

Software Design Specification

for

CarSync

Version <2.0>

Group No.: 8

Kashvin A/L Muthu Mani	243UC2462Z
George	
Muhammad Fahmi Aiman	243UC24635
bin Mohd Fauzi	
Lee Kah Wai	243UC247K0

Date: 25/1/2026

Revisions.....	3
1 System Overview.....	4
1.1 Description.....	4
1.2 Actors.....	5
1.3 Assumptions and Dependencies.....	6
1.4 Use Case Diagram	7
2 Activity Diagrams	10
2.1.1 Use Case 1	Error! Bookmark not defined.
2.1.2 Use Case 2	10
2.1.3 Use Case 3	11
2.1.4 Use Case 4	13
2.1.5 Use Case 5	14
2.1.6 Use Case 6	15
2.1.7 Use Case 7	16
3 Data Design.....	39
3.1 Design Class Diagram	39
3.2 Data Dictionary.....	40
3.3 Data Structures	44
3.3.1 Data Structure 1.....	44
3.3.2 Data Structure 2.....	Error! Bookmark not defined.
4 Component Design.....	Error! Bookmark not defined.
5 Behavioral Modeling.....	46
5.1 Sequence Diagrams.....	46
5.1.1 Use Case 1	46
5.1.2 Use Case 2	47
5.1.3 Use Case 3	48
5.1.3 Use Case 4	Error! Bookmark not defined.
5.1.4 Use Case 5	48
5.2 State Diagram	75
6 Architecture Design.....	96
6.1 Software Architecture.....	96
6.1.1 Subsystem 1.....	Error! Bookmark not defined.
6.1.2 Subsystem 2.....	Error! Bookmark not defined.
7 Interface Design.....	99

7.1	Main Screens	99
7.2	Subsystem 1 Screens	Error! Bookmark not defined.
7.3	Subsystem 2 Screens	104
8	Component Design.....	109
8.1	Main Components	109
8.1.1	Component 1	111
9	Deployment Design.....	115
9.1	Deployment Diagram	115
10	Summary.....	Error! Bookmark not defined.
	References	116

Revisions

Version	Primary Author(s)	Description of Version	Date Completed
SRS in Part 1(as Ver 1.0) SDS in Part 2(as Ver 2.0.X) *System Documentation in Part 3 (as Ver 3.0) Draft Type and Number	Full Name	Information about the revision. This table does not need to be filled in whenever a document is touched, only when the version is being upgraded.	00/00/00

1 System Overview

1.1 Description

The CarSync system is designed to streamline vehicle maintenance management through three major subsystems: User Registration, Service Management, and Administration. The system supports interaction from three distinct user roles:

- Vehicle Owner: Registers vehicles, books services, views service history, and manages appointments via the mobile interface.
- Mechanic/Workshop: Manages bookings, records services, generates invoices, and views workshop reports.
- Administrator: Oversees system users, configures global notification rules, generates system-wide reports, and maintains platform integrity via the web dashboard.

Major Processes:

1. User Registration and Authentication: Allows Vehicle Owners, Mechanics, and Admins to create accounts and log in securely. The system verifies credentials and assigns role-based access.
2. Service Booking and Scheduling: Enables Vehicle Owners to search for workshops and book appointments, while allowing Mechanics to view and manage these incoming requests.
3. Maintenance Record Management: Provides a digital log for Mechanics to update vehicle service history, including service type, cost, parts used, and dates.
4. Notification Management: Automated system logic that monitors vehicle mileage and dates to trigger maintenance alerts for Vehicle Owners.
5. Invoice and Payment History: Facilitates the issuance of digital invoices by workshops and allows Vehicle Owners to track their payment status and history.
6. Workshop Dashboard: Provides Mechanics with statistical insights into business operations, including appointment counts and revenue.
7. Admin Report Generation: Allows Administrators to generate high-level system reports (User Growth, Revenue) and manage user access (Block/Suspend) to maintain platform integrity.

1.2 Actors

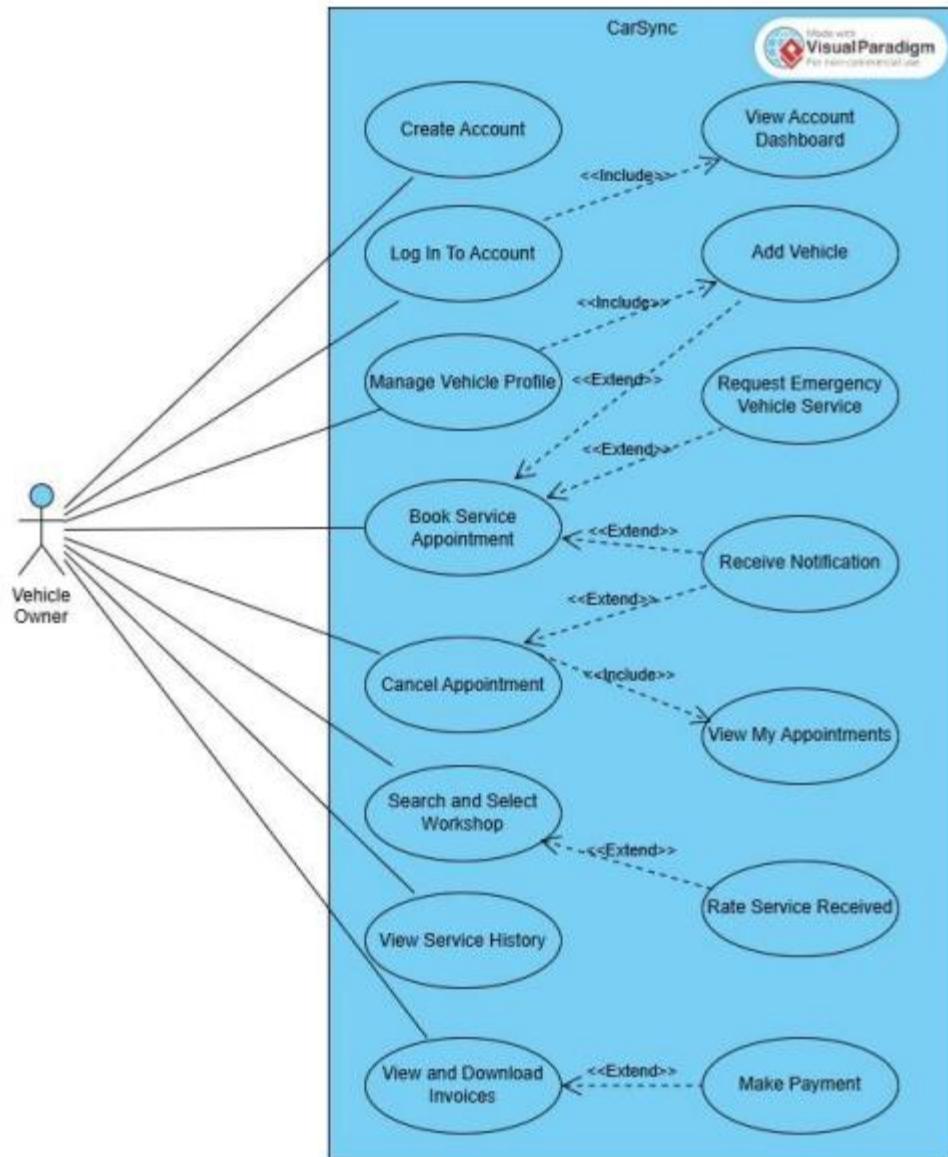
Actor	Use Cases
Vehicle Owner	1.Create Account 2.Log In to Account 3.Manage Vehicle Profile 4.Search and Select Workshop 5.Book Service Appointment 6.Cancel Appointment 7.View Service History 8.View and Download Invoices 9.View Account Dashboard (<<include>>) 10.Add Vehicle (<<include>>) & (<<extend>>) 11.Request Emergency Vehicle Service (<<extend>>) 12.Receive Notifications (<<extend>>) 13.View My Appointments (<<include>>) 14.Make Payment (<<extend>>) 15.Rate Service Received (<<extend>>)
Mechanic/Workshop	1. View & Manage Booking 2. Record Service Details 3. Generate Invoices 4. View Workshop Reports 5. Manage Vehicle Profile 6. Manage Parts Inventory 7.Approve or Reject Booking (<<include>>) 8.Send Notification (<<include>>) 9.Check Vehicle History (<<extend>>)
Admin	1.Login / Authenticate 2. Manage User Accounts 3.Generate System Reports 4.View System Logs 5.Configure Notification Rules 6.Maintain System Data 7.Suspend/Block Users (<<extend>>) 8 Monitor Platform Usage (<<include>>) 9. Maintain System Data (<<include>>)

1.3 Assumptions and Dependencies

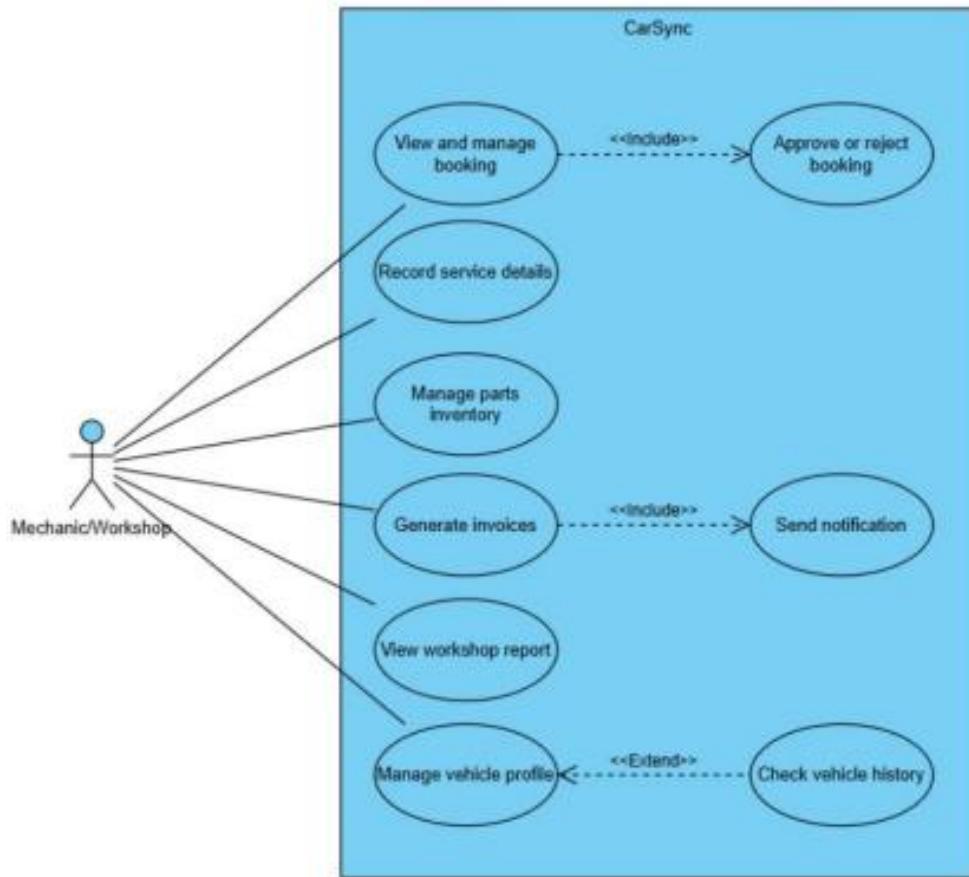
- It is assumed that all users will have internet access to use the system
- The system assumes that only authorized mechanics and workshops are registered and verified by the admin
- It is assumed that all vehicle owners will provide accurate/reasonable vehicle and mileage information
- The system depends on a functioning database server to store all maintenance records, bookings, and user information
- It is assumed that notification features will be simple (dashboard reminders) without requiring external SMS or email gateways (apart from first time user verification).
- For this project and prototype, it is assumed the system will handle a user base of approximately 50–100 active users and is not currently optimized for high-traffic enterprise loads.
- It is assumed that the Admin will manually verify the certification documents of workshops during the registration phase. The system does not automatically validate business licenses with external government databases.
- The "Locate Workshop" feature depends on the availability of an external API (such as Google Maps API or OpenStreetMap) to display workshop locations accurately.
- It is assumed that the Admin interface is designed for desktop web browsers (e.g., Chrome, Edge) to accommodate data-heavy tables and reports, while the Vehicle Owner interface is optimized for mobile views.
- The system depends on a MySQL (Version 8.0+) environment for executing the specific SQL scripts designed for data persistence and table relationships.

1.4 Use Case Diagram

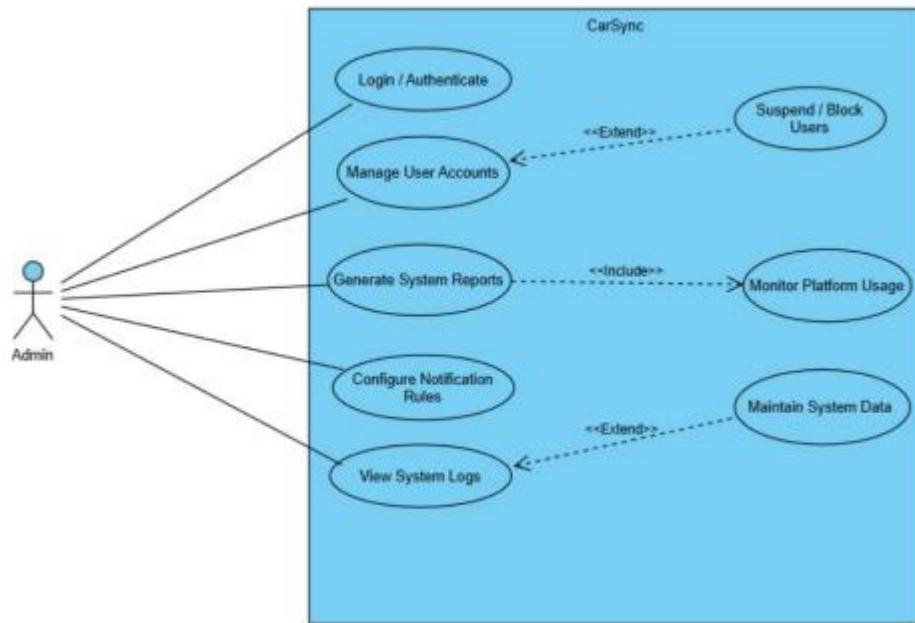
Vehicle Owner



Mechanic/Workshop



Admin



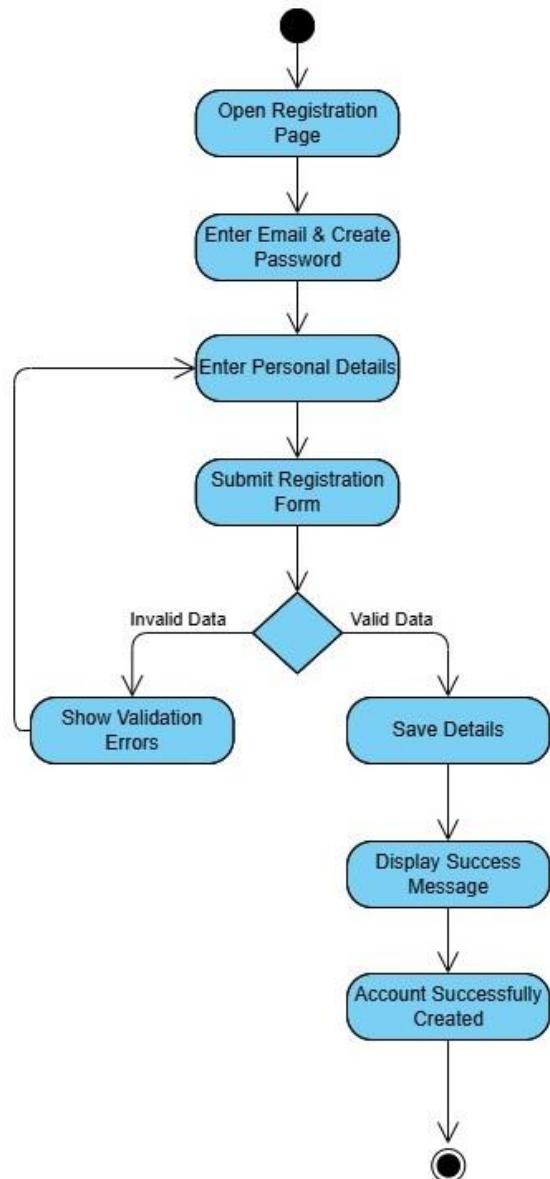
2 Activity Diagrams

2.1 Activity Diagrams

Vehicle Owner

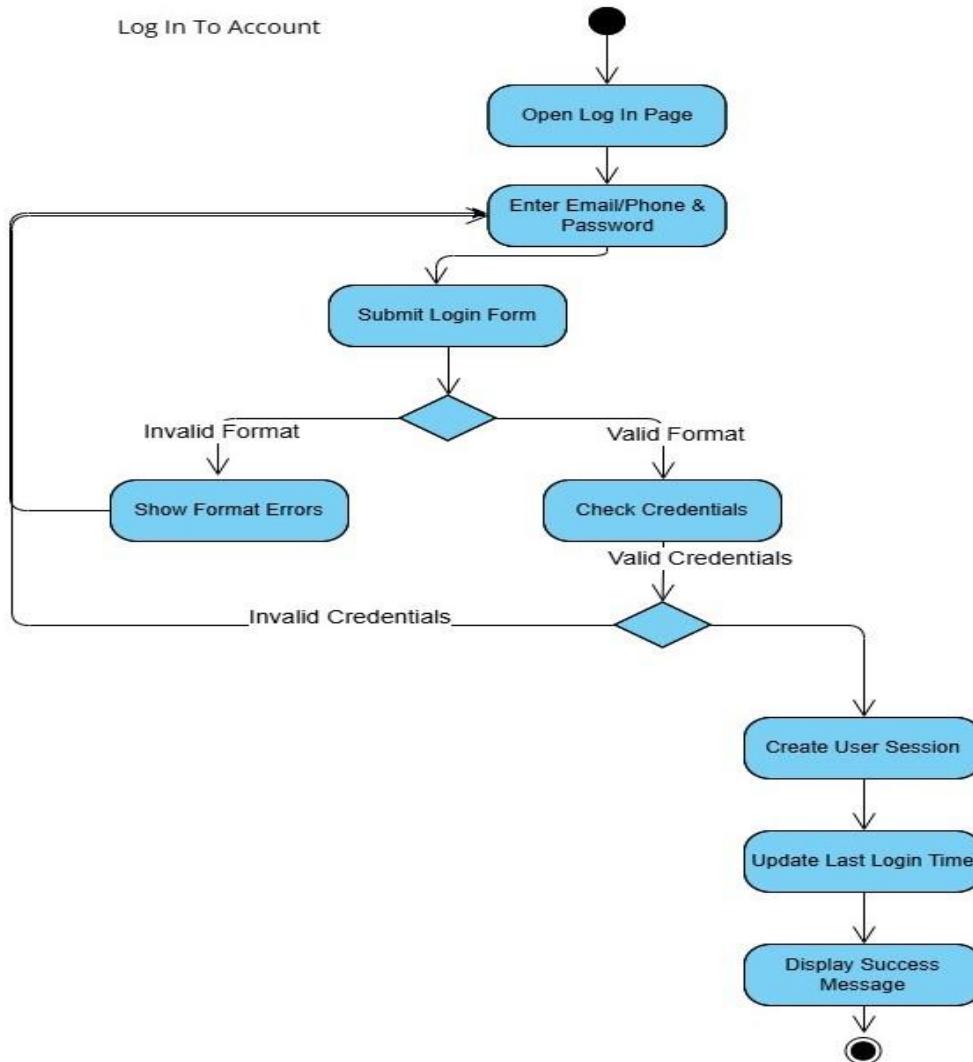
2.1.1 Create Account

Allows new users to register an account.



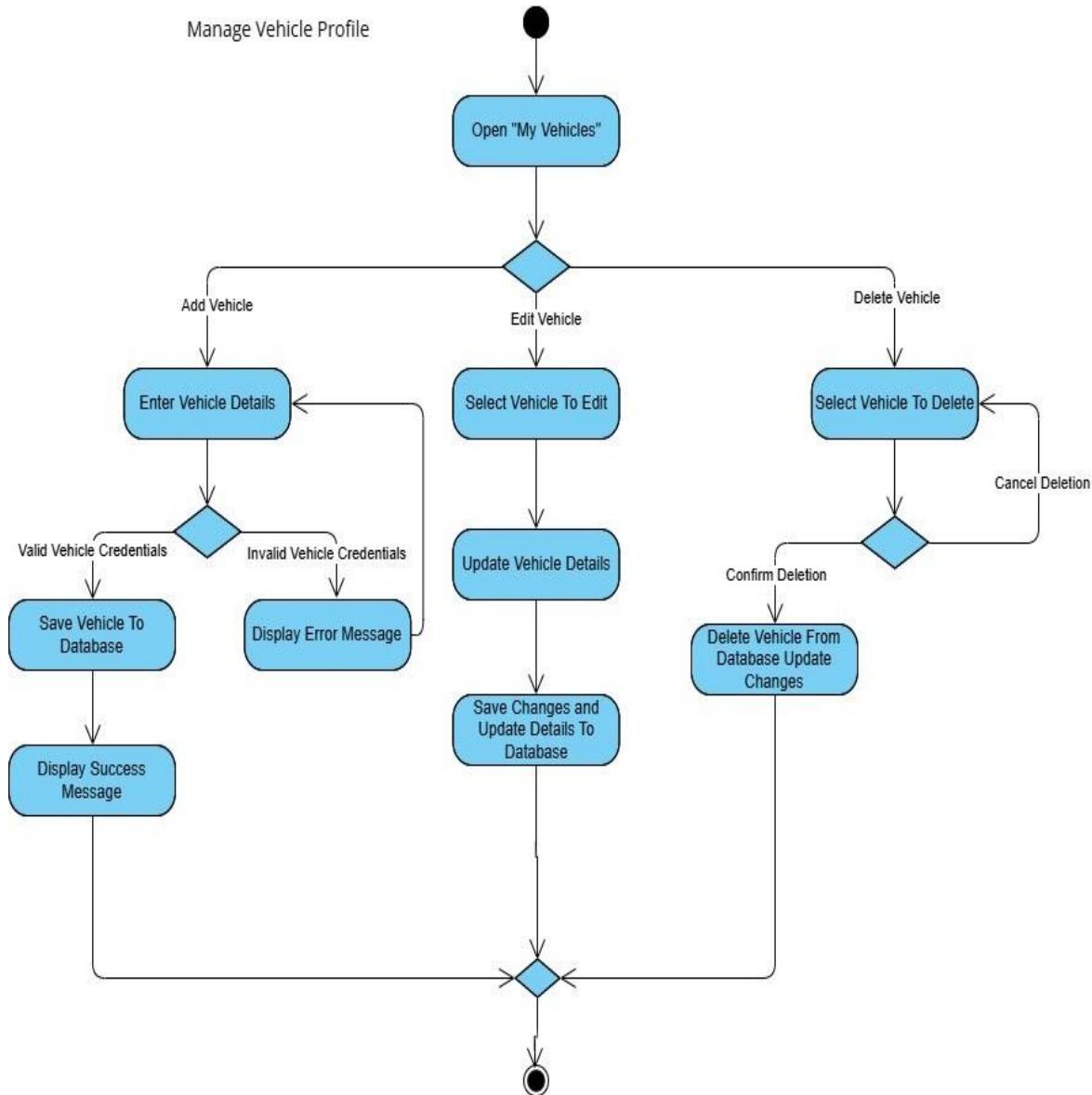
2.1.2 Login To Account

Allows registered users to log in to their respective accounts.



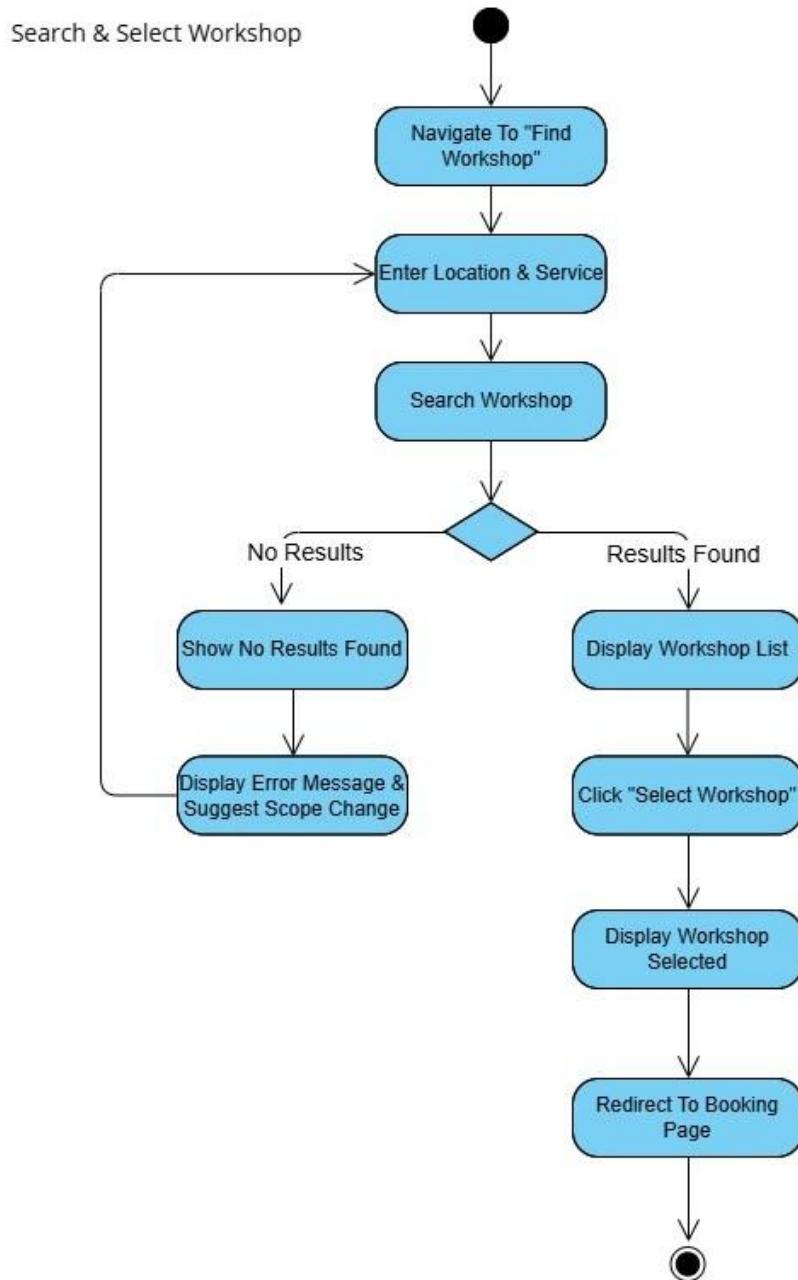
2.1.3 Manage Vehicle Profile

Allows users to control and manage their registered vehicles.



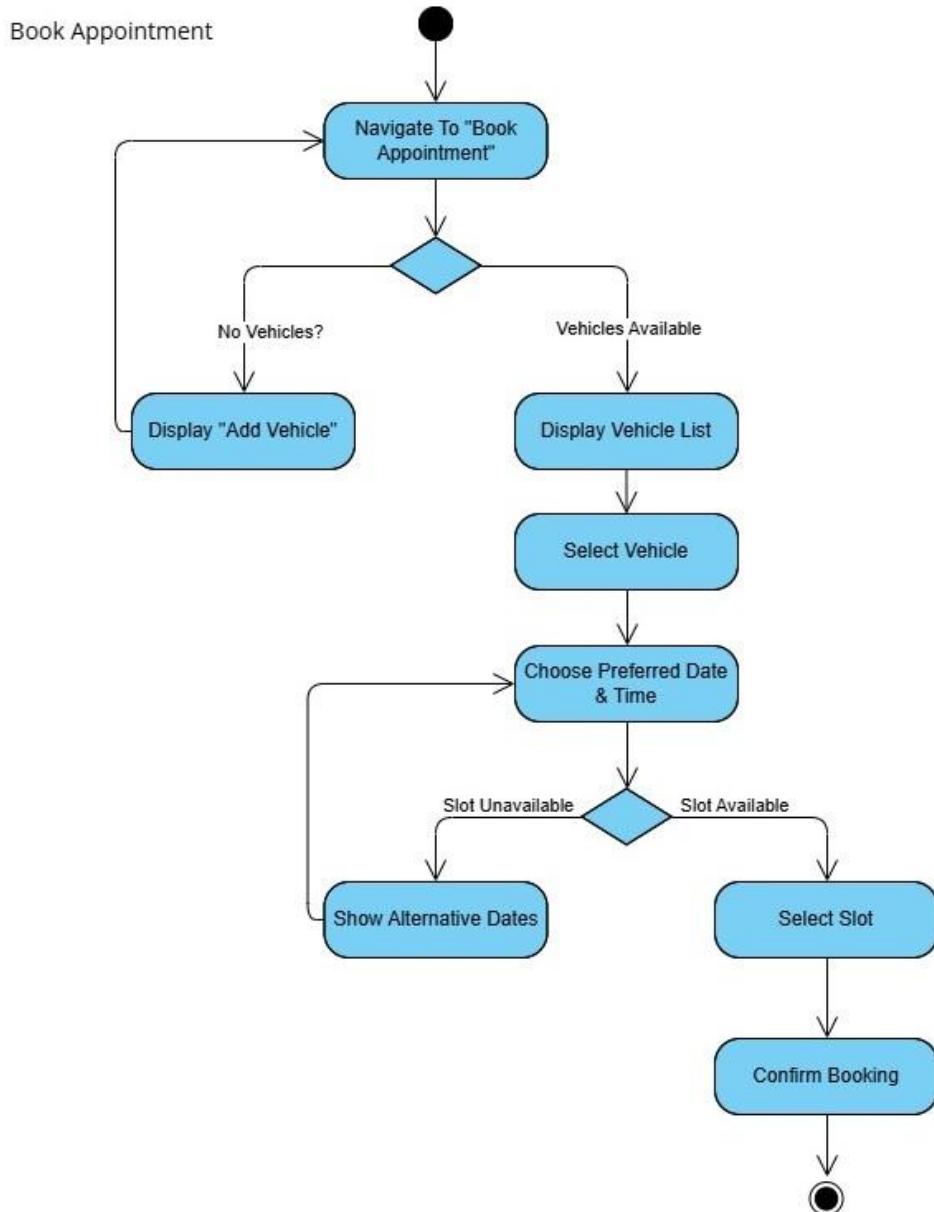
2.1.4 Search & Select Workshop

Provides users with the platform to filter and select workshops.



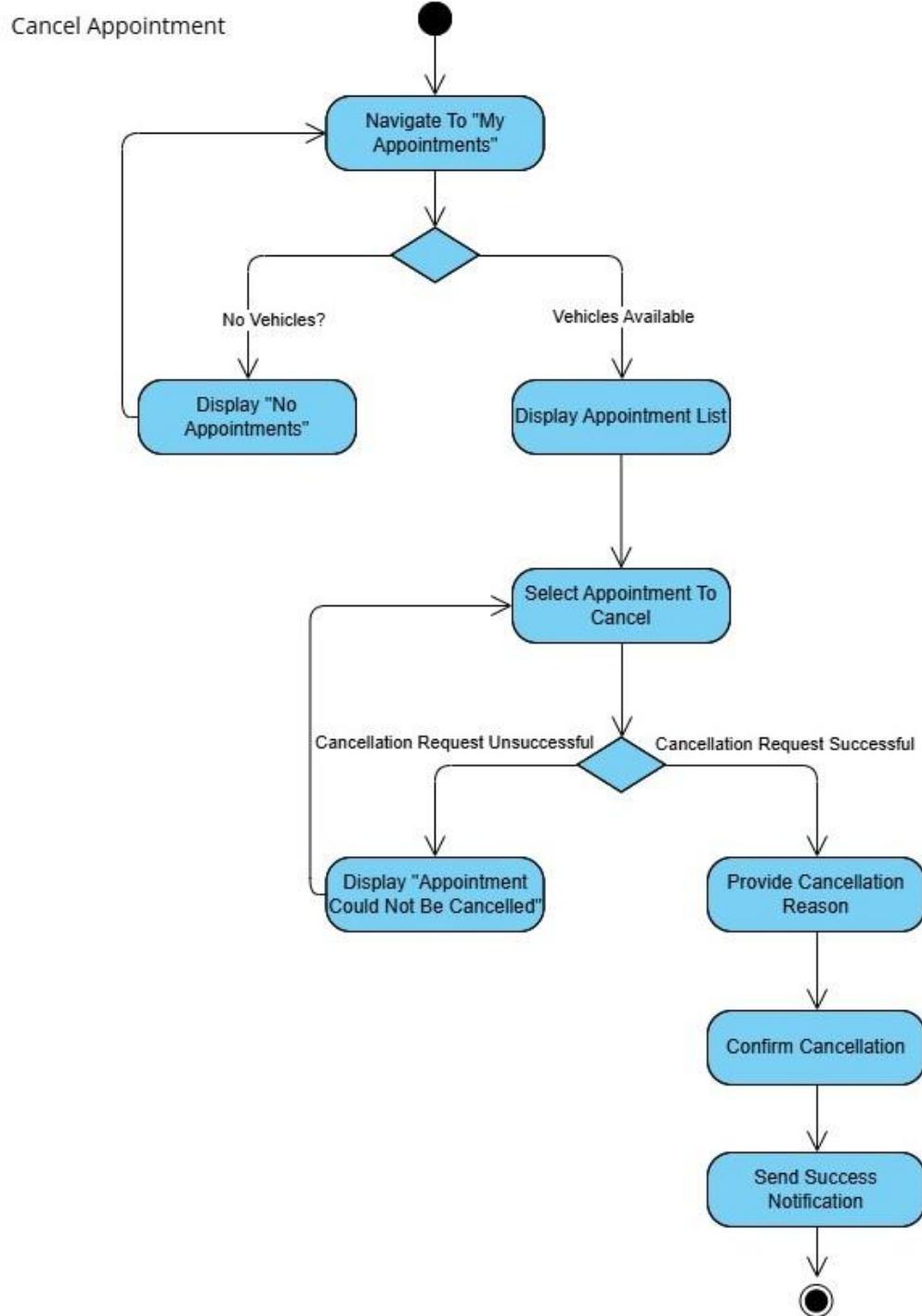
2.1.5 Book Service Appointment

Users can book service appointments.



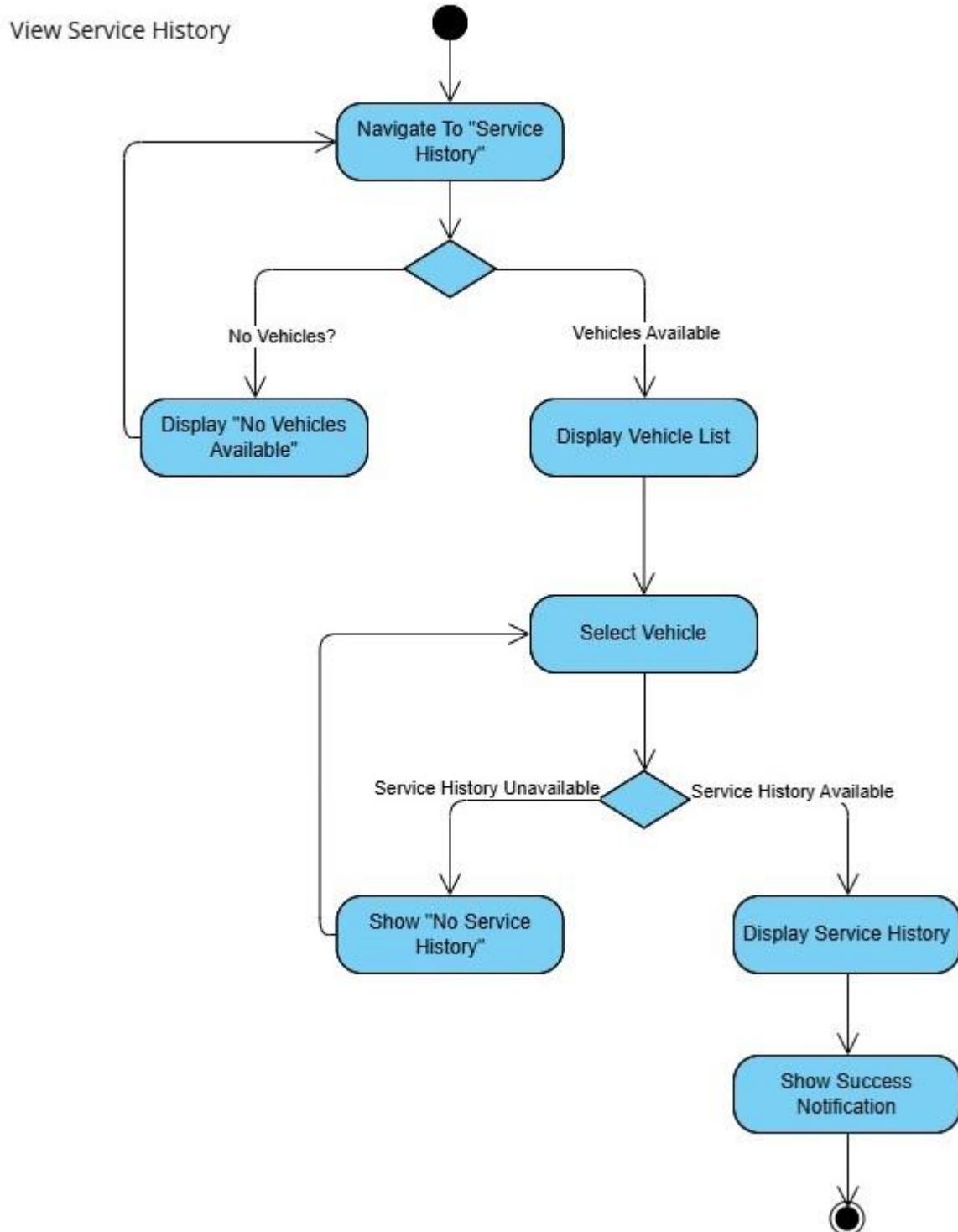
2.1.6 Cancel Service Appointment

Users can cancel booked appointments by navigating to “My Appointments”



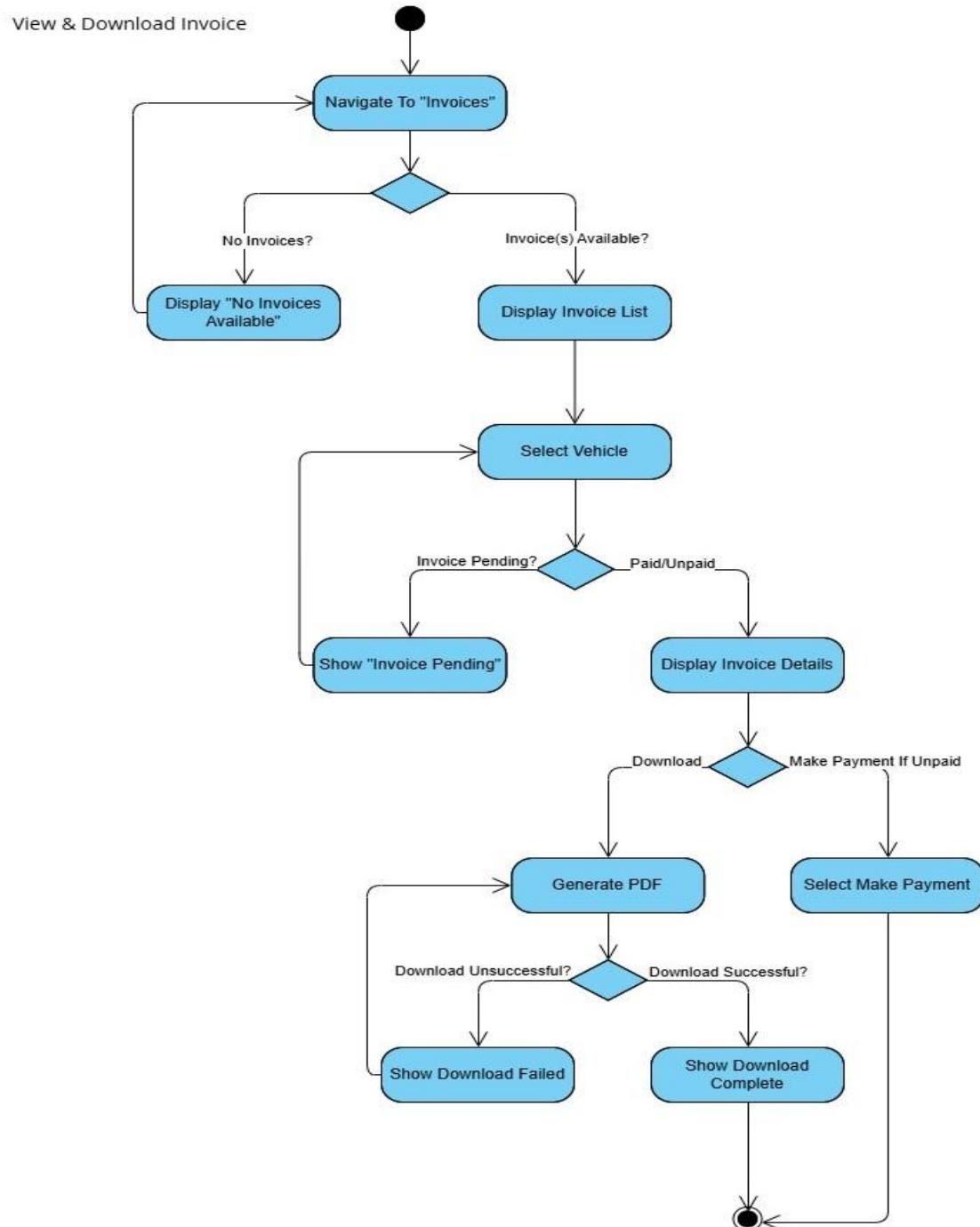
2.1.7 View Service History

Allows users to keep track of their service history and records.



