CHAPTER III

RESEARCH METHODOLOGY

Research Environment

The location of the study is in the Mandaue City. Mandaue City is located on the central-eastern region of Cebu and part of the sixth district of Cebu together with Consolacion and Cordova. The city has 27 barangays and an area of 2, 518 hectares (6, 220 acres). Mandaue City's road network is composed of a national road which connects the city to its neighboring cities and municipalities, and a national second road which traverses metropolitan area. The total length of the city road network is about 133.68 kilometers, and divided into: National road which has 13.16 kilometers, City road lengths 57.10 kilometers, and Barangay road has 63.42 kilometers. Road density is 5.31 km per square kilometer of land. Land transportation is being catered by Public Utility Jeepneys (PUJ), utility vehicles, mini-buses, multi-cabs, tricycle, and for cargoes, trailers and vans.

Software Engineering Methodology

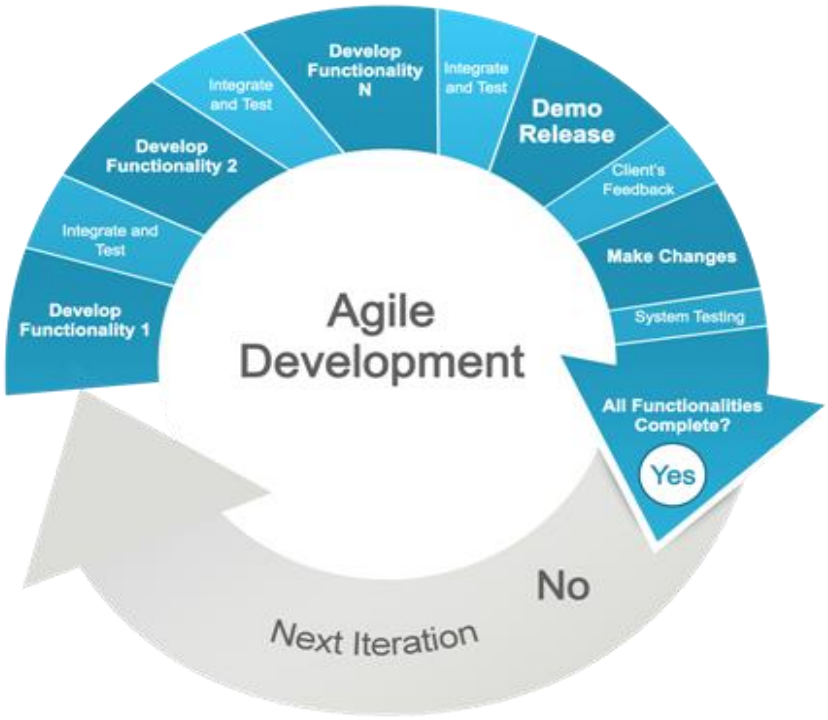

Figure 2: **Agile Development Life Cycle**

Agile methodology is an alternative to traditional project management; it helps teams respond to unpredictability through incremental, iterative work cadences, known as sprints. Agile methodologies are an alternative to waterfall, or traditional sequential development.

Agile development methodology provides opportunities to assess the direction of a project throughout the development lifecycle. This is achieved through regular cadences of work, known as sprints or iterations, at the end of which teams must present a potentially shippable product increment.

Following are the Agile Manifesto principles

Individuals and interactions - in agile development, self-organization and motivation are important, as are interactions like co-location and pair programming.

Working software - Demo working software is considered the best means of communication with the customer to understand their requirement, instead of just depending on documentation.

Customer collaboration - As the requirements cannot be gathered completely in the beginning of the project due to various factors, continuous customer interaction is very important to get proper product requirements.

Responding to change - agile development is focused on quick responses to change and continuous development.

Planning/ Conception-Initiation Phase

Business Model Canvas

Table 2 shows the Business Model Canvass of the system proposed. This will give idea to an investor about the view of the proposed system and who will be the key partners' involved that will buy and help the proposed system. The key activities being done by the system, value propositions which presents why the system will be created, how this is involved with customer relationships, key resources which states the resources involved that will be used in developing the system and who are the proponents involved in the study. The customer segments present the place where the proposed system will be implemented. The channels, presents the ways on how to market the business happens while the cost structure presents where the cost of the business occurs.

Table 2

BUSINESS MODEL CANVAS

<table>
<tr><td>Key Partners</td><td>Key Activities</td><td>Value Proposition</td><td>Customer Relationship</td><td>Customer Segments</td></tr>
<tr><td rowspan="2">-Traffic Management
-CITOM
-Google
-Mandaue City
-Telcom</td><td>-Platform Development
-Data Center Management</td><td rowspan="2">-Provide current Traffic information and alternative routes</td><td>-Automated Services</td><td rowspan="2">-Commuters
-Private vehicle owners</td></tr>
<tr><td>Key Resources
-Network Technology
-Traffic Data
-Internet
-Google Map</td><td>Channels
-Mobile network
-Internet connectivity</td></tr>
<tr><td colspan="2">Cost Structure
-Data center costs
-Research and development
-Hardware and Computer Costs</td><td colspan="3">Revenue Streams
-Free
-Ad Revenues
- Premium usage fees</td></tr>
</table>

Program Workflow

Program workflow shows the workflow shows the process of each system process.

They represent, in a sequential manner, the requisites and/or conditions before the system proceeds to the other process like displaying a page or a prompt.

