhan	Untrimmed Trees | Pokok Tidak Dipotong	MT - Ayer Keroh	2024-07-10	15:02:00	Received	2024-08-15	Update	View Report
CM118	Drainage | Saliran	Clogged Drains | Longkang Tersumbat	MT - Ayer Keroh	2024-07-11	15:27:00	Received	2024-08-15	Update	View Report
CM119	Drainage | Saliran	Clogged Drains | Longkang Tersumbat	MT - Ayer Keroh	2024-07-12	15:28:00	Received	2024-08-11	Update	View Report
CM121	Drainage | Saliran	Clogged Drains | Longkang Tersumbat	MT - Ayer Keroh	2024-07-12	15:56:00	Received	2024-08-15	Update	View Report
CM122	Drainage | Saliran	Clogged Drains | Longkang Tersumbat	MT - Ayer Keroh	2024-07-12	16:03:00	Received	2024-08-15	Update	View Report
CM126	Drainage | Saliran	Clogged Drains | Longkang Tersumbat	MT - Ayer Keroh	2024-07-12	16:36:00	Received	2024-08-17	Update	View Report
CM127	Drainage | Saliran	Clogged Drains | Longkang Tersumbat	MT - Ayer Keroh	2024-07-13	16:45:00	Received	2024-08-17	Update	View Report
CM128	Drainage | Saliran	Clogged Drains | Longkang Tersumbat	MT - Ayer Keroh	2024-07-13	15:00:00	Received	2024-08-17	Update	View Report
CM133	Drainage | Saliran	Clogged Drains | Longkang Tersumbat	AG - Durian Tunggal	2024-07-13	15:30:00	Received	2024-08-18	Update	View Report

Figure 19: List of Complaint - Authority View

Figure 19 shows the list of complaint on Authority view with the functionality to update only.

5.2.1.6 Update Complaint Status Page

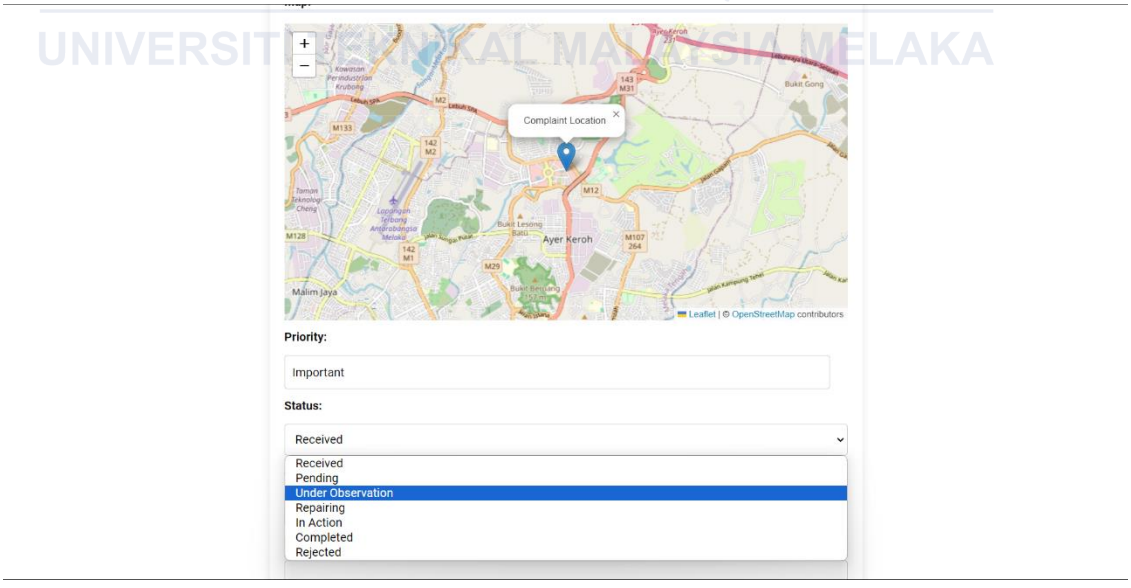


Figure 20: Update Complaint Status Page

Figure 20 shows the update complaint page for updating the status on the complaint.

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5.2.1.7 Assigning Authority Page

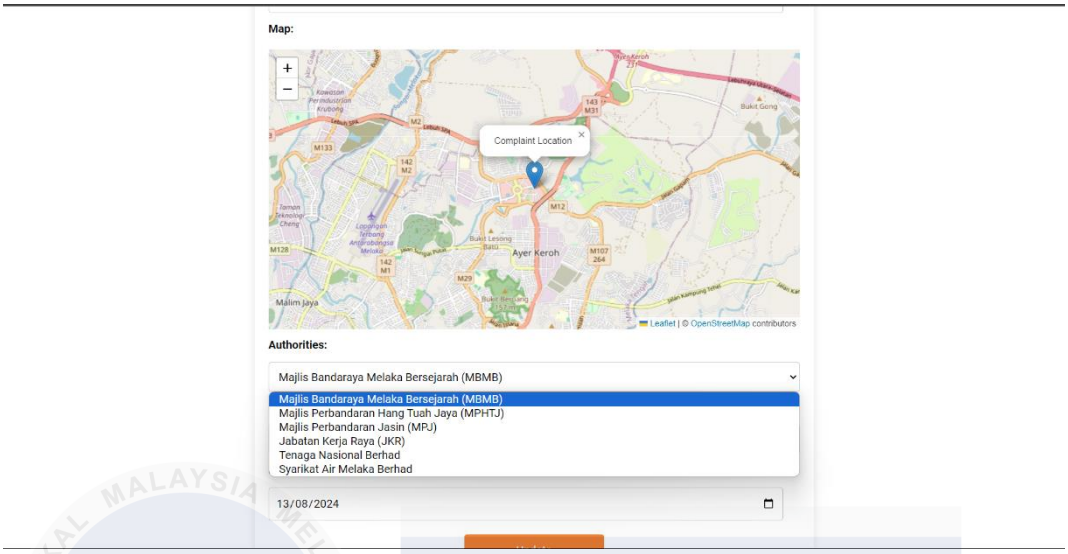

Figure 21: Assigning Authority Page

Figure 21 shows the assigning authority page that act as to send the complaint to that authority.