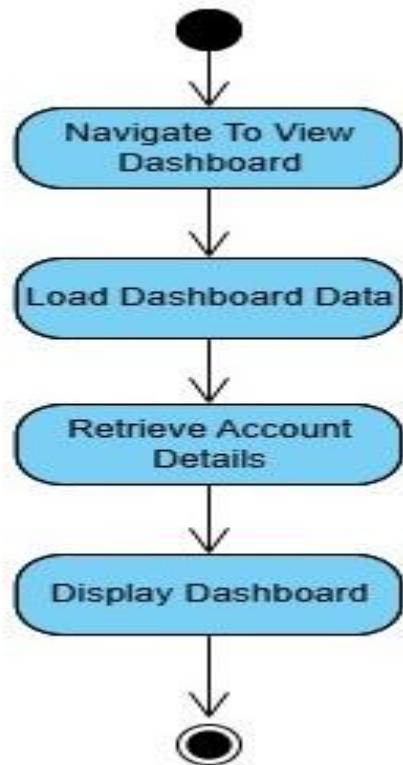
2.1.8 View & Download Invoices

Allows users to view invoices of completed services and download PDF file of the invoice.



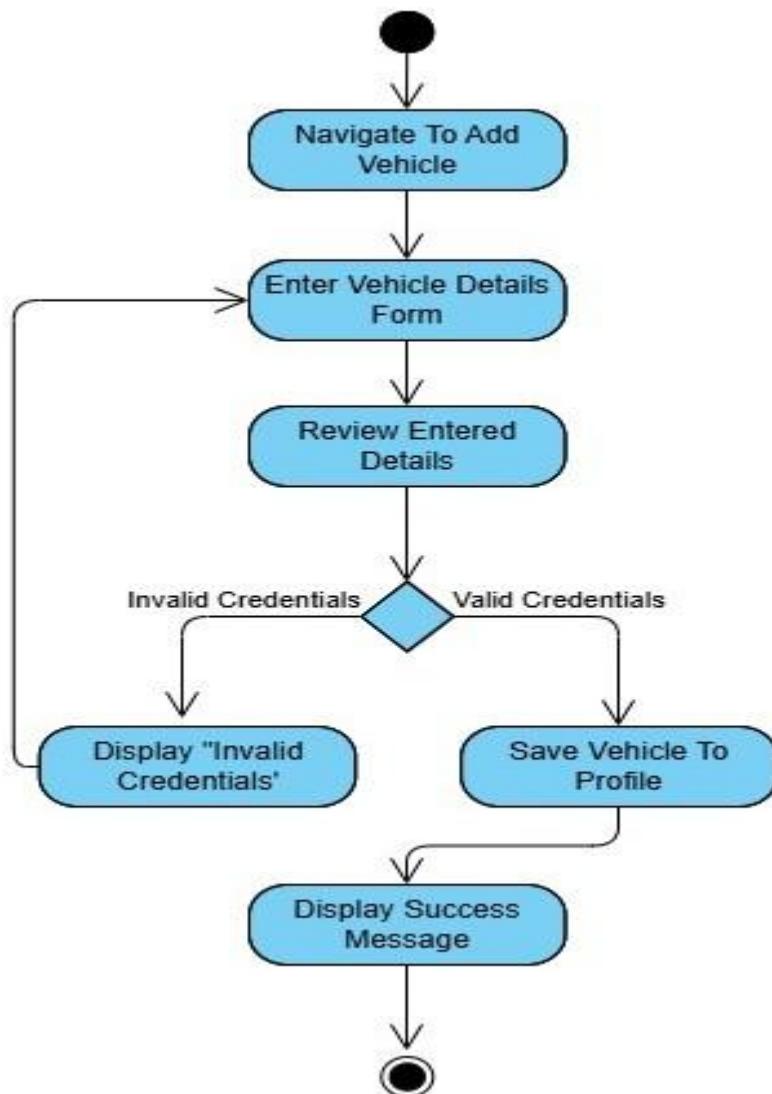
2.1.9 View Account Dashboard <<include>>

Allows users to view their account profile. Users will view their account profile as they will be redirected to the dashboard after creating or logging in to their account.



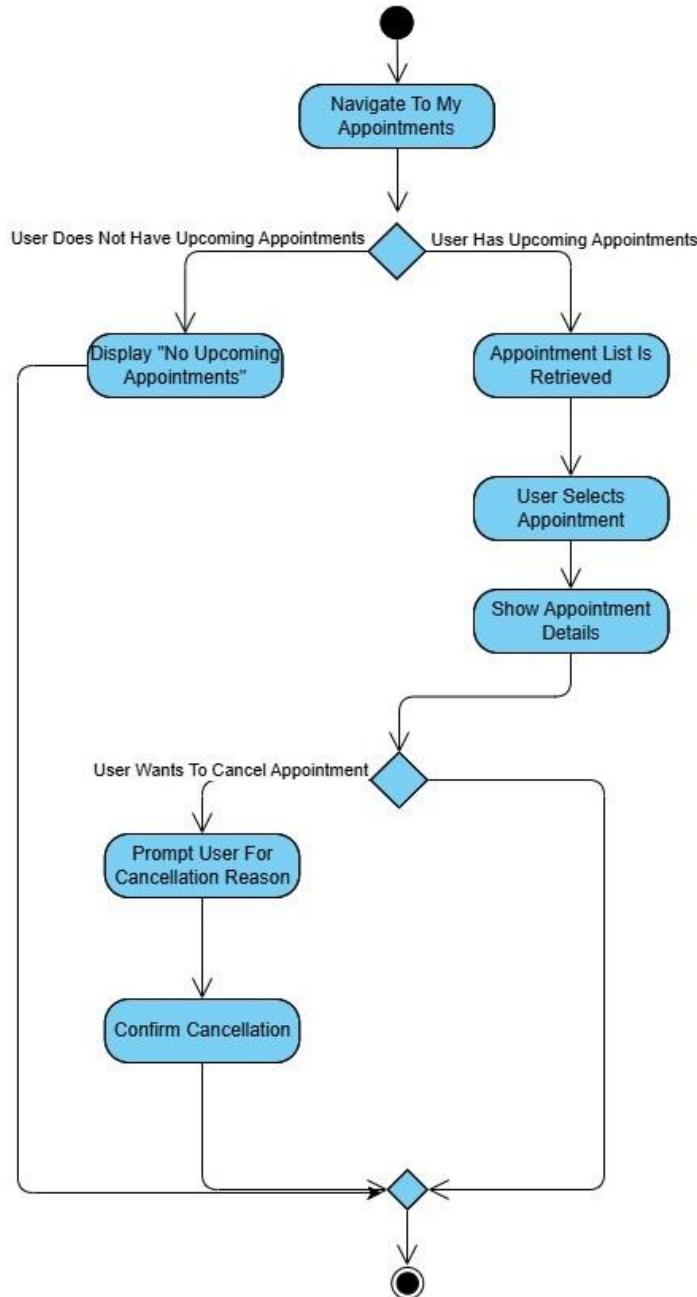
2.1.10 Add Vehicle <<include>> & <<extend>>

Allows users to add vehicles to their account dashboard. Existing users may add an extra vehicle to their account while new users must add a vehicle to their account.



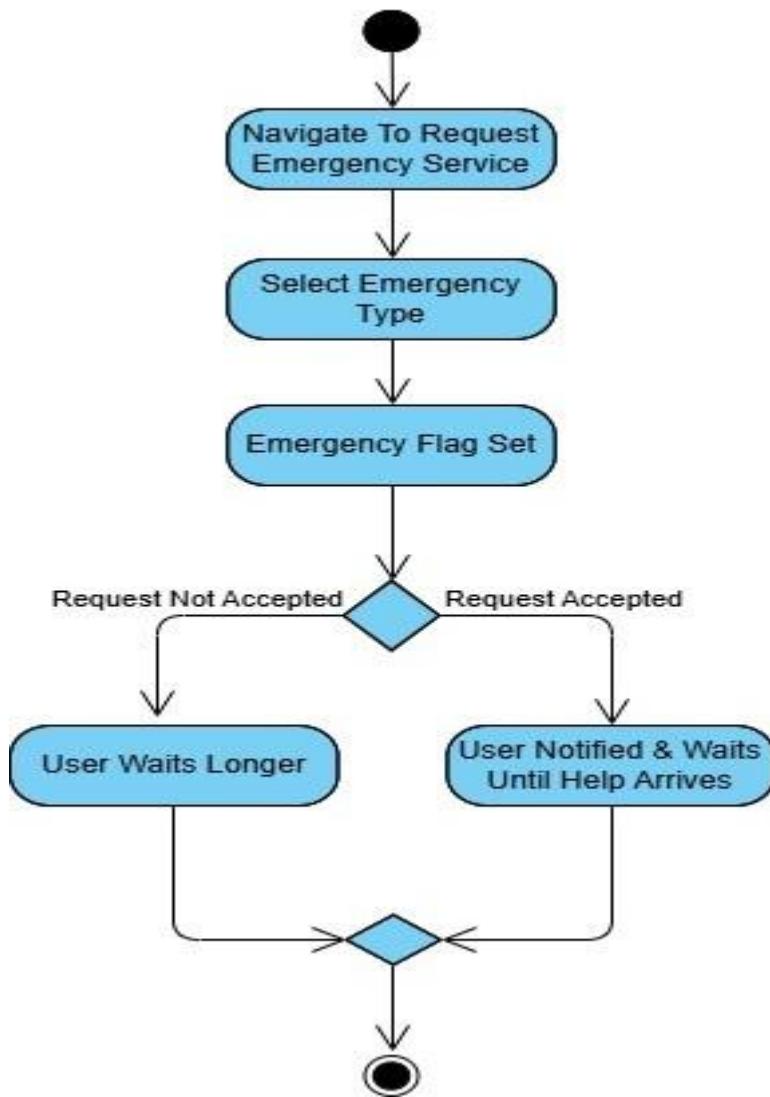
2.1.11 View My Appointments <>include><

Users are allowed to view their upcoming appointments. Users that want to cancel an existing appointment must view appointment before cancellation.



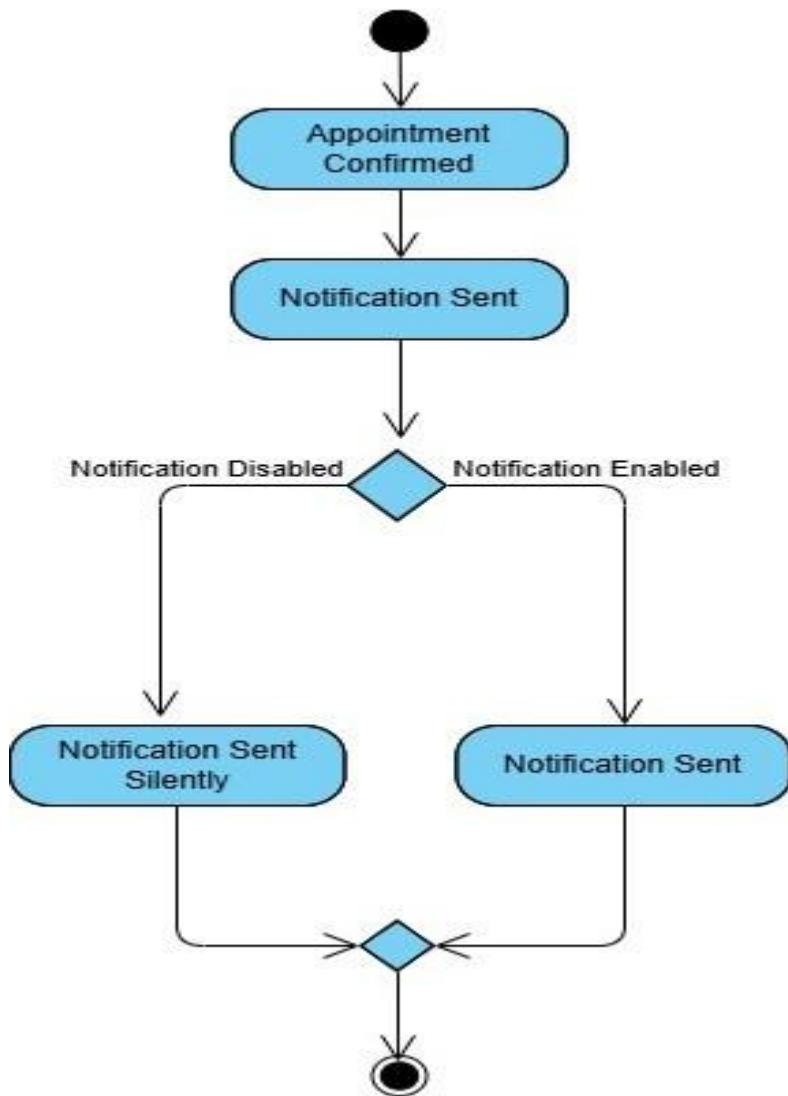
2.1.12 Request Emergency Service <<extend>>

Allows users to request emergency help in certain situations.



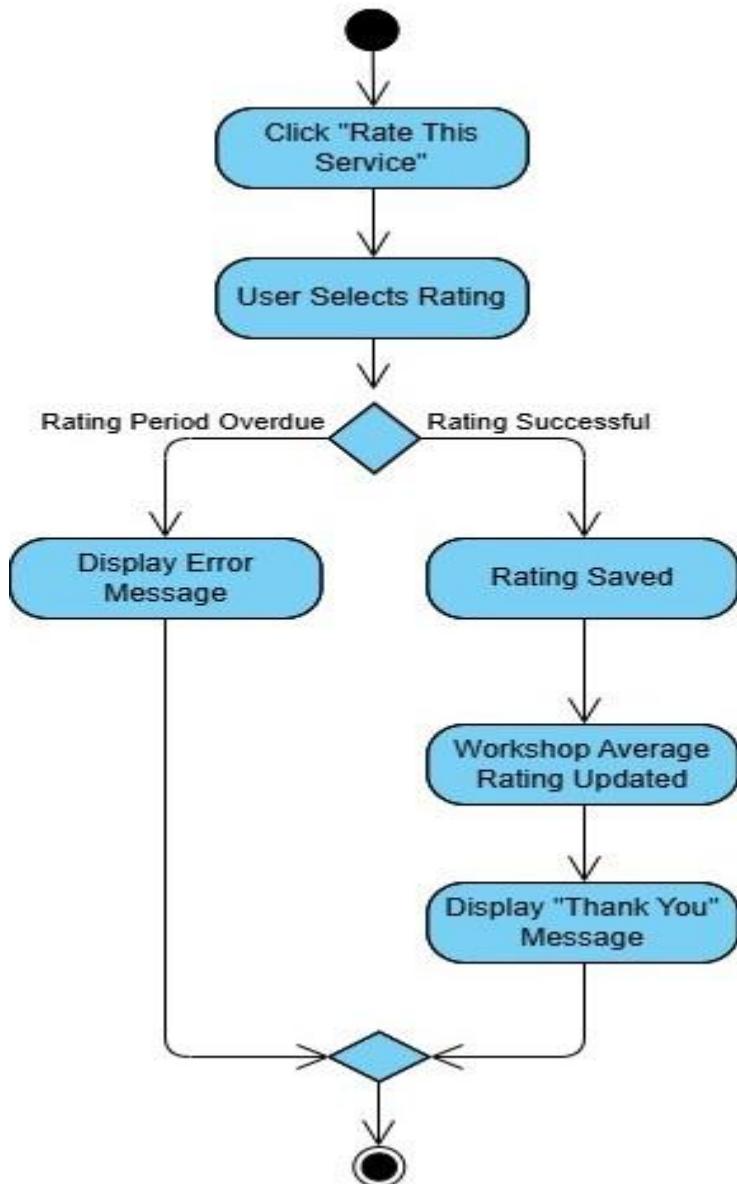
2.1.13 Receive Notification <<extend>>

Gives users the choice of enabling or disabling notifications.



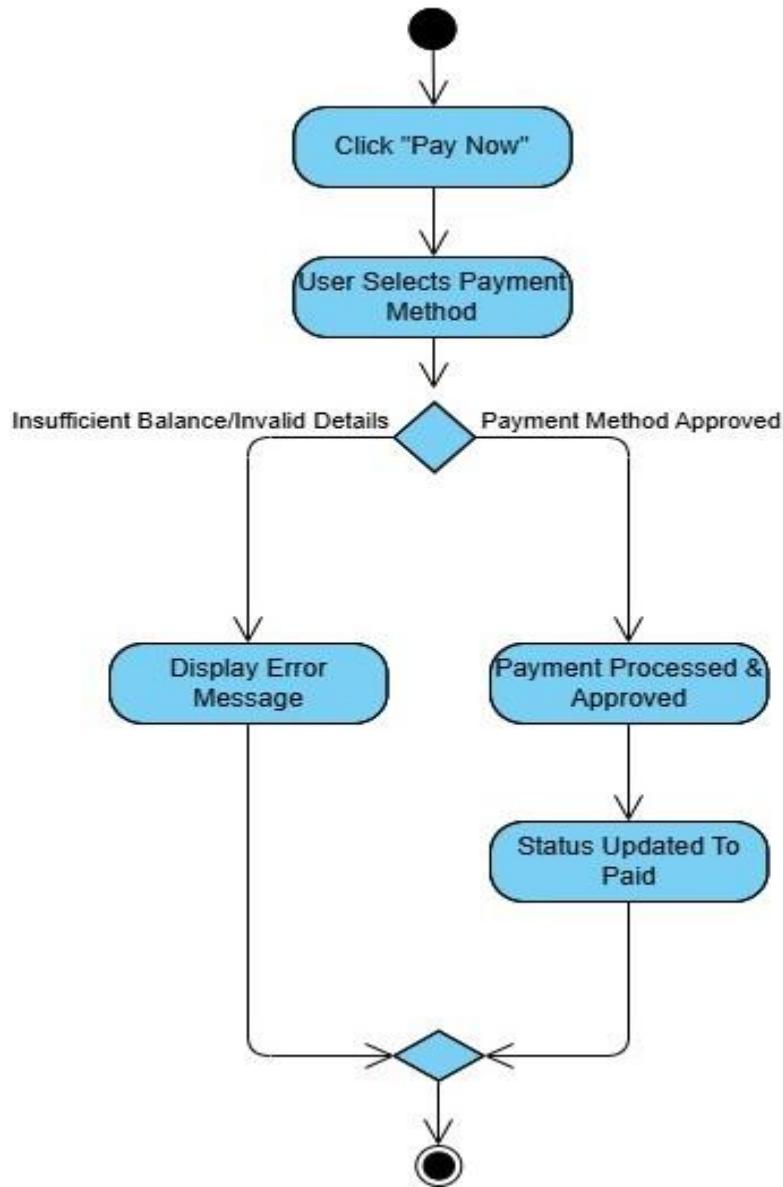
2.1.14 Rate Service Received <<extend>>

Users can support their visited workshops by leaving a rating or feedback regarding their experience.



2.1.15 Make A Payment <<extend>>

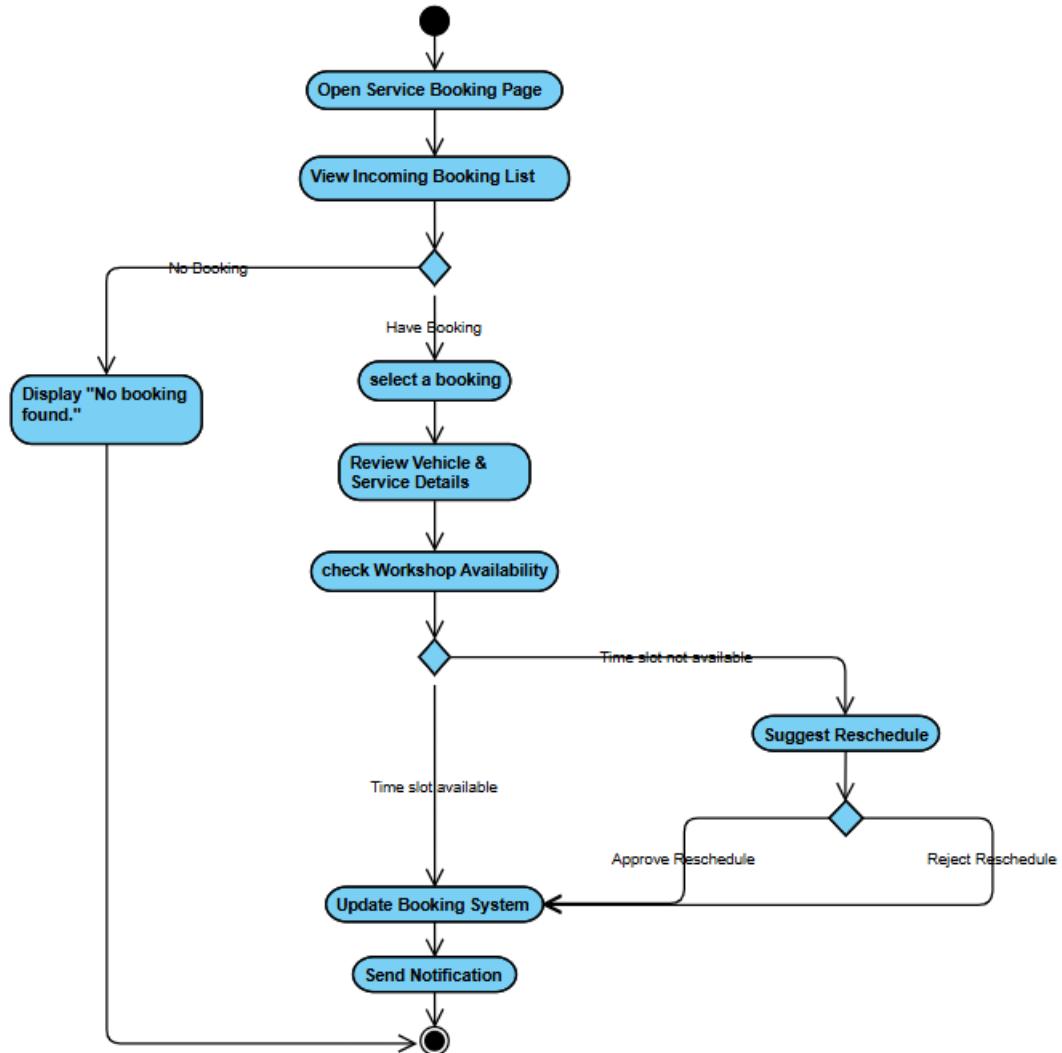
Users can choose to make payments online via funds transfer or online banking.



Mechanic/Workshop

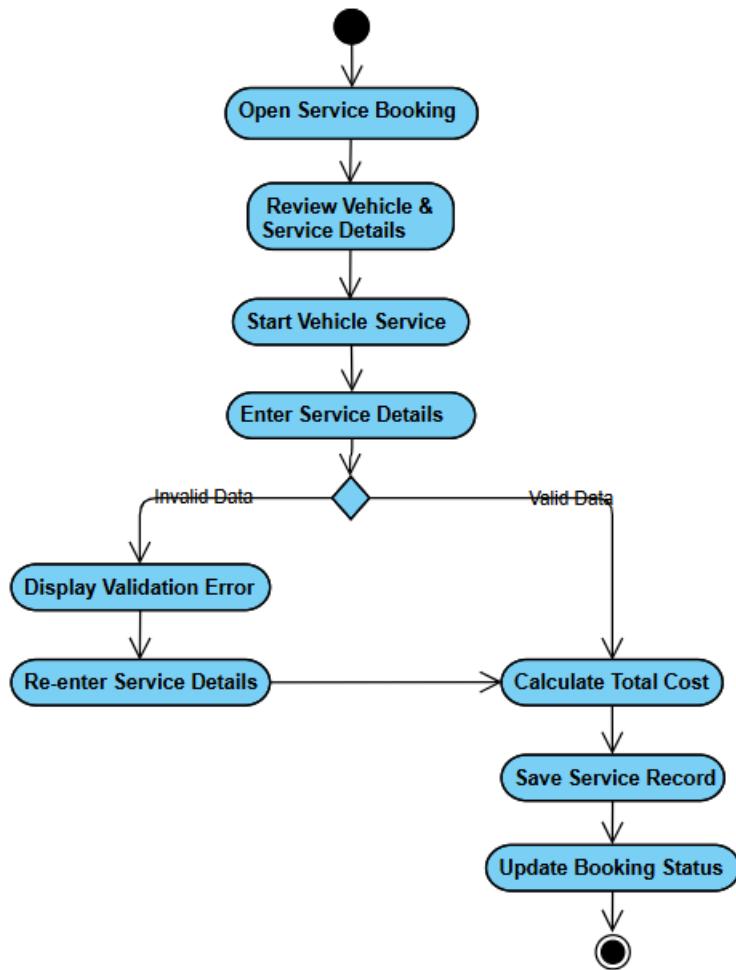
2.1.16 View & Manage Booking

Allows the mechanic or workshop to view incoming service booking requests, review booking details, and manage booking statuses by approving, rejecting, or cancelling bookings based on availability.



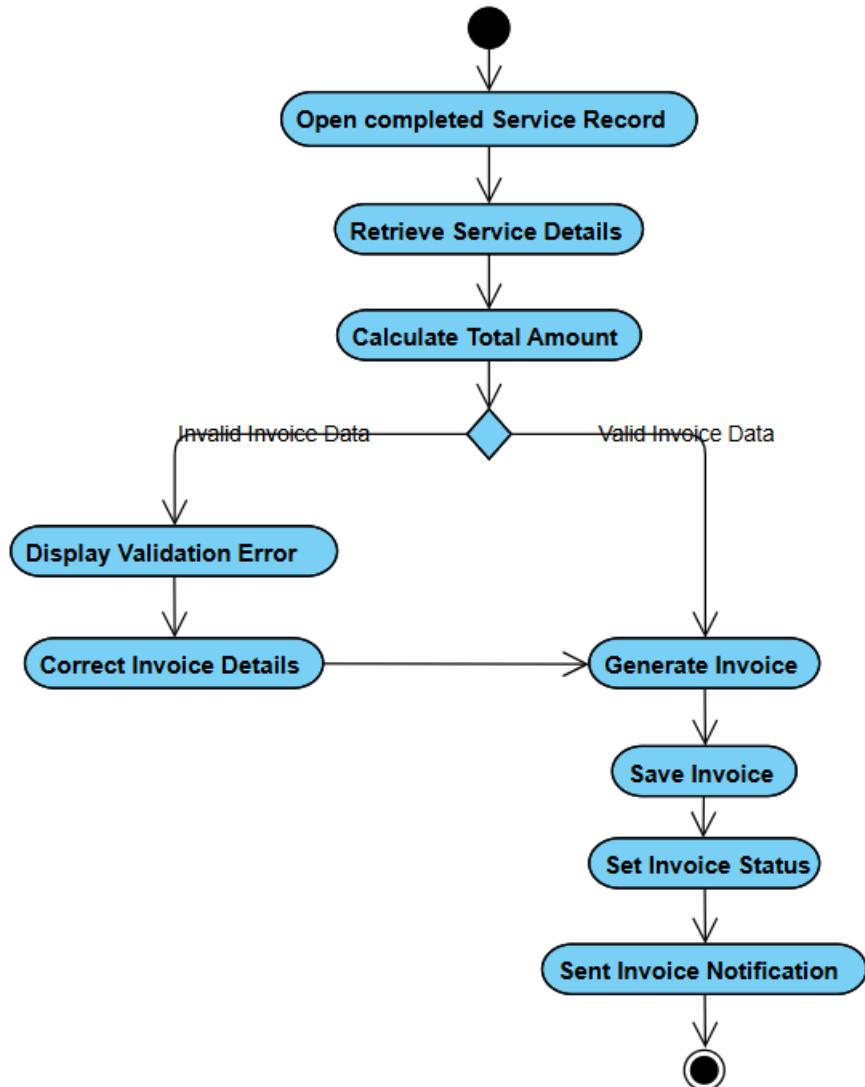
2.1.17 Record Service Details

Allows the mechanic to record service-related information such as service type, mileage, parts used, and labour details after a vehicle service is completed.



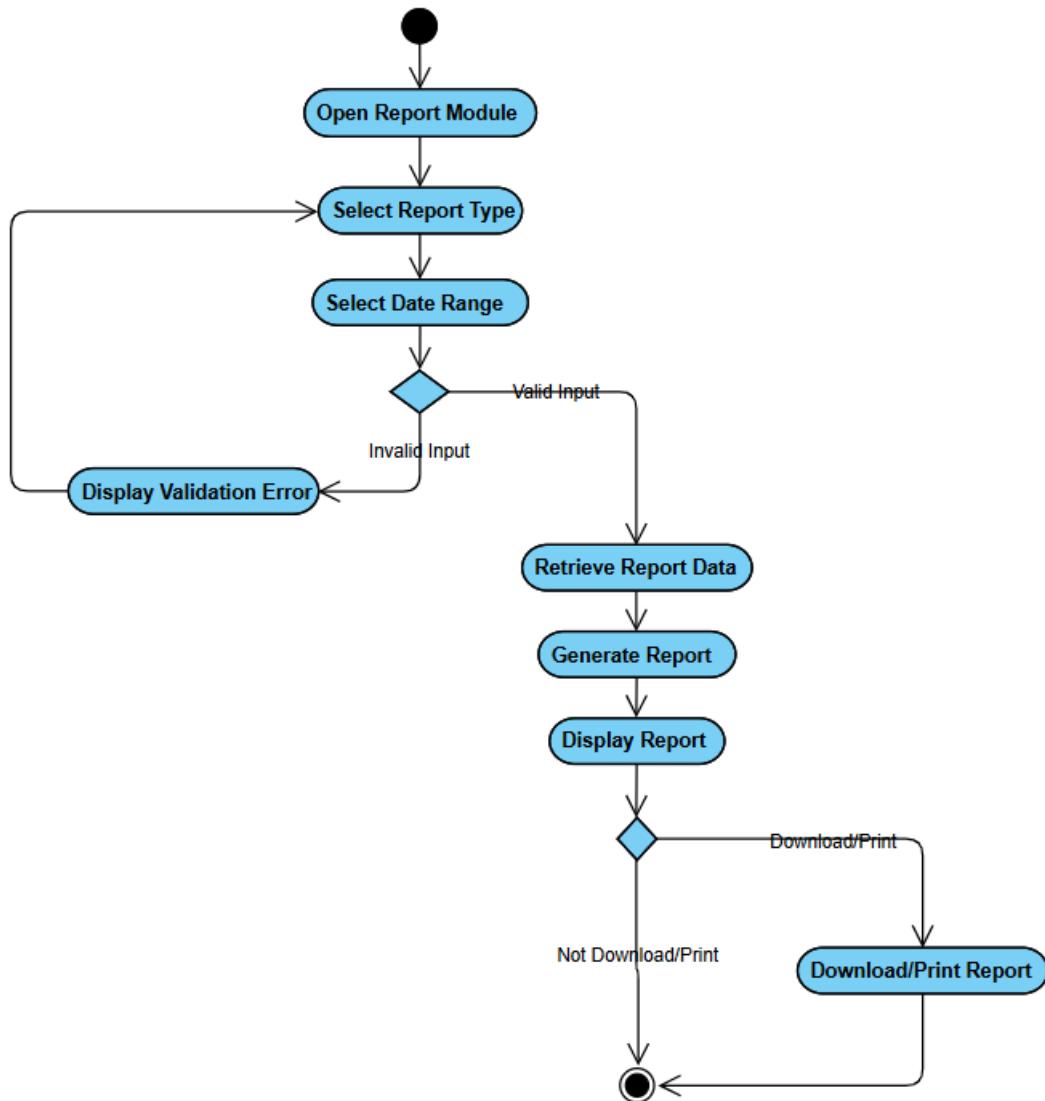
2.1.18 Generate Invoices

Allows the mechanic or workshop to generate an invoice based on completed service records, calculate the total service cost, and issue the invoice to the vehicle owner.



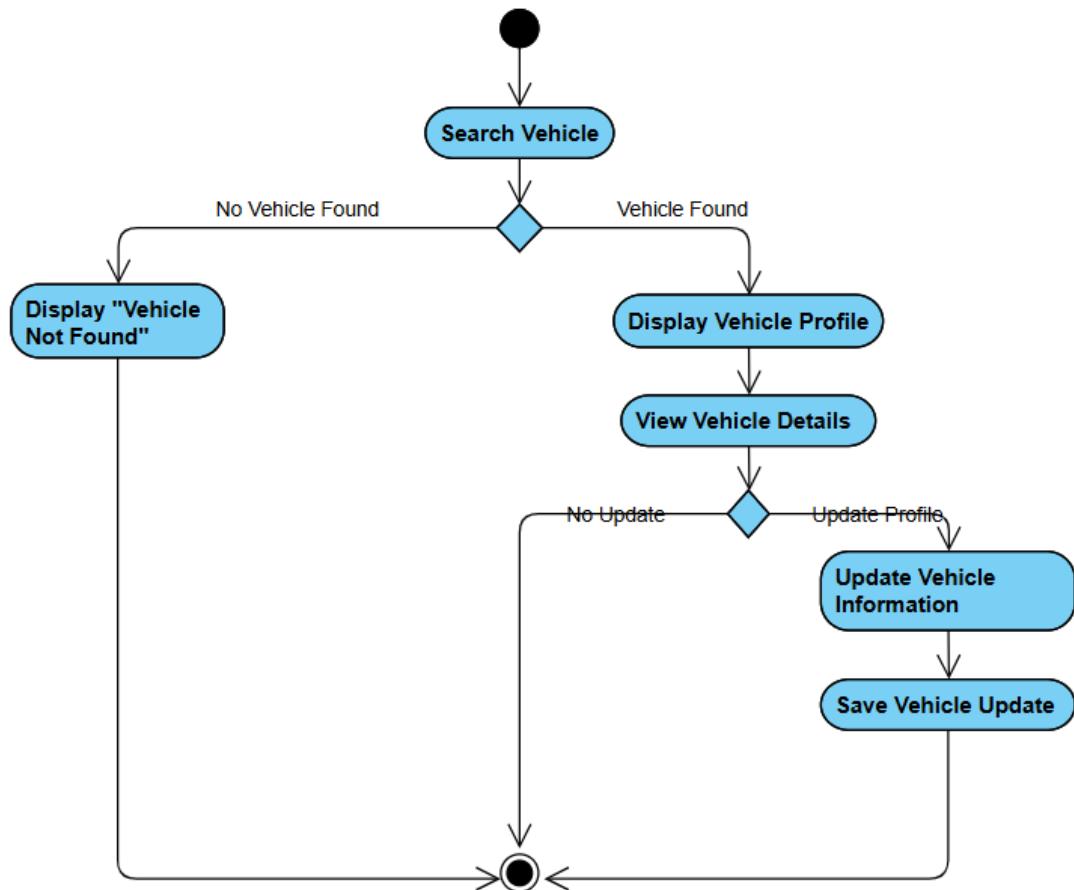
2.1.19 View Workshop Reports

Allows the mechanic or workshop to view and generate reports related to services, inventory usage, and workshop performance, with options to download or print the reports.