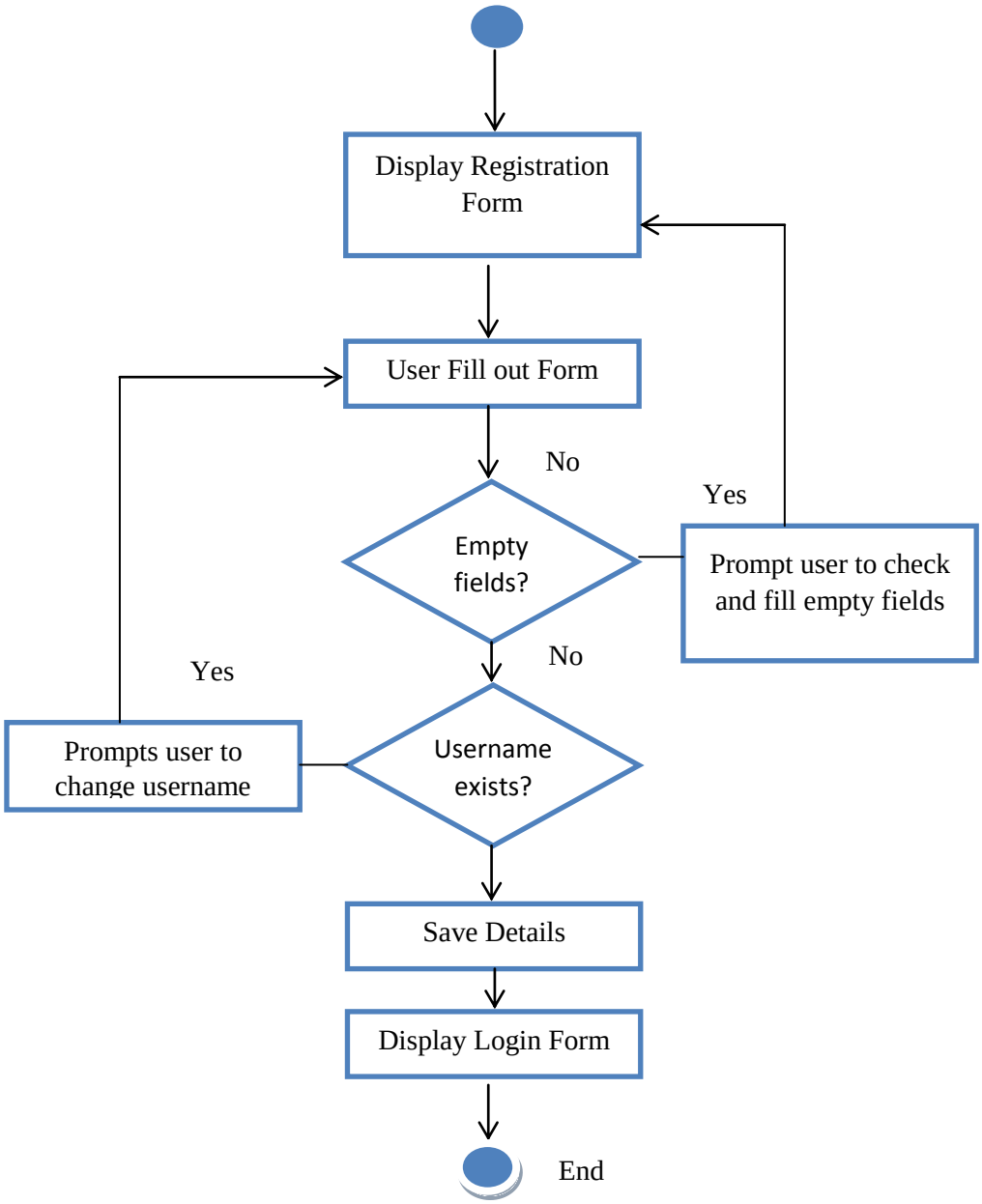

Figure 3: **Registration Workflow**

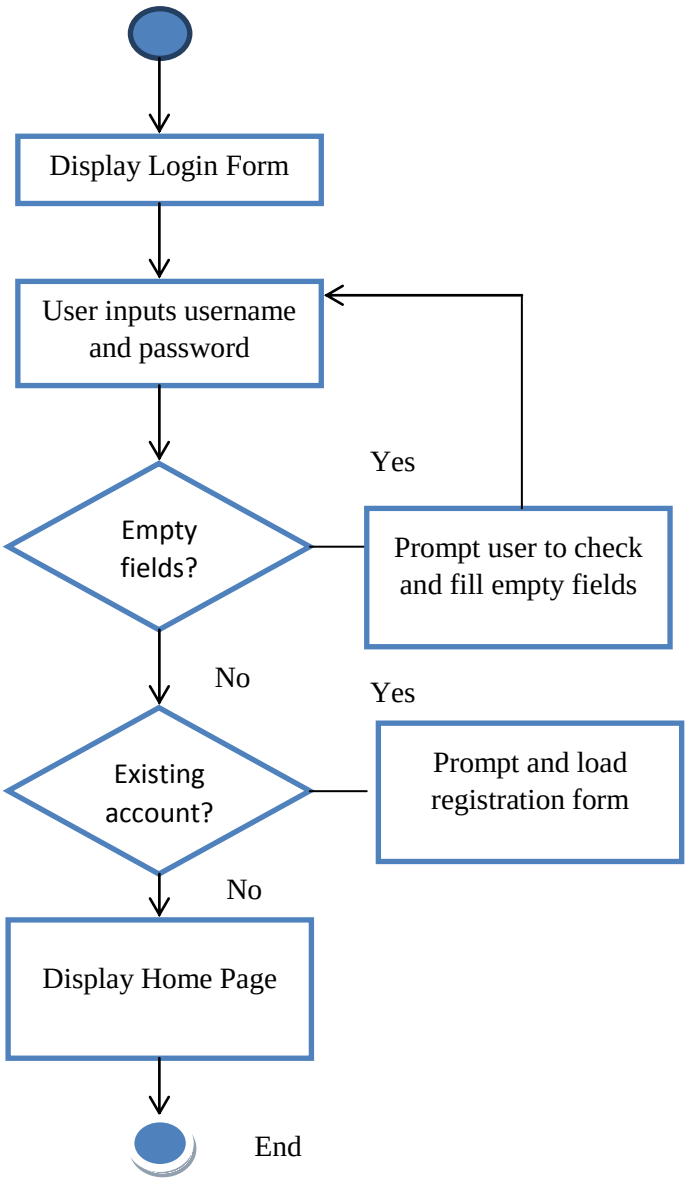

Figure 4: **Login Workflow**

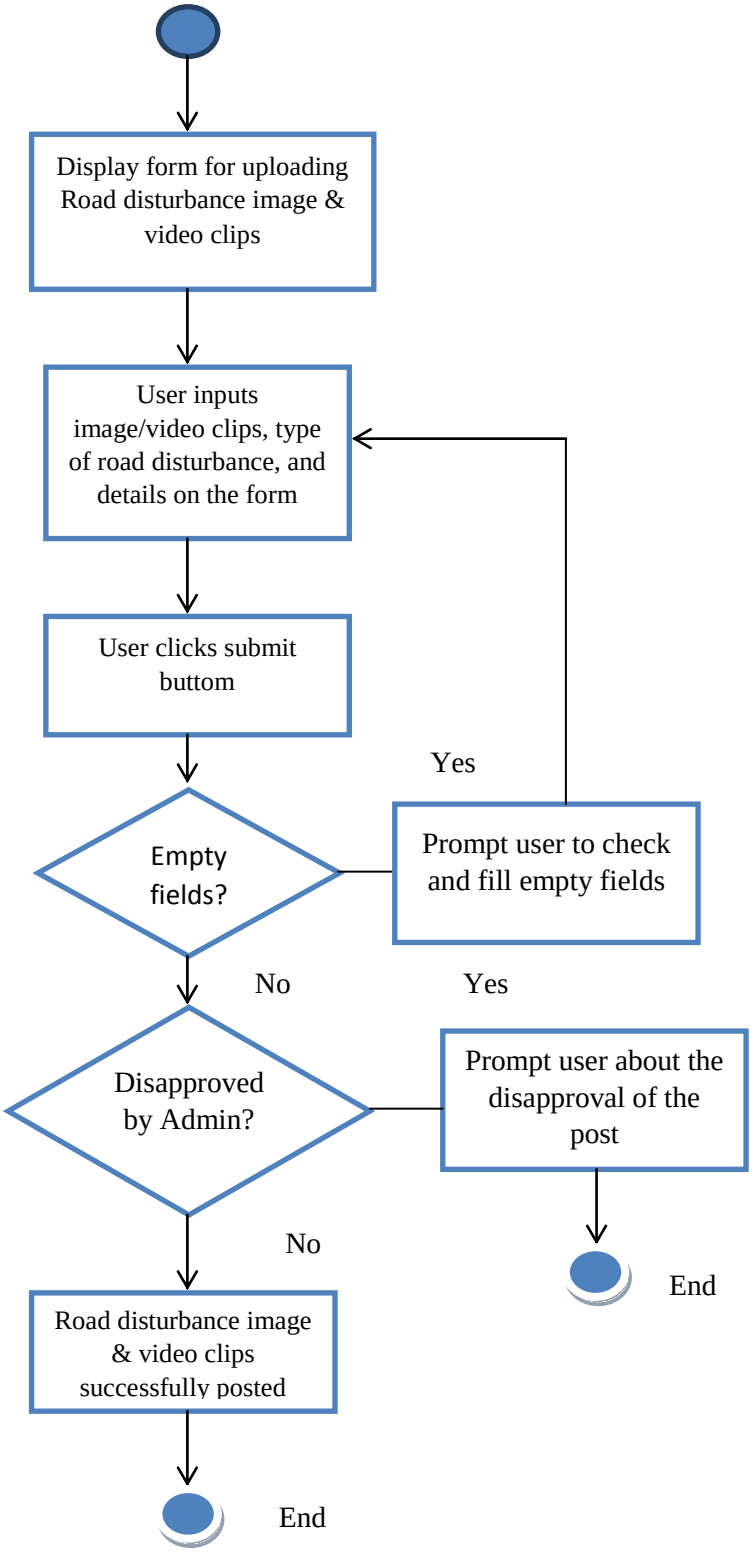

Figure 5: **Road Disturbance Images and Video Clips Workflow**

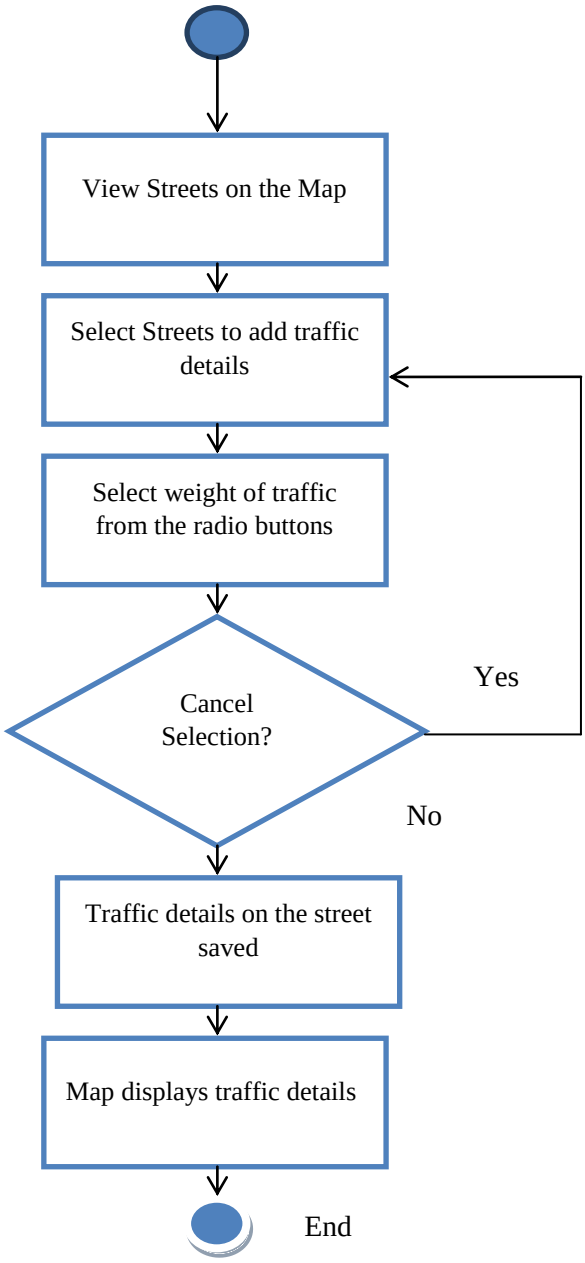

Figure 6: **Process Traffic Details Workflow**

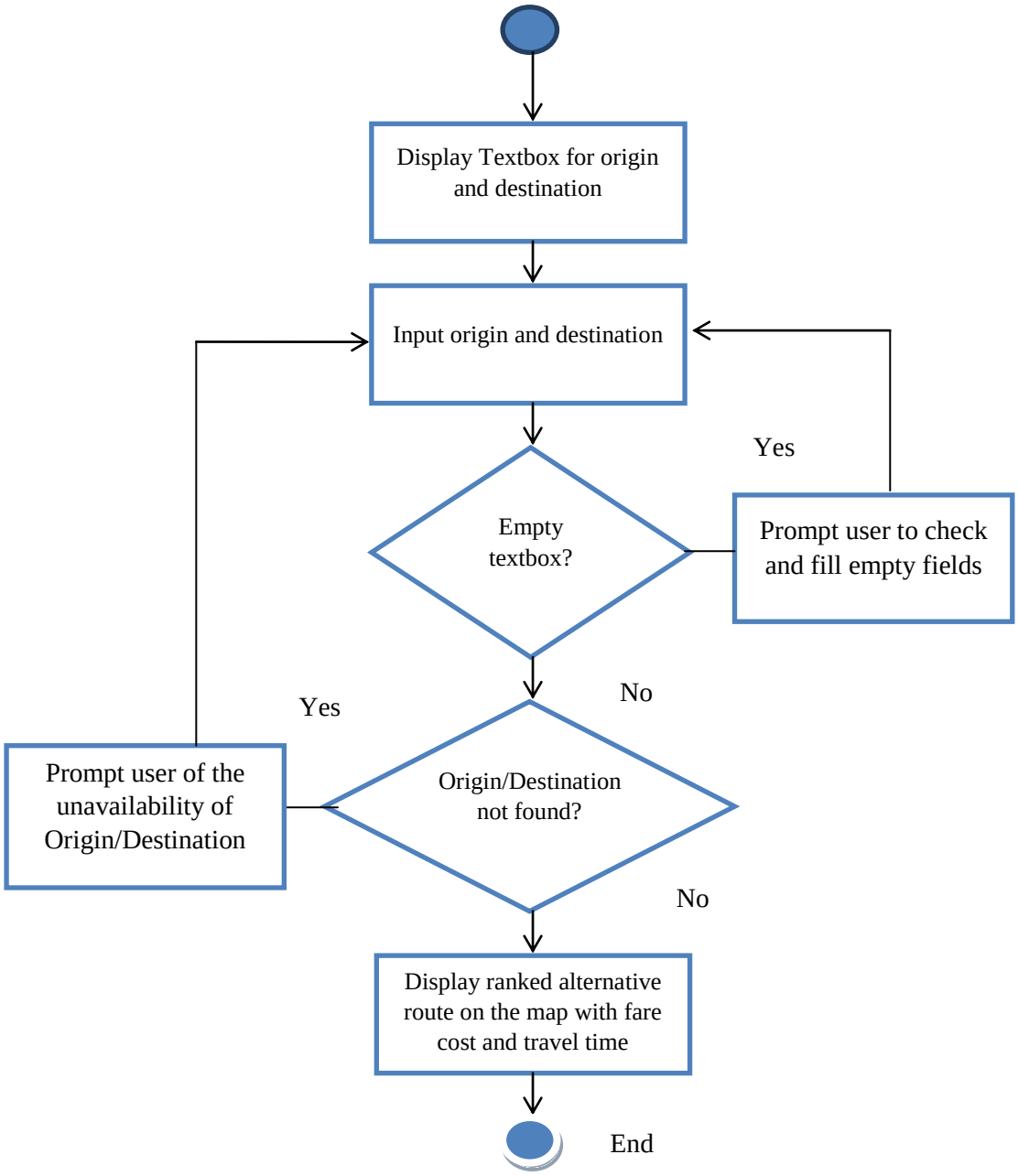

Figure 7: **View Alternative Routes Workflow**

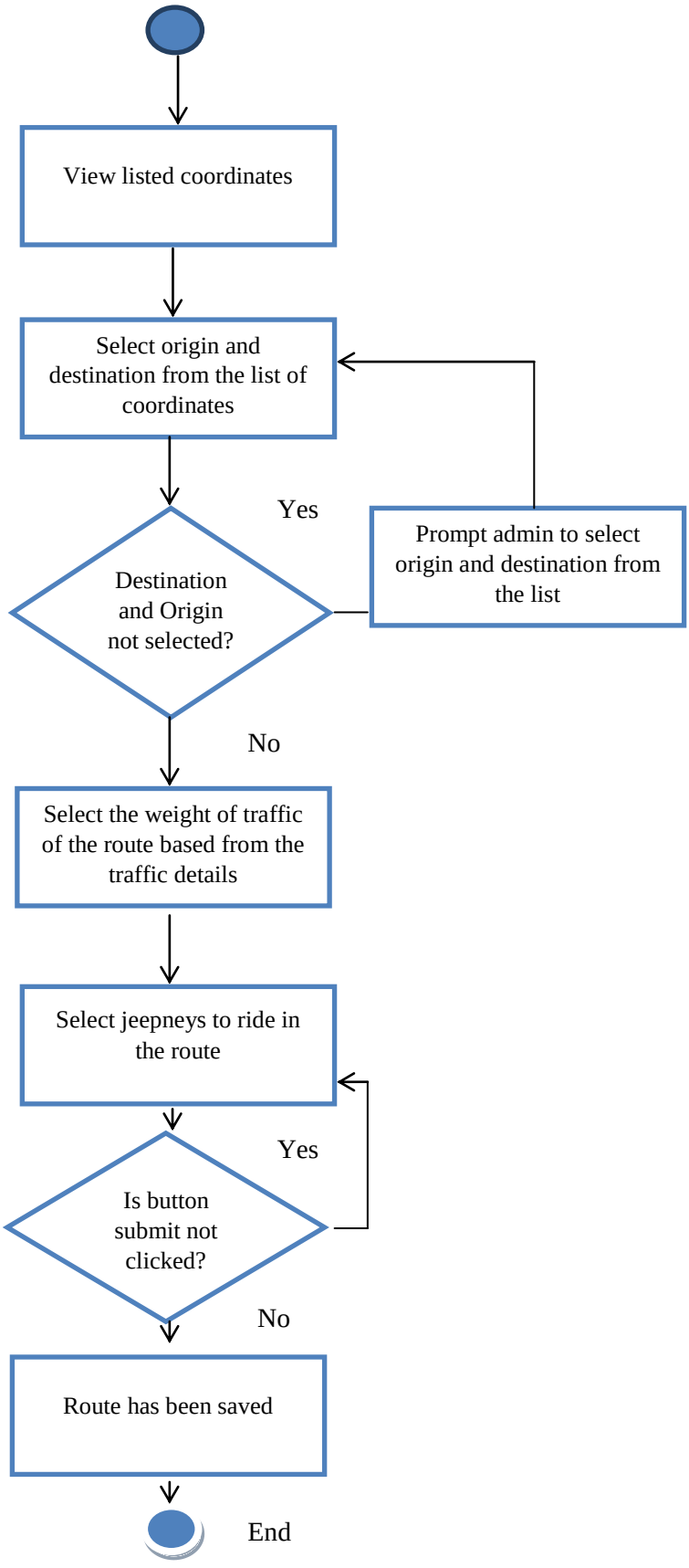

Figure 8: **Add Alternative Routes Workflow**

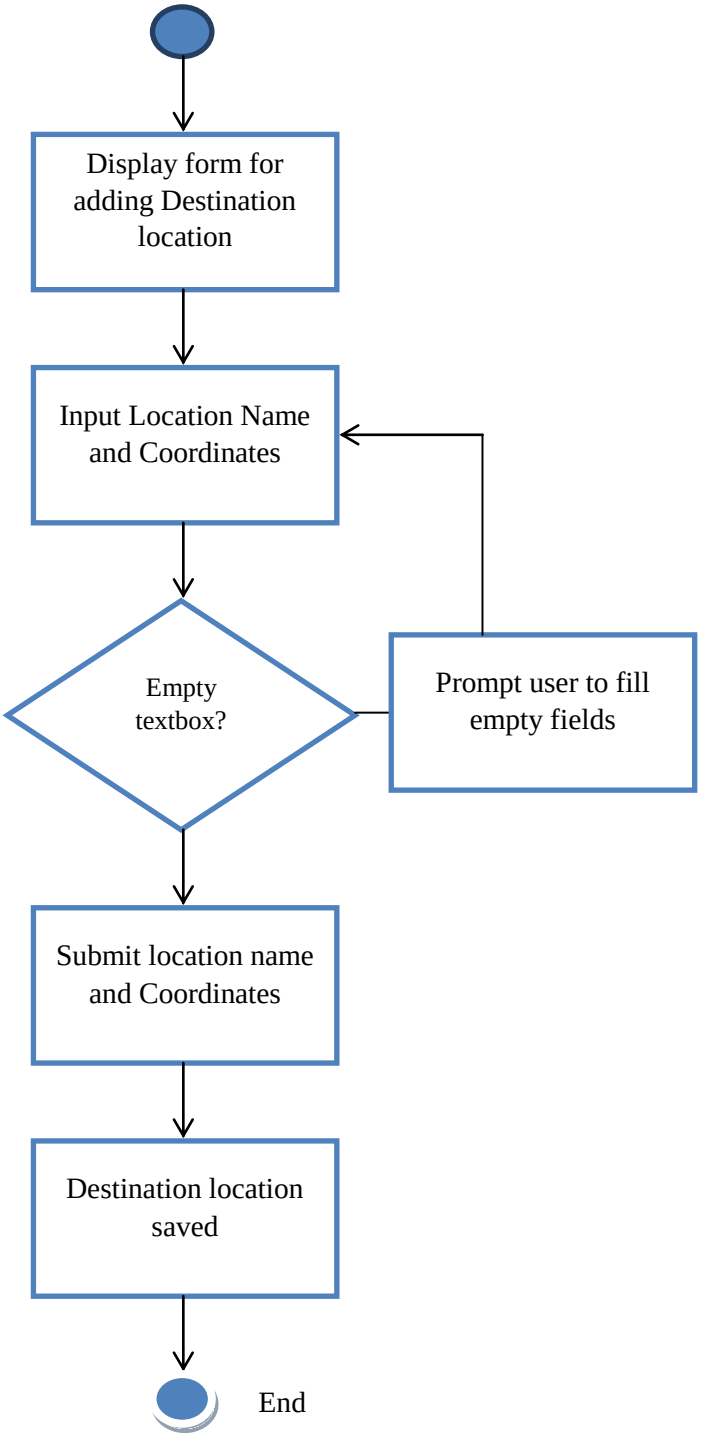

Figure 9: **Add Destination Location Workflow**

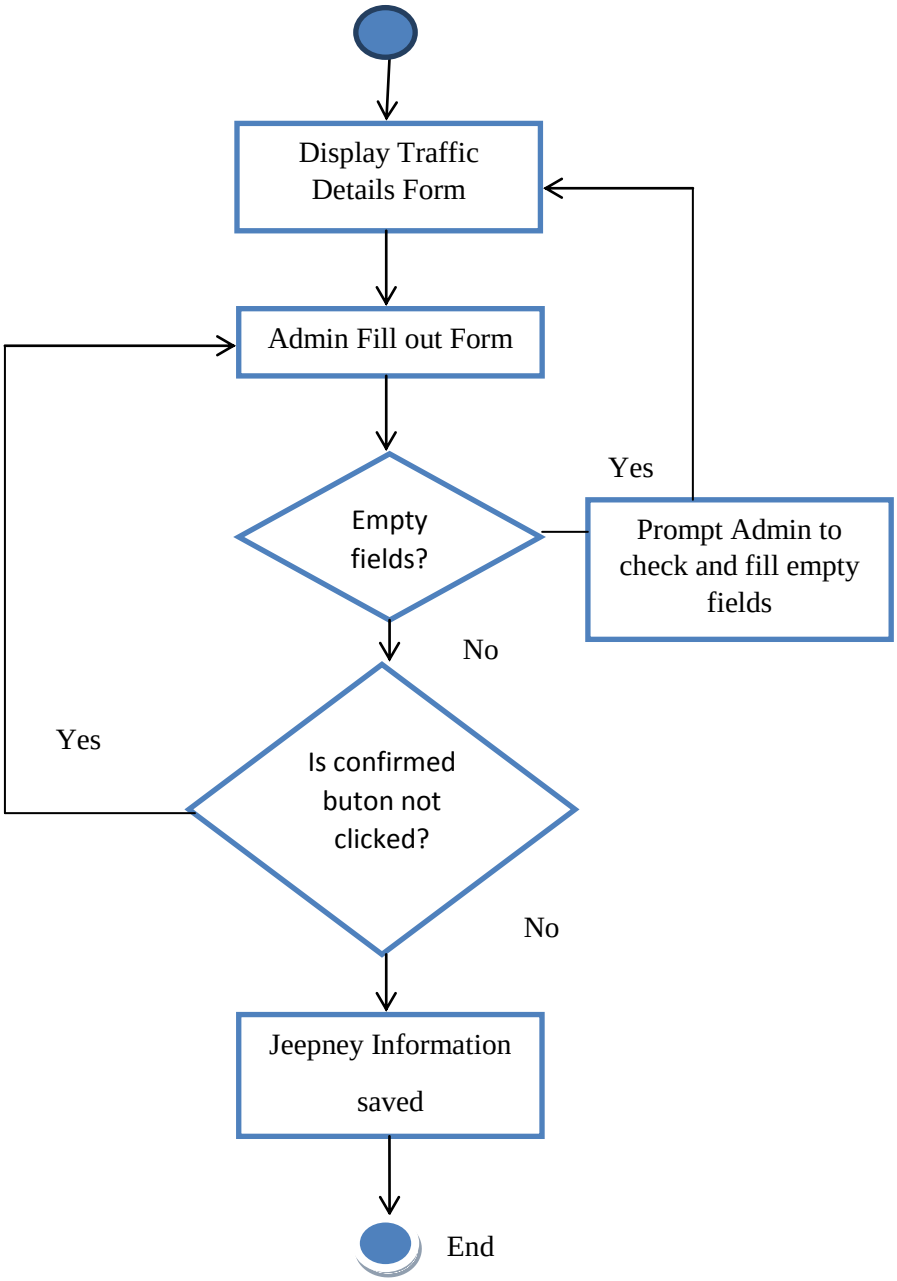

Figure 10: **Process Jeepney Information Workflow**

Table 3

GANTT CHART

		Task	Start	End		June			
	Task Name	Lead	Date	Date	WEEKS				
						W1	W2	W3	W4
1	Planning for Fire Pitch	All Members	6/13/2015	6/13/2015					
2	Brain Storming	All Members	6/17/2015	6/19/2015					
3	Research	All Members	6/17/2015	6/19/2015					
4	Creation of Fire Pitch	All Members	6/21/2015	6/21/2015					
5	Submission of Fire Pitch	All Members	6/24/2015	6/24/2015					
6	Recreation of Fire Pitch	All Members	6/24/2015	6/26/2015					
7	Resubmission on of Fire Pitch	All Members	6/26/2015	6/27/2015					
8	Title Hearing Preparation	All Members	6/27/2015	7/12/2015					
		Task	Start	End		July			
	Task Name	Lead	Date	Date	WEEKS				
						W1	W2	W3	W4
9	Title Hearing	All Members	7/10/2015	7/13/2015					
10	Planning for Chapter 1	All Members	7/13/2015	7/18/2015					
11	Rationale	All Members	7/18/2015	7/23/2015					
12	Scope and Limitation of the Study	All Members	7/20/2015	7/23/2015					
13	Significance of the Study	All Members	7/20/2015	7/24/2015					
14	Flow of the Study	All Members	7/21/2015	7/22/2015					
15	Definition of terms	All Members	7/23/2015	7/23/2015					
		Task	Start	End		August			