5.2.1.8 Authority Updating Complaint Page

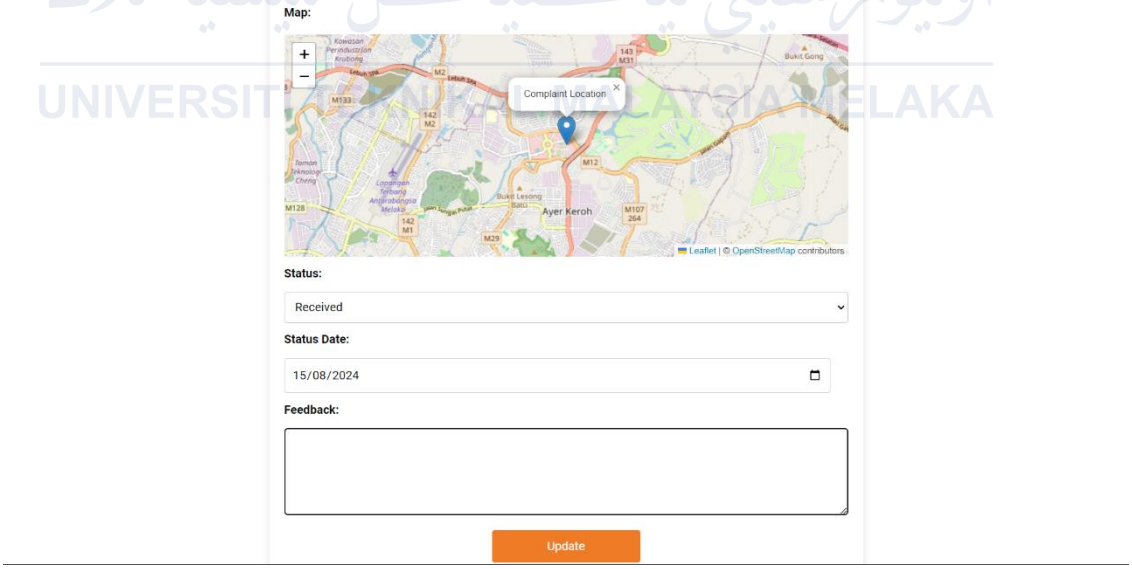

Figure 22: Authority Updating Complaint Page

Figure 22 shows the Authority Updating Complaint page that function to give feedback and updating the complaint.

5.2.1.9 Report Dashboard

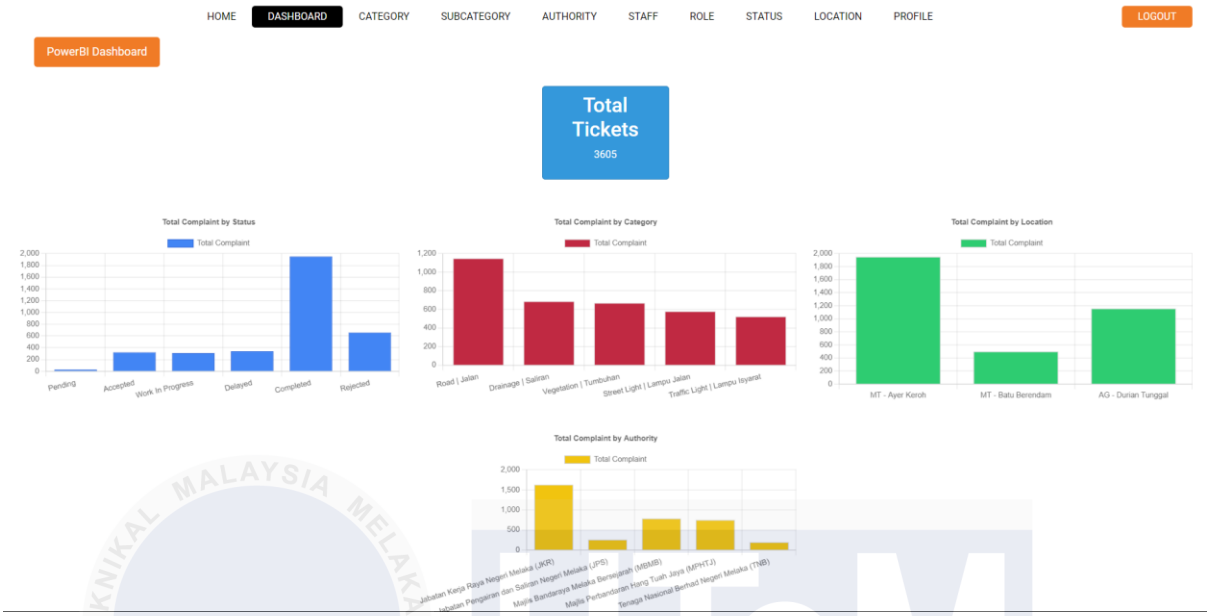

Figure 23: Report Dashboard Page

Figure 23 shows the report dashboard that give generalise visual reports.

5.2.1.10 Authority Close a Ticket

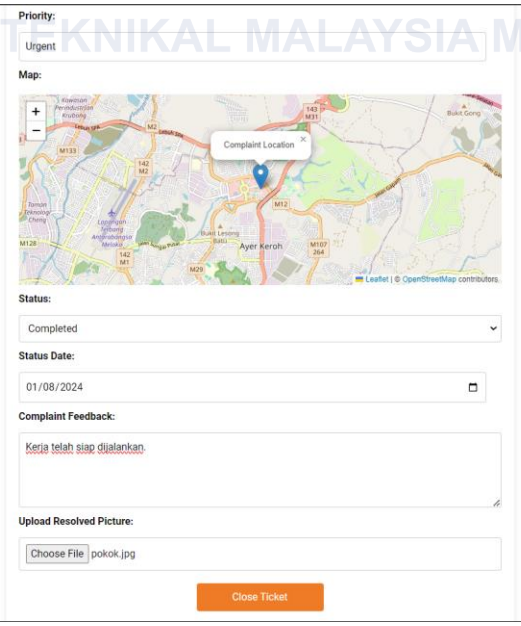

Figure 24: Authority Close a Ticket

Figure 24 shows the page to upload a completion image and feedback before closing any ticket.