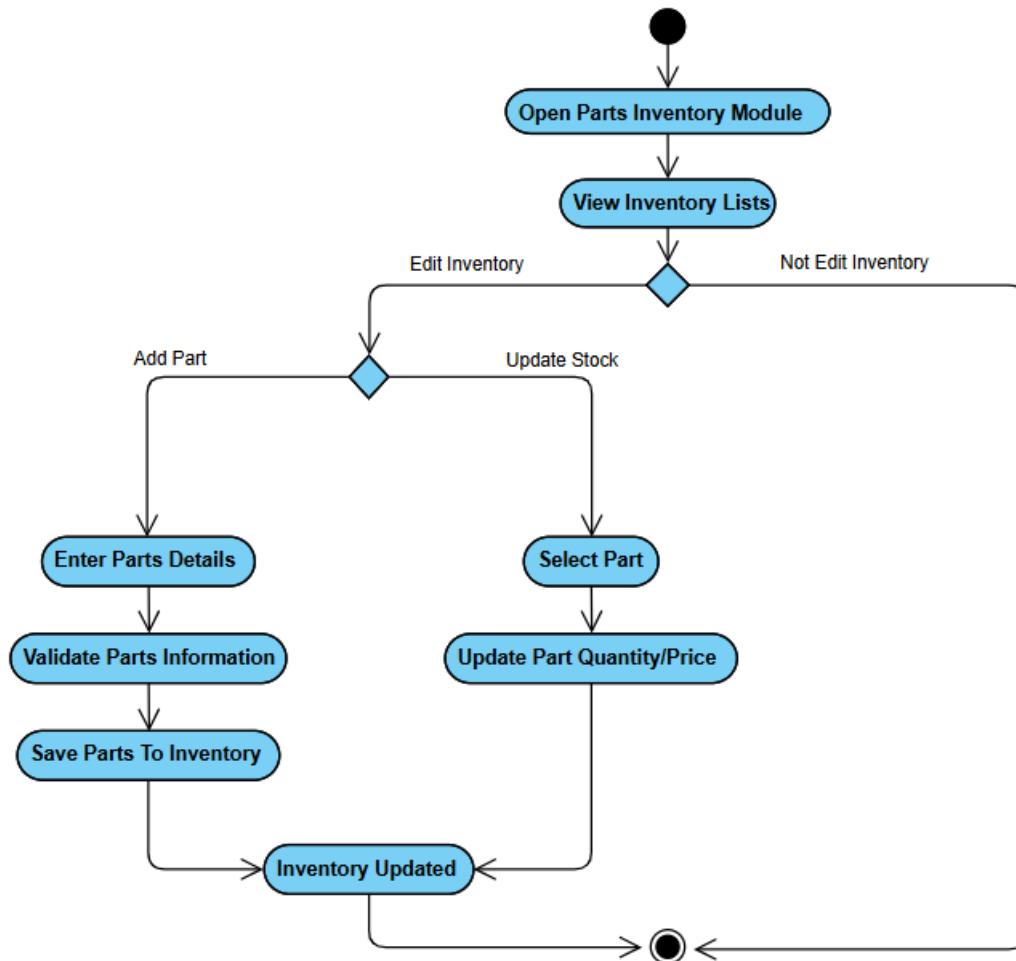
2.1.20 Manage Vehicle Profile

Allows the mechanic to view and update vehicle information such as mileage or service-related details to keep vehicle records accurate and up to date.



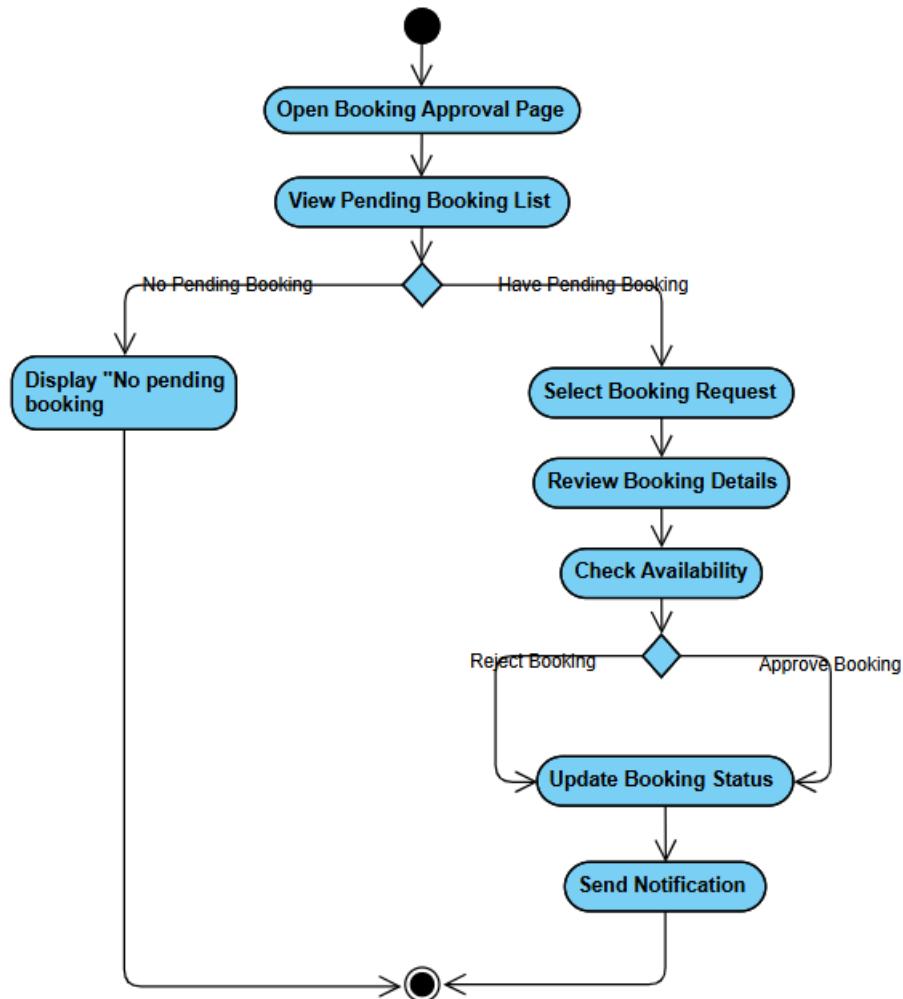
2.1.21 Manage Parts Inventory

Allows the mechanic or workshop to manage spare parts inventory by adding new parts or updating existing stock information to ensure accurate inventory records.



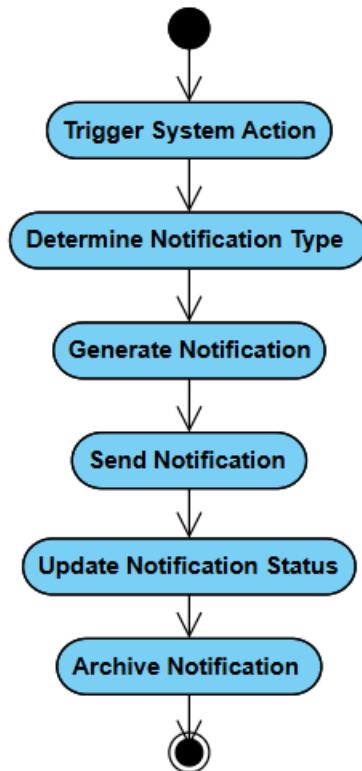
2.1.22 Approve or Reject Booking <<include>>

Allows the mechanic or workshop to evaluate pending service booking requests and decide whether to approve or reject them, after which the system updates the booking status and notifies the vehicle owner.



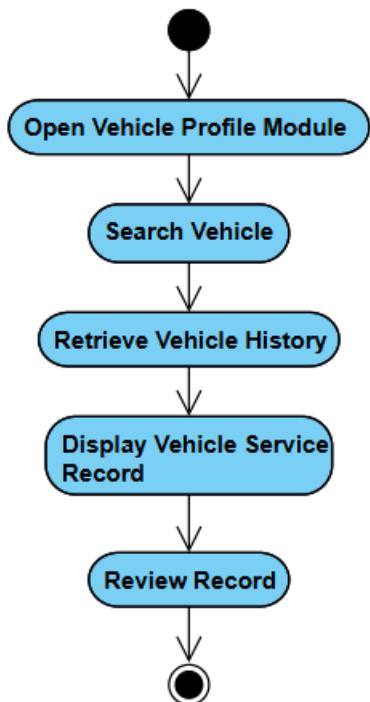
2.1.23 Send Notification <<include>>

Allows the system to send notifications to users regarding important events such as booking approval, rejection, service completion, or invoice generation.



2.1.24 Check Vehicle History

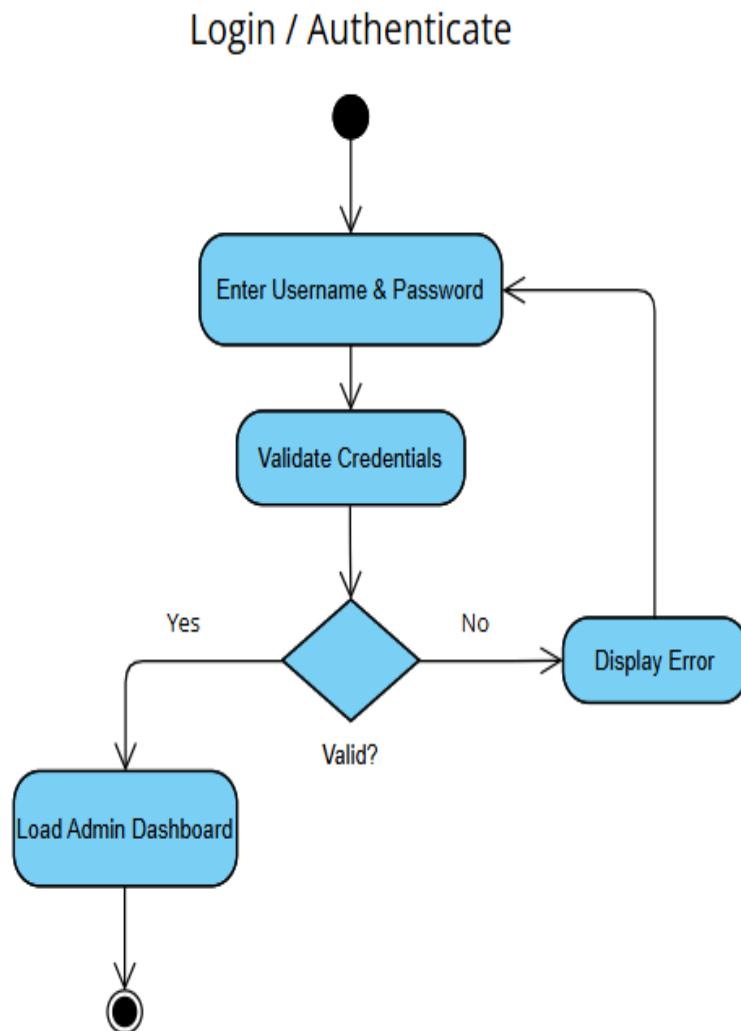
Allows the mechanic to view the historical service records and past invoices of a vehicle when performing related activities such as recording service details.



Admin

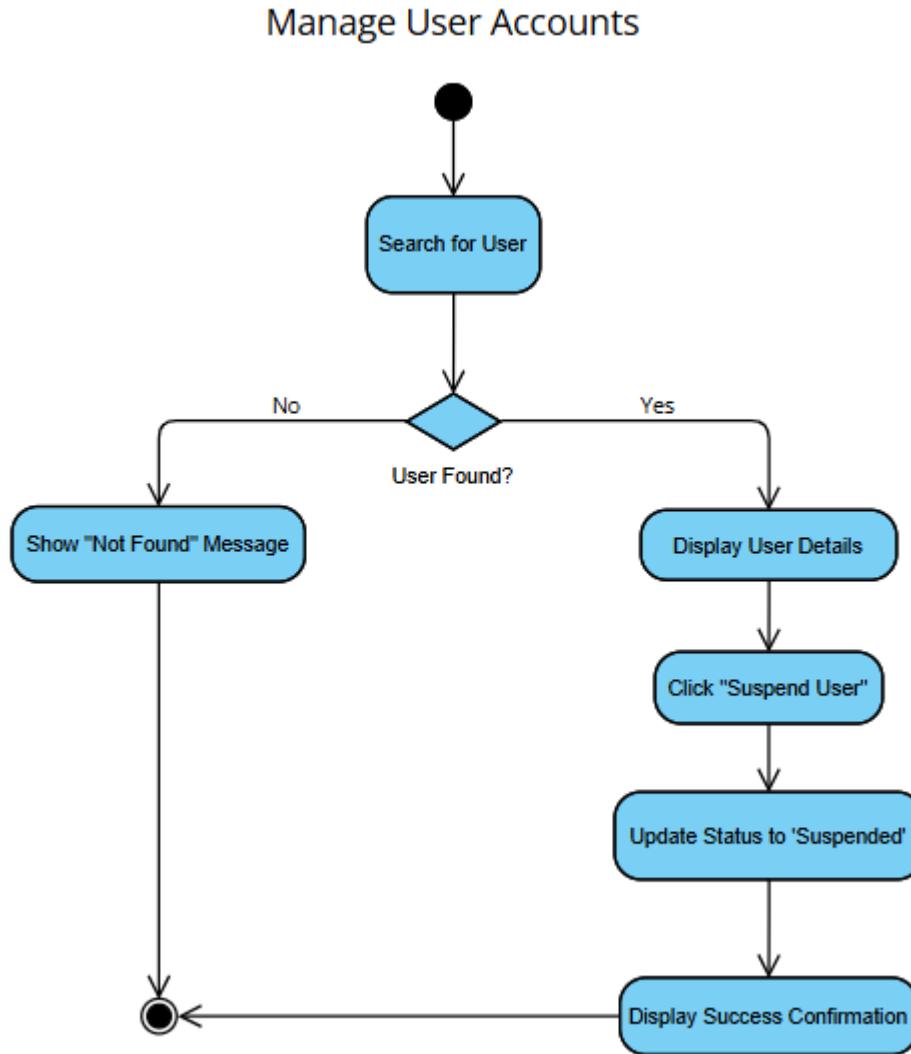
2.1.25 Login / Authenticate

The Administrator enters their credentials to access the system. The System validates the username and password against the database; if valid, the Dashboard is displayed.



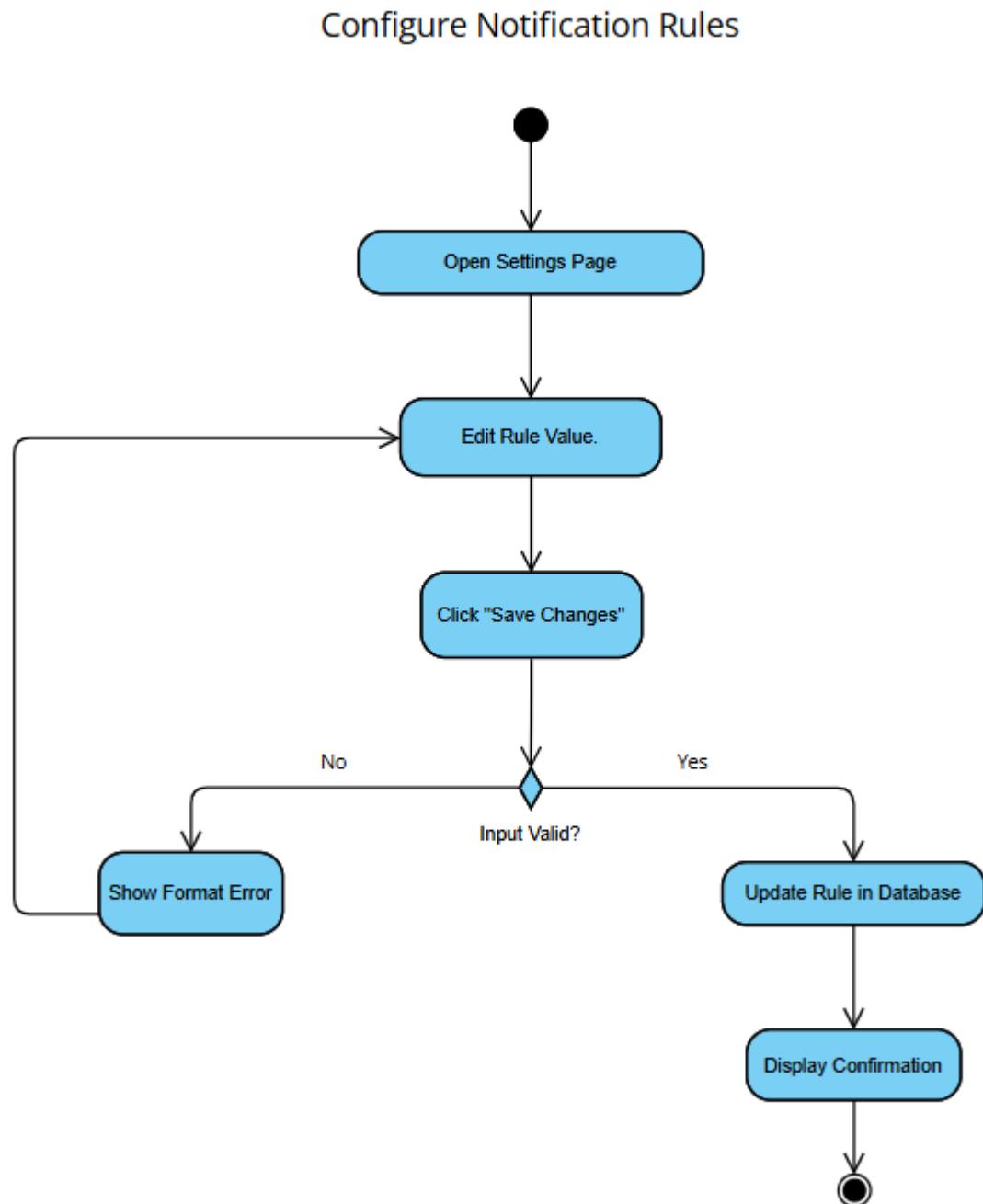
2.1.26 Manage User Accounts

The Admin searches for a registered vehicle owner to manage their account status. If the user is found, their profile is retrieved. The Admin can then flag a violation and suspend the user, updating the database status to "Suspended."



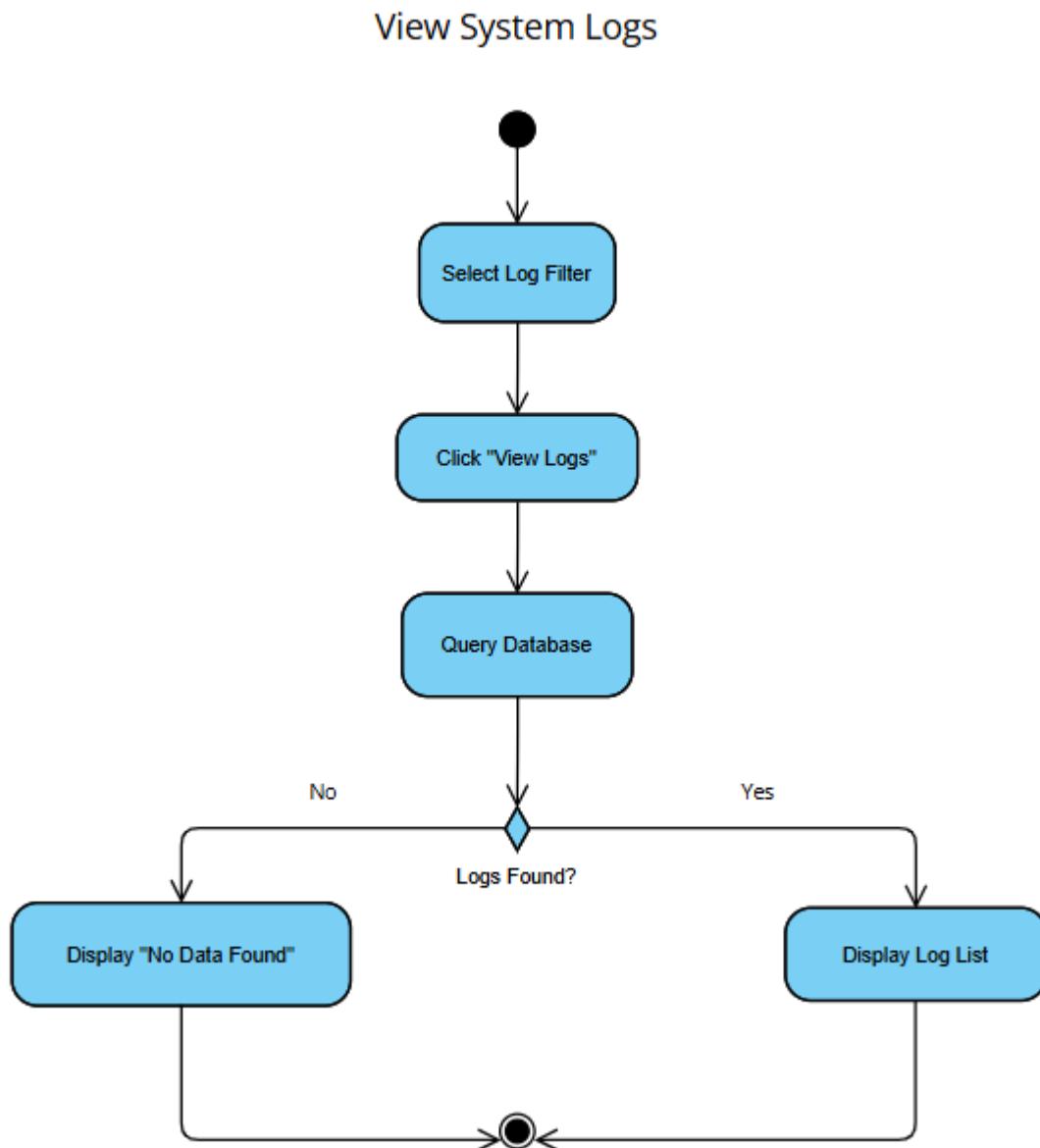
2.1.27 Configure Notification Rules

The Admin accesses settings to modify global rules, such as mileage thresholds. The Admin inputs a new value, and the system validates the format. If valid, the system updates the configuration in the database; otherwise, it prompts for correction.



2.1.28 View System Logs

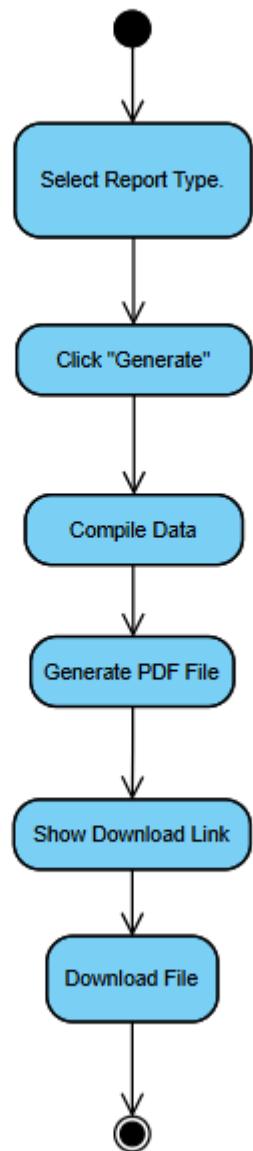
The Admin requests to view the system audit trail. The Admin selects a filter (exp: "Errors Only"), and the System queries the database to retrieve and display the matching log entries.



2.1.29 Generate System Reports.

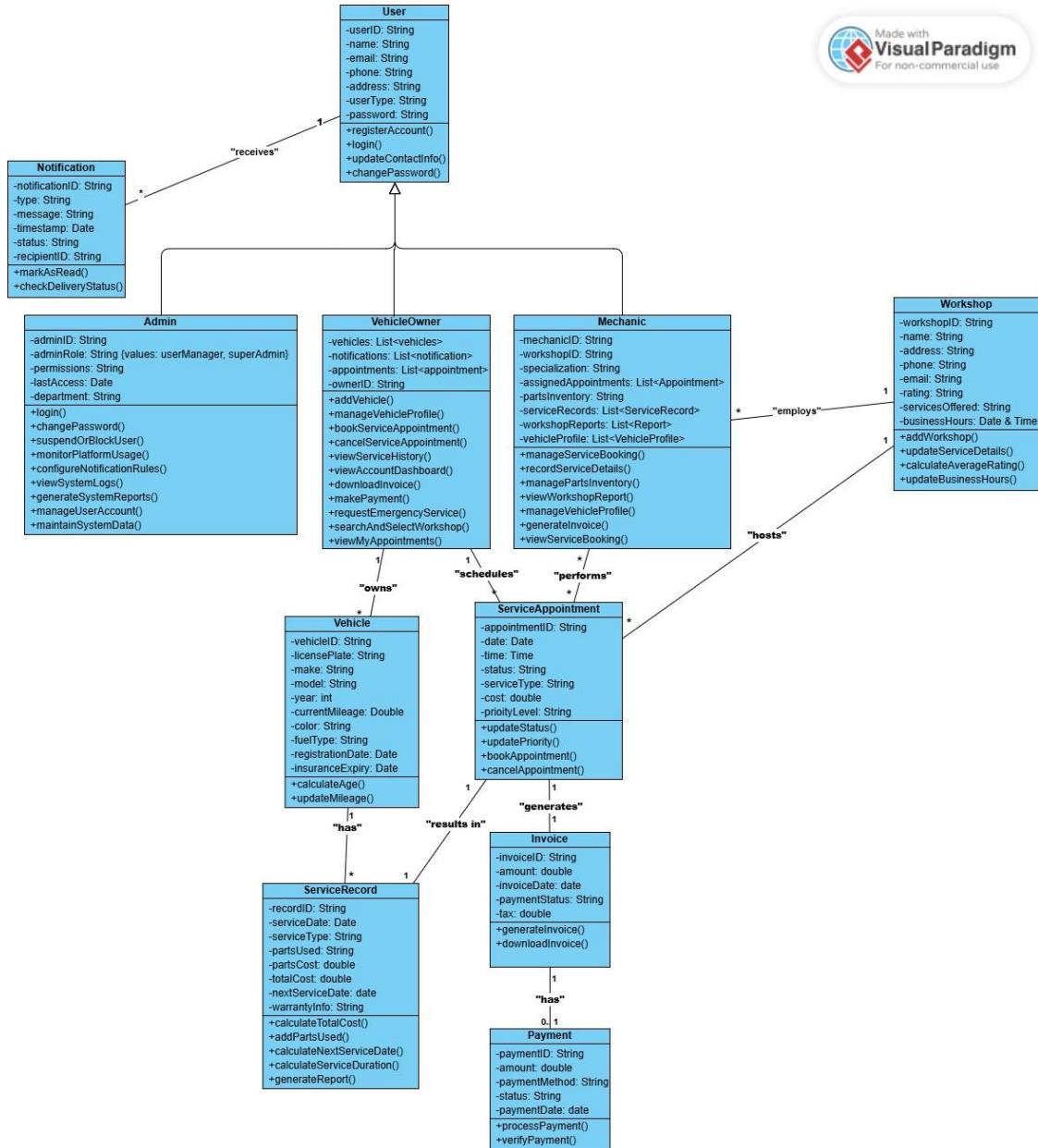
The Admin selects a report type (e.g., Monthly Revenue) to export. The system aggregates the necessary data, compiles it into a downloadable PDF file, and provides the download link to the Admin.

Generate System Reports



3 Data Design

3.1 Design Class Diagram



3 types of users (vehicle owner, mechanic, admin) inherit from user class. A vehicle owner can own multiple vehicles and each of those vehicles will have multiple service records. A vehicle owner can also schedule multiple service appointments, and each service appointment generates a service record and an invoice. An invoice can have 0 payments made or is paid. Next, A workshop can hire many mechanics, and each mechanic performs multiple service appointments. Said service appointments are hosted by the workshop. A user receives many notifications.

3.2 Data Dictionary

(User) -Vehicle owners, mechanics and admins who use the platform. Contains login credentials, contact info, and vehicle count.

field_name	data_type	length	PK/F	required	Null/Not Null	description
user_id	INT	11	PK	YES	Not Null	Unique user identifier
phone	SHORT TEXT	100		YES	Not Null	User email address
email	SHORT TEXT	20		YES	Not Null	Contact phone number
full_name	SHORT TEXT	100		YES	Not Null	User's full name
IC	SHORT TEXT	20		YES	Not Null	Identification number
address	TEXT	300		YES	Not Null	Complete postal address
password	SHORT TEXT	100		YES	Not Null	Hashed password
user_type	ENUM	10		YES	Not Null	User role: owner/mechanic/admin
last_login	ENUM	10		YES	Not Null	Last Login Time
vehicle_count	INT	10		YES	Not Null	Total number of vehicles

(Vehicle) -Cars registered by users for servicing. Stores make, model, license plate, and mileage.

field_name	data_type	length	PK/F	Required	Null/Not Null	description
vehicle_id	INT	11	PK	YES	Not Null	Unique Vehicle Identifier
user_id	INT	11	FK	YES	Not Null	Unique User Identifier
make	SHORT TEXT	10		YES	Not Null	Car Brand
model	SHORT TEXT	50		YES	Not Null	Car Model
year	INT	5		YES	Not Null	Manufactured Year
plate	SHORT TEXT	10		YES	Not Null	License Plate
color	SHORT TEXT	10		YES	Not Null	Vehicle Color
current_mileage	DOUBLE	1000000		YES	Not Null	Current Car Mileage
last_service_mileage	DOUBLE	12000		YES	Not Null	Mileage Since Last Service

(Workshop) -Service centers that perform vehicle maintenance. Includes location, contact details, services offered, and ratings.

field_name	data_type	length	PK/F	Required	Null/Not Null	description
workshop_id	INT	11	PK	YES	Not Null	Unique workshop identifier
name	SHORT TEXT	100		YES	Not Null	Workshop business name
address	TEXT	400		YES	Not Null	Physical address
city	SHORT TEXT	50		YES	Not Null	City location
phone	SHORT TEXT	20		YES	Not Null	Contact number
email	SHORT TEXT	100		YES	Not Null	Business email
rating	DECIMAL	3		YES	Not Null	Workshop Service Rating
rating_count	INT	11		YES	Not Null	Number of ratings received
business_hours	JSON	10		YES	Not Null	Operating hours
services_offered	JSON	500		YES	Not Null	Available services
status	SHORT TEXT	10		YES	Not Null	Operational status: active/inactive

(Appointments) -Bookings for vehicle services. Links users, vehicles, and workshops with date/time and status tracking.

field_name	data_type	length	PK/FK	Required?	Null/Not Null	description
appointment_id	INT	11	PK	YES	Not Null	Unique appointment identifier
user_id	INT	11	FK	YES	Not Null	Customer reference
vehicle_id	INT	11	FK	YES	Not Null	Vehicle reference
workshop_id	INT	11	FK	YES	Not Null	Workshop reference
service_type	SHORT TEXT	100		YES	Not Null	Type of service requested
date	DATE	10		YES	Not Null	Scheduled date
time	TIME	10		YES	Not Null	Scheduled time
status	SHORT TEXT	10		YES	Not Null	Status: pending/confirmed/in_progress/completed/cancelled
emergency_flag	BOOLEAN	10		YES	Not Null	Emergency service indicator
emergency_details	SHORT TEXT	100		YES	Not Null	Emergency description
cancellation_reason	TIMESTAMP	100		YES	Not Null	Cancellation Reason

(Invoice) -Billing documents for services. Includes cost breakdown, taxes, due dates, and payment status.

field_name	data_type	length	PK/FK	Required?	Null/Not Null	description
invoice_id	INT	11	PK	YES	Not Null	Unique invoice identifier
record_id	INT	11	FK	YES	Not Null	Service record reference
invoice_number	SHORT TEXT	50		YES	Not Null	Business invoice number
invoice_date	DATE	10		YES	Not Null	Invoice issue date
subtotal	DECIMAL	10		YES	Not Null	Tax + total
tax_amount	DECIMAL	10		YES	Not Null	Total tax
total_amount	DECIMAL	10		YES	Not Null	Total Amount
due_date	DATE	10		YES	Not Null	Payment due date
payment_status	ENUM	10		YES	Not Null	Status: pending/paid/overdue/cancelled
payment_method	SHORT TEXT	50		YES	Not Null	Payment method used
payment_date	DATE	10		YES	Not Null	Date of payment
created_at	DATETIME	10		YES	Not Null	Invoice creation time

(Service Record) -Completed service history. Contains parts used, costs, service details, and customer feedback from appointments.

field_name	data_type	length	PK/FK	Required?	Null/Not Null	description
record_id	INT	11	PK	YES	Not Null	Unique service record identifier
appointment_id	INT	11	FK	YES	Not Null	Appointment reference
vehicle_id	INT	11	FK	YES	Not Null	Vehicle reference
workshop_id	INT	11	FK	YES	Not Null	Workshop reference
service_date	DATE	10		YES	Not Null	Actual service date
mileage	DECIMAL	10		YES	Not Null	Initial mileage
service_type	SHORT TEXT	100		YES	Not Null	Service performed
parts_used	JSON	100		YES	Not Null	Parts replaced/used
total_amount	DECIMAL	10		YES	Not Null	Service Cost
rating_given	INT	11		YES	Not Null	Customer rating
created_at	TIMESTAMP	10		YES	Not Null	Record creation time

(Notification) -System messages sent to users. Tracks booking confirmations, and other alerts.

field_name	data_type	length	PK/FK	Required?	Null/Not Null	description
notification_id	INT	11	PK	YES	Not Null	Unique notification identifier
user_id	INT	11	FK	YES	Not Null	Recipient user
type	SHORT TEXT	20		YES	Not Null	Type: booking/cancellation/payment/reminder/rating
message	SHORT TEXT	50		YES	Not Null	Notification content
status	SHORT TEXT	10		YES	Not Null	Status: pending/sent/delivered/read/failed

(Payment) -Payment transactions for invoices. Records payment method, amount, transaction ID, and processing status.

field_name	data_type	length	PK/FK	Required?	Null/Not Null	description
payment_id	INT	11	PK	YES	Not Null	Unique payment identifier
invoice_id	INT	11	FK	YES	Not Null	Invoice reference
amount	DECIMAL	10		YES	Not Null	Payable/Paid Amount
payment_method	SHORT TEXT	50		YES	Not Null	Credit Card/Bank Transfer/etc.
transaction_id	SHORT TEXT	100		YES	Not Null	Transaction ID
status	SHORT TEXT	10		YES	Not Null	Status: processing/completed/failed/refunded
created_at	TIMESTAMP	10		YES	Not Null	Payment creation time

(System Logs) -System activity records. Logs user actions, and admin activities for monitoring.

field_name	data_type	length	PK/FK	Required?	Null/Not Null	description
log_id	INT	11	PK	Not Null	YES	Unique log identifier
admin_id	INT	11	FK	Not Null	YES	Admin who performed action
user_id	INT	11	FK	Not Null	YES	User related to log
log_level	SHORT TEXT	20		Not Null	YES	Severity level
module	SHORT TEXT	50		Not Null	YES	System module
action	SHORT TEXT	100		Not Null	YES	Action performed
description	TEXT	400		Not Null	YES	Detailed log message
timestamp	TIMESTAMP	10		Not Null	YES	Log timestamp

(Parts Inventory) -Workshop stock of repair parts. Manages quantities, prices, and availability for each service center.

field_name	data_type	length	PK/FK	Required?	Null/Not Null	description
part_id	INT	11	PK	Not Null	YES	Unique part identifier
workshop_id	INT	11	FK	Not Null	YES	Workshop that owns inventory
part_name	SHORT TEXT	100		Not Null	YES	Name of the part
part_number	SHORT TEXT	50		Not Null	YES	Manufacturer part number
quantity	INT	11		Not Null	YES	Current stock quantity
unit_price	DECIMAL	10		Not Null	YES	Price Of Part
status	SHORT TEXT	20		Not Null	YES	Part availability status
created_at	TIMESTAMP	10		Not Null	YES	Record creation timestamp

(Admin Actions) -Audit trail of admin activities. Records changes made by administrators for accountability.

field_name	data_type	length	PK/FK	Null/Not Null	Required?	business_rules
action_id	INT	11	PK	Not Null	YES	Unique action identifier
admin_id	INT	11	FK	Not Null	YES	Admin who performed action
action_type	SHORT TEXT	30		Not Null	YES	Type of admin action
target_id	INT	11		Not Null	YES	ID of affected entity
target_type	SHORT TEXT	50		Not Null	YES	Type of affected entity
details	TEXT	50		Not Null	YES	Action details
timestamp	TIMESTAMP	10		Not Null	YES	Action timestamp

(System Reports) -Generated system reports. Stores analytic reports.

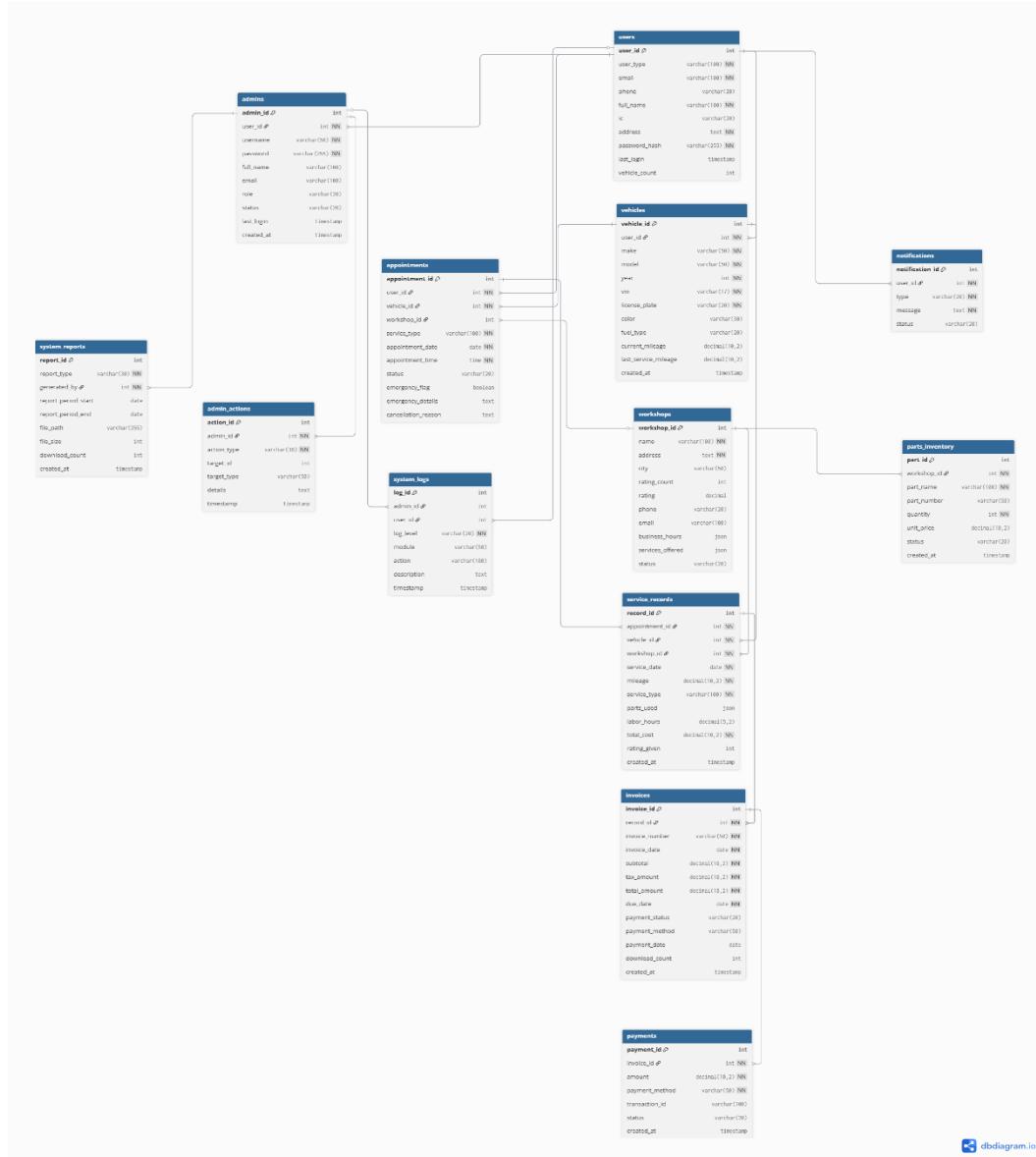
field_name	data_type	length	PK/FK	Null/Not Null	Required?	description
report_id	INT	11	PK	Not Null	YES	Unique report identifier
report_type	SHORT TEXT	30		Not Null	YES	Type of report
generated_by	INT	11		Not Null	YES	Admin who generated report
report_period_start	DATE	10		Not Null	YES	Report start date
report_period_end	DATE	10		Not Null	YES	Report end date
file_path	SHORT TEXT	255		Not Null	YES	Storage path of report file
file_size	INT	11		Not Null	YES	Report file size in bytes
download_count	INT	11		Not Null	YES	Number of times downloaded
created_at	TIMESTAMP	10		Not Null	YES	Report creation timestamp

(Admin) -Administrator accounts for system management. Separate from regular users with different authentication and permissions.

field_name	data_type	length	PK/FK	Null/Not Null	Required?	description
admin_id	INT	11	PK	Not Null	YES	Unique admin identifier
username	SHORT TEXT	50		Not Null	YES	Admin login username
password	SHORT TEXT	255		Not Null	YES	Encrypted password
full_name	SHORT TEXT	100		Not Null	YES	Admin's full name
email	SHORT TEXT	100		Not Null	YES	Admin email address
role	SHORT TEXT	20		Not Null	YES	Admin role type
status	SHORT TEXT	20		Not Null	YES	Account status
last_login	TIMESTAMP	10		Not Null	YES	Last successful login timestamp
created_at	TIMESTAMP	10		Not Null	YES	Account creation timestamp

3.3 Data Structures

3.3.1 Data Structure 1



The CarSync System uses a relational database structure to store and manage information related to users, vehicles, bookings, services, invoices, payments, and system administration. The data structure is designed to ensure data integrity, reduce redundancy, and support efficient interaction between system components.