	Task Name	Lead	Date	Date	WEEKS				
						W1	W2	W3	W4
16	Revisions on Chapter 1	All Members	8/5/2015	8/10/2015					
17	Related Literature	All Members	8/25/2015	9/7/2015					
18	Related Studies	All Members	8/25/2015	9/7/2015					
		Task	Start	End		September			
	Task Name	Lead	Date	Date	WEEKS				
						W1	W2	W3	W4
19	Software Engineering Methodology	All Members	9/23/2015	10/4/2015					
20	Program Workflow	All Members	9/23/2015	10/4/2015					
21	ValiditionBoard	All Members	9/23/2015	10/4/2015					
22	Gantt Chart	All Members	9/23/2015	10/4/2015					
23	Functional Decompostion Diagram	All Members	9/23/2015	10/4/2015					
24	Usecase Diagrams	All Members	9/23/2015	10/4/2015					
25	Storyboard	All Members	9/23/2015	10/4/2015					
26	Entity Relationship Diagram	All Members	9/4/2015	9/24/2015					
27	Data Dictionary	All Members	9/10/2015	9/24/2015					
28	Network Model	All Members	9/24/2015	10/1/2015					
29	Network Topology	All Members	9/24/2015	10/1/2015					
30	Software Specification	All Members	9/4/2015	10/4/2015					
31	Hardware Specification	All Members	9/4/2015	10/4/2015					
32	References	All Members	9/4/2015	10/4/2015					
		Task	Start	End					
	Task Name	Lead	Date	Date	WEEKS				
						W1	W2	W3	W4
33	Testing								
34	Implementation								

LEGEND

Plan, Actual, Delayed

Functional Decomposition Diagram

The functional decomposition diagram represents the breakdown of business processes that the proposed system will do. The processes will mainly cover about the functions of users

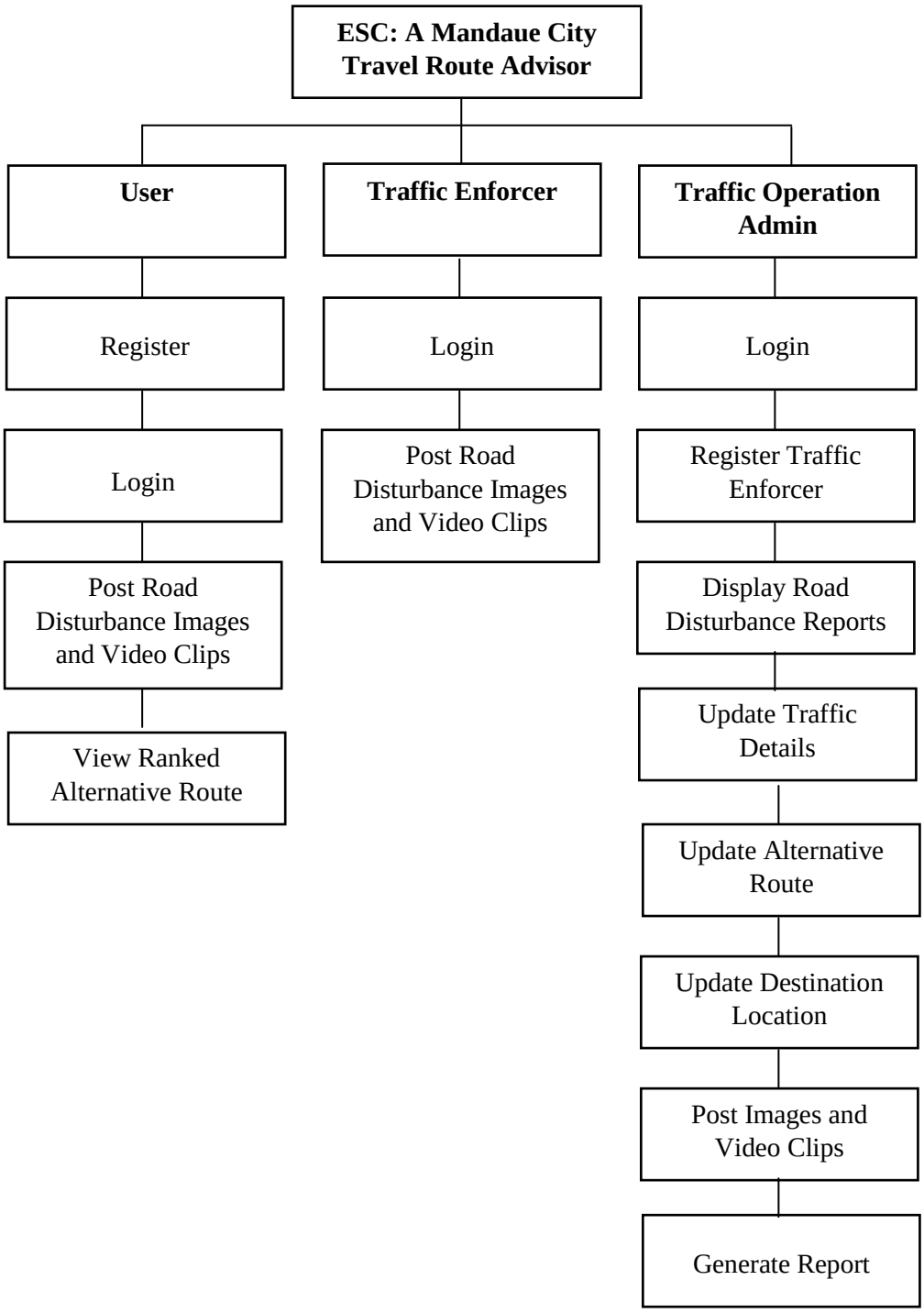

Figure 11: **Functional Decomposition of ESC: A Mandaue City Travel Route Advisor**

Analysis-Design Phase

Analysis design phase consists of design functions and operations which describes in detail the use case diagrams, storyboard, database design, and network design.