5.2.1.11 Profile Page

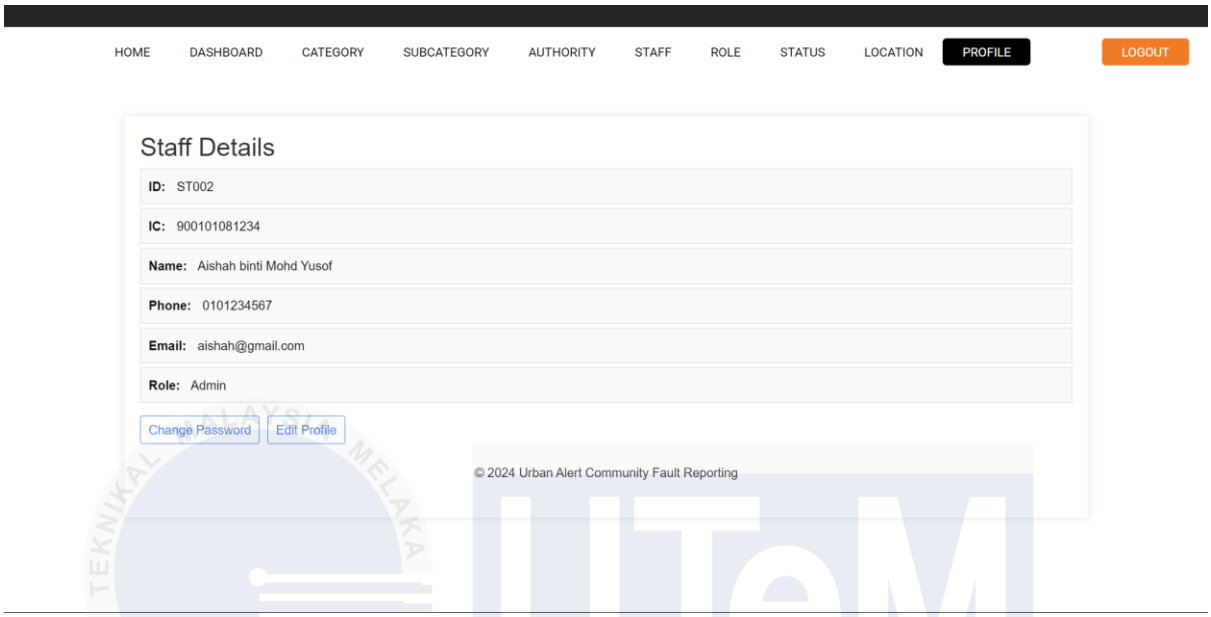

Figure 25: Profile Management Page

Figure 25 shows the profile management page that have a control to update profile and changing the password.

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5.3 Database Implementation

Database Implementation is where the process of creating the database, tables and configure the constraints for each table and populate with some sample data. Based on the design analysis, we have been able to list down some attributes that could have been exist in each table. So, based on that process, we created a database and created the table with those attributes. When all the tables have been created, we manually inserting those sample data into the table. Using PhpMyAdmin we can choose to insert the data using Terminal which are using SQL or using graphical interface on the website.

5.3.1 DBMS

For this project, XAMPP is used as the software package that contain web server and Database Management System (DBMS). For web server, Apache is chosen because it provides an efficient and convenient way to set up a local environment for a web application. For DBMS, MySQL and PhpMyAdmin are used due to free and open-source web-based tool. It is also provide graphical user interface (GUI) that make it easier to create table and manage the database. PhpMyAdmin also has a large active community that can help in terms of support and resources throughout the project.

5.3.2 Security Mechanism

For security mechanism, we focused on the user-level security in which distinct roles will have specific permissions to data and task that can be done. For example, Admin can have full access to the database focusing on the permissions. Admin can do SELECT, INSERT, UPDATE and DELETE task. Staff also can do SELECT, INSERT, UPDATE and DELETE but it is limited to some action and tables. Lastly, Authority can only SELECT, INSERT and UPDATE.

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5.3.3 Stored Procedure

Stored Procedure is used in some part of this system to make it easier to debugging the code, save some lines on code space and make the process faster. It is because the stored procedure can save some transaction times because the procedure already been saved in the chosen DBMS. On our code, we just need to call the stored procedure by its specific name that have been declared in the DBMS.

i. changePassword

```
BEGIN
    DECLARE v_existingPassword VARCHAR(20);
    -- Fetch the existing password for the staff member
    SELECT staffPassword INTO v_existingPassword
    FROM staff
    WHERE staff_ID = p_staff_ID;
    -- Check if the current password matches the existing password
    IF v_existingPassword IS NULL THEN
       SET p_result = 'Staff ID not found';
    ELSEIF v_existingPassword != p_currentPassword THEN
       SET p_result = 'Current password is incorrect';
    ELSE
       -- Update the password
       UPDATE staff
       SET staffPassword = p_newPassword
       WHERE staff_ID = p_staff_ID;
       SET p_result = 'Success';
    END IF;
END
```

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ii. AddComplaint

```
BEGIN
  INSERT INTO complaint (
    complaint_ID,
    compCategory_ID,
    complaintPicture,
    complaintRemark,
    location_ID,
    latitude,
    longitude,
    complaint_date,
    complaint_time,
    subCategory_ID,
    status_ID,
    complaint_statusDate,
    user_ID
    complaint_numeric
  ) VALUES (
    p_complaint_ID,
    p_compCategory_ID,
    p_complaintPicture,
    p_complaintRemark,
    p_location_ID,
    p_latitude,
    p_longitude,
    p_complaint_date,
    p_complaint_time,
    p_subCategory_ID,
    p_status_ID,
    p_complaint_statusDate,
    p_user_ID
    p_complaint_numeric
  );
```

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```
END
```

iii. AddUser

```
BEGIN
  INSERT INTO user (user_ID, user_IC, userName, userPhone,
userEmail, user_numeric)
  VALUES (p_user_ID, p_user_IC, p_userName, p_userPhone,
p_userEmail, p_user_numeric);
END
```

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5.3.4 Queries

i. Aggregate Queries

```
SELECT cc.complaintType, COUNT(c.complaint_ID) as
total_complaints
    FROM complaint c, complaintcategory cc
    WHERE c.compCategory_ID = cc.compCategory_ID
    GROUP BY cc.complaintType
    ORDER BY c.compCategory_ID ASC
```

ii. Subqueries

```
SELECT s.staff_ID, s.staff_IC, s.staffName, s.staffPhone, s.staffEmail,
r.roleName
    FROM staff s, role r
    WHERE r.role_ID = s.role_ID
```

iii. Join queries

```
SELECT c.complaint_ID,
        cc.complaintType,
        l.locationName,
        c.complaint_date,
        c.complaint_time,
        sc.subCategoryName AS complaint_subCategory,
        s.statusType AS complaint_status,
        c.complaint_statusDate
    FROM complaint c
    LEFT JOIN complaintcategory cc ON c.compCategory_ID =
cc.compCategory_ID
    LEFT JOIN complaintsubcategory sc ON c.subCategory_ID =
sc.subCategory_ID
    LEFT JOIN location l ON c.location_ID = l.location_ID
    LEFT JOIN status s ON c.status_ID = s.status_ID
```

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5.4 Deployed Server

After database is ready to be used and system has been developed in local environment, the whole project will be deployed to the server and web hosting provider on JomHosting.net as our live website. It is used to collect real data from nearby area around Melaka such as Durian Tunggal, Ayer Keroh and Batu Berendam. Since the website is live, it will make it easier to collect data and pinpoint the correct latitude and longitude for our data collection process.

5.5 Data Collection

The main goal of this project is to collect and analyse complaint that have been lodged by the public. Hence, data collection the combination of real data as data artifact and synthetic data is used to help generate more data within a couple of minutes. Real data artifact contains of 200 self-collected data by collecting from different areas. Then, 200 data artifact is used to generate synthetic data by using Gretel AI. The synthetic data tools used is based on ACTGAN model that able to generate more than 5000 complex datasets of synthetic data. Then, the data will be cleaned such as outlier detection, missing data or incomplete data, data filtering and aggregation method is used for data cleansing prior to integration into the database. The whole process needs to be done to improve the data quality and accuracy result of the visualization of data analytic capability in Urban Alert.

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5.6 PowerBI Dashboard

For analytical visualization, PowerBI Dashboard is used since it more versatile and free-to-used software tool. To connect our database to PowerBI, a connector is used or data files are exported from the database in excel format before upload it into PowerBI. For this project, we choose to export the database since it is more stable than depending on the connector.

5.6.1 PowerBI Measure

Below is a measure that being used to calculate different on days to a complaint to be resolved.