Table Name	Primary Key	Description
users	user_id	Stores user account and profile information
admins	admin_id	Stores administrator details
vehicles	vehicle_id	Stores vehicle information linked to users
appointments	appointment_id	Manages service booking details
workshops	workshop_id	Stores workshop information
service_records	record_id	Stores details of services performed
invoices	invoice_id	Stores invoice and billing details
payments	payment_id	Stores payment transaction details
notifications	notification_id	Stores notifications sent to users
parts_inventory	part_id	Manages spare parts stock
system_logs	log_id	Records system activity logs
system_reports	report_id	Stores generated system reports
admin_actions	action_id	Logs administrative actions

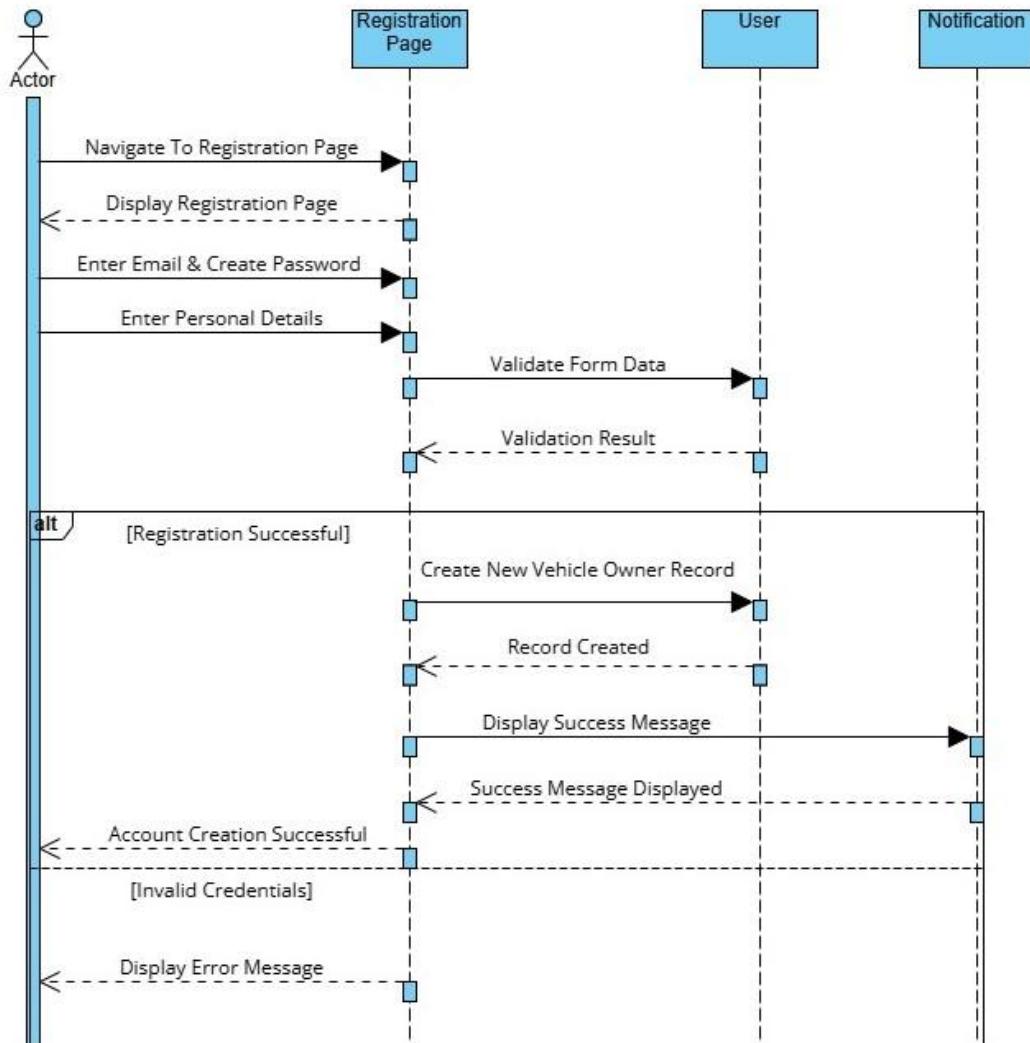
4 Behavioral Modeling

4.1 Sequence Diagrams

Vehicle Owner

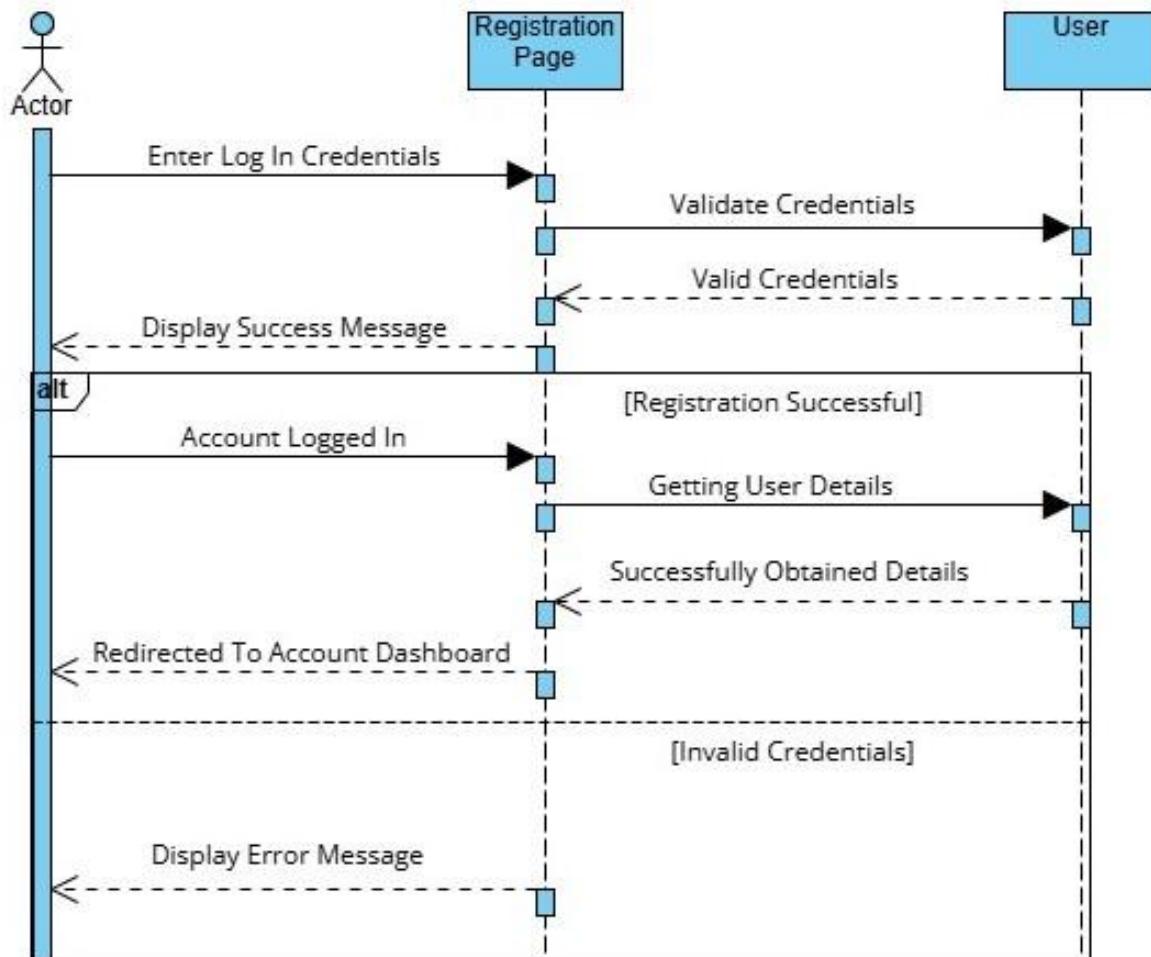
4.1.1 Create Account

Shows the sequence of account creation and what happens when registration is successful/registration failed.



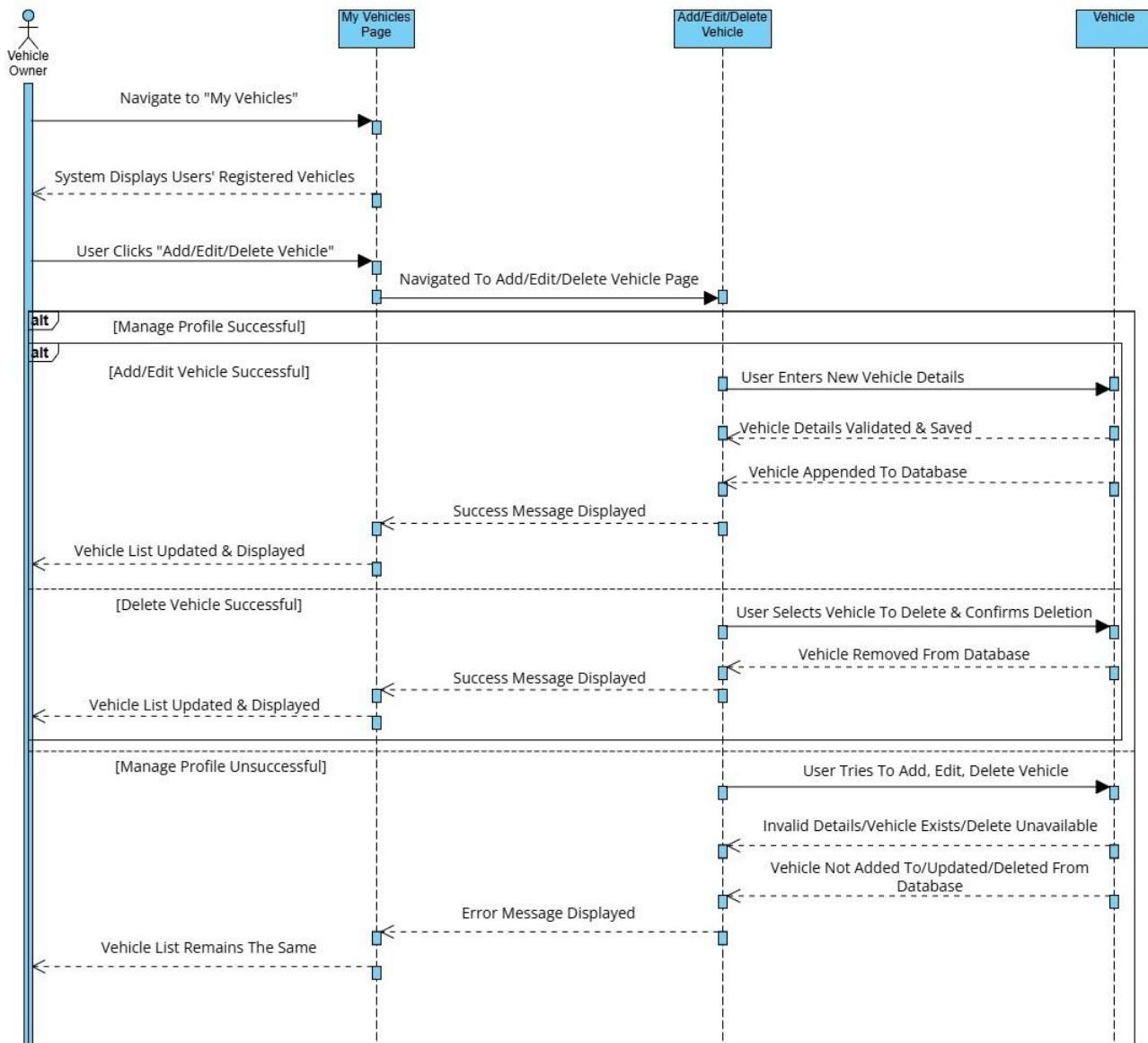
4.1.2 Login To Account

Shows the sequence of account log in and what happens when log in is successful/log in failed.



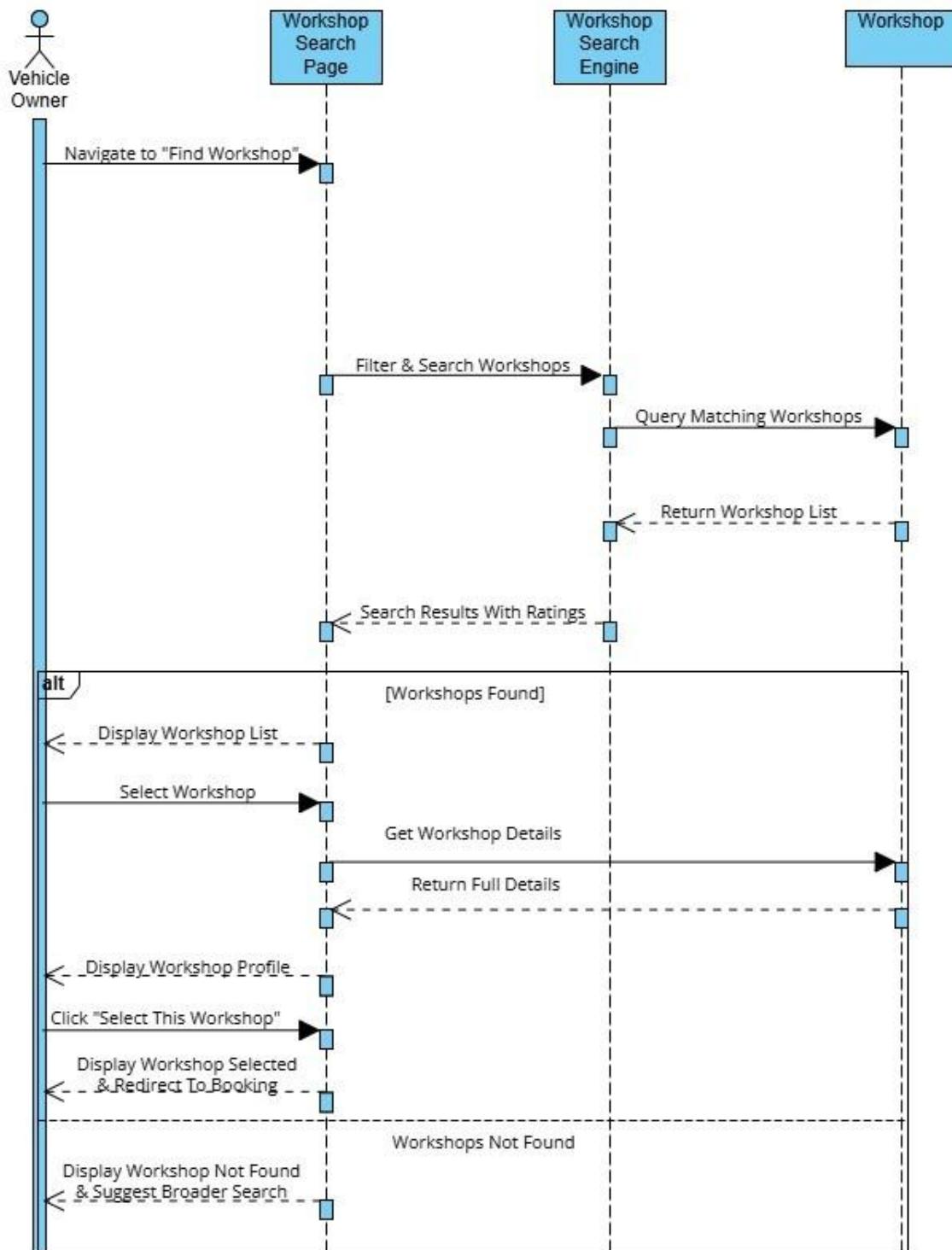
4.1.3 Manage Vehicle Profile

Shows the sequence of add/edit/delete vehicle and what happens when add/edit/delete vehicle is successful/ failed.



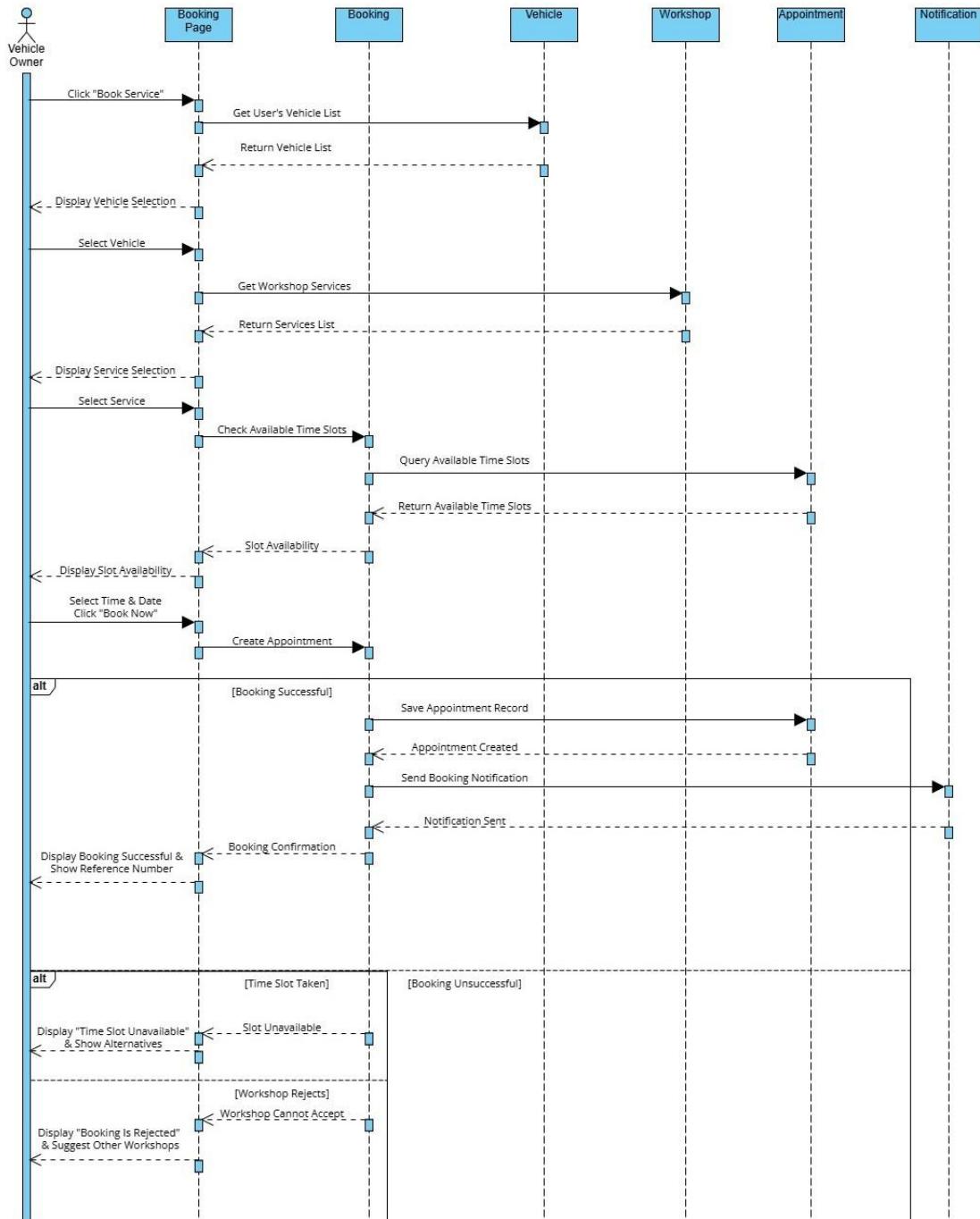
4.1.4 Search & Select Workshop

Shows the sequence of searching and selecting workshop and what happens when search and select is successful/unavailable workshops.



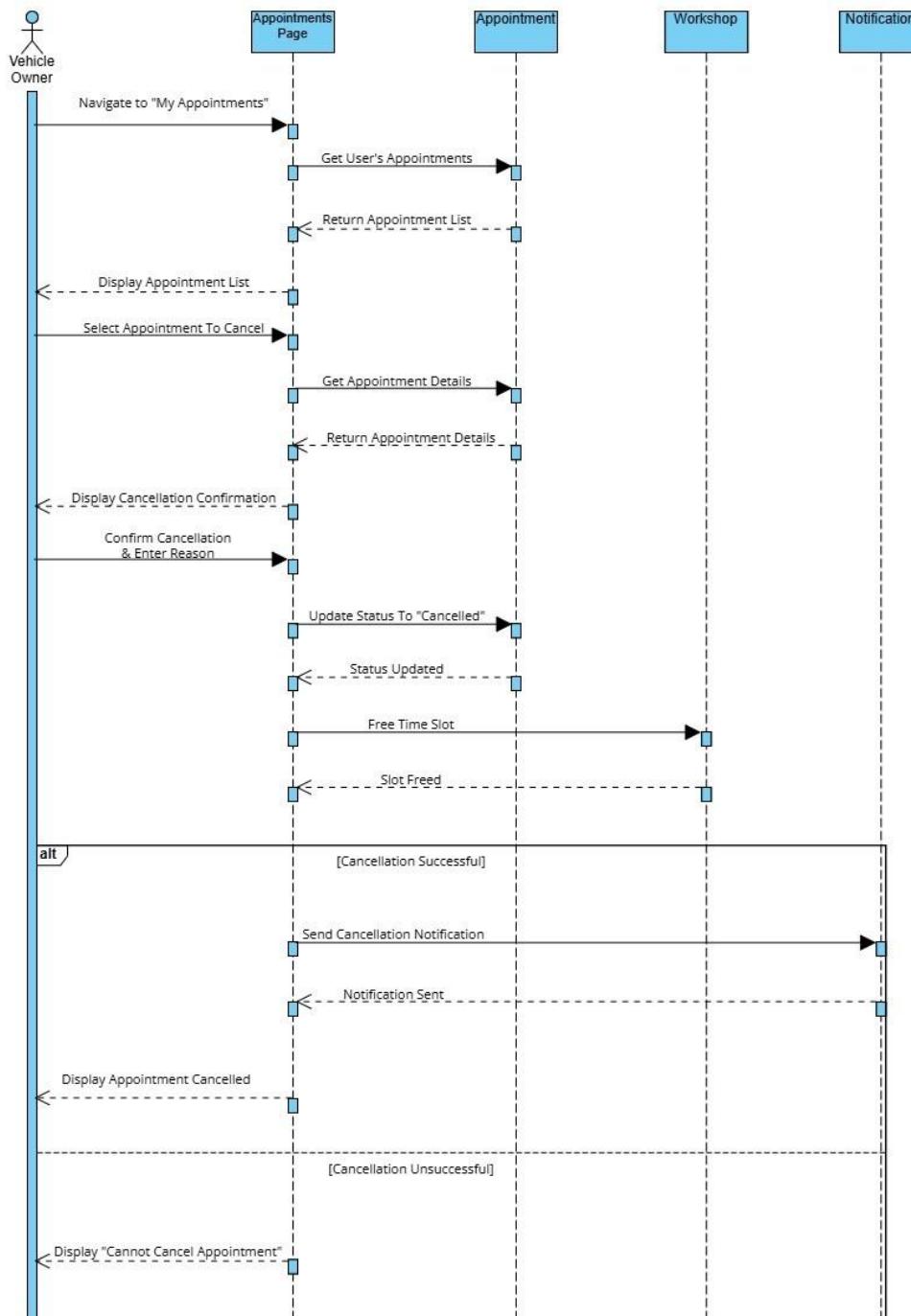
4.1.5 Book Service Appointment

Shows the sequence of booking an appointment and what happens when booking is successful/scenarios where booking may fail.



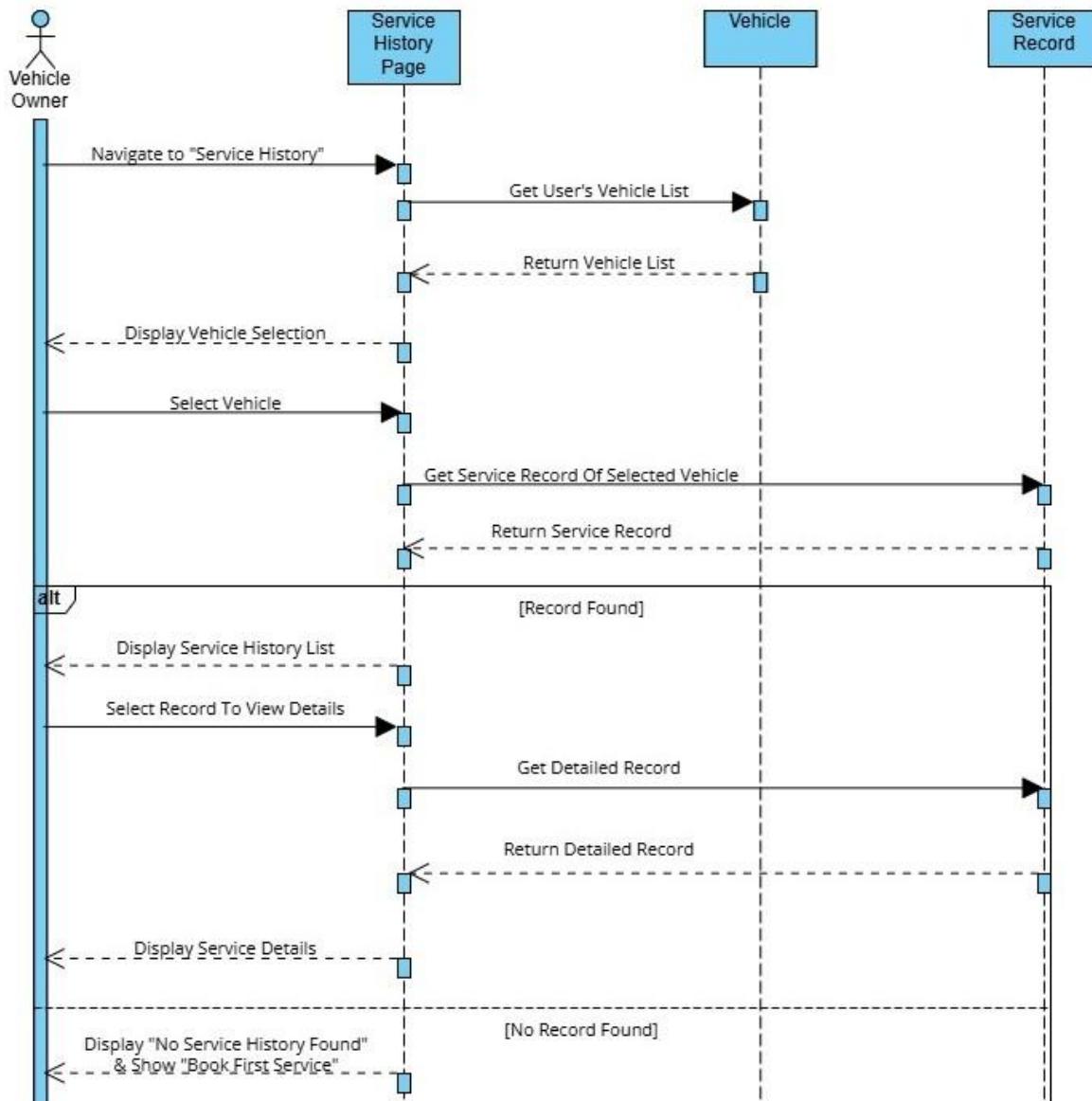
4.1.6 Cancel Service Appointment

Shows the sequence of cancelling booking and what happens when cancellation is successful/cancellation failed.



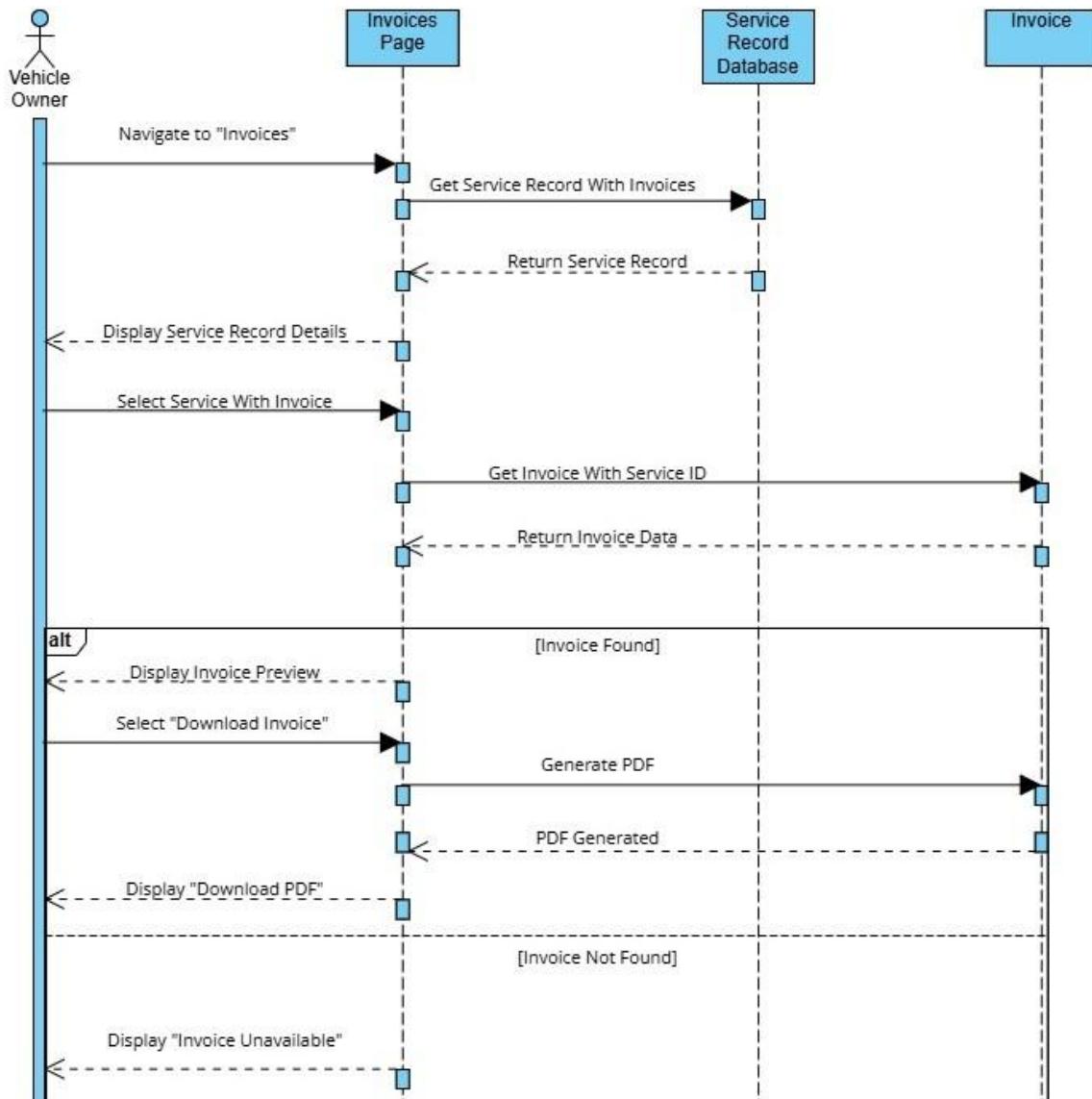
4.1.7 View Service History

Shows the sequence of viewing service history and what happens when view service history is successful/no service history found.



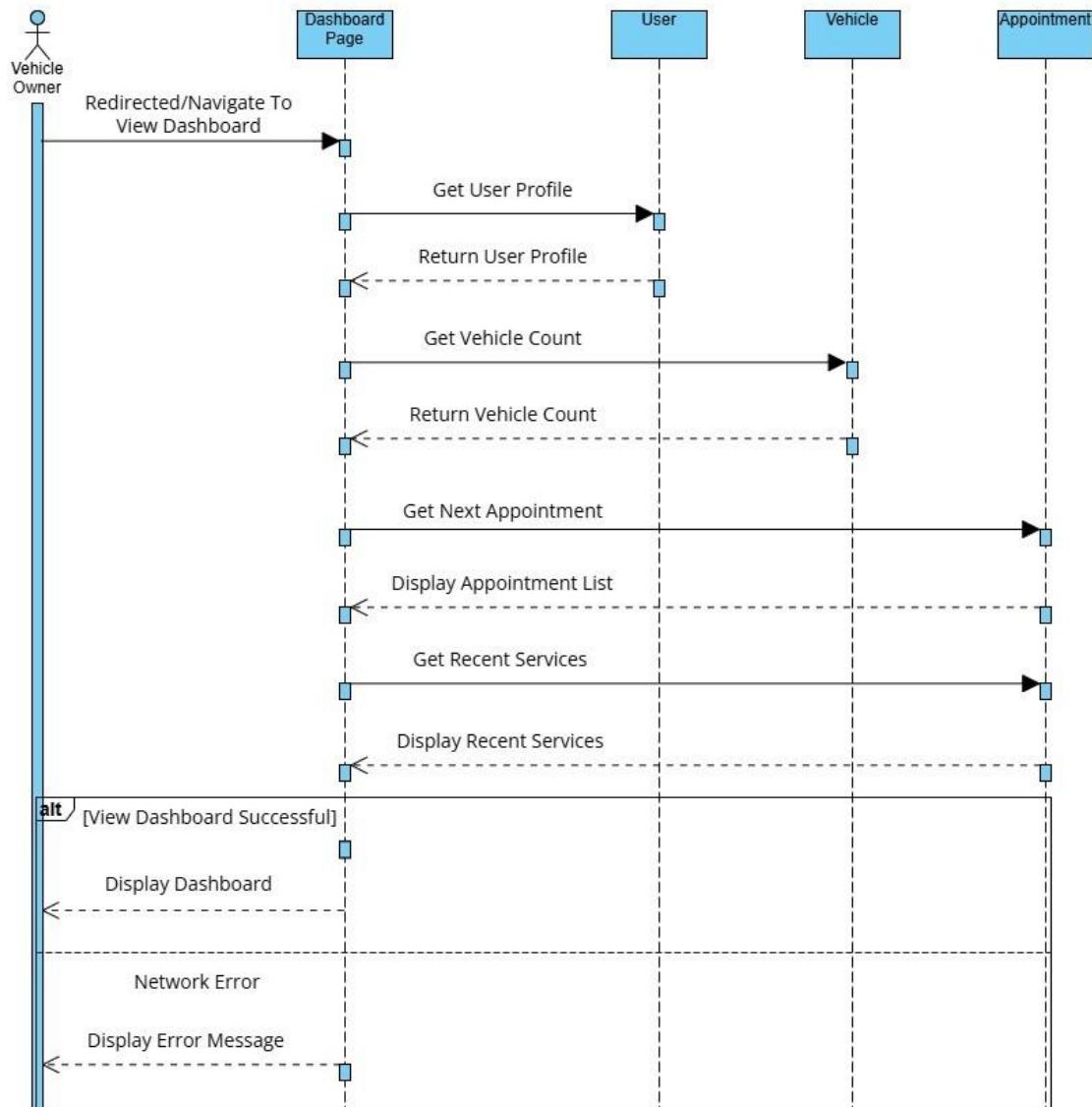
4.1.8 View & Download Invoice

Shows the sequence of viewing and downloading invoice and what happens when it is successful/invoice unavailable.



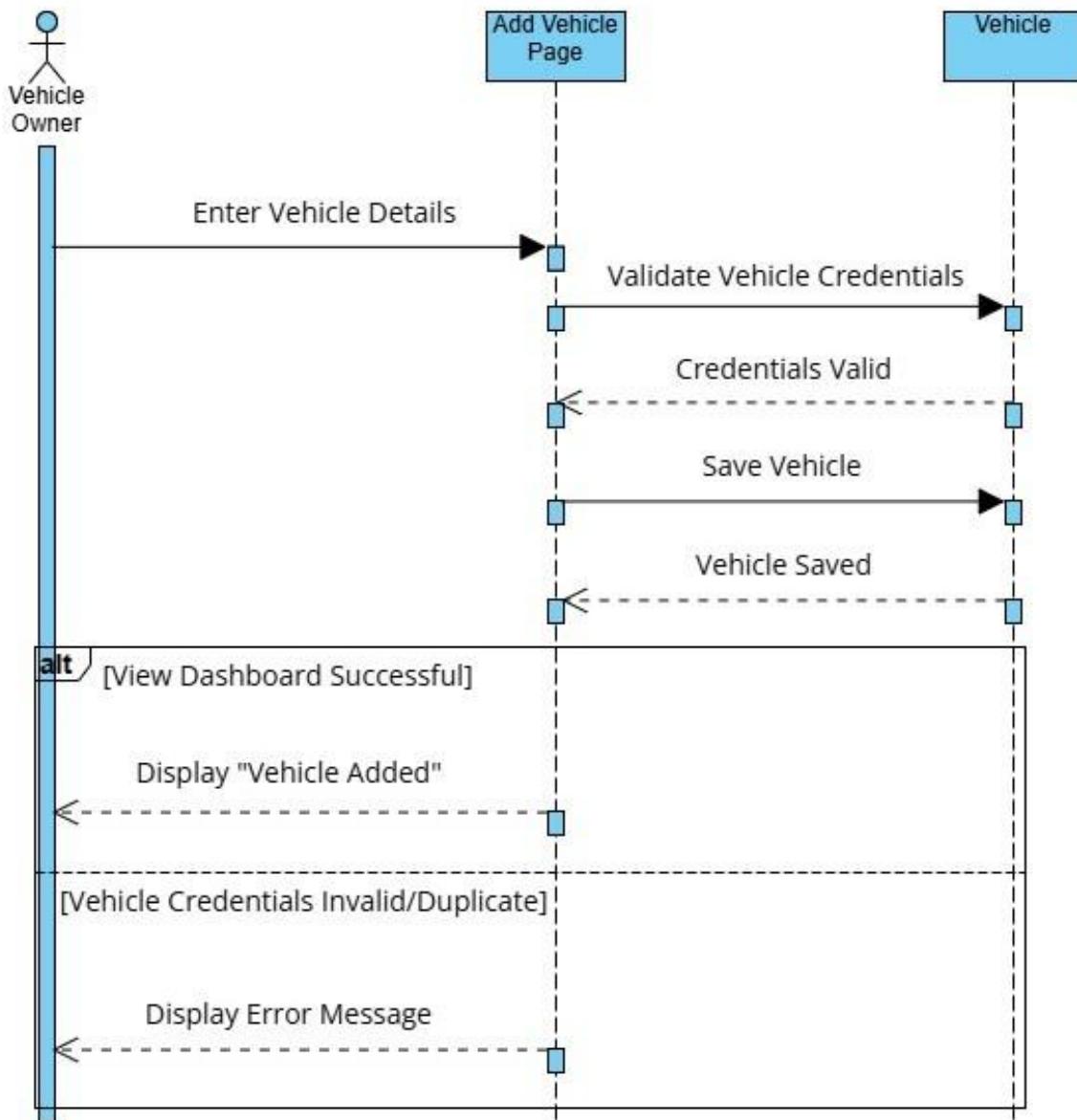
4.1.9 View Account Dashboard

Shows the sequence of view account dashboard and what happens when viewing is successful/network error.