Use Case Diagram

A use case diagram is a graphic depiction of the interactions among the elements of a system. It used to identify, clarify, and organize system requirements.

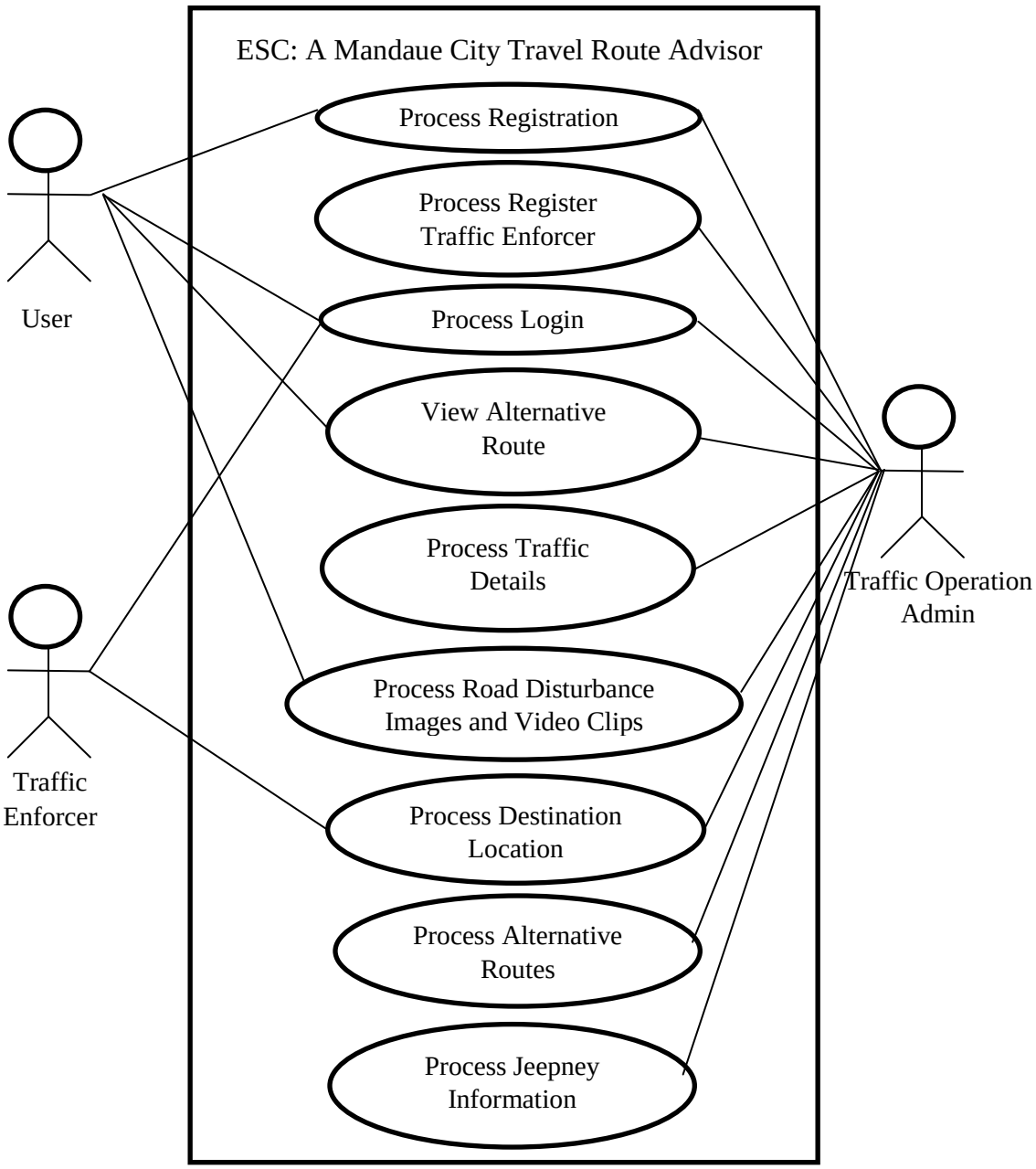

Figure 12: **Use Case Diagram**

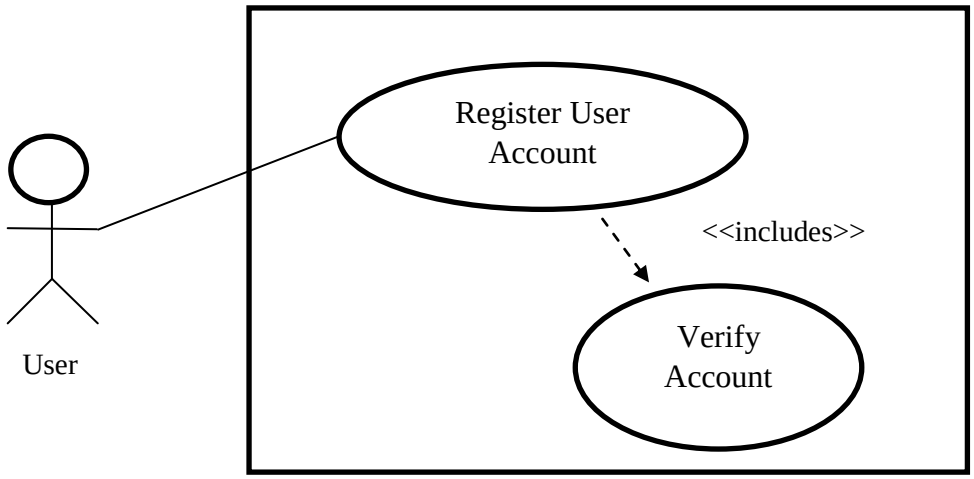

Figure 13: **Process Registration**

Table 4

PROCESS REGISTRATION

Use Case ID	UC-1
Use Case Name	Process Registration.
Actors	User.
Description	To register user in the system.
Trigger	User will click on the registration button.
Pre-Conditions	The user will fill in all necessary information needed.
Expected Conditions	The user will be finally registered on the database.
Normal flow:	User will click the register button. 1. User will input the required data. 2. The User will click the save button. 3. System will send verification through email. 4. User will be successfully registered in the ESC database.
Includes	Verify account.

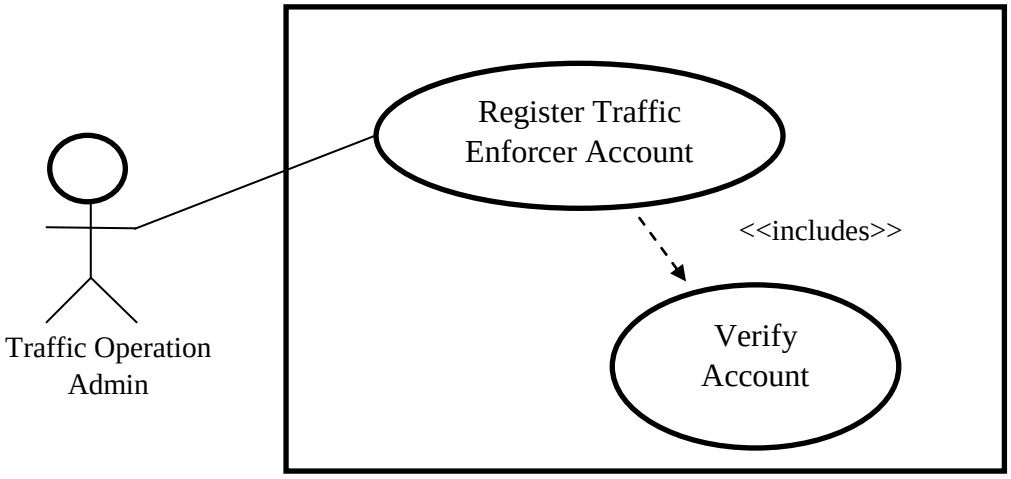

Figure 14: **Process Register Traffic Enforcer**

Table 5

PROCESS REGISTER TRAFFIC ENFOCER

Use Case ID	UC-2
Use Case Name	Process Register Traffic Enforcer
Actors	Traffic Operation Admin.
Description	To register Traffic Enforcer in the system.
Trigger	Traffic Operation Admin will click on the registration button.
Pre-Conditions	The Traffic Operation Admin will fill in all necessary information needed.
Expected Conditions	The Traffic Enforcer will be finally registered on the database.
Normal flow:	Traffic Enforcer will click the register button. 1. Traffic Operation Admin will input the required data. 2. The Traffic Operation Admin will click the save button. 3. System will send verification through email. 4. Traffic Enforcer will be successfully registered in the ESC

	database.
Includes	Verify account.

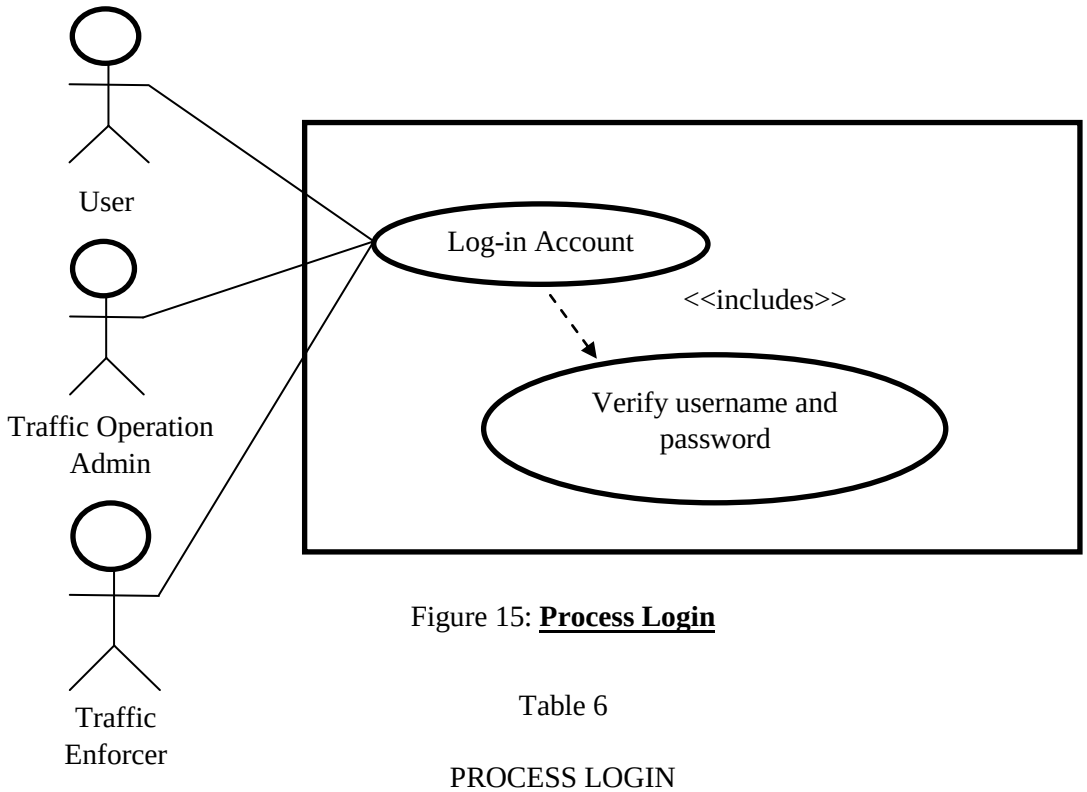

Figure 15: **Process Login**

Table 6

PROCESS LOGIN

Use Case ID	UC-3
Use Case Name	Process Login.
Actors	User, Traffic Enforcer, Traffic Operation Admin
Description	To login User/TE/TOA in the system.
Trigger	User/TE/TOA will click on the login button.
Pre-Conditions	The User/TE/TOA will fill in username and password.
Expected Conditions	The User/TE/TOA will finally enter the system.
Normal flow:	1. User/TE/TOA will input the username and password. 2. The User/TE/TOA will click the login button. 3. User/TE/TOA successfully logged in.

Includes	Verify username and password.