```
DayComplaintToResolve =

    DATEDIFF(
        [complaint_date],
        [complaint_statusDate],
        DAY
    )
```

5.7 Conclusion

This chapter conclude the implementation of this system. it covers from the tools and software been used, operating system, and the IDE for writing the code. It also covers the implementation of the database for this project including creating tables, creating stored procedure and populate with some sample data.

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CHAPTER 6: TESTING

6.1 Introduction

Testing is one of the most important parts when developing a system or application. The goal is to test the entire system and its component whether it will be given the expected results based on different situations. After that, we will analyse the test results to change or fix the code to achieve a bug-free system.

6.2 Test Plan

6.2.1 Test Strategy

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White box testing, also known as glass box or structural testing, is a testing technique that focuses on the internal structure and implementation of the software system (Cao et al., 2012). Unlike black box testing, it is a technique that treats the software as a "black box," where the tester has no knowledge of the internal structure or workings of the system (Cao et al., 2012). White box testing allows testers to access and analyse the internal logic, data structures, and control flow of the software (Cao et al., 2012). This approach is particularly useful in the initial stages of the software development process, as it allows for a comprehensive evaluation of the software's functionality without the need for in-depth technical knowledge (Gregoire, M, 2024).

6.2.2 Test Environment

Testing process will be conducted in controlled environments that able to resemble to the actual live environment. It will focus on hardware, software, and network. For hardware, different hardware will be used when testing the system such as a laptop, mobile phones and tablet. It is to ensure that this system is capable with different devices. Then, the different software such as the device's operating system. for this case we perform the testing on the windows and android operating system only. Next, for network we are focusing on using the mobile data and Wi-Fi connection to open and interact with the system.

6.2.3 Classes of Test

The following test will be conducted:

a. Functionality Test

Verify that the system performs as it intended functions correctly and produce expected results and given correct output.

b. Usability test

Verify that the system's ease of use and user-friendly.

c. Compatibility test

Verify that the system is compatible with different hardware, software and network connections.

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6.2.4 Test Description

Several test scenarios will be tested on the system such as navigation to designation pages using button or navigation bar, inserting new data in the database, update or delete any records in the database. In addition, we will test lodging a report and fill in any of text field with different types of inputs to test the output if this situation happens. Other than that, we will try to upload the picture with different files to test the system. Lastly, we will do a testing on the input validation focusing on the email's field.

6.3 Test Result and Analysis

Table 17 below shows the results and analysis for testing process.

Table 17: Testing Result and Analysis