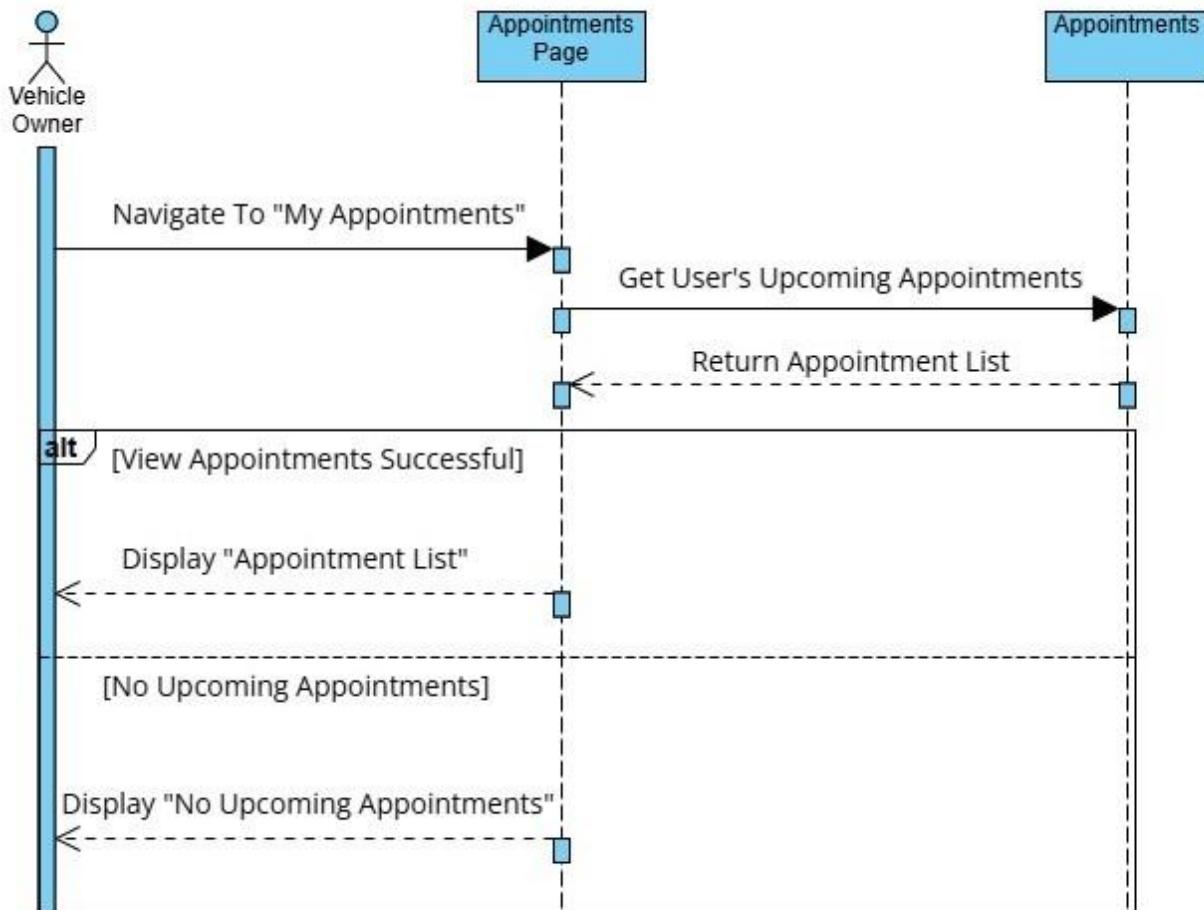
4.1.10 Add Vehicle

Shows the sequence of add vehicle and what happens when add vehicle is successful/invalid credentials or duplicate details.



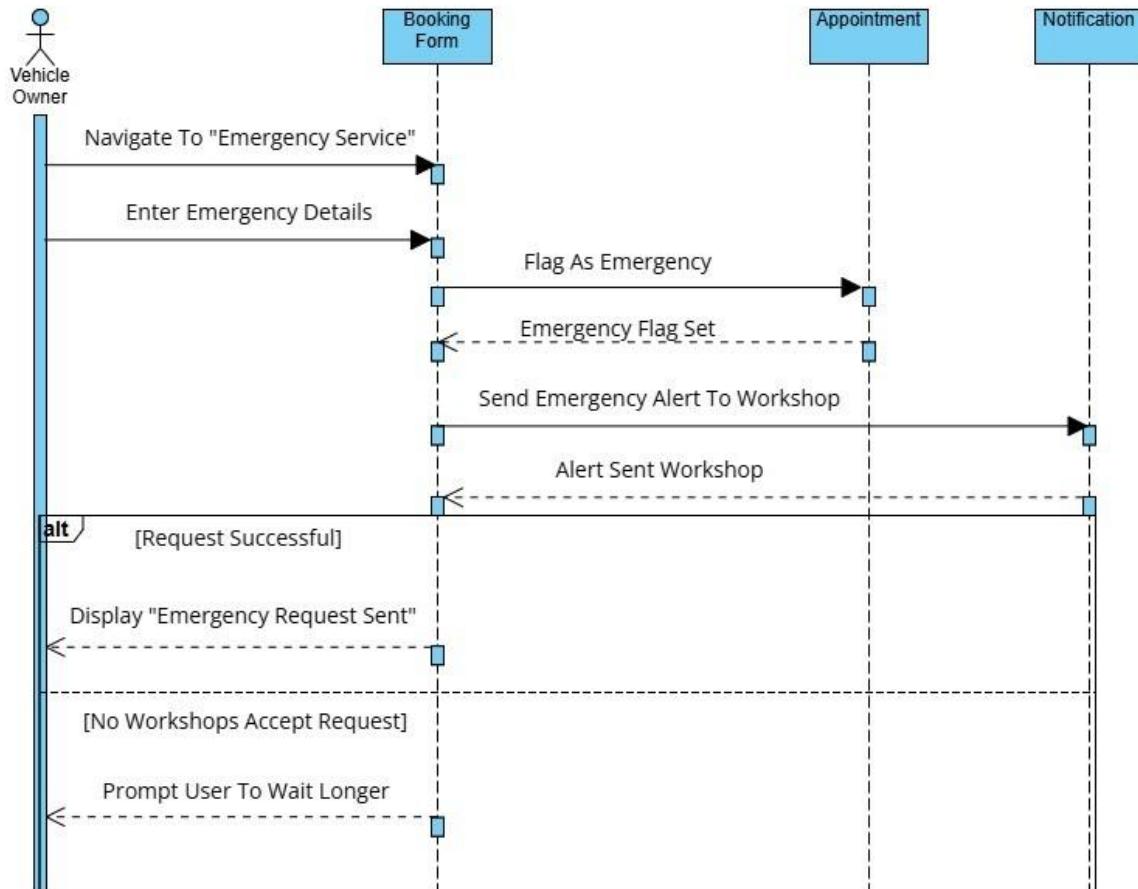
4.1.11 View My Appointments

Shows the sequence of view my appointments and what happens when viewing is successful/no upcoming appointments.



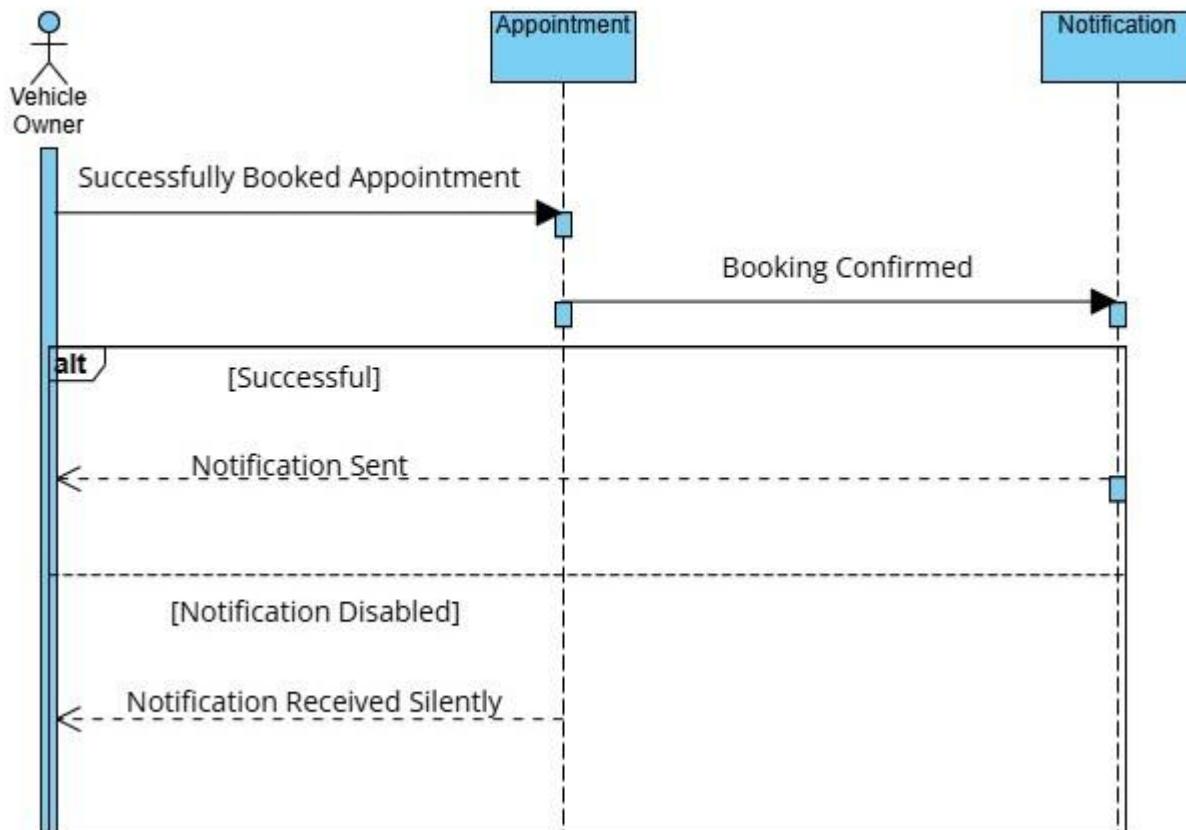
4.1.12 Request Emergency Service

Shows the sequence of request emergency service and what happens when request is successful/no workshops accept.



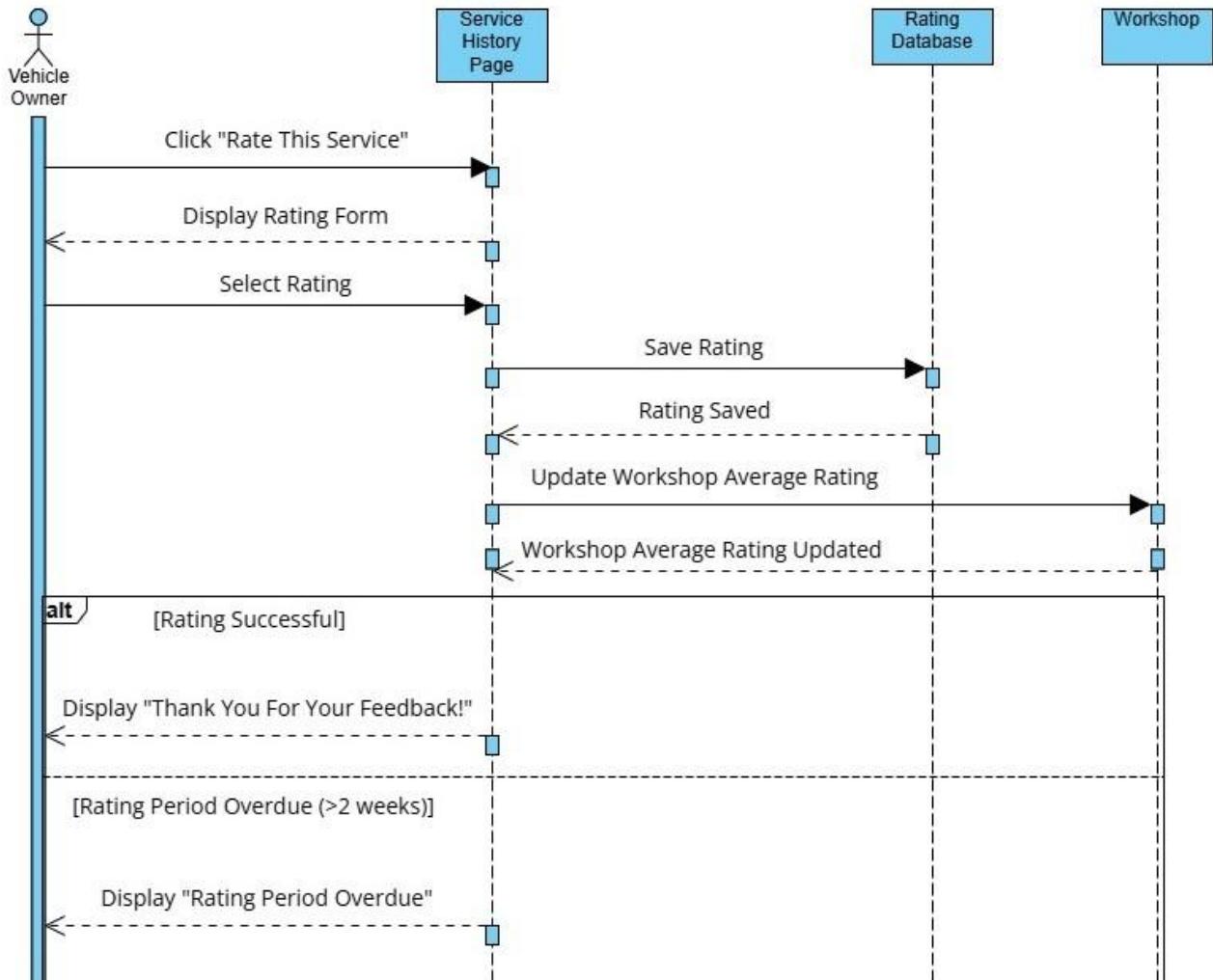
4.1.13 Receive Notification

Shows the sequence of receive notification and what happens when notification is sent/notification is disabled.



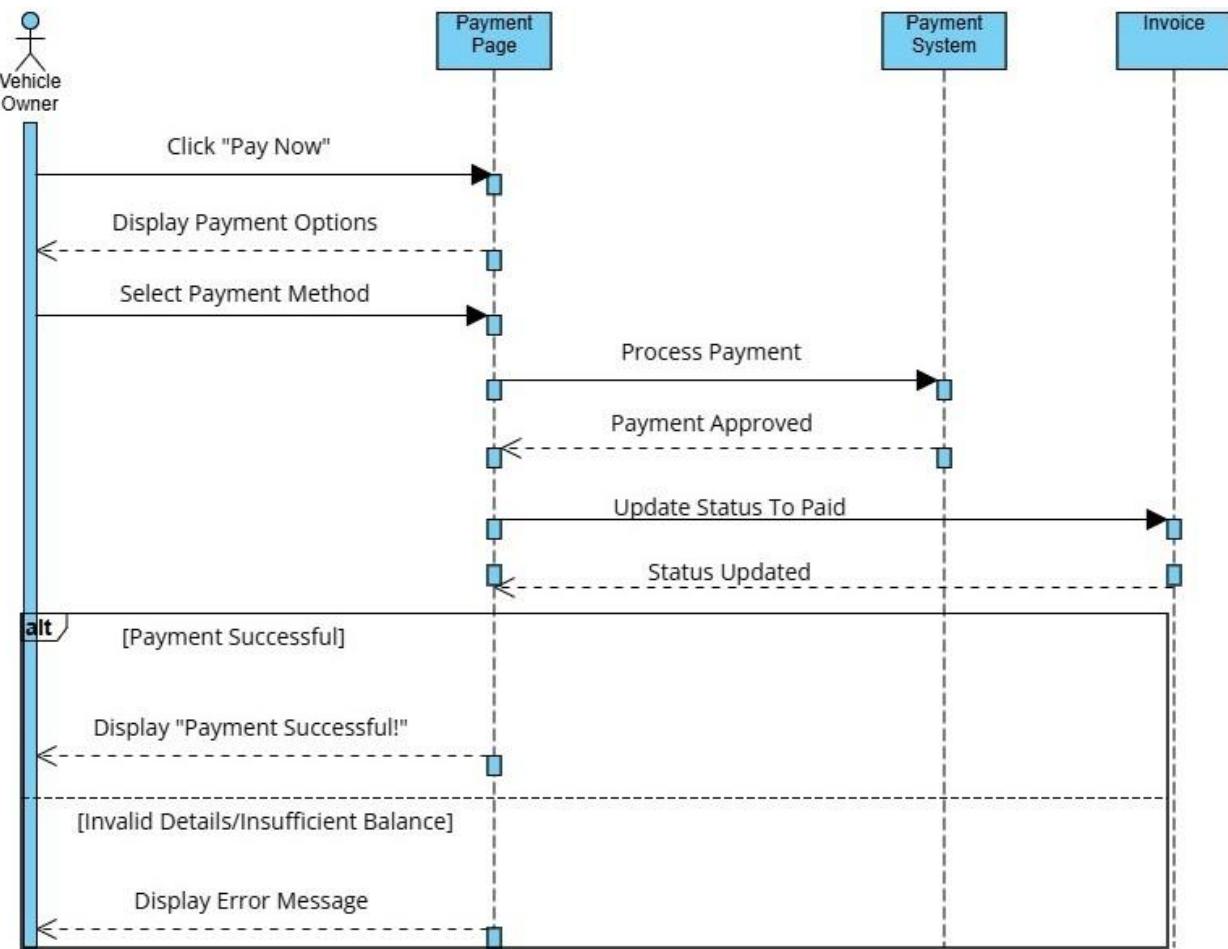
4.1.14 Rate Service Received

Shows the sequence of rating service received and what happens when rating is successful/rating failed due to period overdue.



4.1.15 Make A Payment

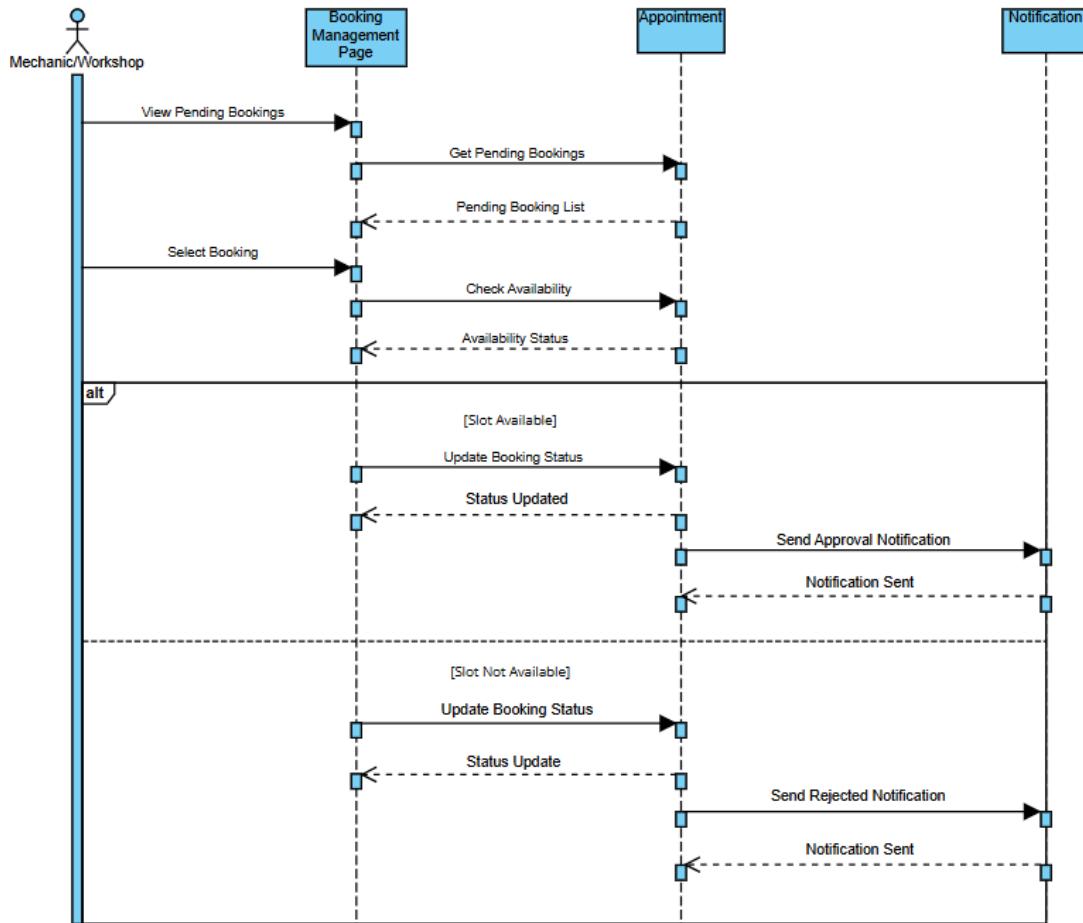
Shows the sequence of make a payment and what happens when payment is successful/insufficient balance or invalid credentials.



Mechanic/Workshop

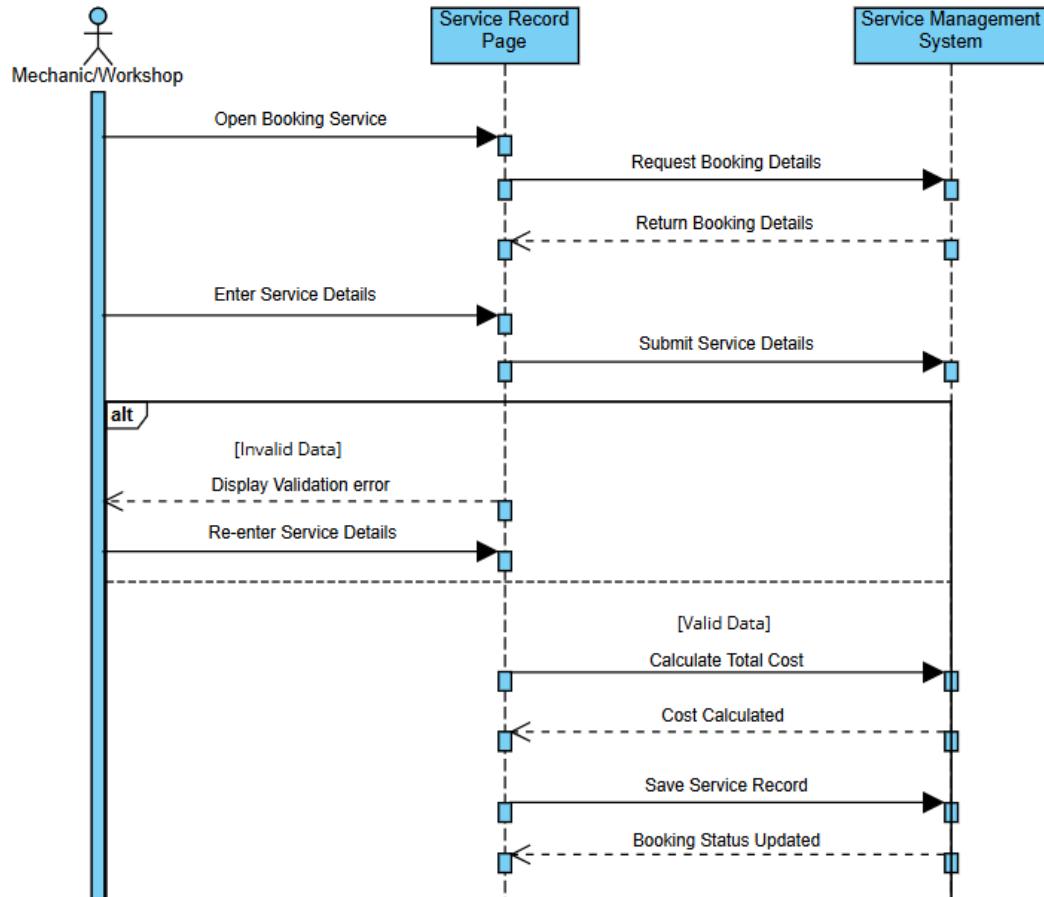
4.1.16 View & Manage Booking

Shows how the mechanic/workshop reviews a pending booking and decides to approve or reject it. If approved, the booking status is updated, and an approval notification is sent. If rejected, the booking status is updated, and a rejection notification is sent to the user.



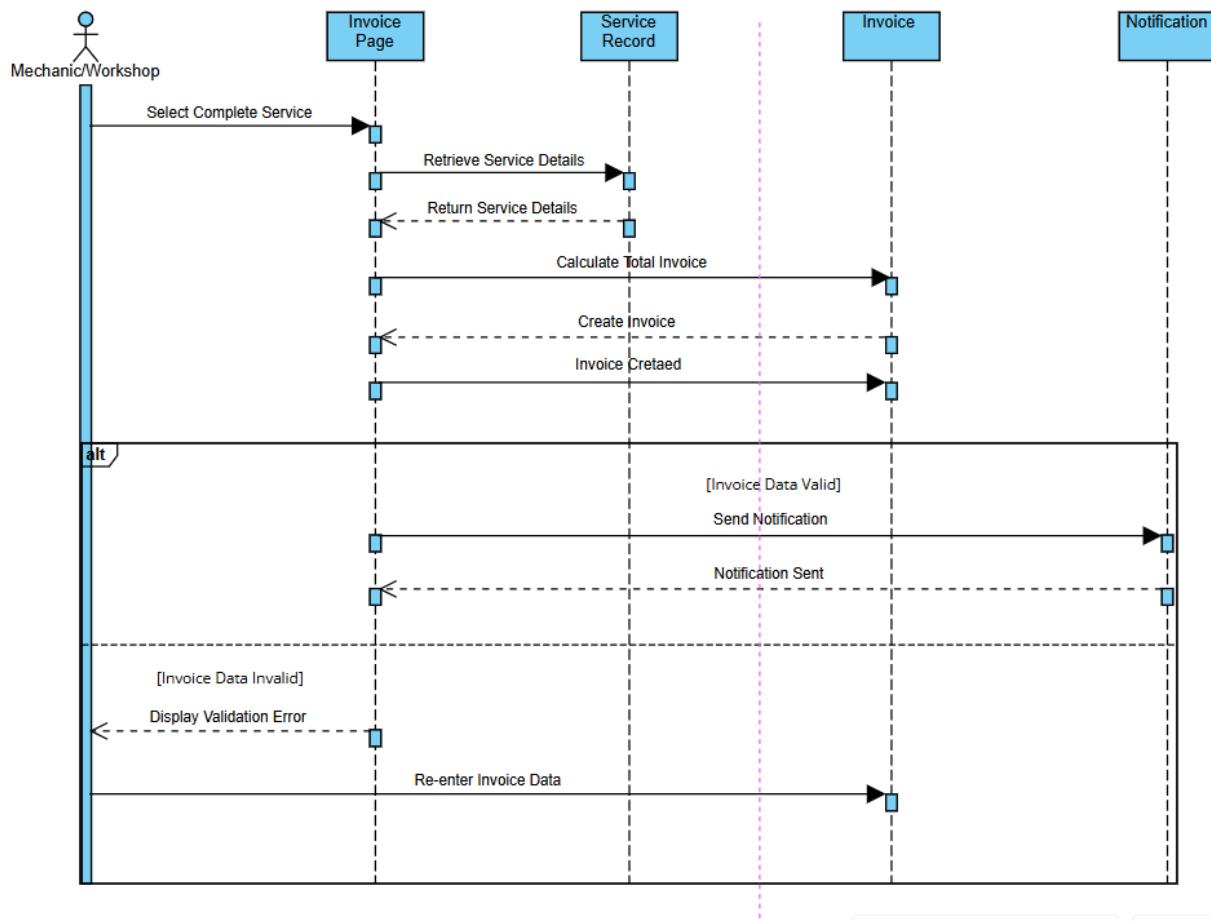
4.1.17 Record Service Details

Shows how the mechanic records service details after starting a vehicle service. The system validates the entered details, saves the service record, updates the booking status, and prepares the data for invoice generation.



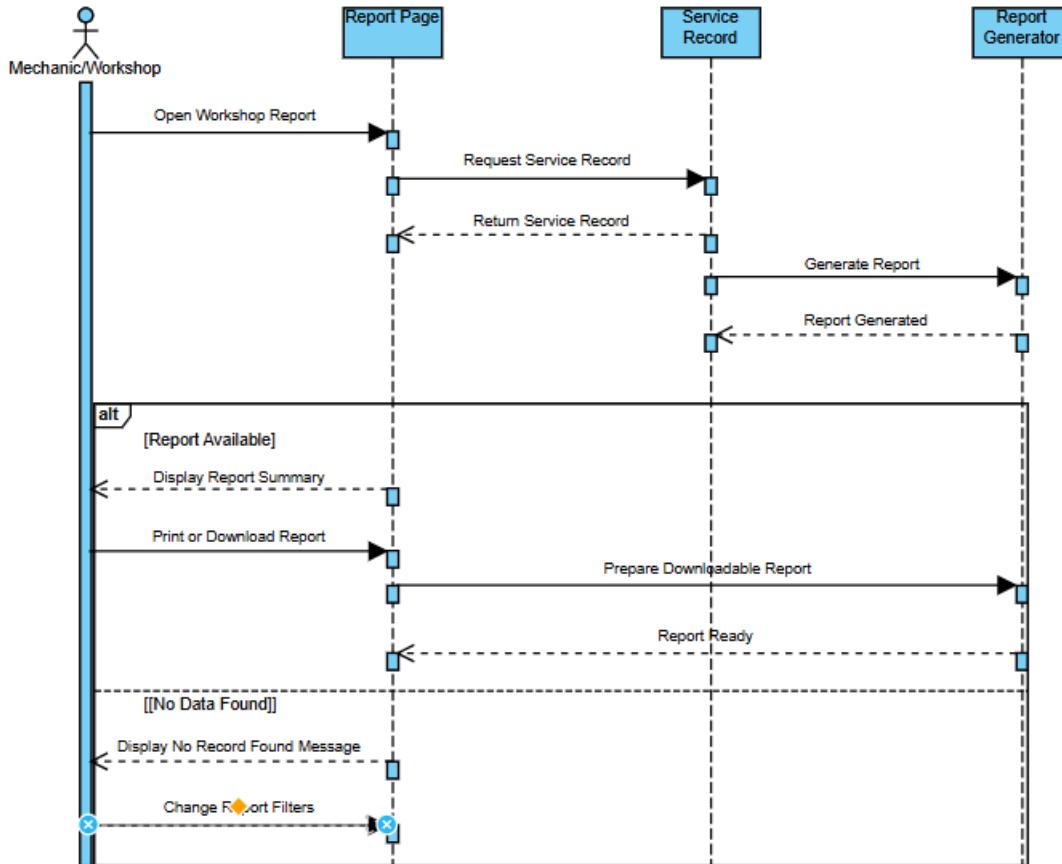
4.1.18 Generate Invoices

Shows how the mechanic records service details after starting a vehicle service. The system validates the entered details, saves the service record, updates the booking status, and prepares the data for invoice generation.



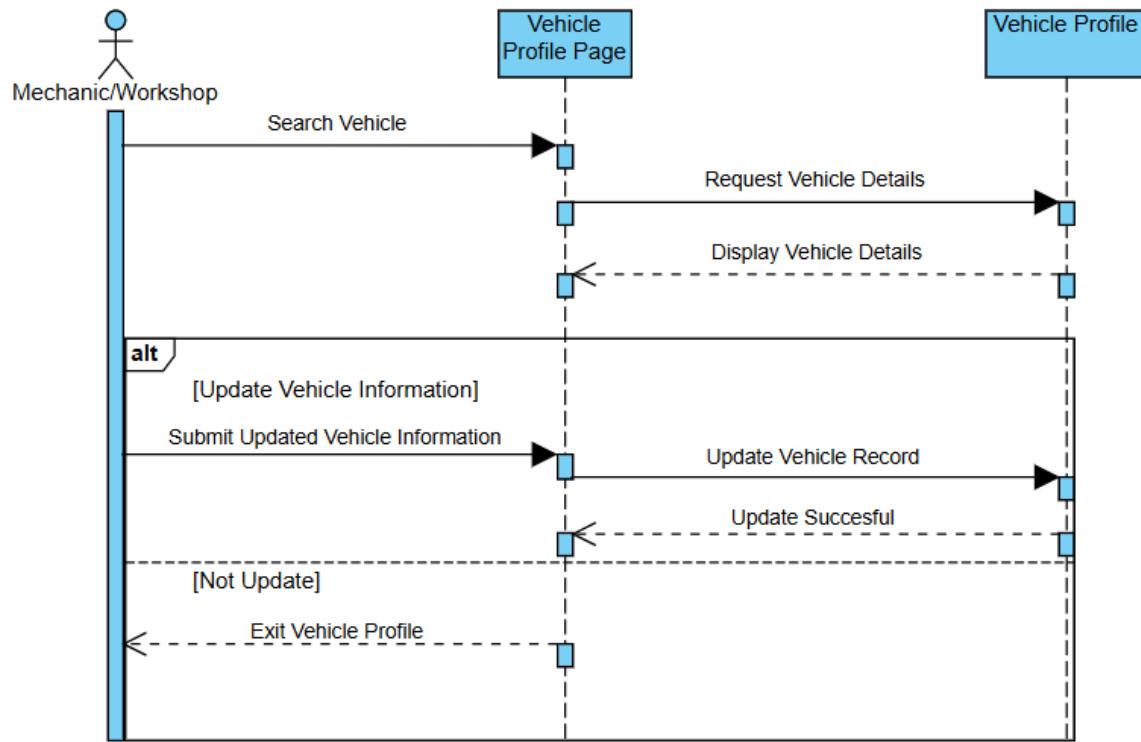
4.1.19 View Workshop Reports

Shows how the workshop requests reports, the system retrieves report data based on selected criteria and displays the generated report. The workshop may optionally download or print the report.



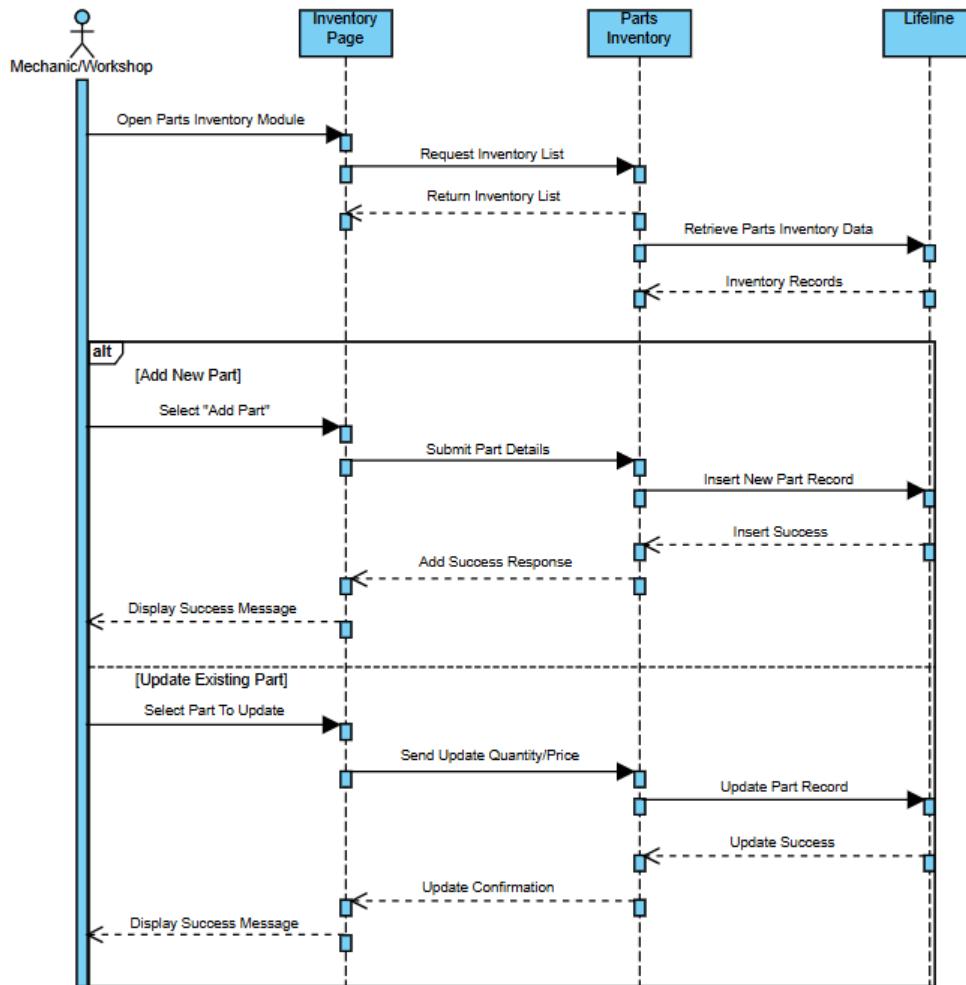
4.1.20 Manage Vehicle Profile

Shows how the workshop requests reports, the system retrieves report data based on selected criteria and displays the generated report. The workshop may optionally download or print the report.