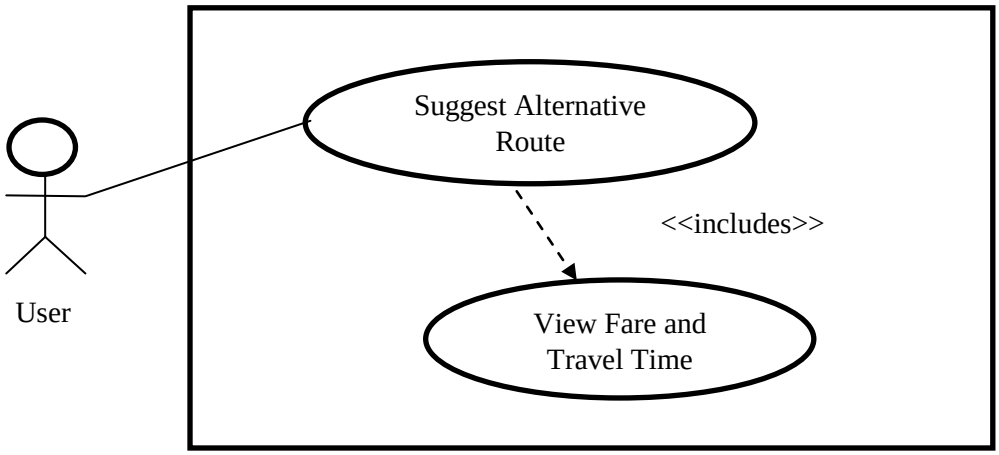

Figure 16: **View Alternative Route**

Table 7

VIEW ALTERNATIVE ROUTE

Use Case ID	UC-4
Use Case Name	View Alternative Route
Actors	User
Description	To let User view alternative route.
Trigger	User will click on the view alternative button to view ranked alternative route with fare and travel time.
Pre-Conditions	The User will fill in its origin and destination.
Expected Conditions	The User will finally be successful on viewing the alternative route with fare and travel time.
Normal flow:	1. User will input details necessary viewing alternative route.

	2. The User will click the view button. 3. User successfully viewed the alternative route.
Includes	View Fare and Travel Time

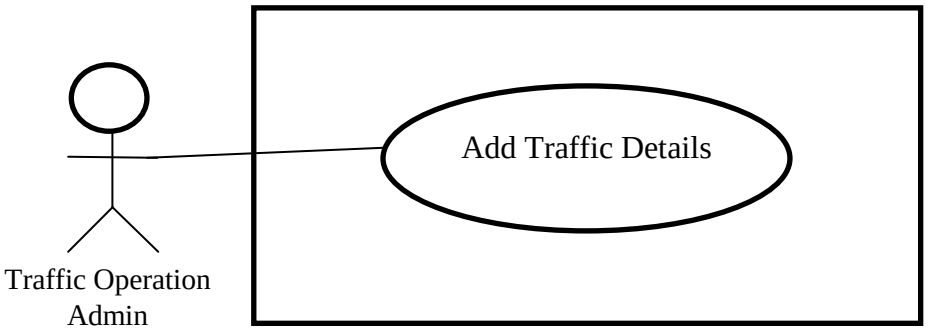

Figure 17: **Process Traffic Details**

Table 8

PROCESS TRAFFIC DETAILS

Use Case ID	UC-5
Use Case Name	Process Traffic Details.
Actors	Traffic Operation Admin
Description	To let Traffic Operation Admin add traffic details.
Trigger	Traffic Operation Admin will click on the add button.
Pre-Conditions	The Traffic Operation Admin will add traffic details.
Expected Conditions	The Traffic Operation Admin will be successful on adding traffic details.
Normal flow:	1. Traffic Operation Admin will input details necessary for adding traffic details. 2. Traffic Operation Admin will click the Add button. 3. Traffic Operation Admin successfully added traffic details.

Includes	None

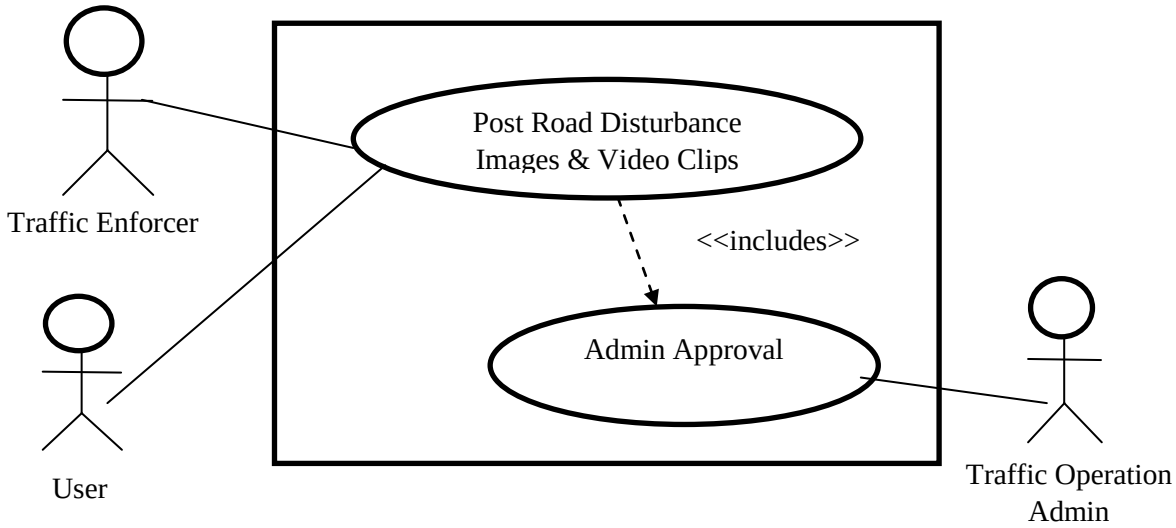

Figure 18: **Process Road Disturbance Images and Video Clips**

Table 9

PROCESS ROAD DISTURBANCE IMAGES AND VIDEO CLIPS

Use Case ID	UC-6
Use Case Name	Process Road Disturbance.
Actors	Traffic enforcer, User
Description	To let Traffic enforcer and user post road disturbance images or video clips.
Trigger	Traffic enforcer/User will click on the post button to post images and video clips.
Pre-Conditions	The Traffic enforcer/User will fill in the necessary details with images and video clips.
Expected Conditions	The Traffic enforcer/User will finally be successful on posting images and video clips.
Normal flow:	1. Traffic enforcer/User will input details necessary for posting

	images and video clips. 2. The Traffic enforcer/User will click the post button. 3. Admin will approve the image or video clips. 4. Traffic enforcer/User successfully posted the images or video clips.
Includes	Admin Approval

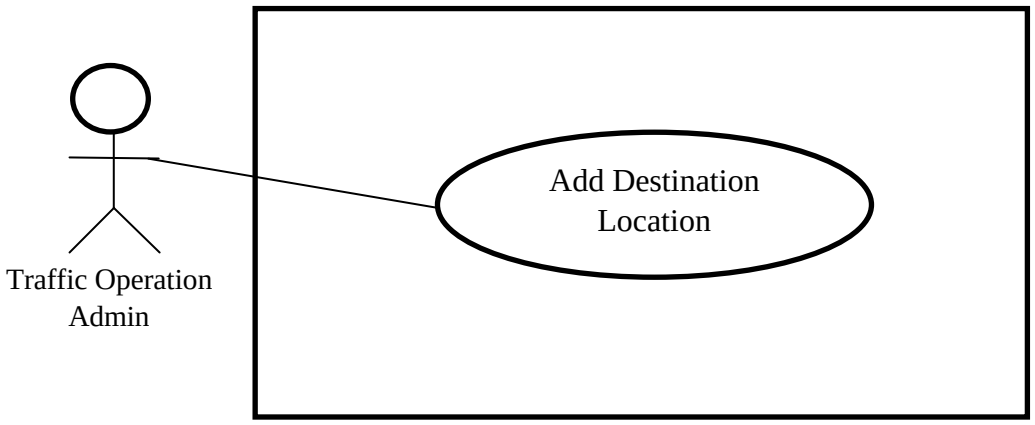

Figure 19: **Process Destination Location**

Table 10

PROCESS DESTINATION LOCATION

Use Case ID	UC-7
Use Case Name	Process Destination Location.
Actors	Traffic Operation Admin.
Description	To let Traffic Operation Admin add destination location.
Trigger	Traffic Operation Admin will click on the add button.
Pre-Conditions	The Traffic Operation Admin will add destination location.
Expected Conditions	The Traffic Operation Admin Account will be successful on adding destination location.
Normal flow:	1. Traffic Operation Admin will input details necessary for adding destination location.

	2. Traffic Operation Admin will click the Add button. 3. Traffic Operation Admin successfully added destination location.
Includes	None

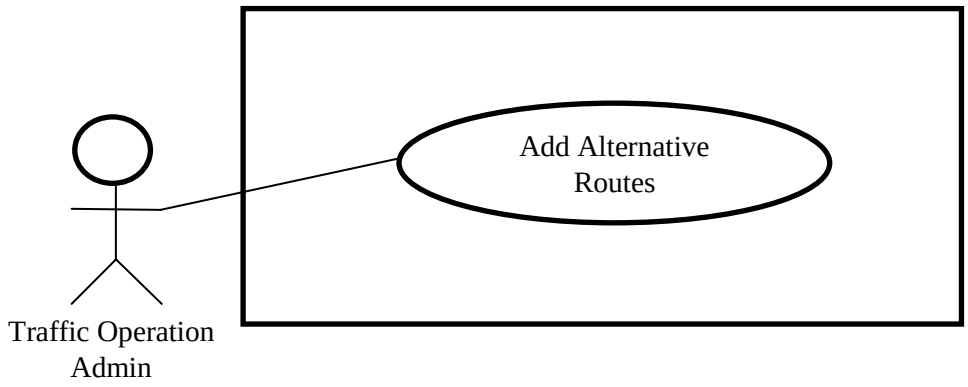

Figure 20: **Process Alternative Routes**

Table 11

PROCESS ALTERNATIVE ROUTES

Use Case ID	UC-8
Use Case Name	Process Alternative Routes.
Actors	Traffic Operation Admin.
Description	To let Traffic Operation Admin to add new alternative routes.
Trigger	The Traffic Operation Admin will click on the Add Routes.
Pre-Conditions	The Traffic Operation Admin will add new alternative route.
Expected Conditions	The Traffic Operation Admin will be successful on adding new alternative route.
Normal flow:	1. Click Add Routes button. 2. Inputs necessary information about the new alternative routes to be added. 3. Click Add button. 4. New alternative routes successfully added.
Includes	None

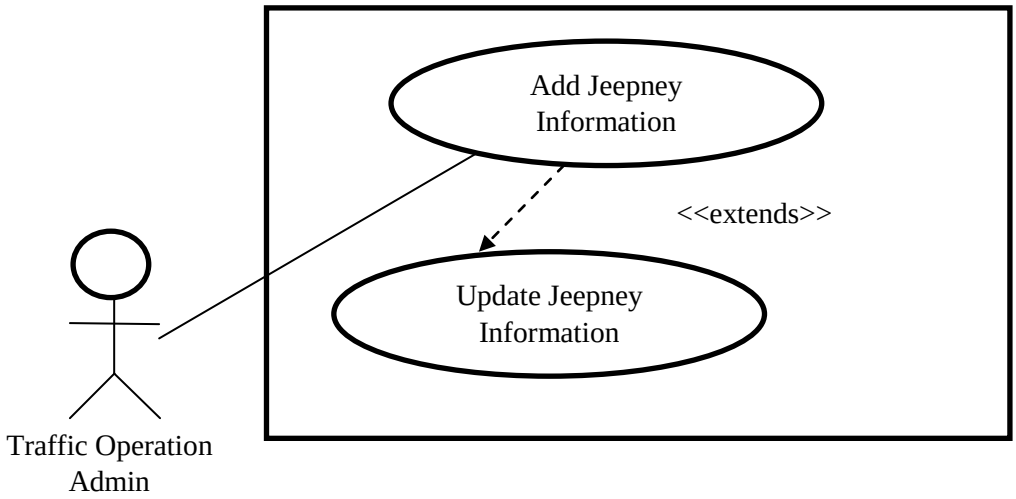

Figure 21: **Process Jeepney Information**

Table 12

PROCESS JEEPNEY INFORMATION TABLE

Use Case ID	UC-9
Use Case Name	Process Jeepney Information
Actors	Traffic Operation Admin.
Description	To let Traffic Operation Admin to add jeepney information on the system
Trigger	The Traffic Operation Admin will click on the manage jeepney information button
Pre-Conditions	The Traffic Operation Admin will input information about a jeepney which include routes
Expected Conditions	The Traffic Operation Admin will be successful on adding jeepney information
Normal flow:	1. Click Manage Jeepney Information 2. Input details on the form 3. Jeepney Information successfully added
Includes	None

Storyboard

Storyboard helps the user understand exactly how the system will work, much better than an abstract description, and it illustrate the important steps of the user experience.