Test Case No.	Description	Test Data	Expected Result	Actual Result	Status (Pass/Fail)
1.	Lodge a complaint with verify personal's detail and complaint's detail	Personal details and complaint details	Complaint received	Complaint received	Pass
2.	Lodge a complaint with unverified personal's detail and complaint's detail	Wrong format for email	Complaint cannot be submitted	Complaint cannot be submitted	Pass
3.	Lodge an incomplete complaint form (Personal detail)	Blank on IC number, phone number, Email	Complaint cannot be submitted	Complaint cannot be submitted	Pass
4.	Lodge an incomplete complaint form (Complaint detail)	Not provide any picture	Complaint cannot be submitted	Complaint cannot be submitted	Pass
5.	Lodge an incomplete complaint form (Complaint detail)	Not provide any coordinate	Complaint cannot be submitted	Complaint still be submitted	Fail
6.	Try uploading different format for picture	Other than .jpeg, .jpg	Not able to read other file's format during the process	Not able to read other file's format during the process	Pass
7.	Search for existing complaint	Complaint ID = CM001	Report can be view	Report can be view	Pass
8.	Search for existing complaint	Search Complaint ID with only 005	Report cannot be view	Report cannot be view	Pass

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9.	Search for existing complaint	Leave it blank	Report cannot be view	Report cannot be view	Pass
10.	Print report's ticket details	Ticket can be printed by clicking the button	Ticket can be print	Ticket can be print	Pass
11.	Login with wrong password	Wrong password	Cannot login into the system	Cannot login into the system	Pass
12.	Login with wrong staff ID	Wrong staff ID	Cannot login into the system	Cannot login into the system	Pass
13.	Login with wrong credentials with more than 3 times	Wrong credentials	Cannot login into the system, back to index	Cannot login into the system, back to index	Pass
14.	Login with verify login credentials	Login credentials	Can login into the system, go to specific role's page	Can login into the system, go to specific role's page	Pass
15.	Logout by clicking logout button	Logout button	Successfully log out, back to index	Successfully log out, back to index	Pass
16.	Admin updating report's status	New status	Successfully update the record	Successfully update the record	Pass
17.	Admin delete any report	Delete button	Successfully delete the record	Successfully delete the record	Pass
18.	Admin view report	View Button	Report can be view	Report can be view	Pass
19.	Admin navigate to Dashboard Page	Dashboard navbar	Successfully navigate to designated page	Successfully navigate to designated page	Pass
20.	Admin navigate to PowerBI Dashboard	PowerBI Dashboard button	Successfully navigate to designated page	Successfully navigate to designated page	Pass

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21.	Admin navigate to Category Page	Category navbar	Successfully navigate to designated page	Successfully navigate to designated page	Pass
22.	Admin register new category	New category name	Successfully register new category	Successfully register new category	Pass
23.	Admin update category	Change category name	Successfully rename category	Successfully rename category	Pass
24.	Admin Delete category	Delete button	Successfully delete category	Successfully delete category	Pass
25.	Admin navigate to subcategory Page	subcategory navbar	Successfully navigate to designated page	Successfully navigate to designated page	Pass
26.	Admin register new subcategory	New subcategory name	Successfully register new subcategory	Successfully register new subcategory	Pass