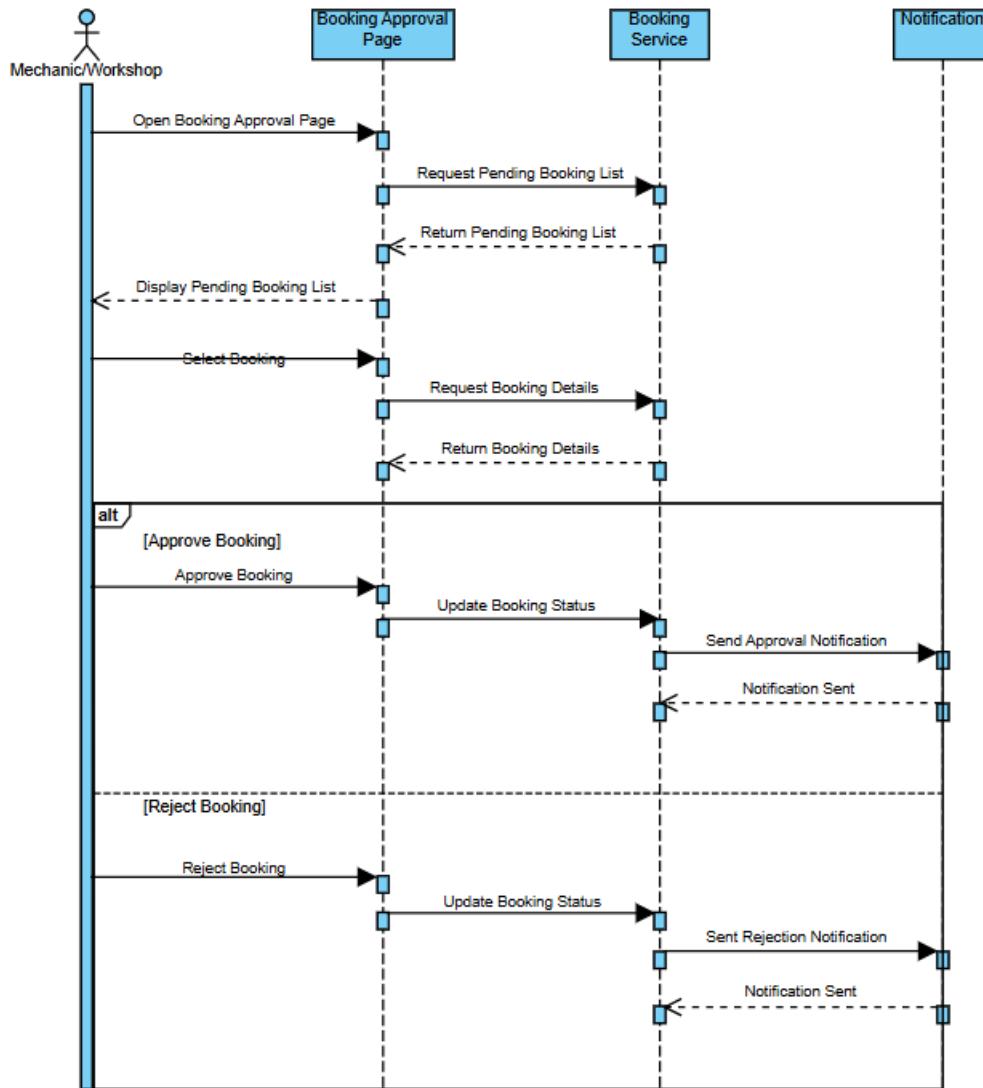
4.1.21 Manage Parts Inventory

Shows how the workshop searches for a vehicle, views its details, updates vehicle information if required, and saves the changes to the system.



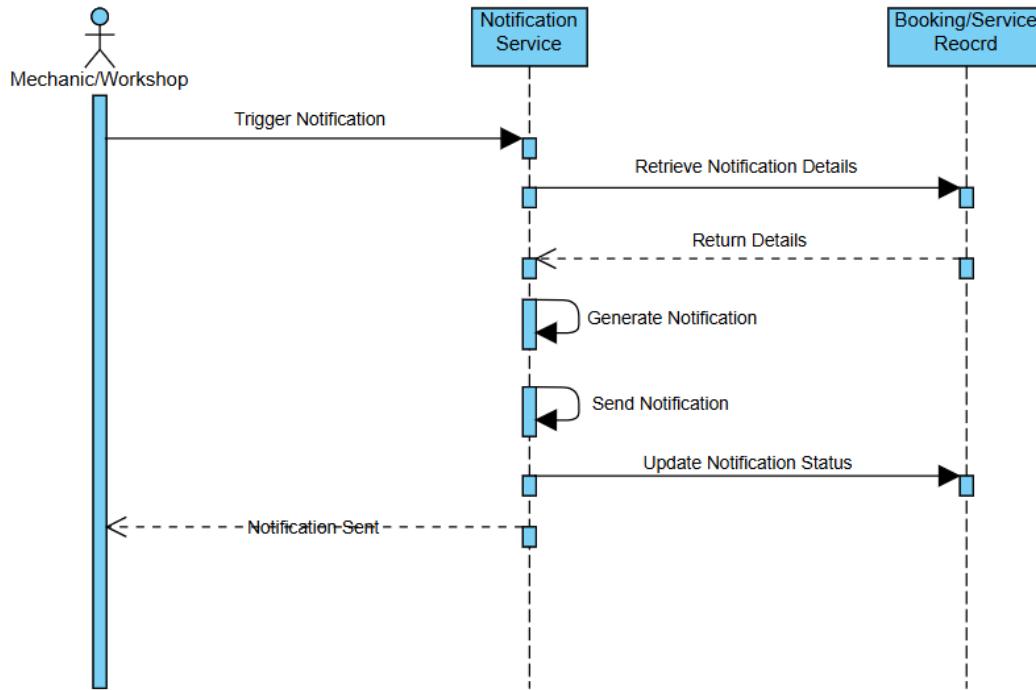
4.1.22 Approve or Reject Booking <<include>>

Shows how the workshop views the parts inventory, adds new parts or updates existing stock, and saves the inventory changes in the system.



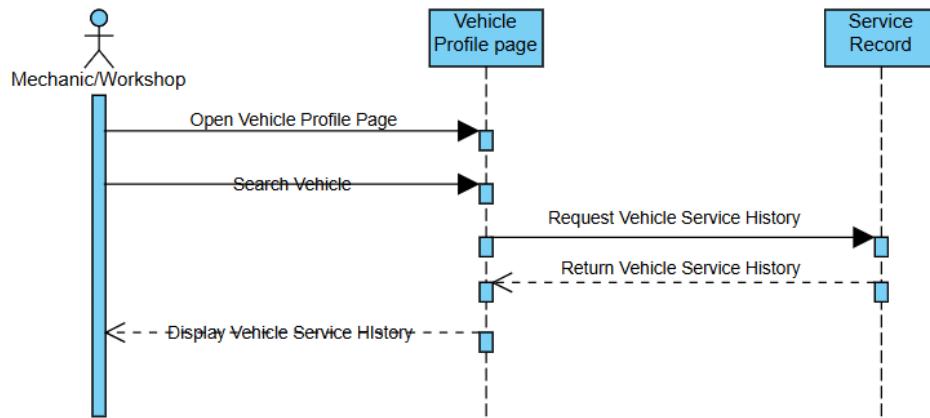
4.1.23 Send Notification <<include>>

Shows how the mechanic/workshop reviews a pending booking and decides to approve or reject it. If approved, the booking status is updated, and an approval notification is sent. If rejected, the booking status is updated, and a rejection notification is sent to the user.



4.1.24 Check Vehicle History <<extend>>

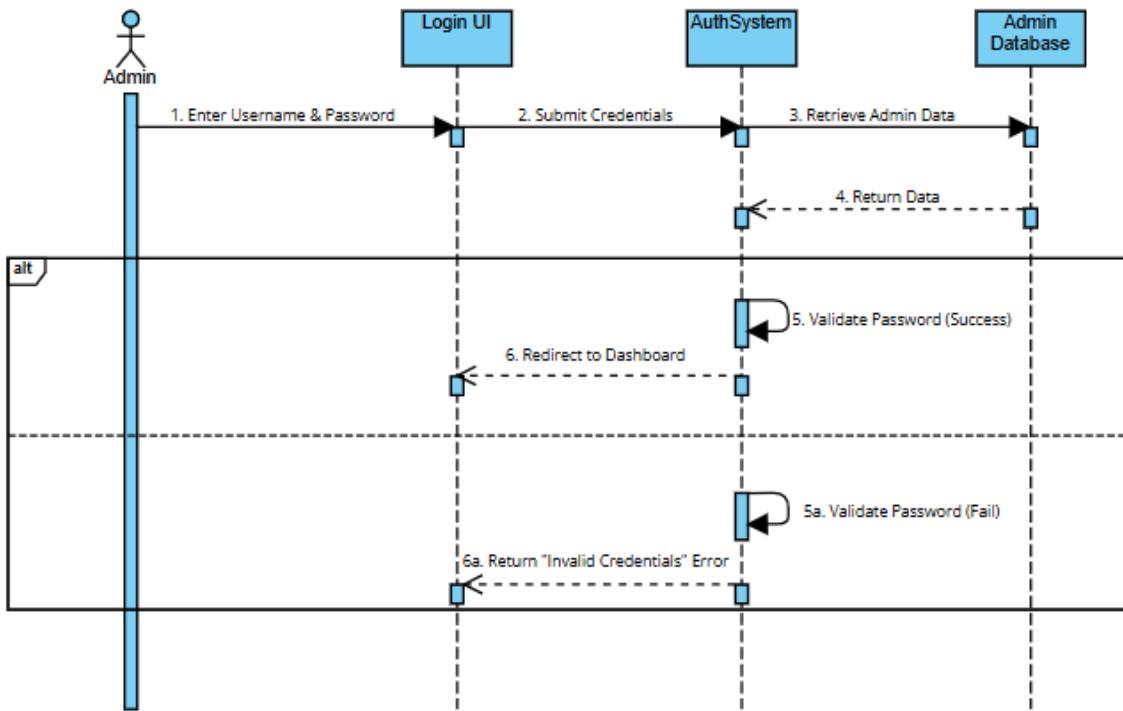
Shows how the system generates and sends notifications triggered by events such as booking approval, rejection, service completion, or invoice generation, and updates the notification status after sending.



Admin

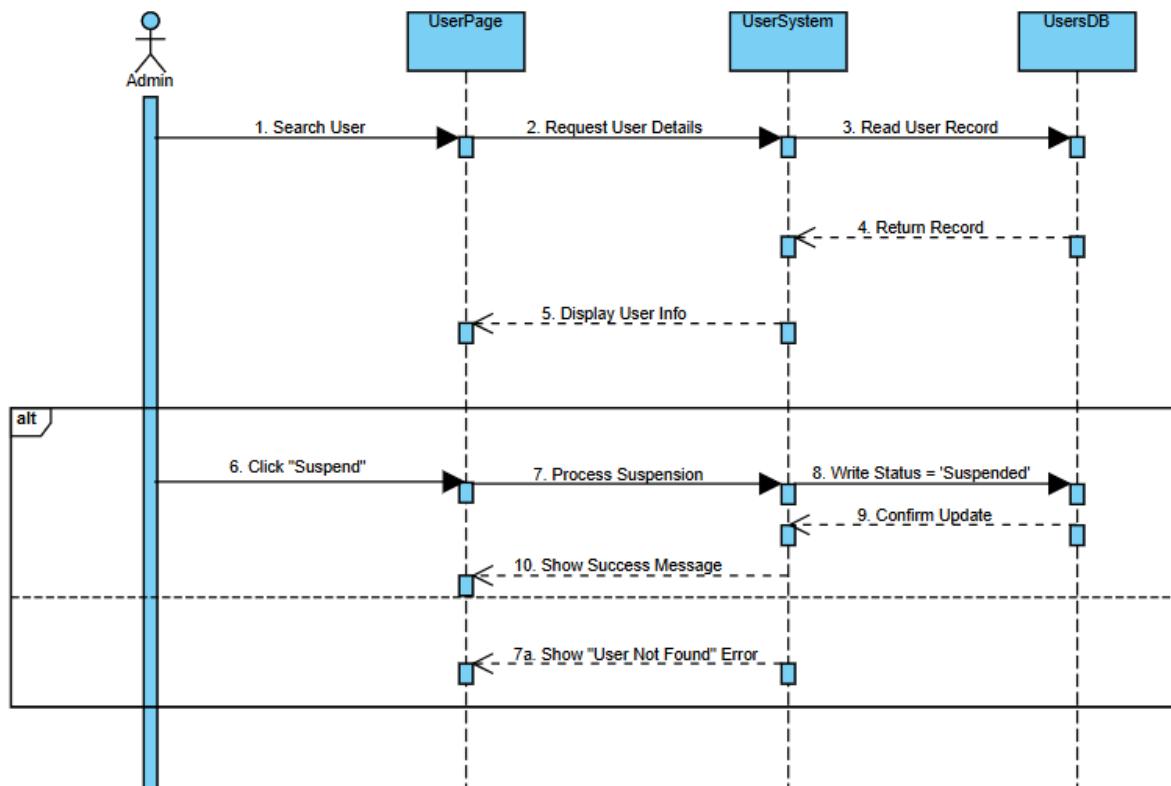
4.1.25 Login / Authenticate

Admin submits their username and password through the login interface. The system queries the admins table in the database to validate these credentials. Upon a successful match, the database returns a confirmation signal, and the system redirects the Admin to the main Dashboard.



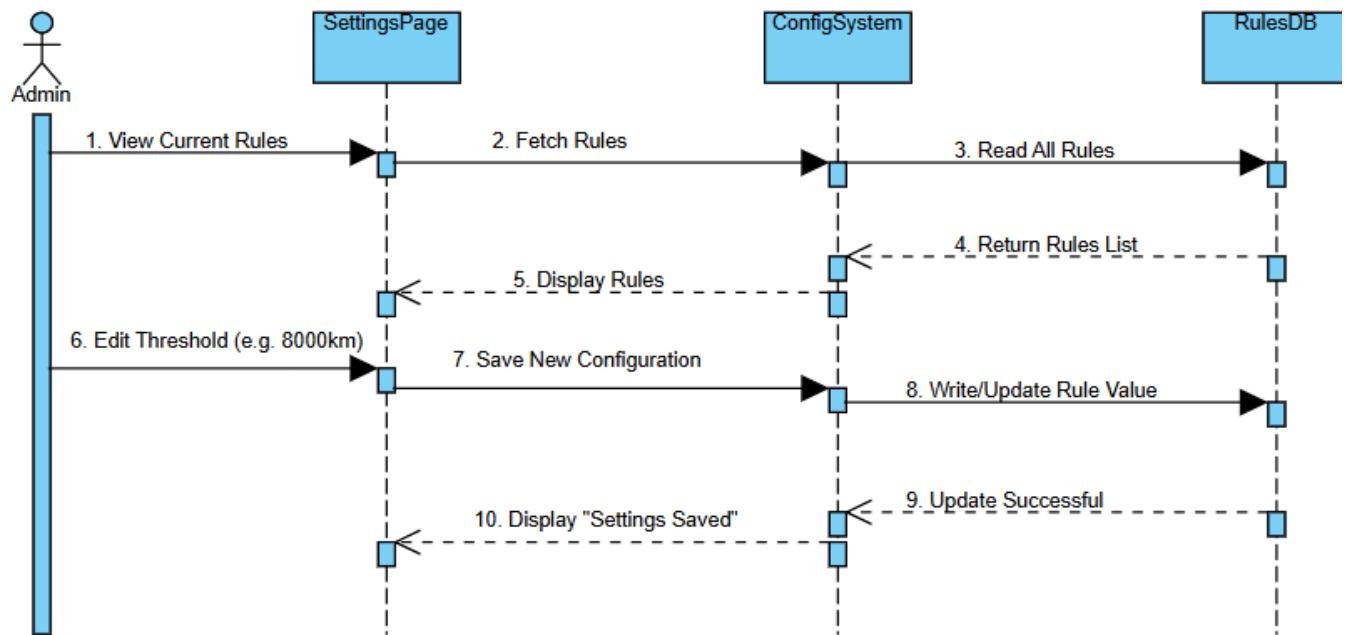
4.1.26 Manage User Accounts

The Admin selects a specific user from the management list and triggers the suspend command. The system executes an update query on the users table to change the account status from Active to Suspended. The database confirms the modification, and the user interface updates to reflect the account's restricted status.



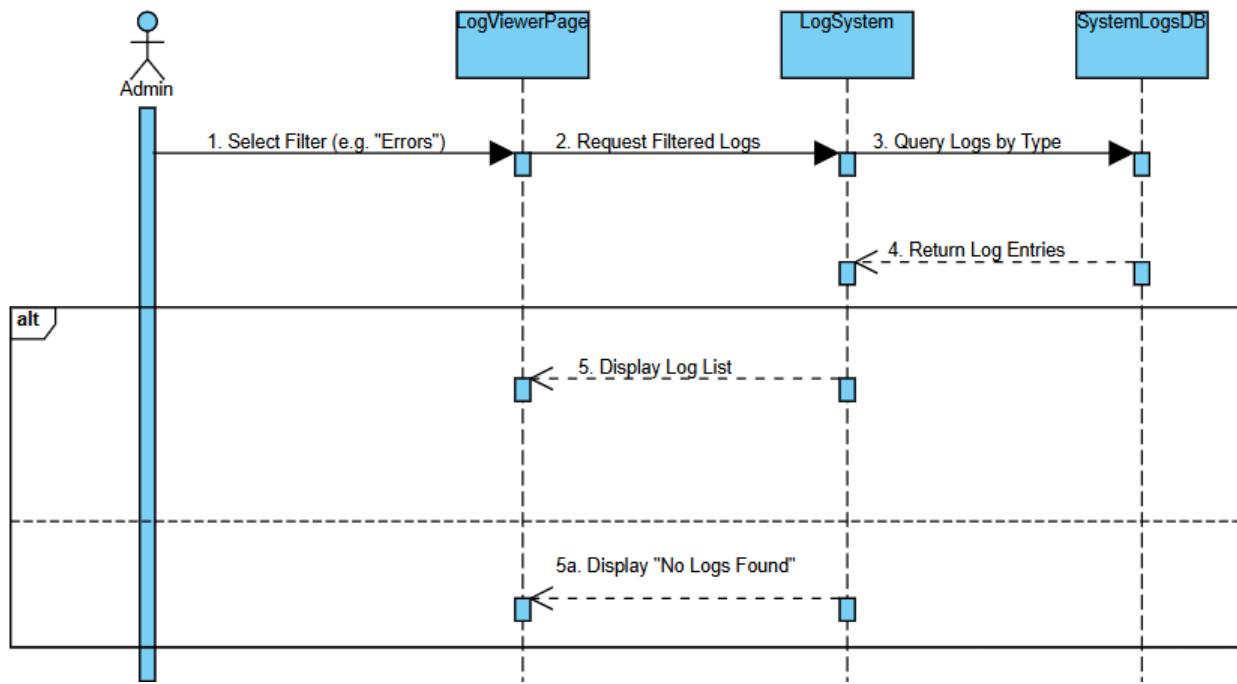
4.1.27 Configure Notification Rules

The Admin modifies a system parameter, such as the service mileage limit, through the settings panel. The system validates the input and commits the new value to the notification_rules table. Once the database confirms the update, the new rule immediately applies to all future vehicle checks.



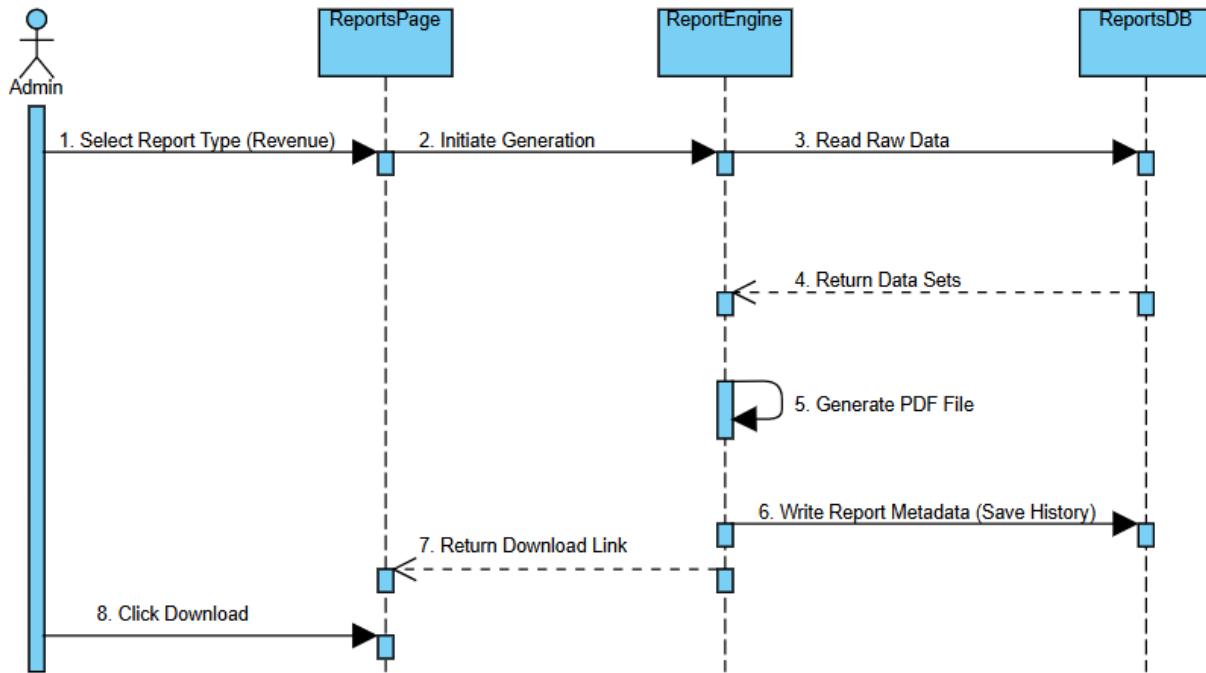
4.1.28 View System Logs

The Admin accesses the logs module to review system health. The interface requests the latest error and event records from the system_logs table. The database returns the requested entries, which are then displayed to the Admin for analysis and troubleshooting.



4.1.29 Generate System Reports

The Admin requests a specific report type, prompting the system to fetch historical data from the database. The system compiles this data into a PDF document and records the file path in the system_reports table for future access.

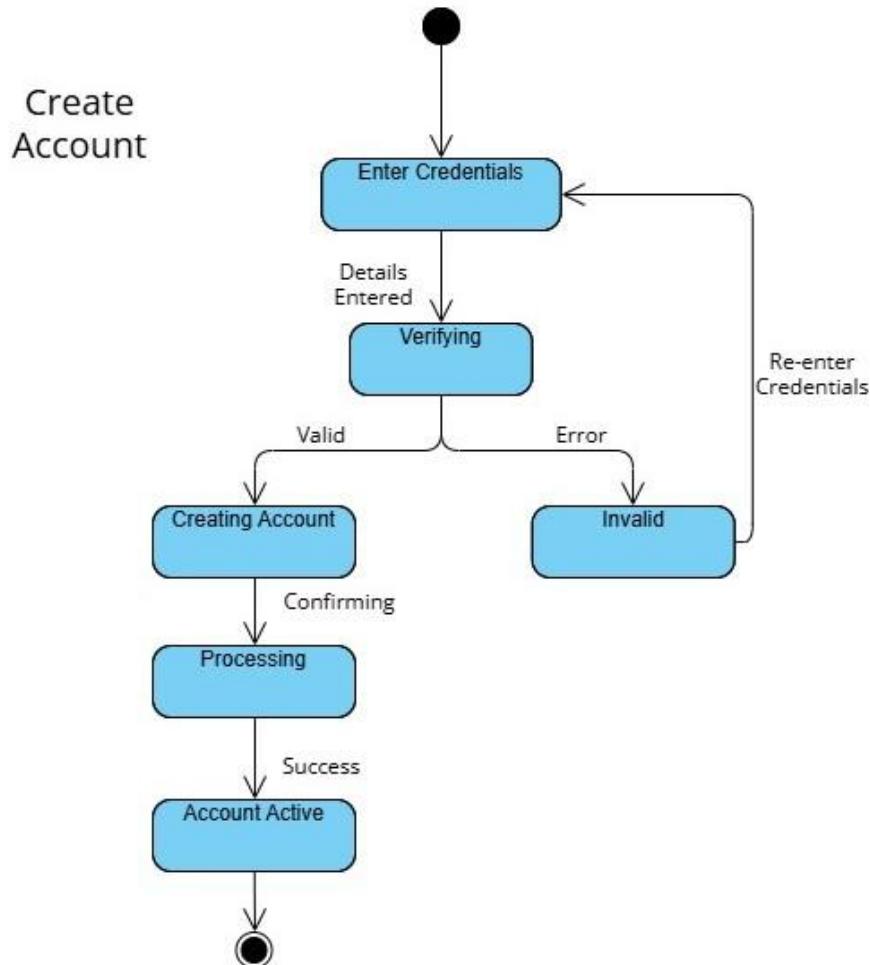


4.2 State Diagram

Vehicle Owner

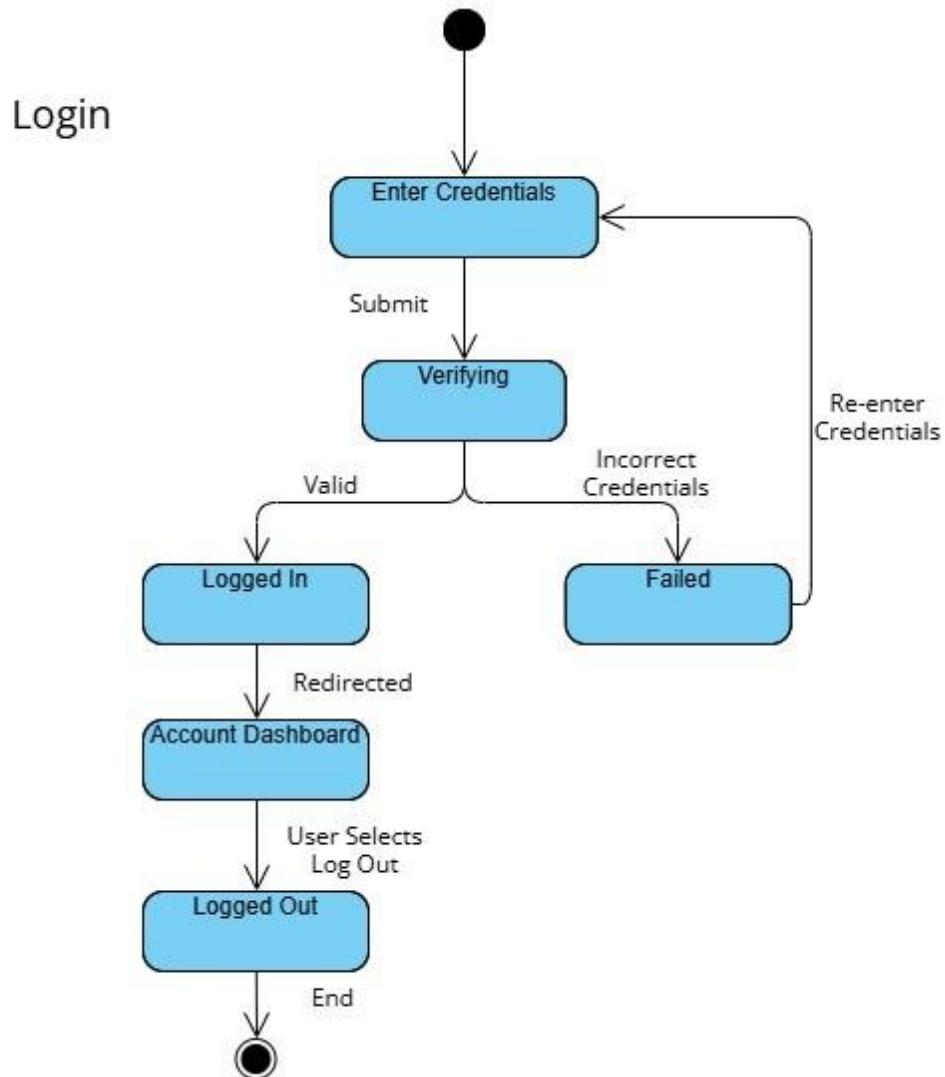
4.2.1 Create Account

Starts at the initial state (Enter Credentials), ends after the final state (account active) and shows the remaining states of create account and what happens at an invalid state.



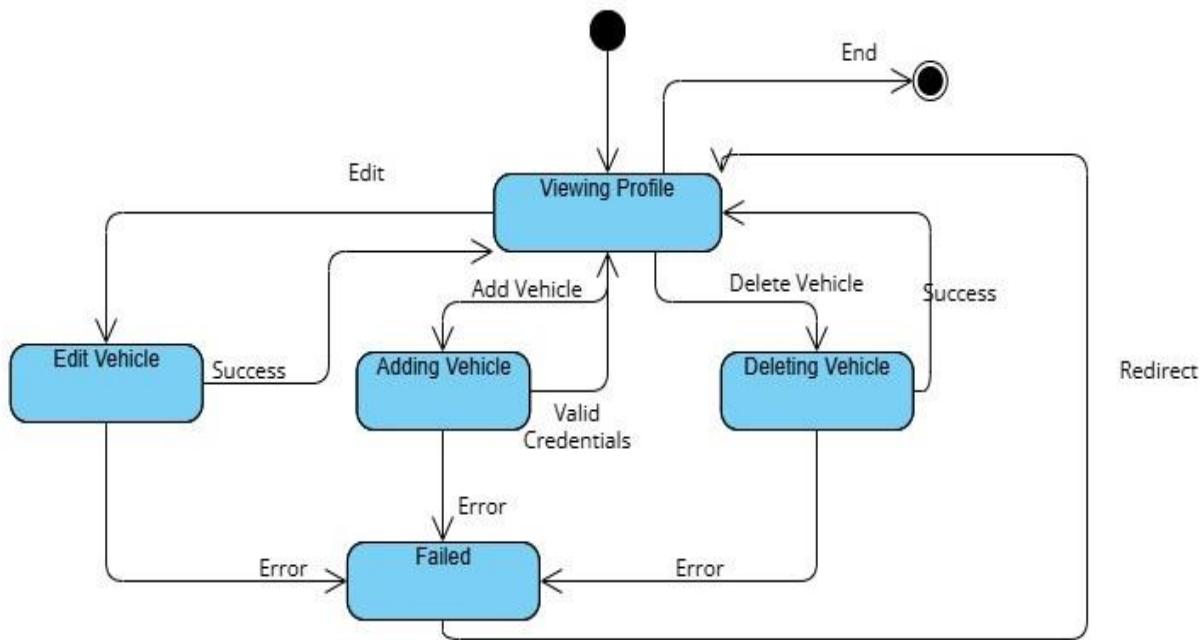
4.2.2 Login To Account

Starts at the initial state (Entering Credentials), ends after the final state (logged out) and shows the remaining states of login to account and what happens at a failed state.



4.2.3 Manage Vehicle Profile

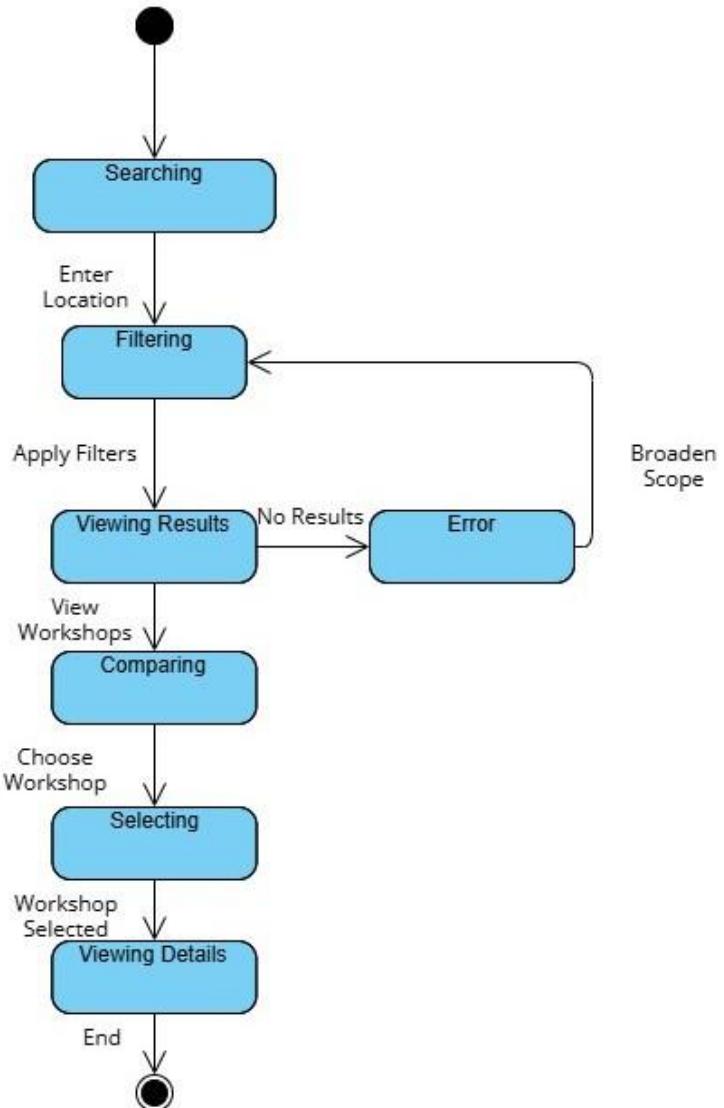
Starts the initial state (viewing), ends at the final state (viewing) and shows the remaining states of manage vehicle profile and what happens at a failed state.



4.2.4 Search & Select Workshop

Starts at the initial state (searching), ends at the final state (viewing) and shows the remaining states of search and select workshop and what happens at an error state

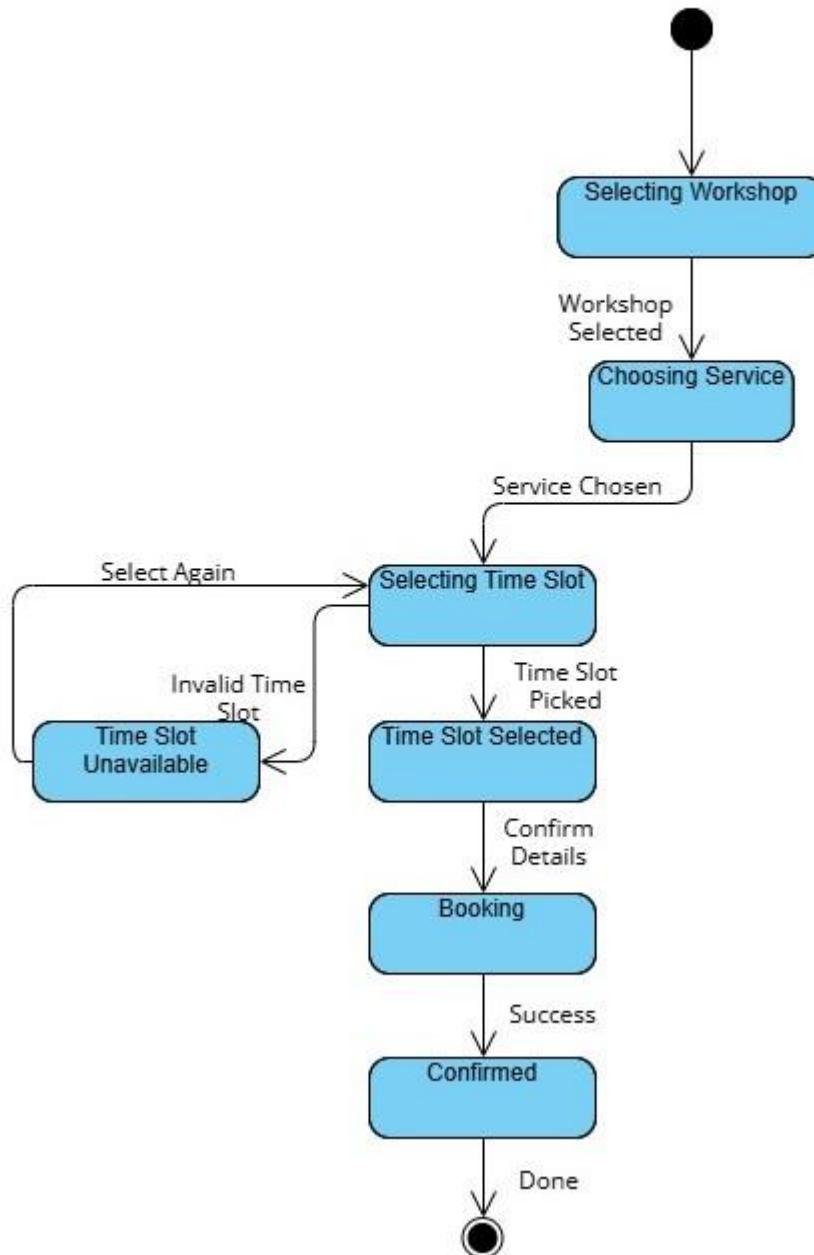
Search & Select Workshop



4.2.5 Book Appointment

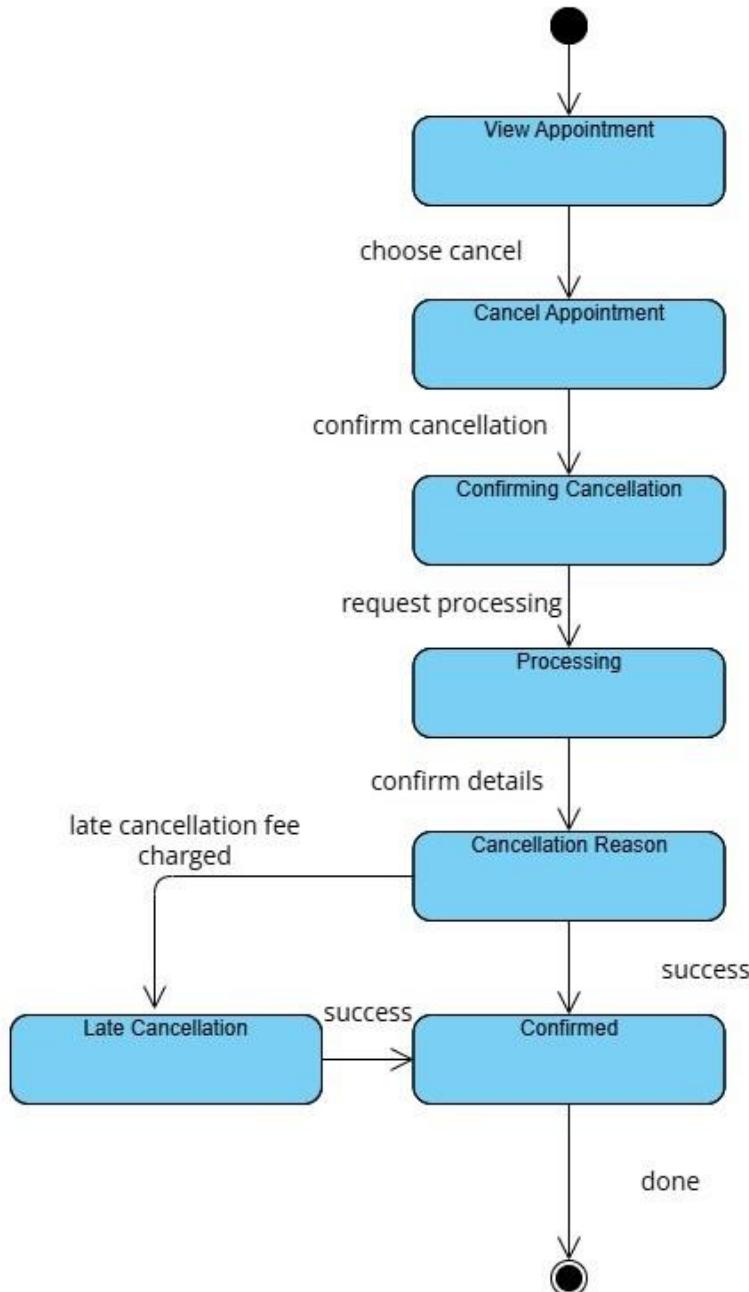
Starts at the initial state (selection), ends after the final state (confirmed) and shows the remaining states of book appointment and what happens at state where time slot is unavailable.