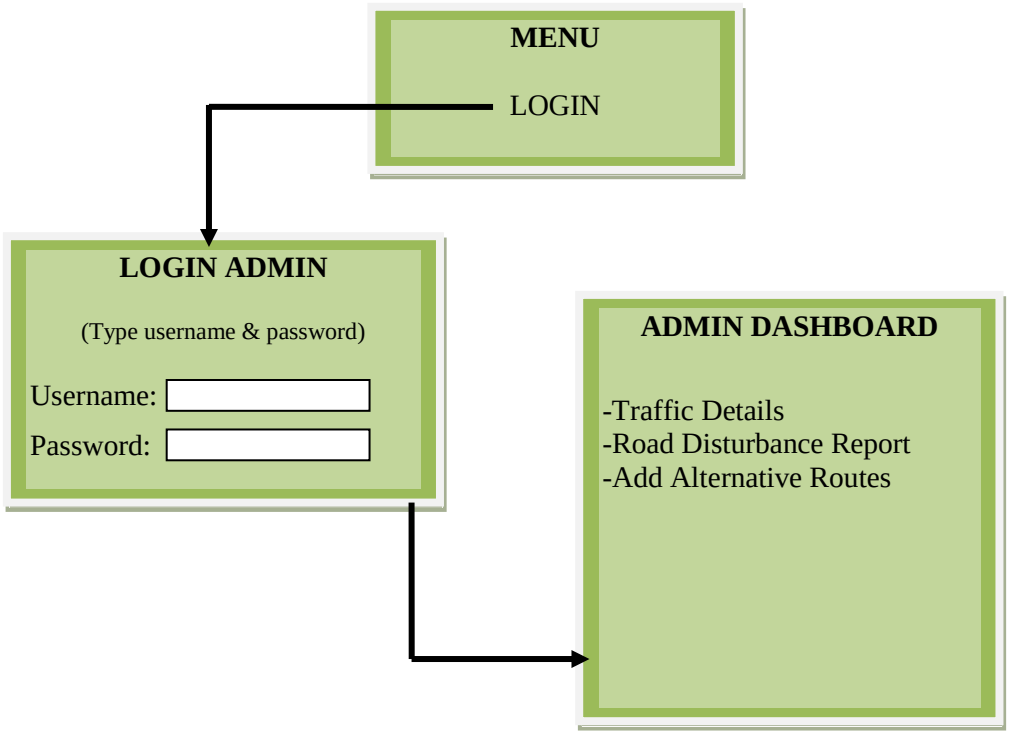

Figure 22: **Storyboard of Admin**

The Admin will type its username and password to access to its dashboard.

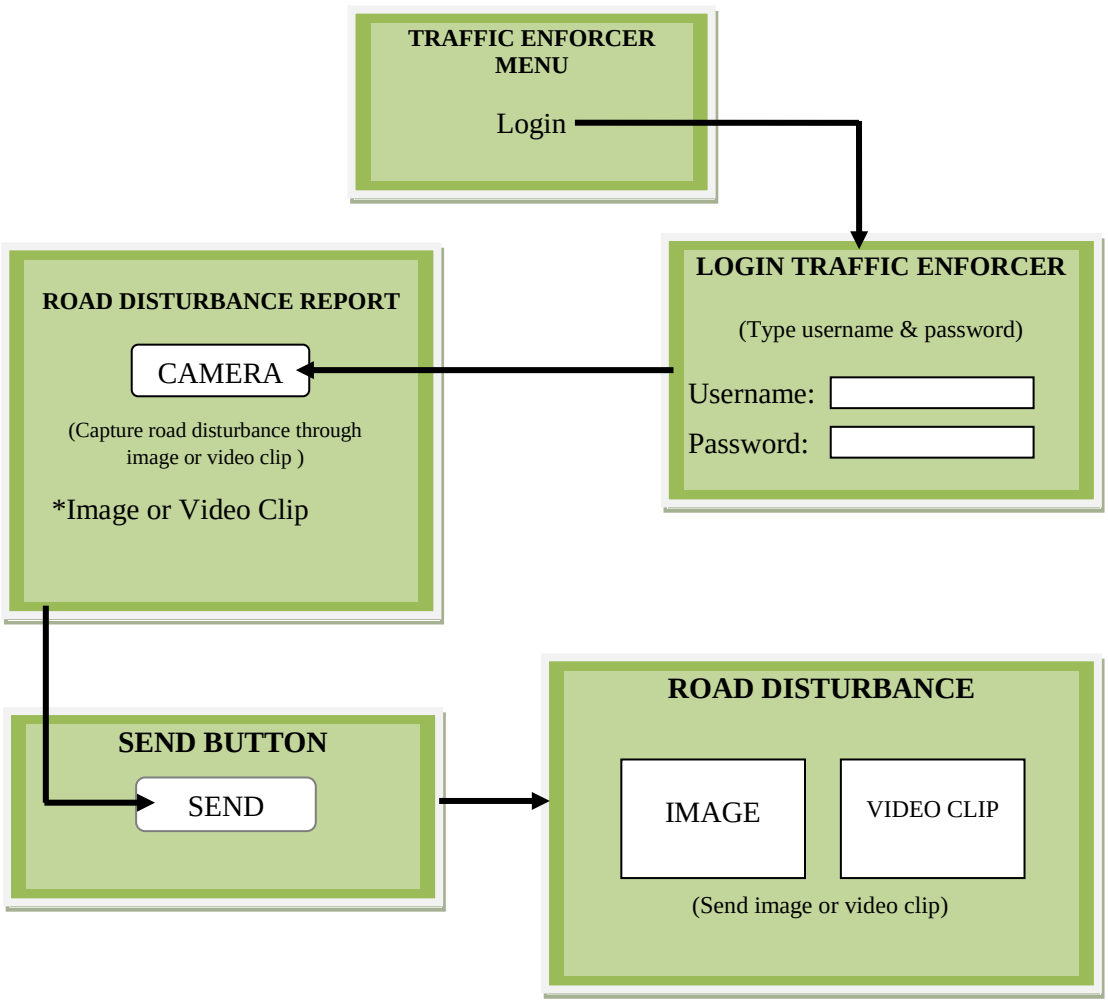

Figure 23: **Storyboard of Traffic Enforcer**

The figure shows the process in posting Traffic Images and Video Clips in the newsfeed by the traffic enforcer

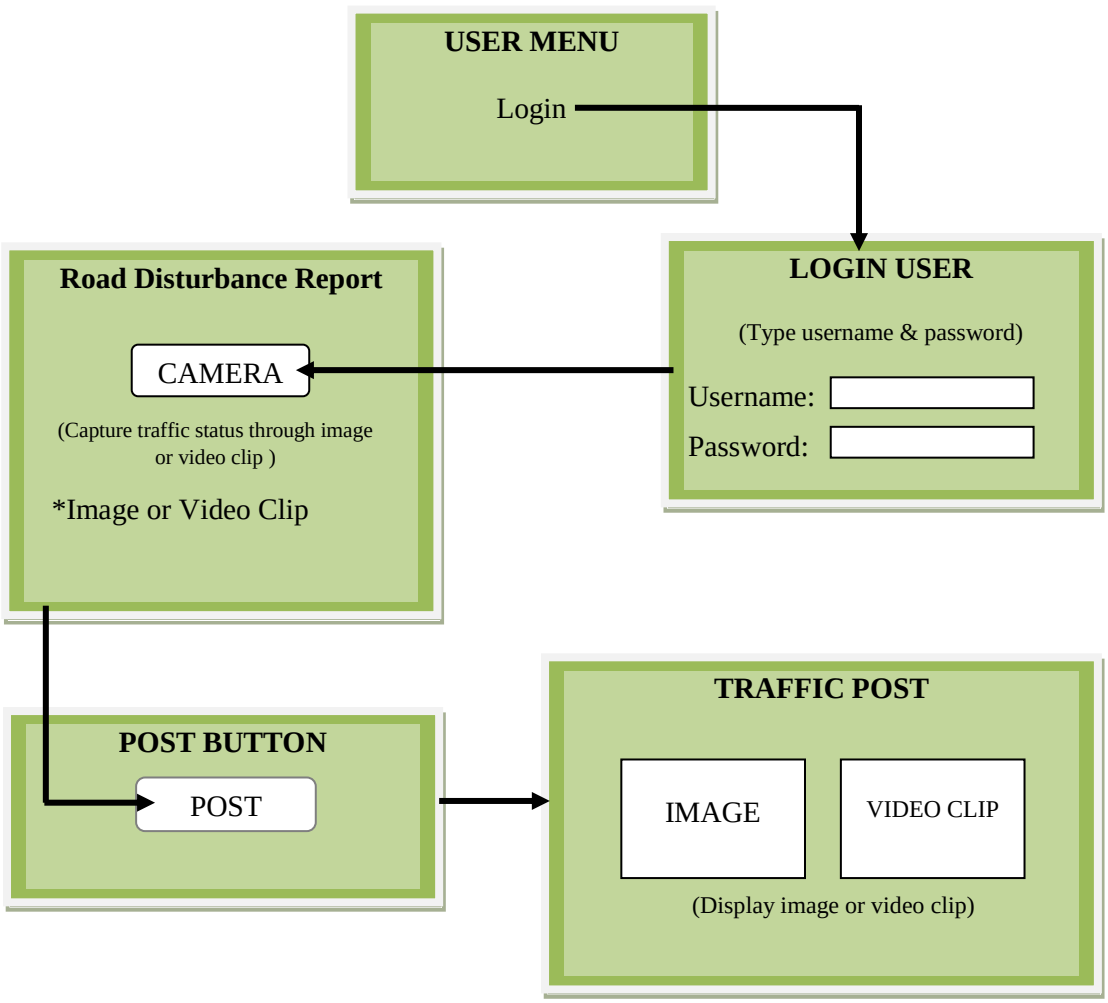

Figure 24: **Storyboard of User**

The figure shows the process in posting Traffic Images and Video Clips in the newsfeed by the user

Database Design

Database design is the process of producing a detailed data model of a database. This logical data model contains all the needed logical and physical design choices and physical storage parameters needed to generate a design in a data definition language, which can then be used to create a database.