27.	Admin update subcategory	Change subcategory name	Successfully rename subcategory	Successfully rename subcategory	Pass
28.	Admin Delete subcategory	Delete button	Successfully delete subcategory	Successfully delete subcategory	Pass
29.	Admin navigate to authority page	Authority navbar	Successfully navigate to authority page	Successfully navigate to authority page	Pass
30.	Admin register new authority	Authority name, Phone number, Department & staff-in-charge	Successfully register new authority	Successfully register new authority	Pass
31.	Admin update authority	Change subcategory name	Successfully rename authority	Successfully rename authority	Pass
32.	Admin Delete authority	Delete button	Successfully delete authority	Successfully delete authority	Pass

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33.	Admin navigate to staff page	Staff navbar	Successfully navigate to staff page	Successfully navigate to staff page	Pass
34.	Admin register new staff	IC number, name, phone number, email, password	Successfully register new staff	Successfully register new staff	Pass
35.	Admin update staff	Change subcategory name	Successfully rename staff	Successfully rename staff	Pass
36.	Admin Delete staff	Delete button	Successfully delete staff	Successfully delete staff	Pass
37.	Admin navigate to role page	Role navbar	Successfully navigate to role page	Successfully navigate to role page	Pass
38.	Admin register new role	New role name	Successfully register new role	Successfully register new role	Pass
39.	Admin update role	Change role name	Successfully rename role	Successfully rename role	Pass
40.	Admin Delete role	Delete button	Successfully delete role	Successfully delete role	Pass
41.	Admin navigate to status page	Status navbar	Successfully navigate to status page	Successfully navigate to status page	Pass
42.	Admin register new status	New status name	Successfully register new status	Successfully register new status	Pass
43.	Admin update status	Change status name	Successfully rename status	Successfully rename status	Pass
44.	Admin Delete status	Delete button	Successfully delete status	Successfully delete status	Pass
45.	Admin navigate to location page	Location navbar	Successfully navigate to location page	Successfully navigate to location page	Pass
46.	Admin register new location	New location name	Successfully register new location	Successfully register new location	Pass

47.	Admin update location	Change location name	Successfully rename location	Successfully rename location	Pass
48.	Admin Delete location	Delete button	Successfully delete location	Successfully delete location	Pass
49.	Admin navigate to profile page	Profile navbar	Successfully navigate to profile page	Successfully navigate to profile page	Pass
50.	Admin change password	Create new password	Successfully changing password & back to login page	Successfully changing password & back to login page	Pass
51.	Admin change password	Re-type wrong password	Failed changing password	Failed changing password	Pass
52.	Admin update profile	Name, phone number & email	Successfully update profile	Successfully update profile	Pass
53.	Staff assign complaint to authority	Choose dropdown choices of authority	Successfully assign & update complaint	Successfully assign & update complaint	Pass
54.	Staff set complaint's priority	Choose dropdown choices of priority	Successfully update complaint	Successfully update complaint	Pass
55.	Staff update complaint	Change status & feedback	Successfully update complaint	Successfully update complaint	Pass