Book Appointment



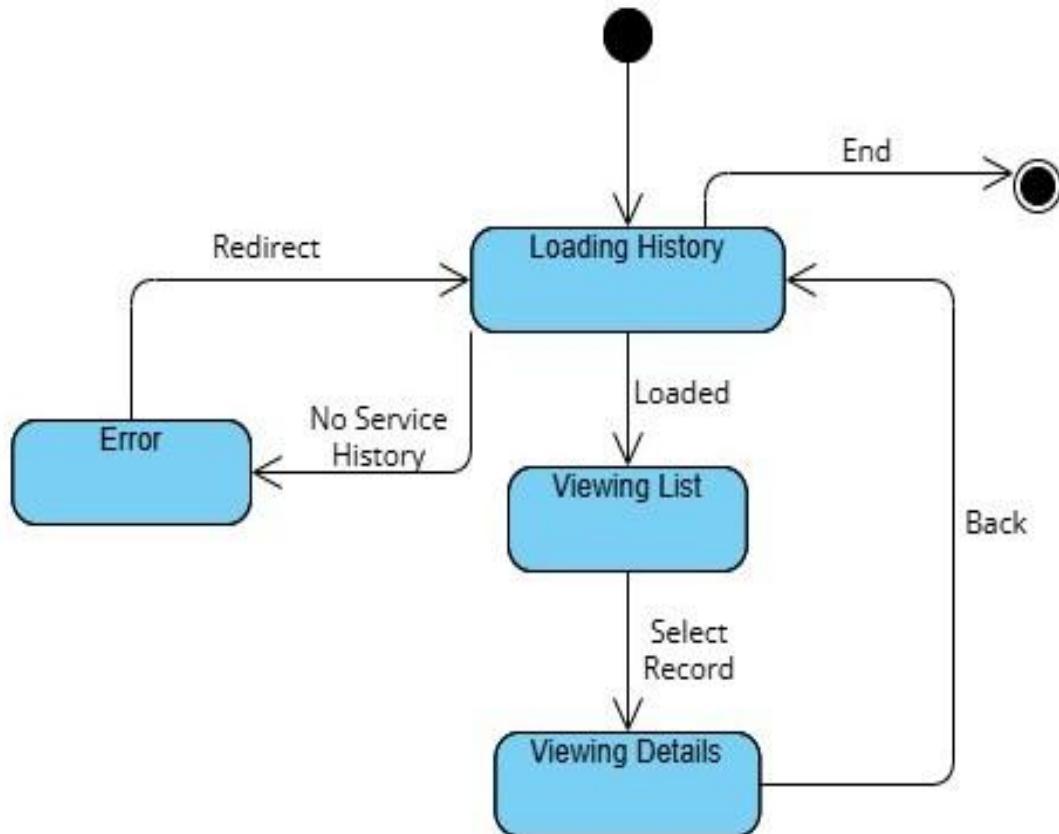
4.2.6 Cancel Appointment

Starts at the initial state (viewing), ends after the final state (confirmed) and shows the remaining states of cancel appointment and what happens at a late cancellation state



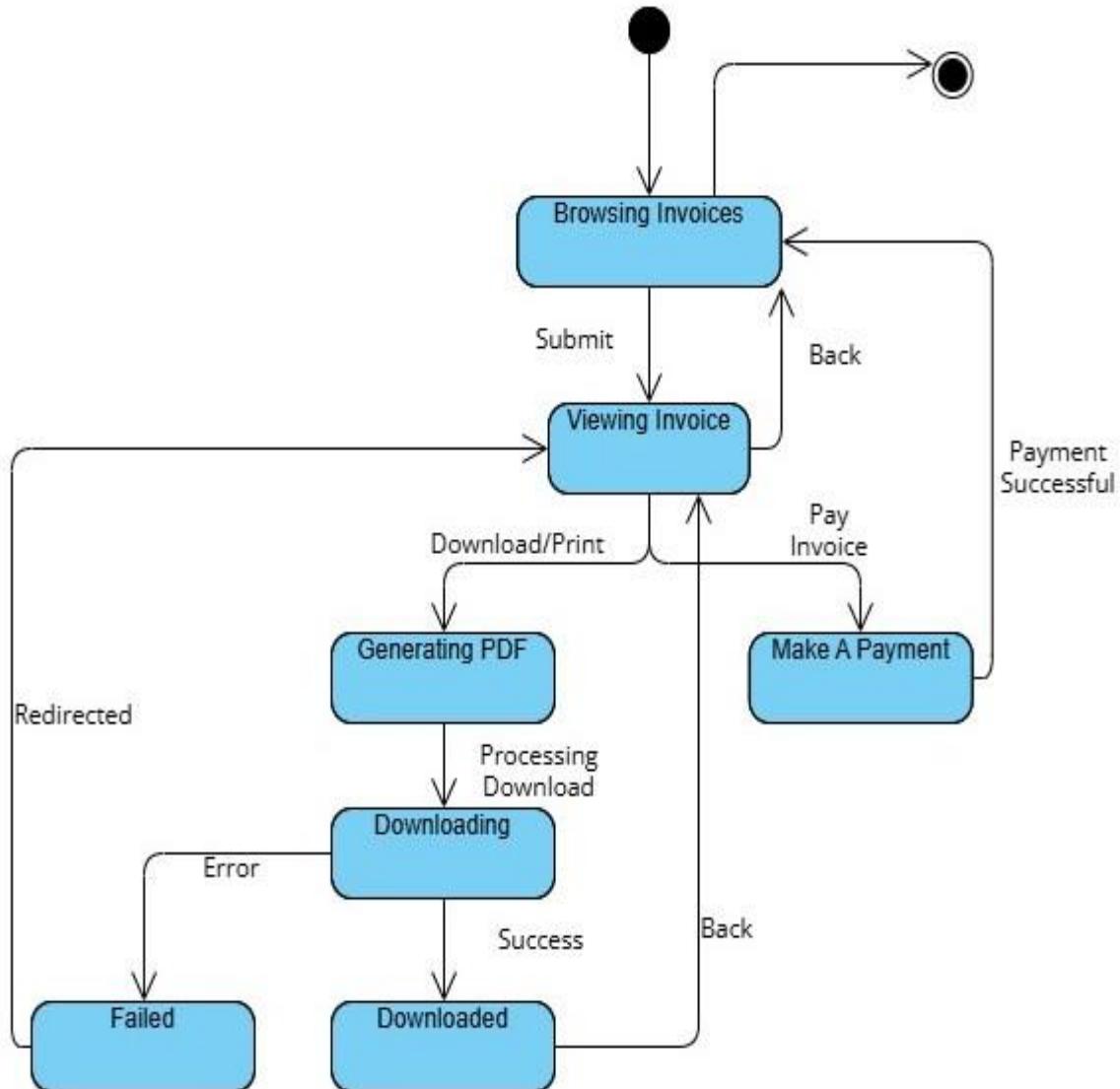
4.2.7 View Service History

Starts at the initial state (loading), ends after the final state (loading) and shows the remaining states of view service history and what happens at an error state.



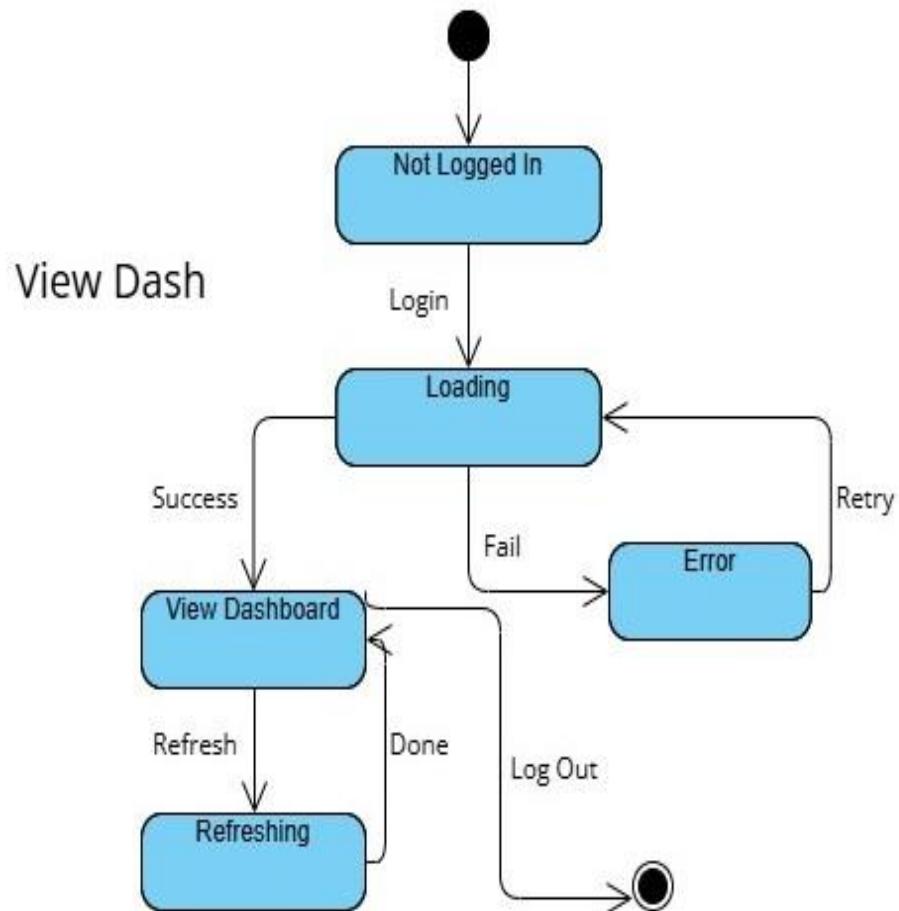
4.2.8 View & Download Invoices

Starts at the initial state (browsing), ends at the final state (browsing) and shows the remaining states of view & download invoices and what happens at a failed state.



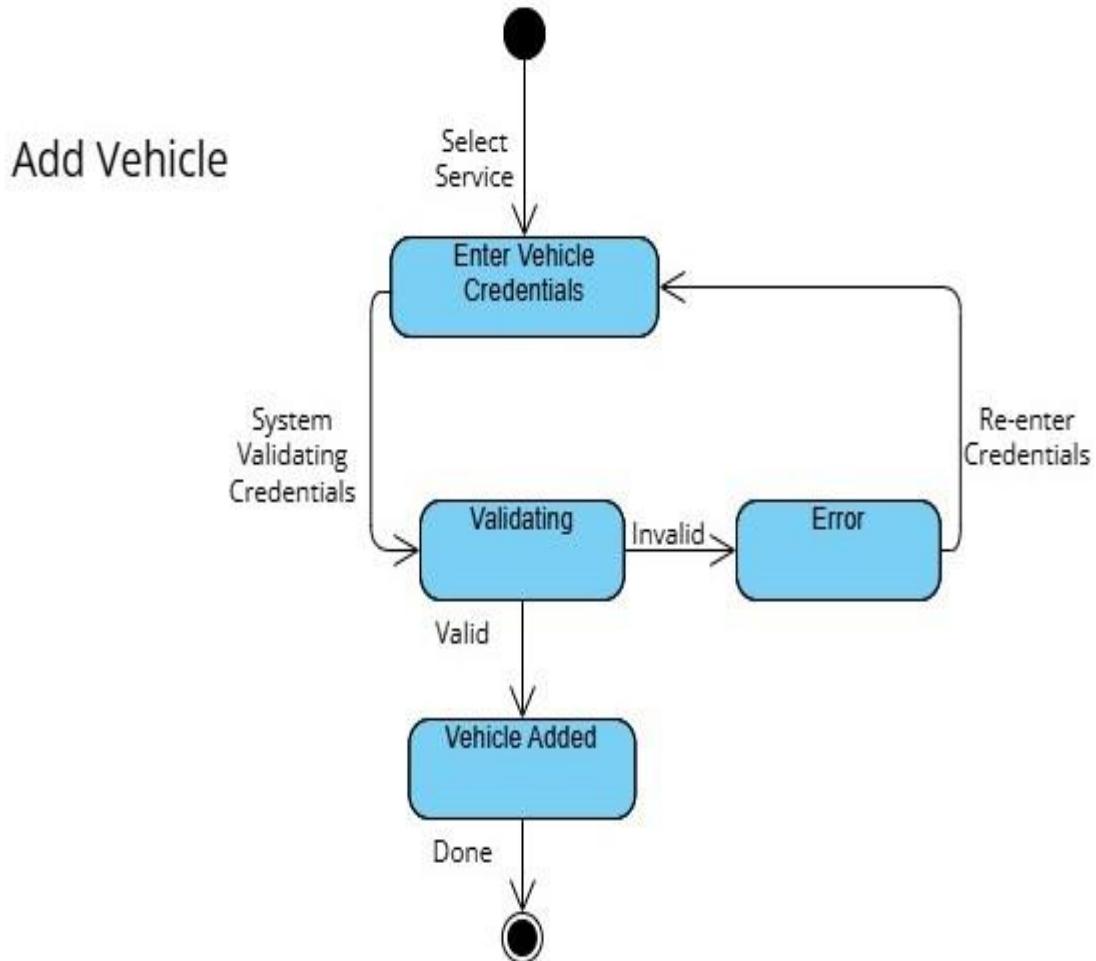
4.2.9 View Account Dashboard <<include>>

Shows the initial state, final state and remaining states of view account dashboard and what happens at an error state.



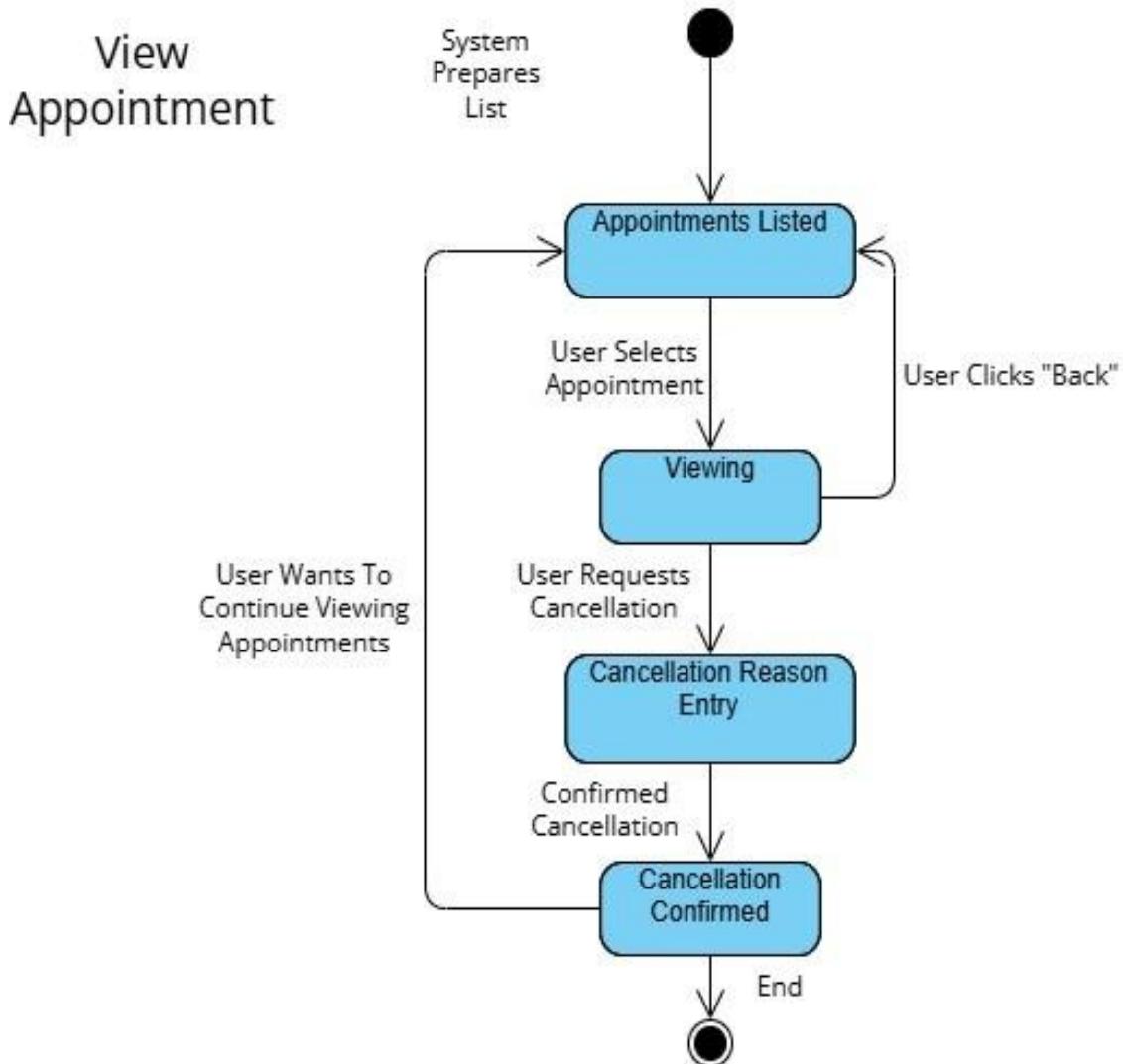
4.2.10 Add Vehicle <<include>>

Starts at the initial state (input credentials), ends after the final state (vehicle added) and shows the remaining states of add vehicle and what happens at an error state.



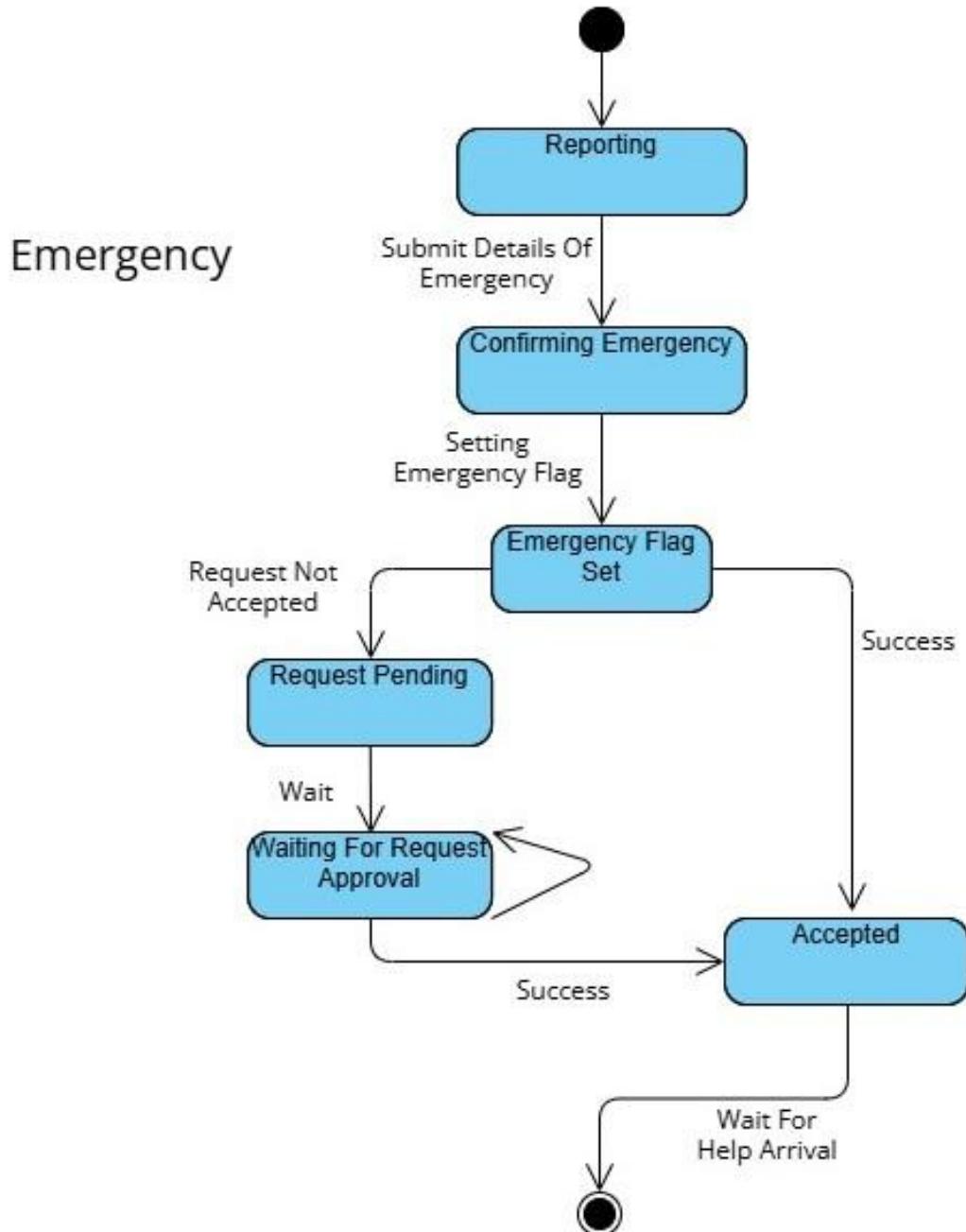
4.2.11 View My Appointments <<include>>

Starts at the initial state (listing), ends after the final state (cancellation confirmed) and shows the remaining states of view my appointments and what happens when user clicks cancel.



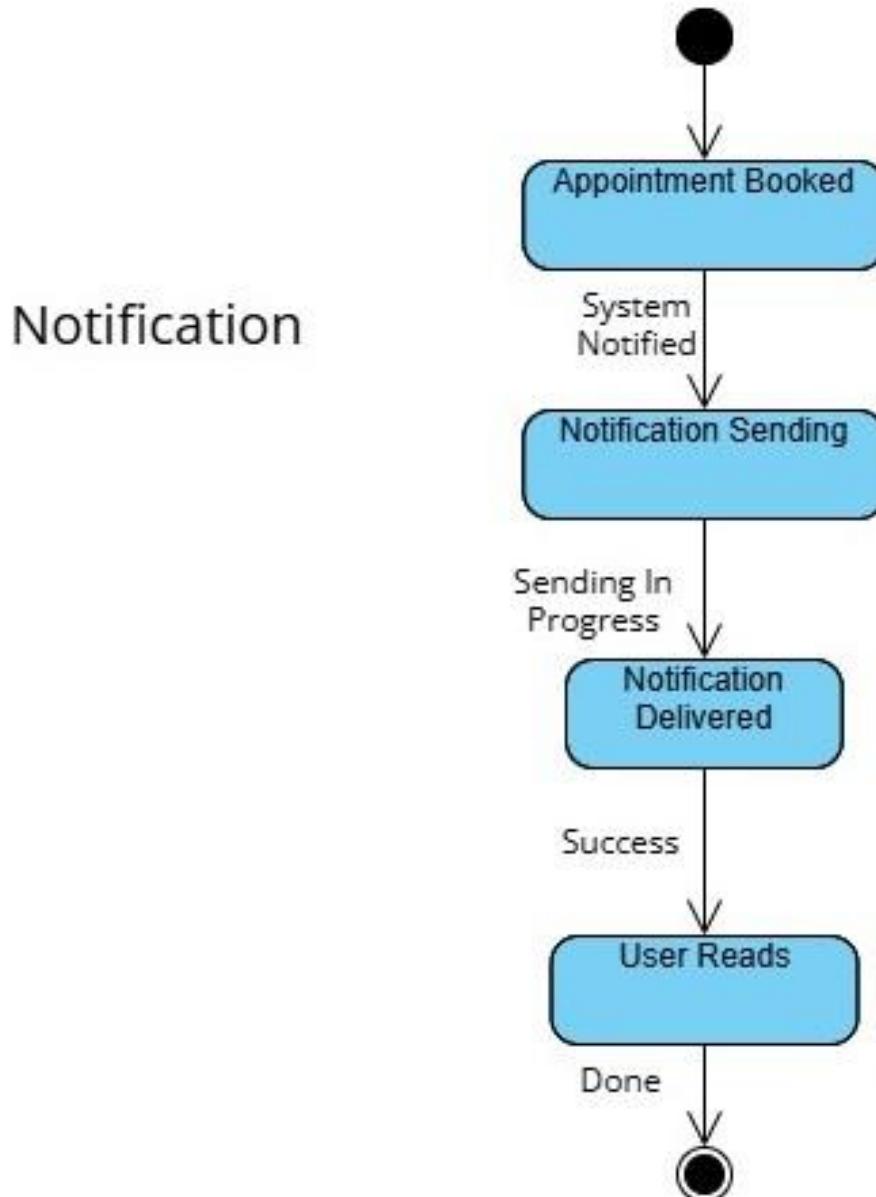
4.2.12 Request Emergency Service <<extend>>

Starts at the initial state (reporting), ends after the final state (accepted) and shows the remaining states of request emergency service and what happens at the request pending state.



4.2.13 Receive Notification <>extend>>

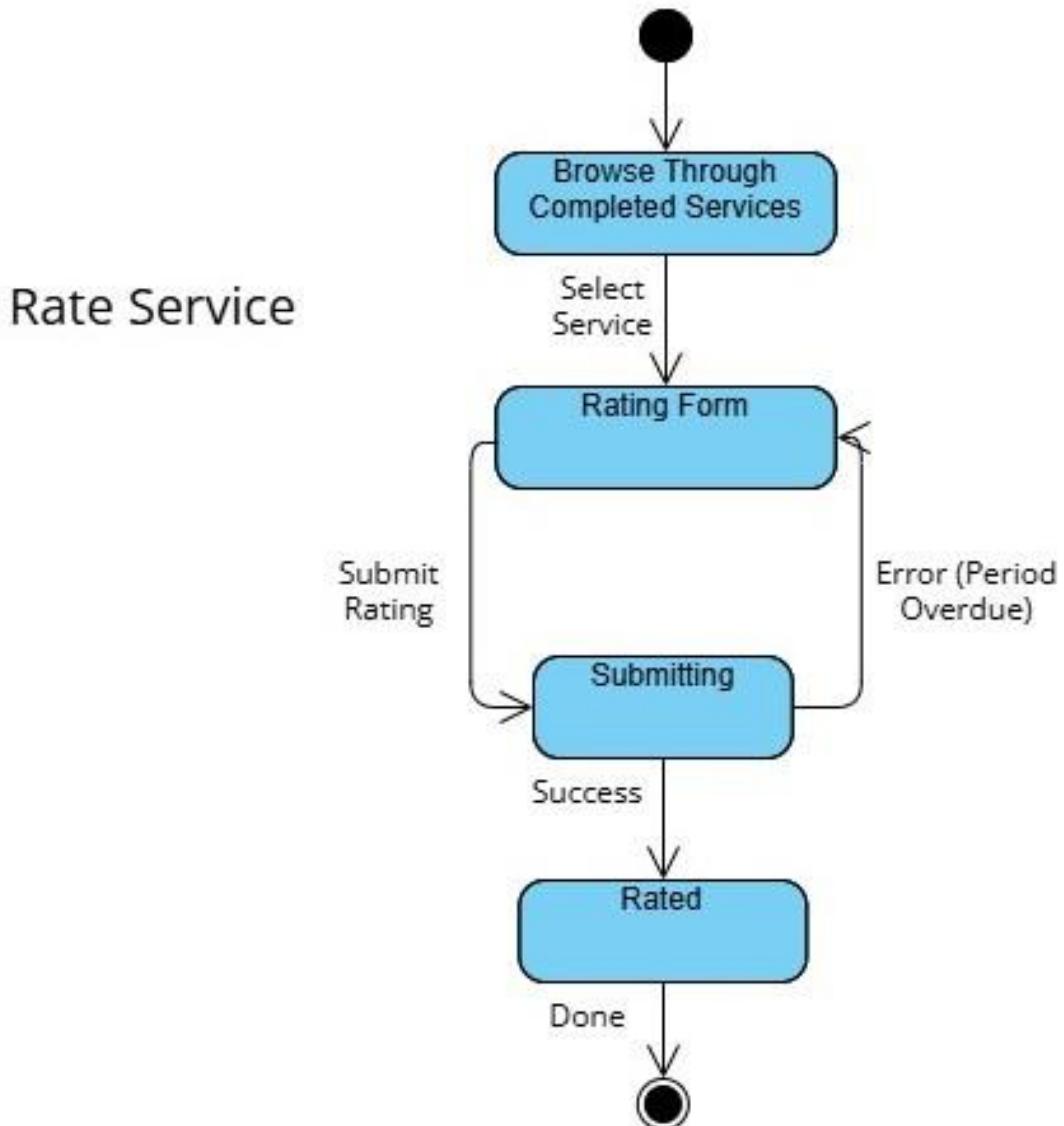
Starts at the initial (booking), ends after the final state (read) and shows remaining states of receive notification.



Notification

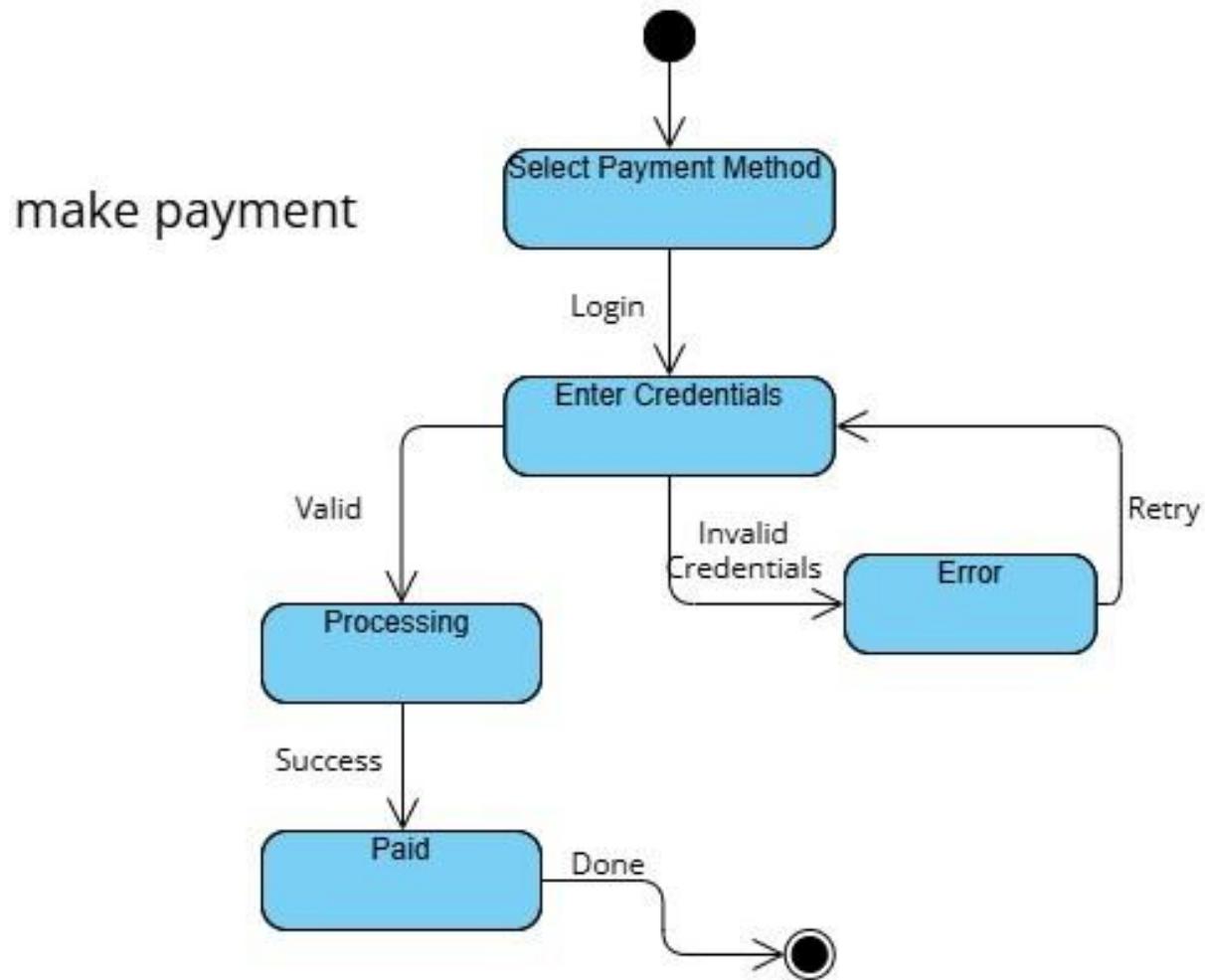
4.2.14 Rate Service Received <<extend>>

Starts at the initial state (browsing), ends after the final state (rated) and shows the remaining states of rate service received.



4.2.15 Make A Payment <<extend>>

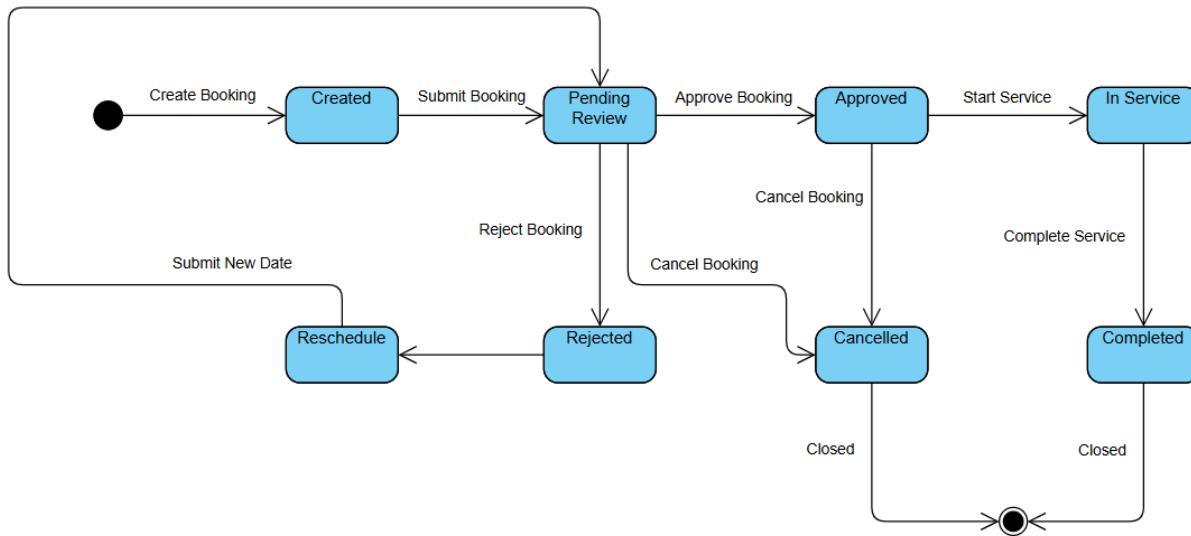
Starts at the initial state (payment method), ends after the final state (paid) and shows the remaining states of make payment and what happens at an error state.



Mechanic/Workshop

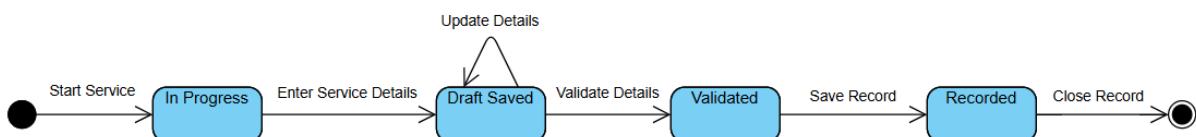
4.2.16 View & Manage Booking

Shows the initial state, final state, and remaining states of managing service bookings and what happens at the pending approval state where the workshop can approve or reject a booking request.



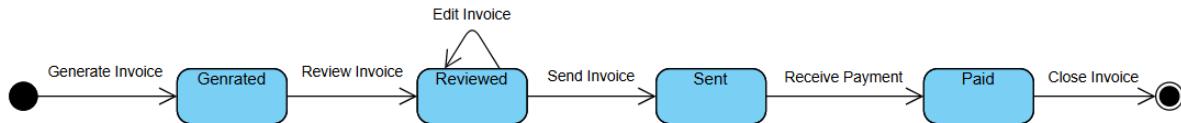
4.2.17 Record Service Details

Shows the initial state, final state, and remaining states of recording service details and what happens at the service in progress state when the mechanic enters and saves service information.



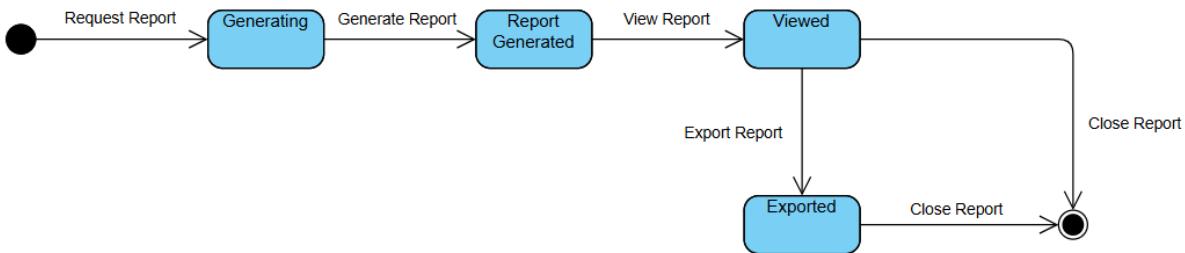
4.2.18 Generate Invoices

Shows the initial state, final state, and remaining states of recording service details and what happens at the service in progress state when the mechanic enters and saves service information.