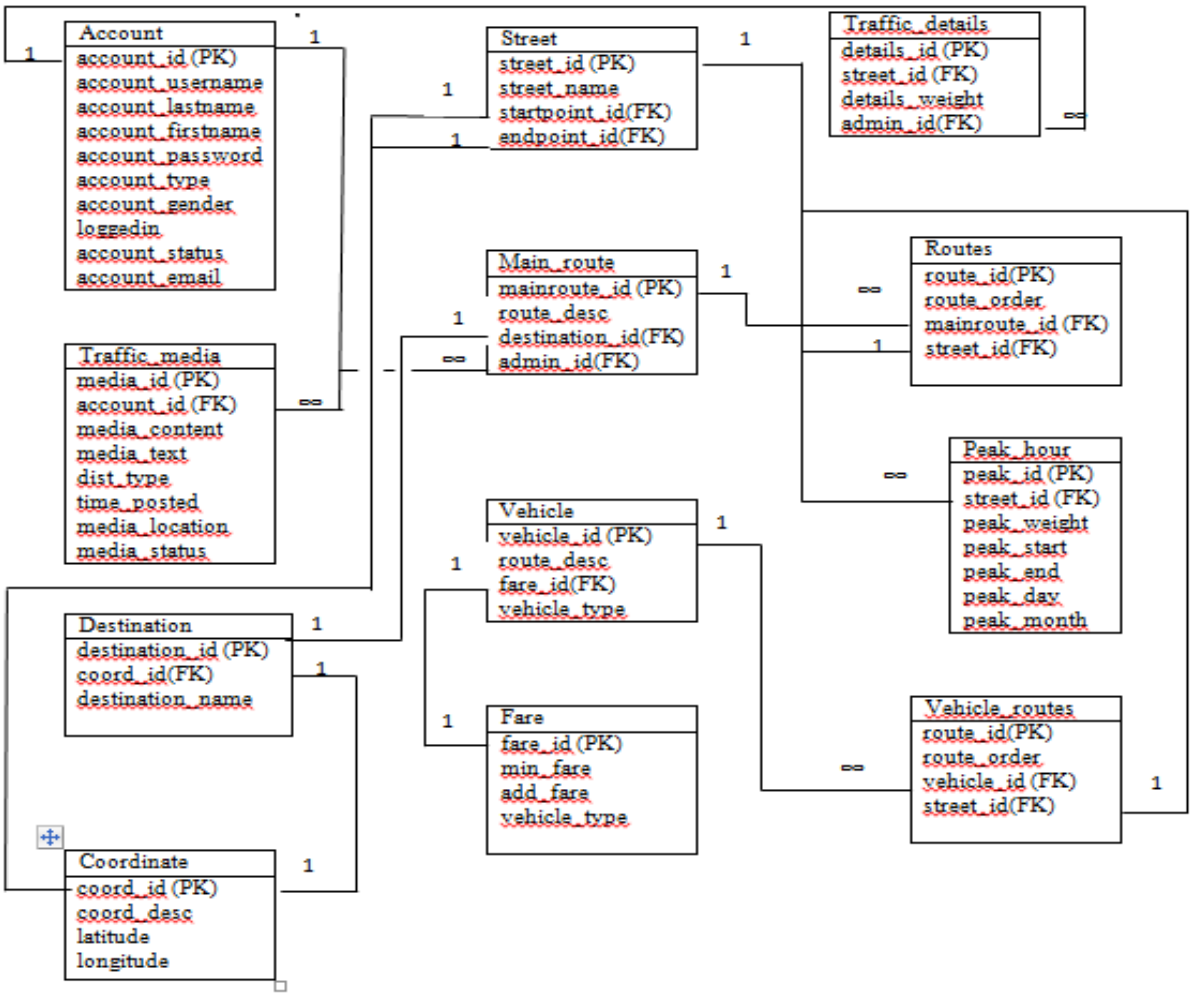

Figure 25: **Database Design**

Entity-Relationship Diagram

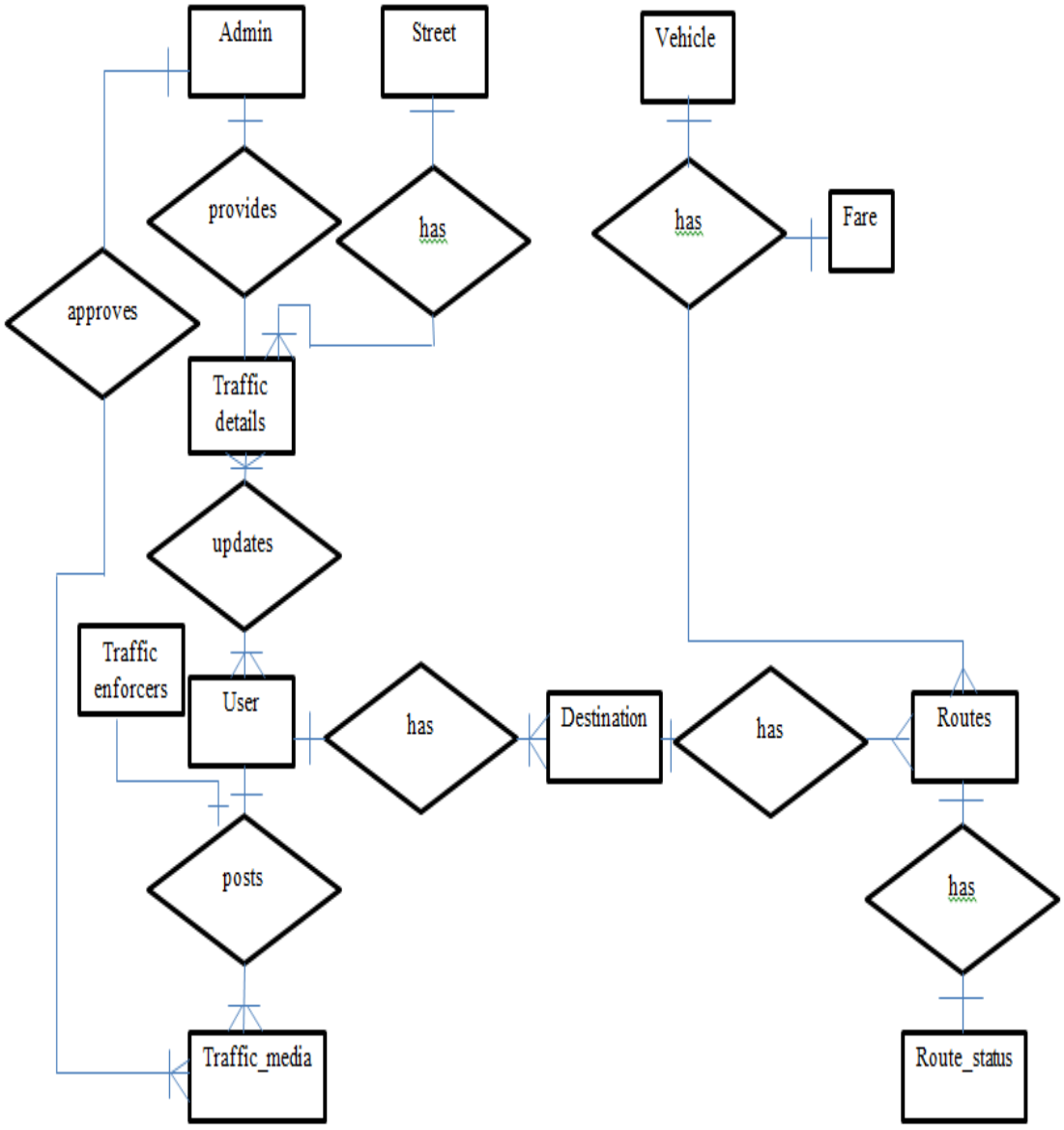

Figure 26: **Entity Relationship Diagram**

Data Dictionary

A set of information describing the contents, format, and structure of a database and the relationship between its elements, used to control access to and manipulation of the database.

Table 13

ACCOUNT TABLE

Column Name	Data Type	Length	Description	Allow Nulls?	Business Constraints
account_id (PK)	Integer		Unique identification of the user	No	Consists of integers which are incremented when new users are registered
account_username	Varchar	50	Unique username of the user, admin or enforcer	No	
account_lastname	Varchar	50	Last name of the user, admin or traffic enforcer	No	
account_firstname	Varchar	50	First name of the user, admin or traffic enforcer	No	
account_password	Varchar	20	First name of the user, admin or enforcer	No	
account_gender	char	1	Gender of the user, admin or traffic	No	Entered as ‘m’ for male and ‘f’ for female

			enforcer		
account_type	char	1	Account type of the user	No	Entered as ‘u’ normal users, ‘a’ for admin and ‘e’ for traffic enforcers
account_status	char	1	The status of the user traffic, enforcer, and admin	No	Entered as ‘1’ if the account is already approved by the admin
account_email	Varchar	50	Email address of the user	Yes	
loggedin	char	1	Determines if the account has been already logged in	No	Entered as ‘1’ if logged in and ‘0’ if not

Table 14

COORDINATES TABLE

Column Name	Data Type	Length	Description	Allow Nulls?	Business Constraints
coord_id (PK)	Integer		Unique identification of the coordinates	No	Consists of integers which are incremented when new coordinates are added
coord_desc	Varchar	50	Description of the coordinates	No	
latitude	Varchar	50	Longitude of the coordinate	No	Used for geocoding the location
longitude	Varchar	50	Latitude of the coordinate	No	Used for geocoding the location

Table 15

STREET TABLE

Column Name	Data Type	Length	Description	Allow Nulls?	Business Constraints
street_id (PK)	Integer		Unique identification of the street	No	Consists of integers which are incremented when new street are added
street_name	Varchar		Street name of the street	No	
startpoint_id(FK)	Integer		Foreign key used to reference the coord_id in coordinates table	No	Used to retrieve coordinates for the starting point of a street
endpoint_id(FK)	Integer		Foreign key used to reference the coord_id in coordinates table	No	Used to retrieve coordinates for the end point of a street

Table 16

TRAFFIC_MEDIA TABLE

Column Name	Data Type	Length	Description	Allow Nulls?	Business Constraints
media_id (PK)	Integer		Unique identification road disturbance media	No	Consists of integers which are incremented when new road disturbance media is added
account_id (FK)	Integer		Primary key used to reference the account_id of the user or enforcer in the Account table	No	Used for referencing the admin or user who posted the road disturbance media
date_posted	Date		Date in which the admin or user posted the status	No	
media_content	Blob		Contains image or video clip of the road disturbance		
time_posted	Timestamp		Time when the user or traffic enforcer posted the road disturbance	No	
dist_type	char	1	Type of road disturbance	No	Entered as ‘a’ for accidents, ‘r’ for road closures, and ‘t’ for traffic jam
media_location	Varchar	100	Location where the user or traffic enforcer posted the	No	

			status		
media_status	Char	1	Status of the traffic media posted		Entered as ‘1’ if approved by the admin and ‘0’ if not

Table 17

MAIN_ROUTE TABLE

Column Name	Data Type	Length	Description	Allow Nulls?	Business Constraints
mainroute_id (PK)	Integer		Unique identification of the main route	No	Consists of integers which are incremented when new main routes are registered
route_desc	Varchar	50	Desciption of the route	No	
destination_id(FK)	Integer		Primary key used to reference the destination_id in the Destination table	No	
admin_id(FK)	Integer		Primary key used to reference the account_id of the admin in the Account table	No	

Table 18

ROUTE_TABLE

Column Name	Data Type	Length	Description	Allow Nulls?	Business Constraints
route_id(PK)	Integer		Unique identification	No	Consists of integers which are incremented when

			of the route		new routes are registered
route_order	Integer		The order of the route according to which comes first in the main route	No	
mainroute_id (FK)	Integer		Primary key used to reference the mainroute_id in the Main_route table	No	
street_id(FK)	Intger		Primary key used to reference the street_id in the street table	No	

Table 19

TRAFFIC_DETAILS TABLE

Column Name	Data Type	Length	Description	Allow Nulls?	Business Constraints
details_id (PK)	Integer		Unique identification of the traffic details	No	Consists of integers which are incremented when new traffic details are registered
streetd_id (FK)	Integer		Primary key used to reference the street_id in the street table	No	
details_weight	Char	1	Weight of traffic		Entered as ‘l’ for light, ‘m’ for medium and ‘h’ for heavy
admin_id(FK)	Integer		Primary key used to	No	

			reference the account_id of the admin in the Account table		

Table 20

PEAK_HOUR TABLE

Column Name	Data Type	Length	Description	Allow Nulls?	Business Constraints
peak_id (PK)	Integer		Unique identification of the peak hour information about a street	No	Consists of integers which are incremented when new peak_hour is registered
street_id (FK)	Integer		Primary key used to reference the street_id in the Street table	No	
peak_weight	Char	1	Weight of traffic		Entered as ‘l’ for light, ‘m’ for medium and ‘h’ for heavy
peak_start	Timestamp		Starting time of congestion in a street		
peak_end	Timstamp		End time of congestion in a street		
peak_day	Char	3	Day of congestion in a street		
peak_month	Char	1	Month of congestion in a street		Entered as numeric but treated as character. For example January is ‘1’

Table 21

DESTINATION TABLE

Column Name	Data Type	Length	Description	Allow Nulls?	Business Constraints
destination_id (PK)	Integer		Unique identification of the destination	No	Consists of integers which are incremented when new destinations are registered
coord_id(FK)	Integer		Primary key used to reference the coordinates in the Coordinates table	No	
destination_name	Varchar	50	Name of the destination		

Table 22

VEHICLE TABLE

Column Name	Data Type	Length	Description	Allow Nulls?	Business Constraints
vehicle_id (PK)	Char	20	Unique identification of a Vehicle	No	
route_desc	Integer		Primary key used to reference the location_no in the Location table	No	
fare_id(FK)	Integer		Primary key used to reference the fare_id in the Fare table		

vehicle_type	Char	1	Type of vehicle		Entered as ‘t’ for taxi and ‘j’ for jeepney

Table 23

VEHICLE_ROUTES TABLE

Column Name	Data Type	Length	Description	Allow Nulls?	Business Constraints
route_id(PK)	Char	20	Unique identification of a Vehicle route	No	
route_order	Integer		The order of a route in a vehicle	No	
PUJ_id (FK)	Char	20	Primary key used to reference the vehicle_id in the vehicle table		
street_id(FK)			Primary key used to reference the street_id in the Street table		

Table 24

FARE TABLE

Column Name	Data Type	Length	Description	Allow Nulls?	Business Constraints
fare_id (PK)	Integer	20	Unique identification of the fare	No	
min_fare	Double		Minimum fare in texi or a jeepney	No	
add_fare	Float		Additional fare in texi or a jeepney in the succeeding km	No	
vehicle_type	Char	1	Type of vehicle	No	Entered as ‘t’ for taxi and ‘j’ for jeepney

Network Design

The design of our proposed system has a database where the data are stored, a server that connects to the database, a wireless or LAN/WAN that forward data to the android users which serve as a client.