56.	Staff navigate to Dashboard Page	Dashboard navbar	Successfully navigate to designated page	Successfully navigate to designated page	Pass
57.	Staff navigate to PowerBI Dashboard	PowerBI Dashboard button	Successfully navigate to designated page	Successfully navigate to designated page	Pass
58.	Staff navigate to profile page	Profile navbar	Successfully navigate to profile page	Successfully navigate to profile page	Pass

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59.	Staff change password	Create new password	Successfully changing password & back to login page	Successfully changing password & back to login page	Pass
60.	Staff change password	Re-type wrong password	Failed changing password	Failed changing password	Pass
61.	Staff update profile	Name, phone number & email	Successfully update profile	Successfully update profile	Pass
62.	Authority's staff update complaint	Change status & feedback	Successfully update complaint	Successfully update complaint	Pass
63.	Authority's staff navigate to Dashboard Page	Dashboard navbar	Successfully navigate to designated page	Successfully navigate to designated page	Pass
64.	Authority's staff navigate to PowerBI Dashboard	PowerBI Dashboard button	Successfully navigate to designated page	Successfully navigate to designated page	Pass
65.	Authority's staff navigate to profile page	Profile navbar	Successfully navigate to profile page	Successfully navigate to profile page	Pass
66.	Authority's staff change password	Create new password	Successfully changing password & back to login page	Successfully changing password & back to login page	Pass
67.	Authority's staff change password	Re-type wrong password	Failed changing password	Failed changing password	Pass
68.	Authority's staff update profile	Name, phone number & email	Successfully update profile	Successfully update profile	Pass
69.	Authority navigates to close ticket page	Close ticket button	Navigate to close ticket form	Navigate to close ticket form	Pass
70.	Authority close ticket	Update status, feedback &	Successfully update & show the ticket details	Successfully update & show the ticket details	Pass

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	completion picture

6.4 Conclusion

This chapter concludes the testing process taken to test the functionality, usability and compatibility of the system. This is to ensure this system functioning well including all the button, dropdown bar and every text field can be written with value. Other than that, we can analyse the user interface as we want it ease to every user's age of groups and have the user friendliness. Then, we also can try with different hardware, software and network connections. In addition, it will focus on testing the actual results and output match with the expected results and output. As testing phase is one of the most important phases in development cycle to ensure the system is ready to be used, have minimum or zero error and bug before we going to place it into the live server.

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CHAPTER 7: CONCLUSION

7.1 Project Conclusion

Urban Alert Community Fault Reporting System has successfully achieved its objectives of aligning the fault reporting, improving transparency handling all those reports and enhancing infrastructure management especially in Melaka. Using the web-based platform, the system encourages publics to frequently makes the reports especially in certain areas that hardly known by the authorities. Moreover, with centralized database and analytical tools used to can help to prioritize and address the issue effectively.