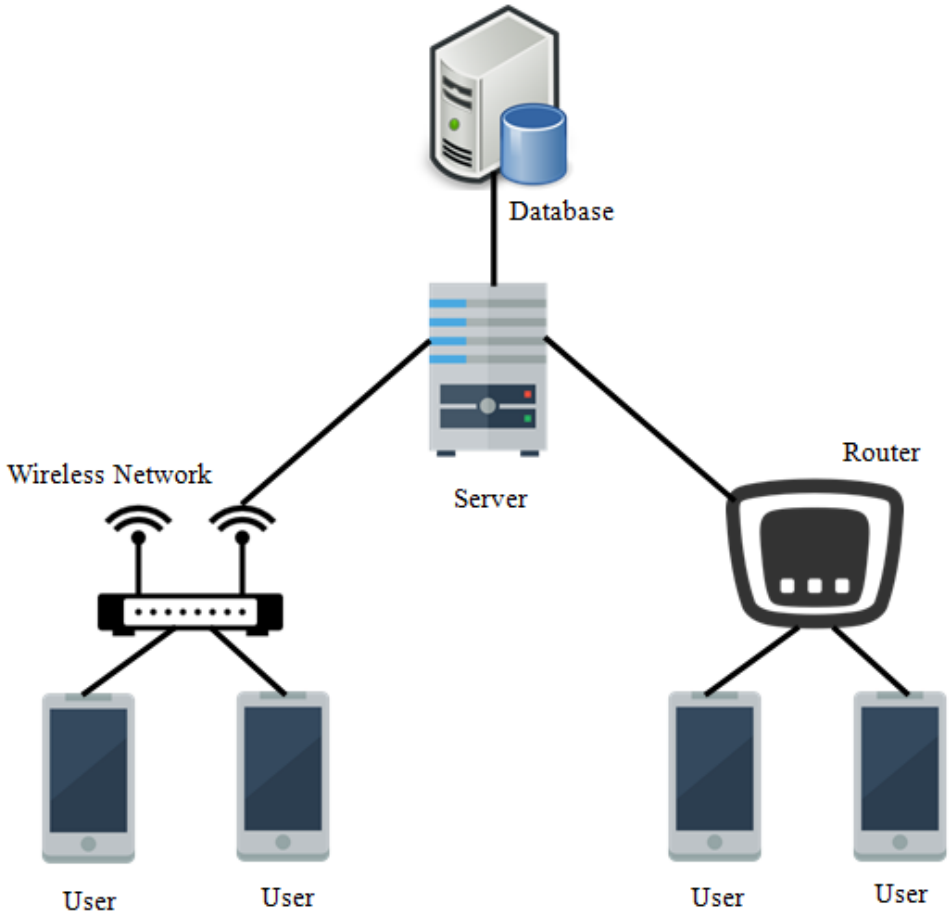

Figure 27: **Network Design**

Network Model

WAN or Wide Area Network is being used in this design. Both server and client need internet connection to employ its full functionality.

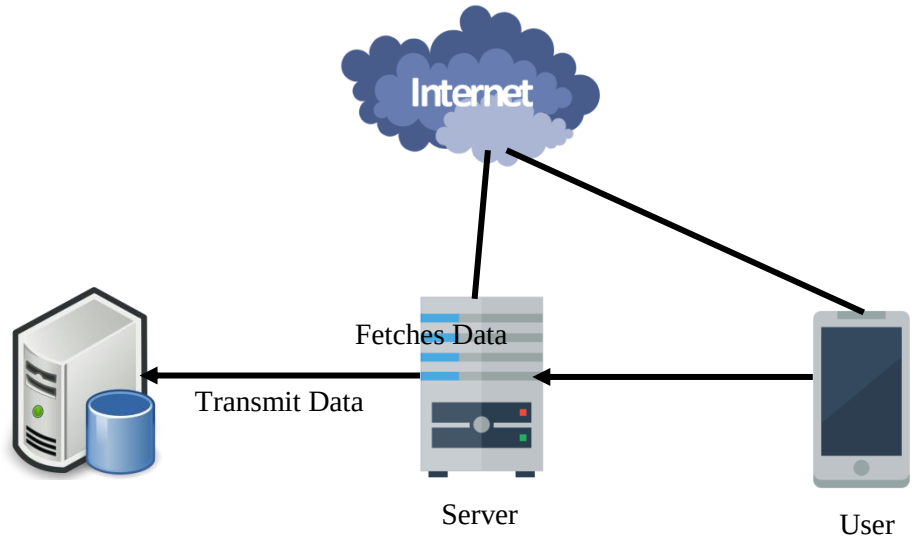

Figure 26: **Network Model**

Network Topology

A mesh network is a network topology in which each node relays data for the network. All mesh nodes cooperate in the distribution of data in the network. Mesh networks can relay messages using either a flooding technique or a routing technique.

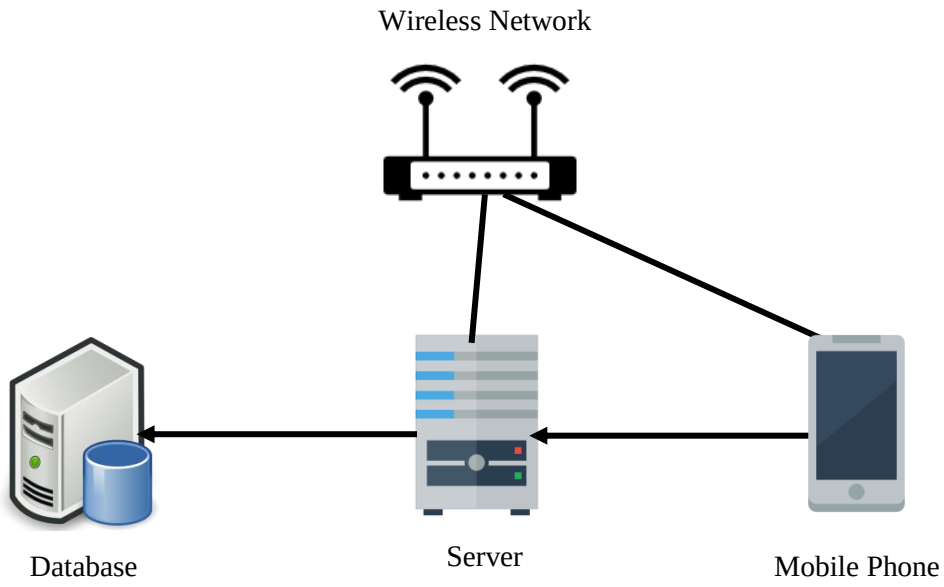

Figure 27: **Network Topology**

Development/Construction/Build Phase

Development Phase shows and explains the software specifications, hardware specifications, and program specification of the system.

Technology Stack Diagram

A technology stack comprises the layers of components or services that are used to provide a software solution or application.

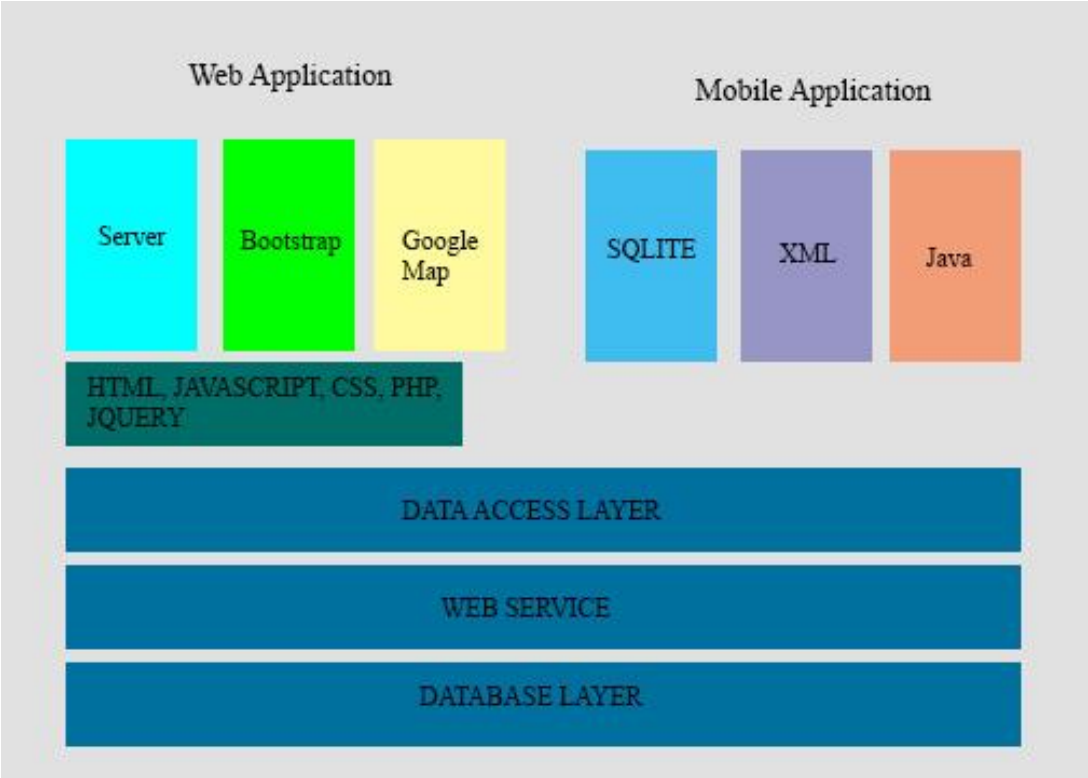

Figure 30: **ESC: A Mandaue City Travel Route Advisor Technology Stack Diagram**

Hardware and Software Specifications

This section evaluates the methods of computer communication and discusses how they could be integrated in this project as well as to discuss all about the necessary hardware and software used to employ the system.

Software Specification

- The front-end
  - PHP for web
  - Java for android device
- Database support
  - MYSQL
- Graphical User Interface Support
  - Cascading Style Sheet using Bootstrap Framework
- Running in an Operating System such as:
  - Windows 7 (32-bit / 64-bit Operating system)
  - Windows XP - Windows 10

Hardware Specification

1. CPU
   - Intel Core i5
2. Motherboard
   - 305U1A model
3. RAM
   - 8GB DDR3
4. Hard disk drive
   - Hitachi HTS545050A7E380 SATA Disk Device 476939 MB
5. Monitor
   - ASUS
6. Keyboard
   - Standard Keyboard
7. Mouse
   - Optical Mouse
8. Mobile phone
   - Any android phones
9. Internet Connection
   - PLDT Home DSL with a speed of 3 MB

Program Specification

For the project implementation, the following are the detailed modules that make up the entire proposed system:

- **Functional Requirements**
    1. Account Registration
        a. Lastname
        b. Firstname
        c. Gender
        d. Email
        e. Username
        f. Password
    2. User Login
        a. Username
        b. Password
    3. Input origin and destination
        a. Mandaue City Location
    4. Display Alternative Route
        a. Rank routes according to congestion percentage
        b. Fare cost of taxi and jeepney
    5. Display Traffic Details
        a. Show map with thickness of congestion
    6. Display Road Disturbance
        a. Show type of road disturbance
        b. Show road disturbance image or video clips
    7. Update Traffic Details
        a. Traffic details
        b. Location
        c. Date and Time
    8. Upload Road Disturbance
        a. Type of Disturbance
        b. Location
        c. Date and Time
        d. Road disturbance image or video clips

9. Update Alternative Routes
    a. Coordinates
    b. Destination
10. Generate Report
    a. Monthly Report on Congested Roads
    b. Monthly Report on Accident Counts
11. Update Jeepney Information
    a. Jeepney no
    b. Route
    c. Min fare

- **Non-Functional Requirements**
    1. The system will be sufficiently fast to accommodate various internet connection speeds.
    2. The system will run on android devices.
    3. The system will be easy to maintain.

List of Modules

Table consists of Modules which comprises the whole system which will be divided among the members to ensure the success of the development of the system.

Table 17

LIST OF MODULES

Programmer	Modules	User	Admin	Traffic Enforcer
Aynrand Danielle Sebucao	**Account Verification**			
	Login	*	*	*
	Logout	*	*	*
No. of points(1 point per module per user)		1	1	1
Bryan Jay Alegres	**Registration**			
	User Registration	*		
	Traffic Enforcer Registration		*	
No. of points(1 point per module per user)		1	1	1
Argie H. Berou & Mark Justin Tumulak	**Manage Road Disturbance Images and Videos**			
	Post Images and Videos	*		*
	Update Images and Videos	*		*
	Delete Images and Videos	*		*
	Approve Images and Videos		*	
No. of points(1 point per module per user)		1	1	1
Charlie Pogoy & Bryan Alegres	**Destination Location Management**			
	Add Destination Location		*	

	Update Destination Location		*	
	Delete Destination Location		*	
No. of points(1 point per module per user)		1	1	1
All Members	**Alternative Route Management**			
	Add Alternative Routes		*	
	Update Alternative Routes		*	
	Delete Alternative Routes		*	
No. of points(1 point per module per user)		1	1	1
Argie H. Berou and Mark Justin Tumulak	**Monthly Report Generation**			
	Congested Road Reports		*	
	Accident Reports		*	
	Number of Users		*	
Aynrand Sebucao	**Manage Jeepney Information**			
	Add Jeepney Information		*	
	Update Jeepney Information		*	
	Delete Jeepney Information		*	
No. of points(1 point per module per user)		1	1	1
Number of Modules per User (equals total no. of points per user)			1	1
Total Number of Modules			7	7