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The goals are to improve local community involvement including tourists, visitors and locals via a web-application with geolocation capabilities, to promote transparency between any authorities or agency with progress tracking ensuring better accountability, to improve urban life through sustainable and efficient solutions, and to be more data-driven when making some key and important decisions (Sergio, C., 2015).

7.2 Future work

There is also room of improvements that can be done to increase the usability, functionality and improving the user experience. For example, we can consider a functionality to get a notification by email or SMS when a progress is being track or when the ticket has been close due to rejection or completion. Overall, the Urban Alert Community Fault Reporting System has proven to be a key tool for improving infrastructure management, enhancing public safety and promoting a smart and sustainable development in Melaka. This can be a step for more and other potential of technology being used when making decision and strengthen local government and locals' relationship to be able flourish into some positive change in the future.

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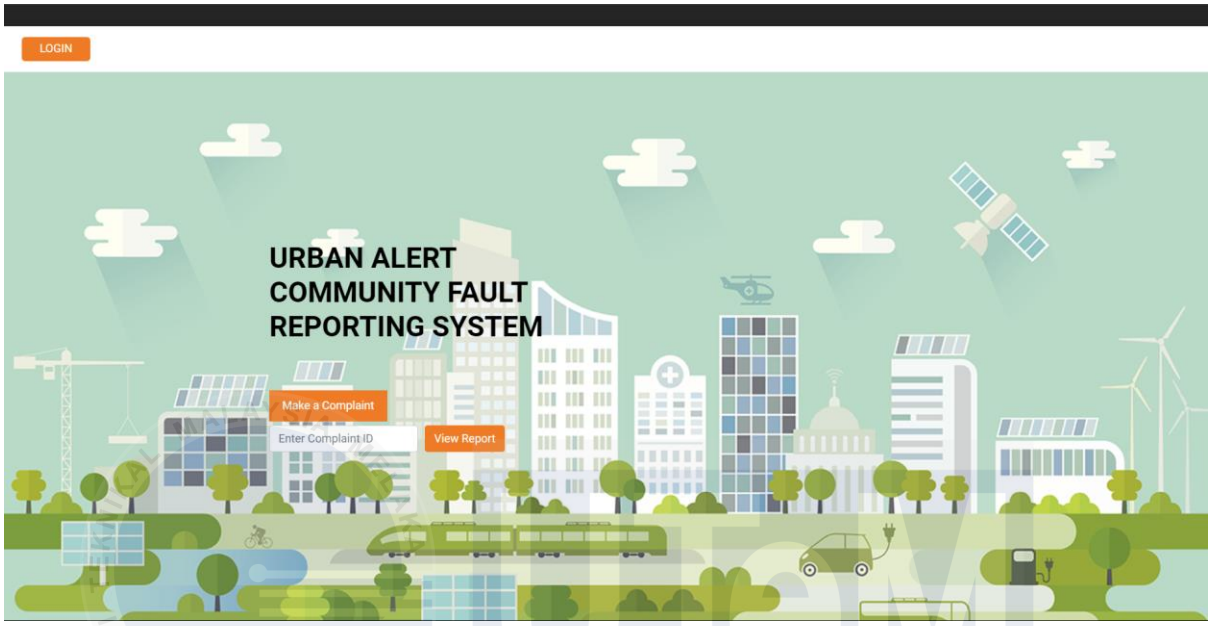
APPENDIX A



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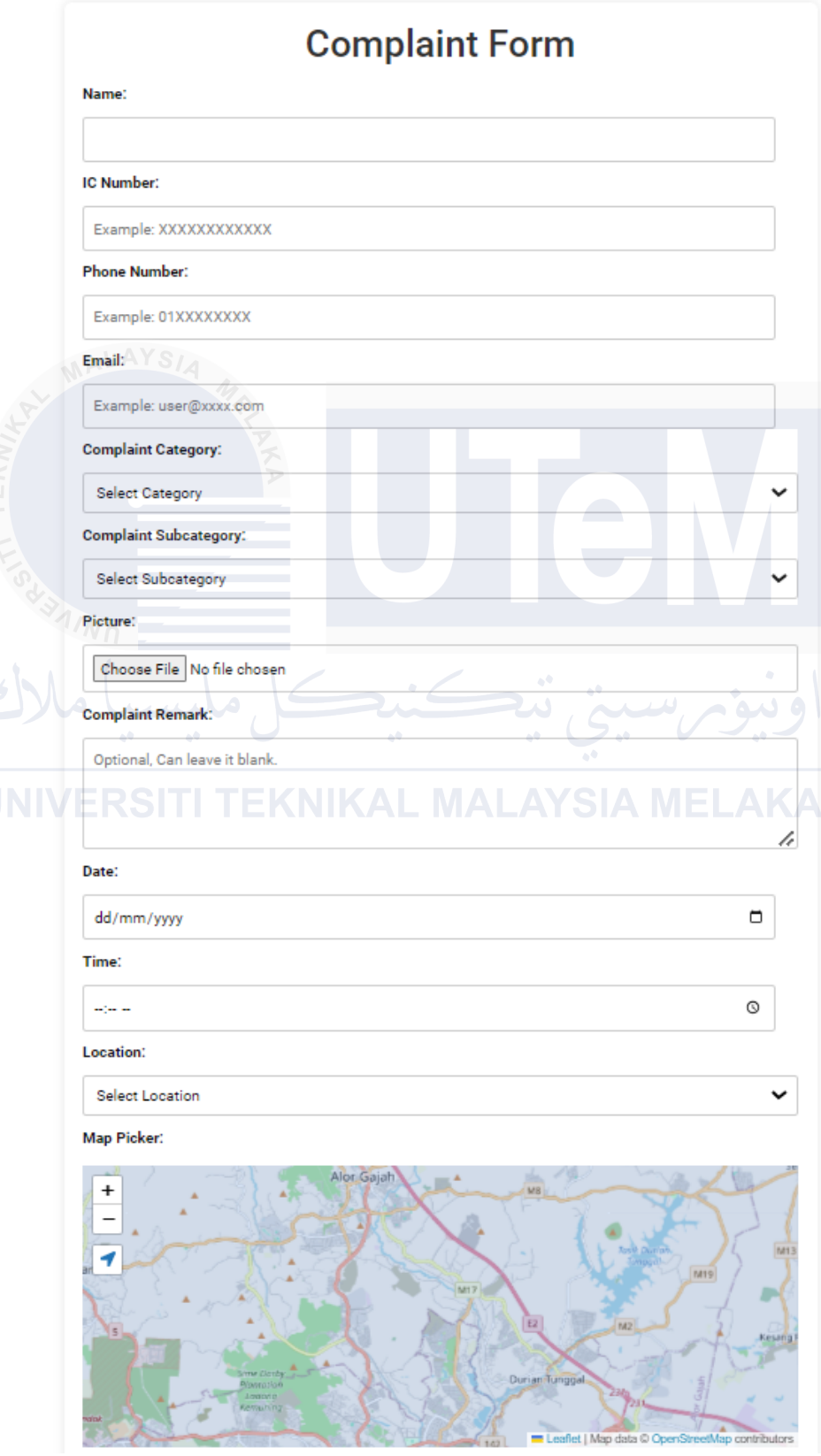
APPENDIX B



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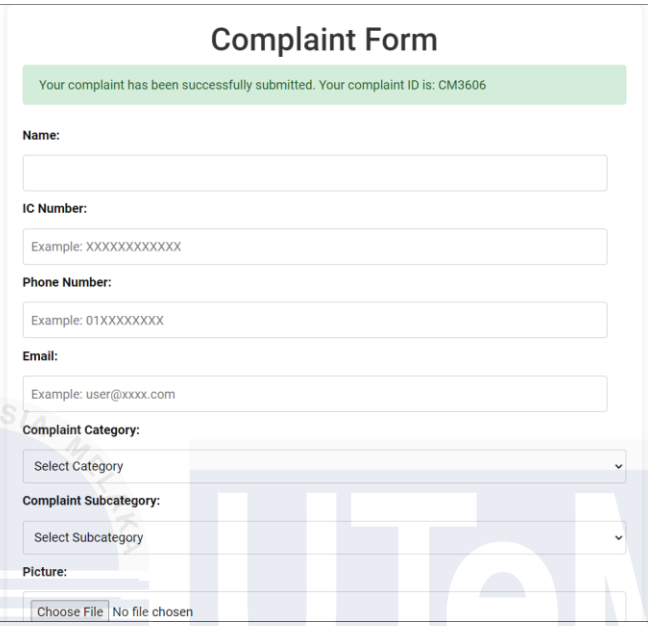
APPENDX C



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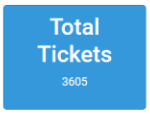
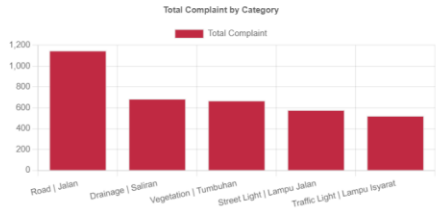
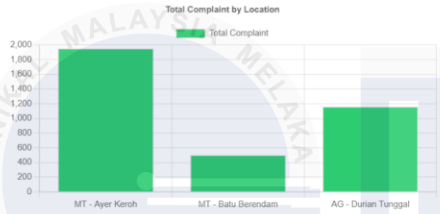
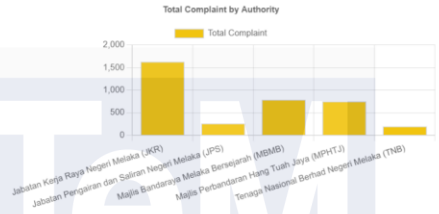
APPENDIX D









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APPENDIX E

Urban Alert Community Fault Report

Complainant Details

Complainant Name: Halimah Saad
Complainant Phone: 0187254856
Complainant Email: halimah@gmail.com

Complaint Details

Complaint ID: CM112
Complaint Picture:

Complaint Type: Vegetation | Tumbuhan
Complaint Category: Untrimmed Trees | Pokok Tidak Dipotong
Complaint Remark:
Location: MT - Ayer Keroh
Latitude: 2.2712273795743325
Longitude: 102.29129940022177
Complaint Date: 2024-07-10
Complaint Time: 15:02:00
Complaint Status: Completed
Completion Picture:

Status Date: 2024-08-01
Complaint Feedback: Kerja telah siap dijalankan.

Authority Details

Authority Name: Jabatan Kerja Raya (JKR)
Department: Pengurusan Aduan Awam
Authority Phone: 06-2854 600
Staff Name: Sharmila Devi
Staff Phone: 0121234567
Staff Email: sharmila@gmail.com

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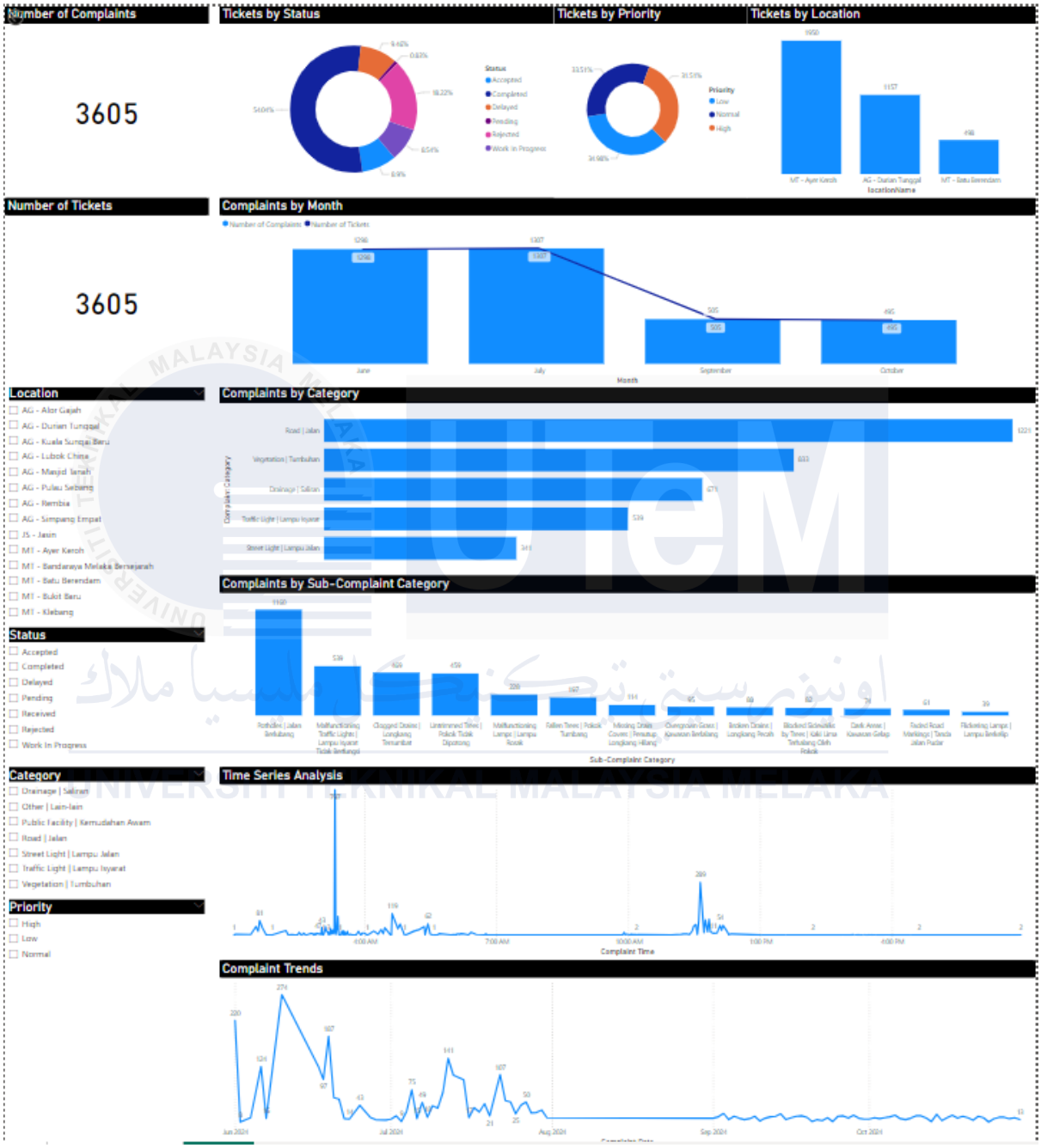
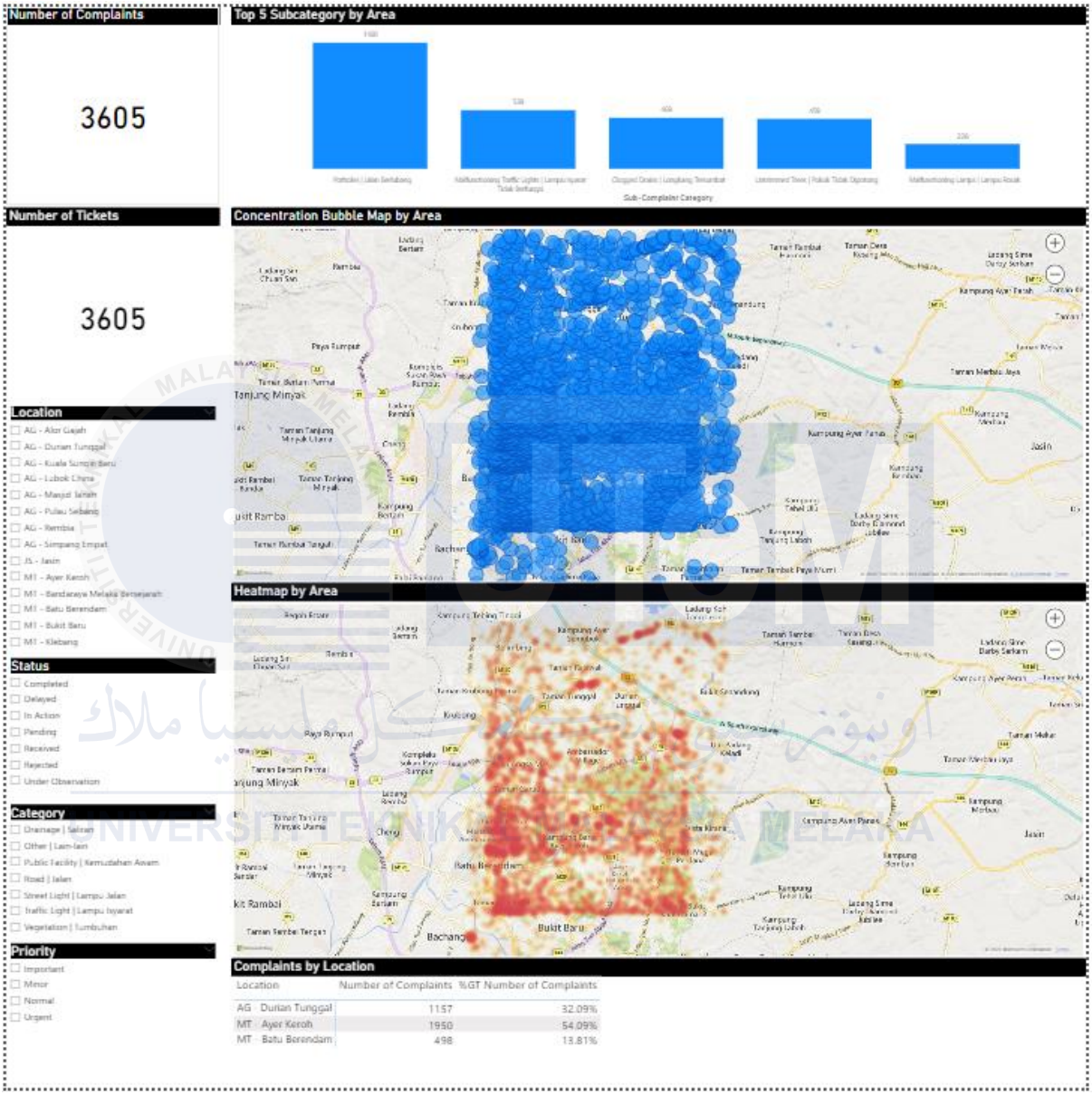
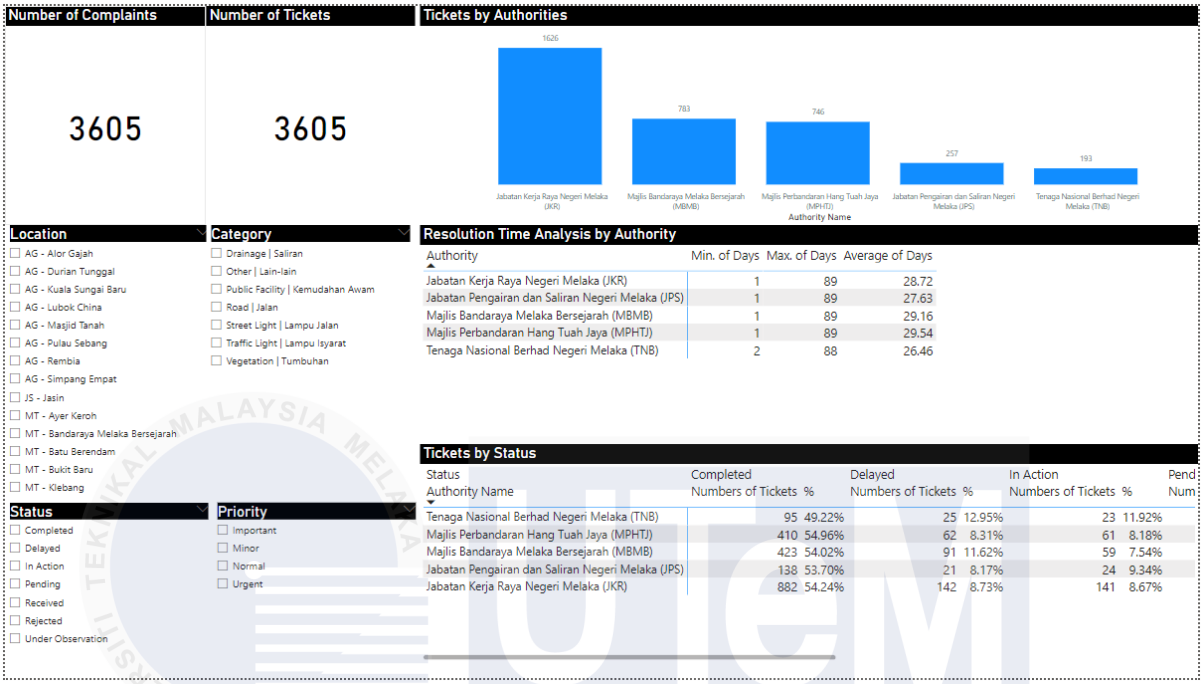
APPENDIX F


Number of Complaints
3605
Tickets by Status
Tickets by Priority
Tickets by Location
Number of Tickets
3605
Complaints by Month
Location
Complaints by Category
Complaints by Sub-Complaint Category
Status
Category
Time Series Analysis
Priority
Complaint Trends

APPENDIX G


Number of Complaints
3605
Top 5 Subcategory by Area
Sub-Complaint Category
Number of Tickets
3605
Concentration Bubble Map by Area
Location
Status
Heatmap by Area
Category
Priority
Complaints by Location
Location
Number of Complaints
%GT Number of Complaints
AG Durian Tunggal
1157
32.09%
MT Ayer Keroh
1950
54.09%
MT Batu Berendam
498
13.81%

APPENDIX H



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