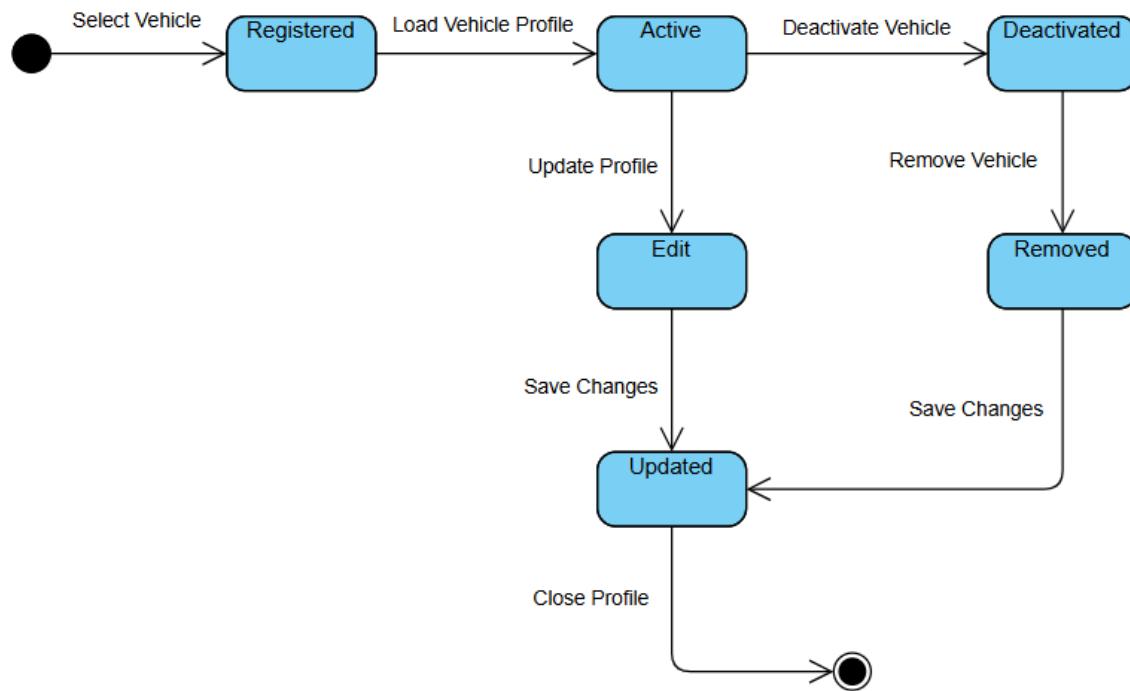
4.2.19 View Workshop Reports

Shows the initial state, final state, and remaining states of viewing workshop reports and what happens at the report generated state when reports are displayed, downloaded, or printed.



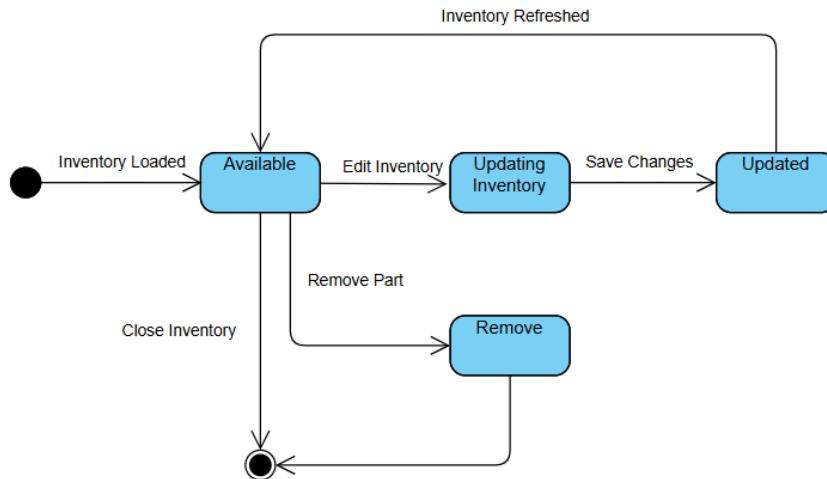
4.2.20 Manage Vehicle Profile

Shows the initial state, final state, and remaining states of viewing workshop reports and what happens at the report generated state when reports are displayed, downloaded, or printed.



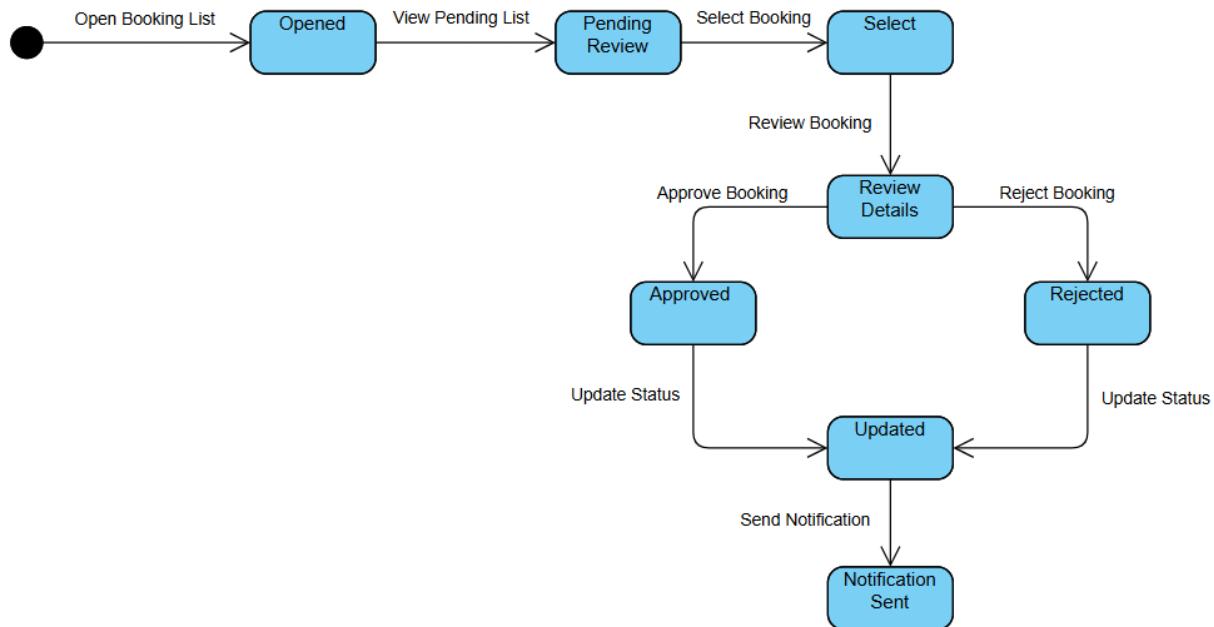
4.2.21 Manage Parts Inventory

Shows the initial state, final state, and remaining states of managing a vehicle profile and what happens at the active vehicle state where vehicle information can be updated or removed.



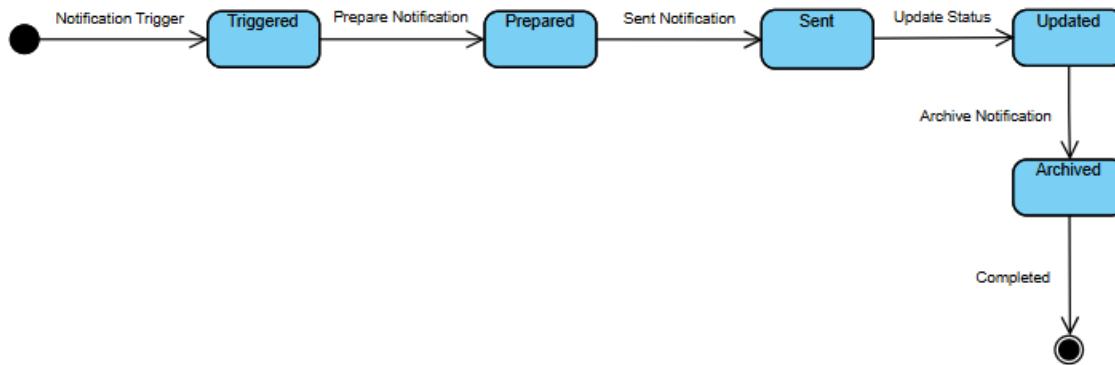
4.2.22 Approve or Reject Booking <<extend>>

Shows the initial state, intermediate states, and final state of the booking approval process, including how the system behaves when a booking is reviewed, approved, or rejected.



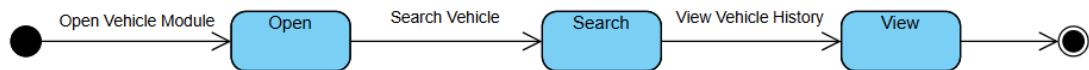
4.2.23 Send Notification <<extend>>

Shows the initial state, intermediate states, and final state of the booking approval process, including how the system behaves when a booking is reviewed, approved, or rejected.



4.2.24 Check Vehicle History <<include>>

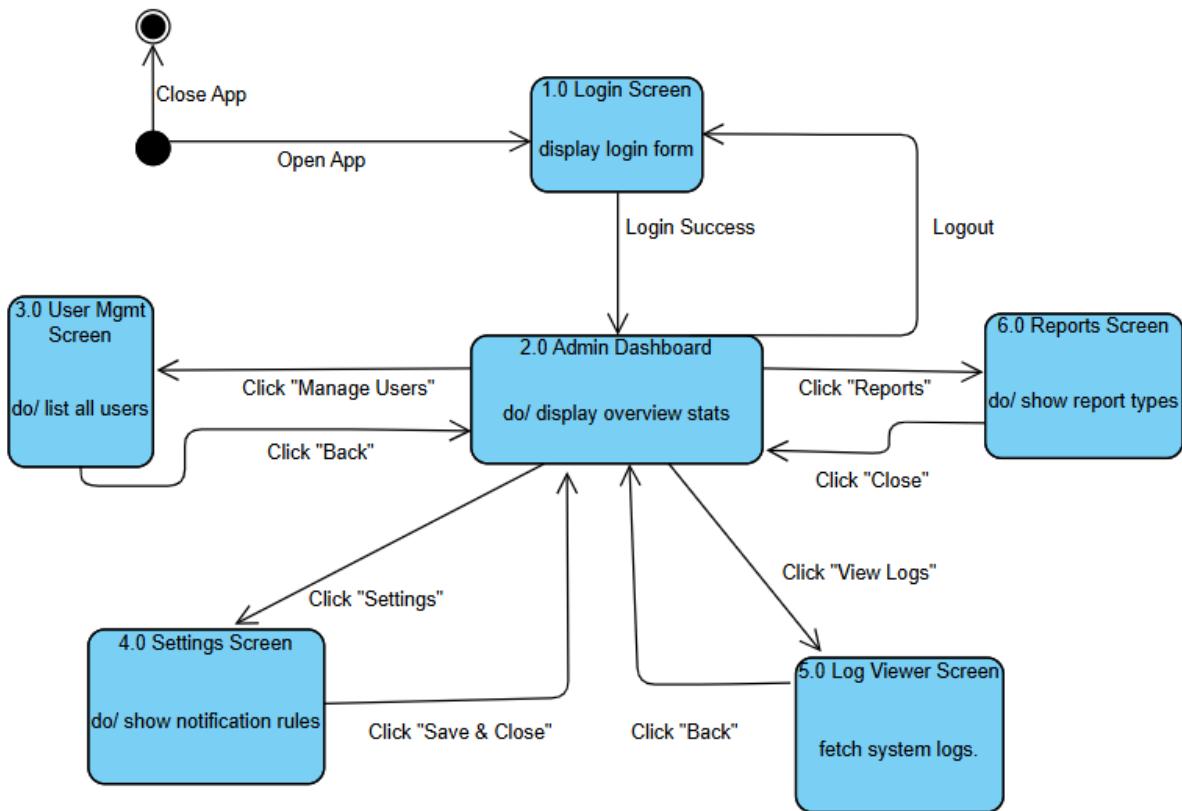
Shows the initial state, final state, and remaining states of sending notifications and what happens at the notification generated state before the notification is sent and archived.



Admin

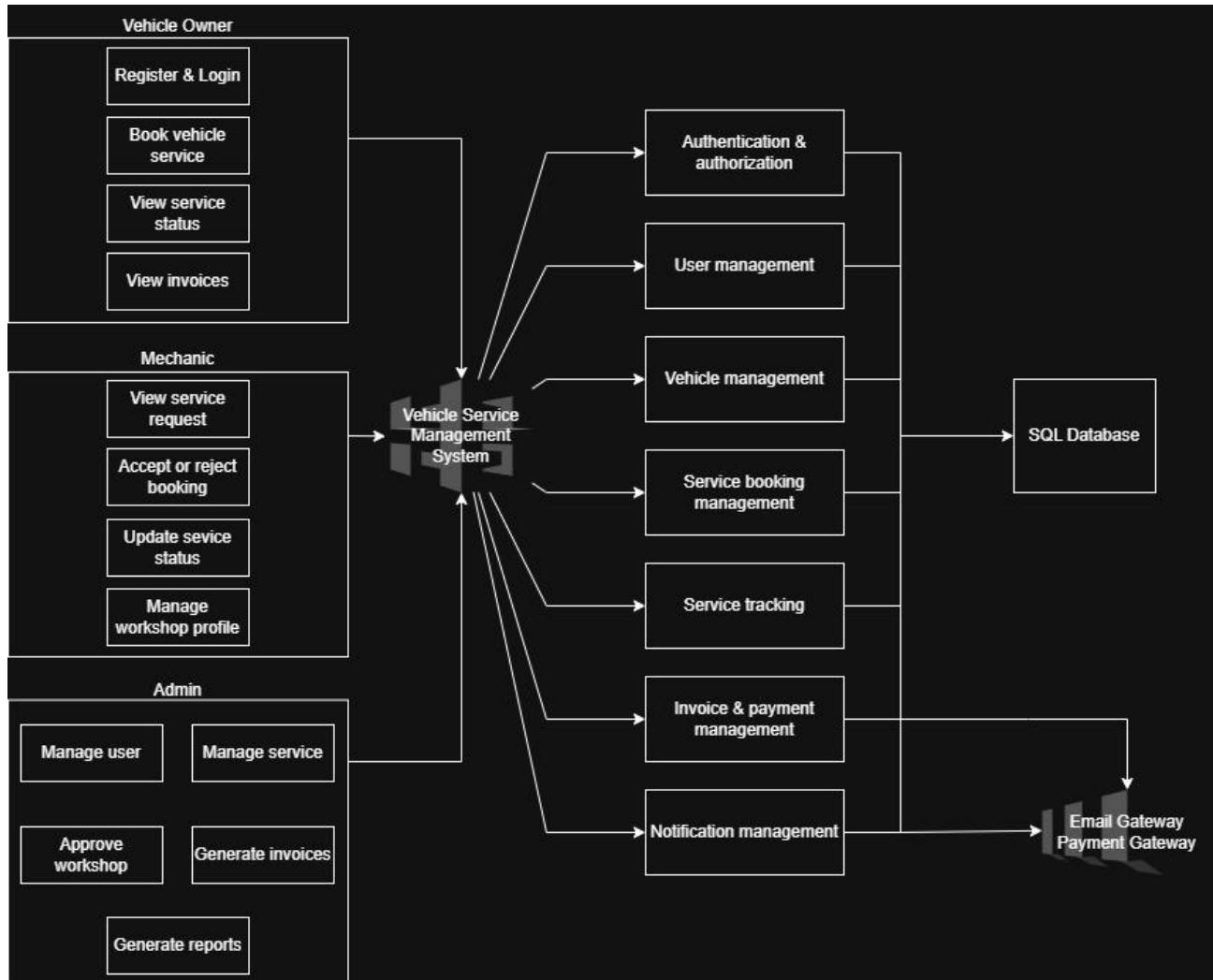
4.2.25 Admin State Diagram

The system begins in the Unauthenticated state (1.0). Upon successful login, it transitions to the Dashboard (Idle) state, which serves as the central hub. From here, the system can transition into specific functional states Managing Users (2.0), Configuring Rules (3.0), Viewing Logs (4.0), or Generating Reports (5.0) based on Admin input. The system returns to the Dashboard state upon completing a task and transitions to the Terminated state when the Admin executes the Logout command (6.0).



5 Architecture Design

5.1 Software Architecture



To efficiently develop the system with a three-person team, the subsystems are assigned as follows:

- Team Member 1 (Kashvin) is responsible for the Authentication & Authorization and User Management subsystems. This includes handling user registration, login, role-based access control, and profile management.
- Team Member 2 (Fahmi) is responsible for the Vehicle Management, Service Booking Management, and Service Tracking subsystems. This member handles vehicle data, service requests, booking approvals, and service status updates.
- Team Member 3 (Kah Wai) is responsible for the Invoice & Payment Management and Notification Management subsystems. This includes invoice generation, payment, and sending notifications related to bookings, service updates, and payments.

All team members collaboratively handle database integration and system testing to ensure seamless interaction between subsystems.

The subsystems are as follows:

5.1.1 Authentication & Authorization Subsystem

This subsystem is responsible for verifying user identity and controlling access to the system. It handles user login, registration, password management, and role-based access control to ensure that vehicle owners, mechanics, and admins can only access features permitted to them.

5.1.2 User Management Subsystem

This subsystem manages user-related data and operations. It maintains user profiles, roles, contact details, and account status. Admins use this subsystem to manage users, while other subsystems rely on it to retrieve user information.

5.1.3 Vehicle Management Subsystem

This subsystem handles all vehicle-related information. It allows vehicle owners to add, update, and view their vehicles, and links vehicles to service requests, service history, and invoices.

5.1.4 Service Booking Management Subsystem

This subsystem manages the complete service booking workflow. It allows vehicle owners to book services, mechanics to accept or reject service requests, and the system to schedule services based on availability.

5.1.5 Service Tracking Subsystem

This subsystem tracks the progress of a vehicle service. It records service status updates such as “Booked,” “Pending,” “Completed,” enabling vehicle owners and admins to monitor service progress in real time.

5.1.6 Invoice & Payment Management Subsystem

This subsystem generates invoices based on completed services and manages payment processing. It integrates with external payment gateways and maintains payment records, transaction status, and billing history.

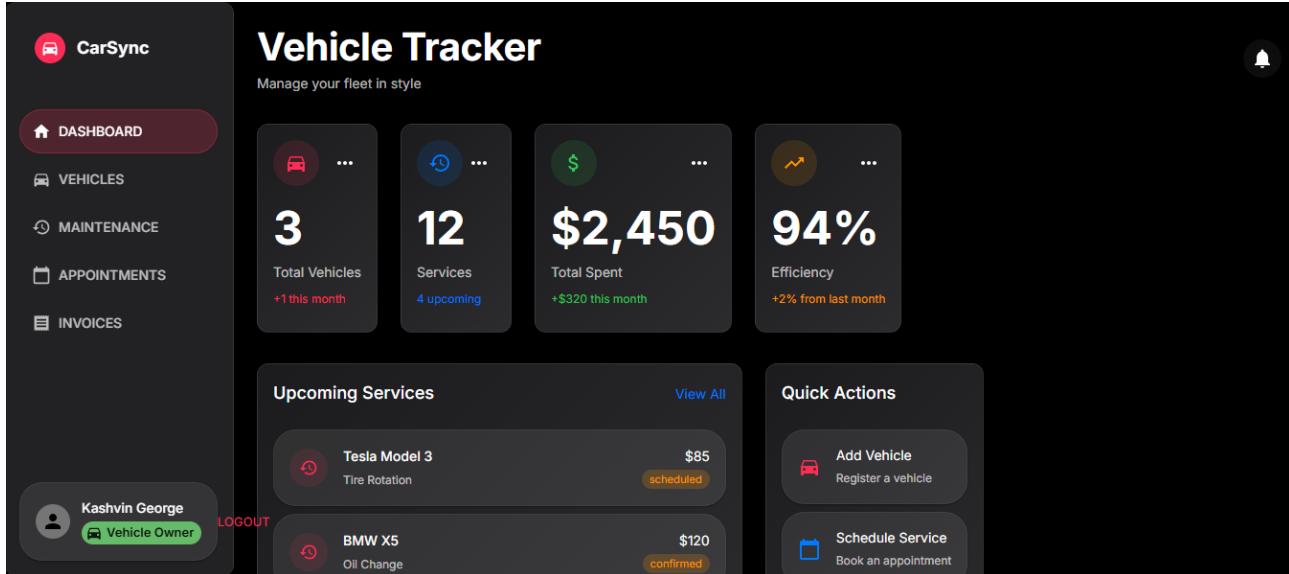
5.1.7 Notification Management Subsystem

This subsystem handles system notifications and alerts. It sends emails or messages related to booking confirmations, service status updates, invoice generation, and payment confirmations by integrating with external email and notification services.

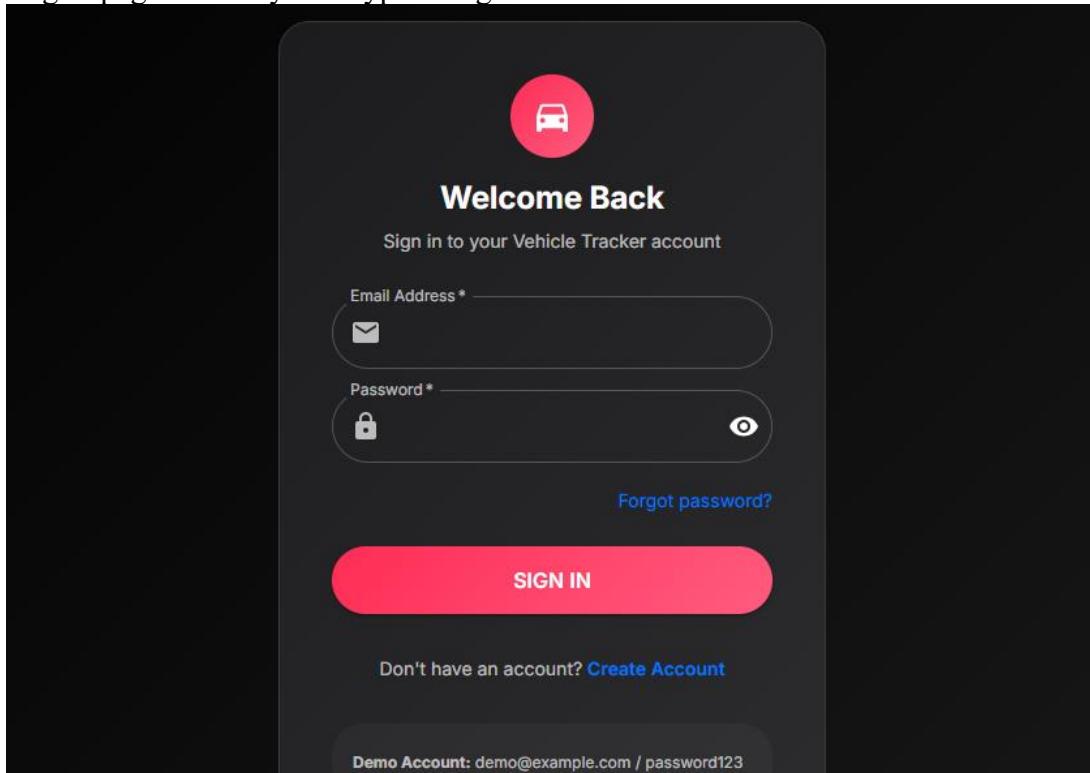
6 Interface Design

6.1 Main Screens

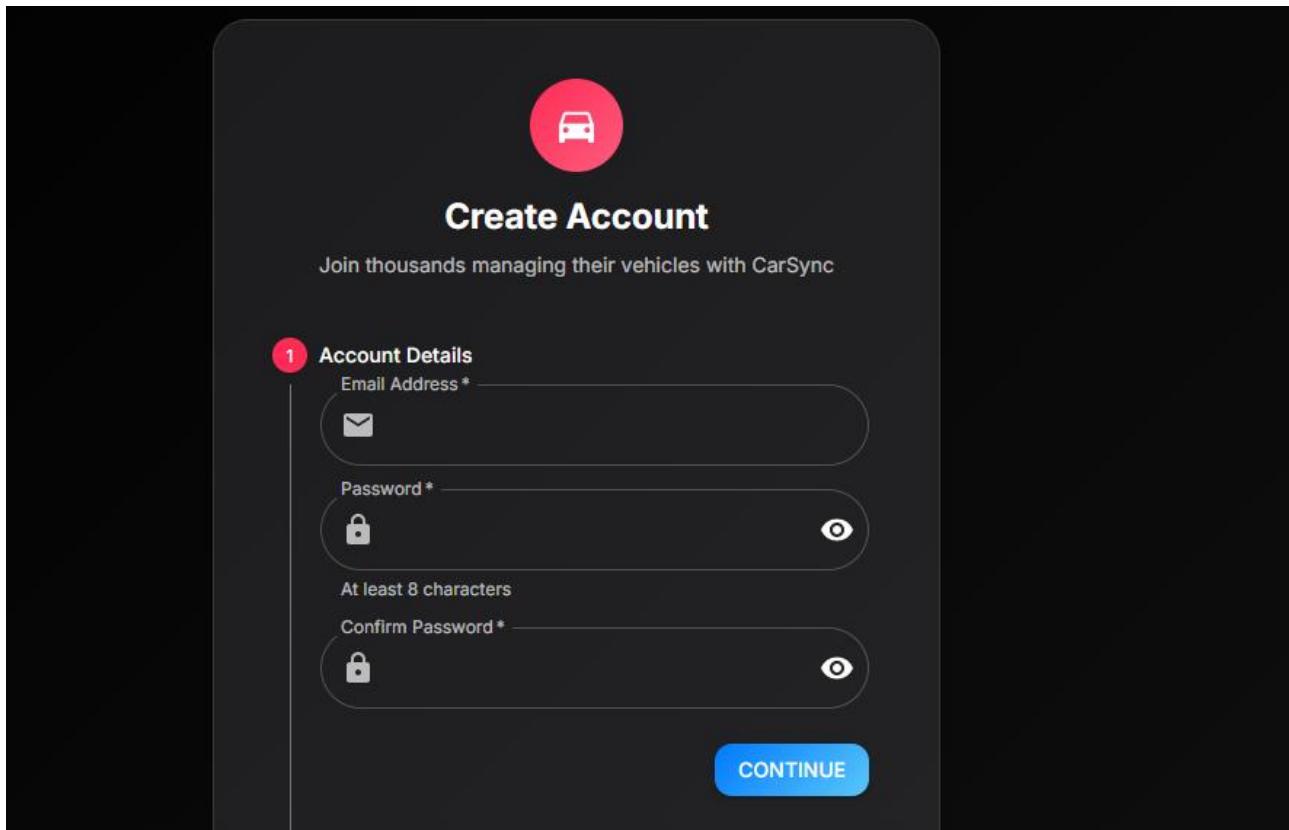
User dashboard screen which shows information such as vehicles, services, total spent etc.



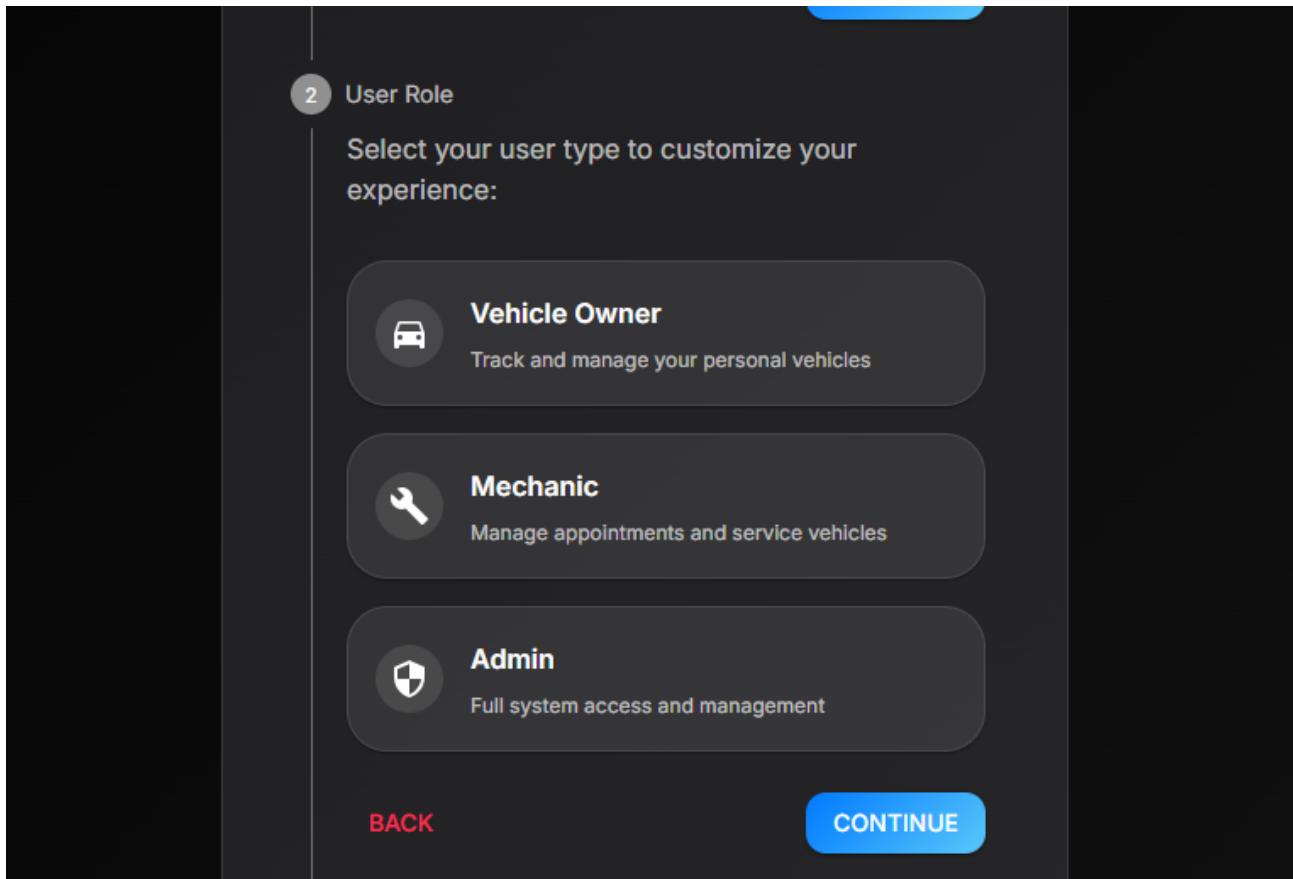
Log In page for every user type to login.



Create Account page for new users to sign up.



Role-based access which allows system to differentiate between admins and vehicle owners/mechanics.



Admin panel where admin gets to monitor user activity in admin mode.

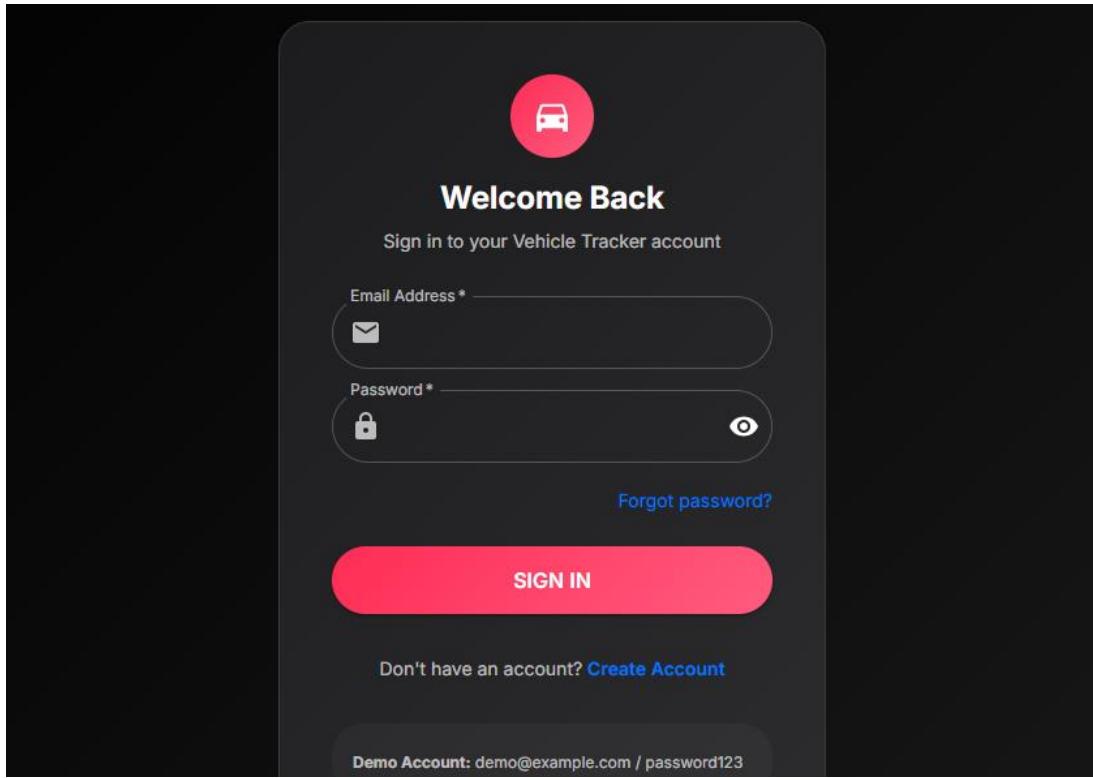
This screenshot shows the 'Admin Panel' dashboard. On the left is a sidebar with navigation links: DASHBOARD, VEHICLES, MAINTENANCE, APPOINTMENTS, INVOICES, and ADMIN PANEL (which is highlighted). Below the sidebar is a user profile for 'kumat gahah' with 'Admin Mode' checked. The main area has a dark header with the title 'Admin Panel' and sub-titles 'System Administration & User Management'. It includes two buttons: 'GENERATE ADMIN KEY' and 'EXPORT DATA'. Below the header are five summary boxes showing user counts: Total Users (2), Active Users (2), Administrators (1), Mechanics (0), and Vehicle Owners (1). A search bar below these boxes shows 'Showing 2 of 2 users'. The user list table has columns: User, Email, Role, Status, Joined, and Actions. Two users are listed:

User	Email	Role	Status	Joined	Actions
Kashvin George	kashvin116300@gmail.com	Vehicle Owner	Active	1/22/2026	Logout Delete
kumat gahah	kumatgahah@gmail.com	Admin	Active	1/24/2026	Logout Delete

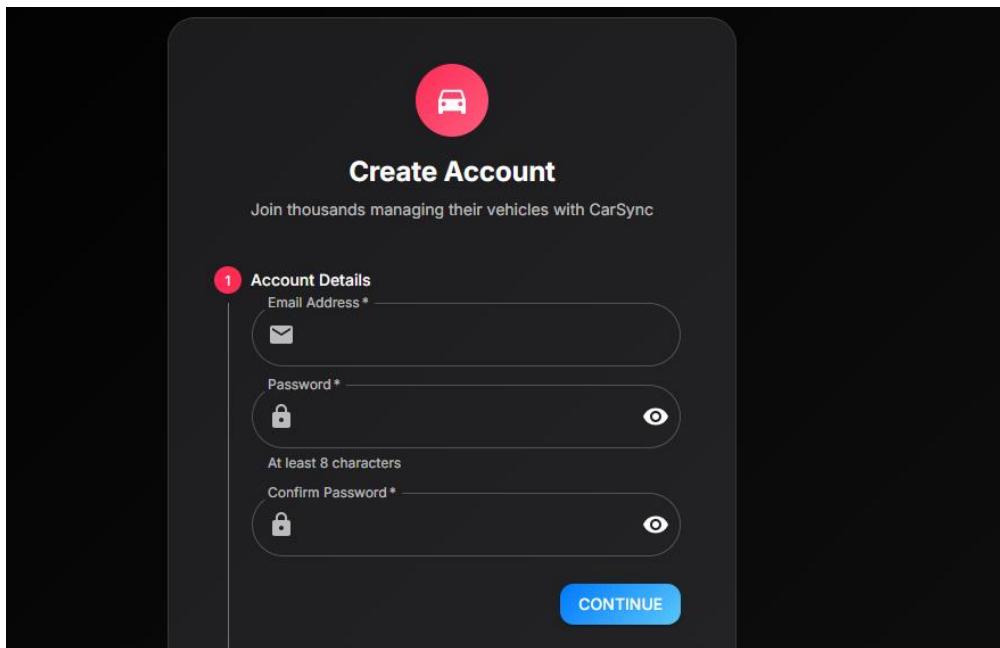
At the bottom are 'LOGOUT' and 'System Actions' buttons.

6.2 Authentication & Authorization Subsystem

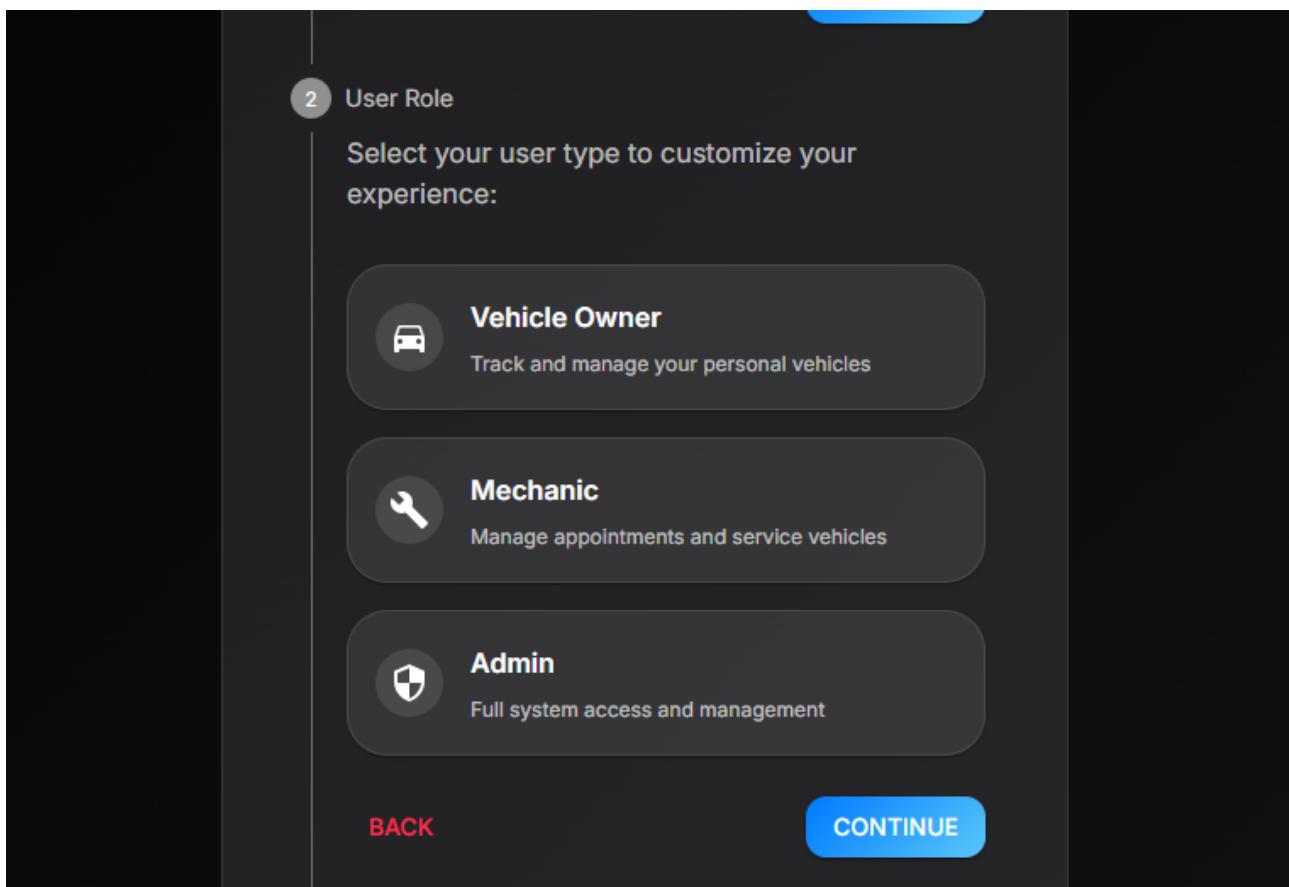
Login, Registration and Role-based access screens.



(Login)



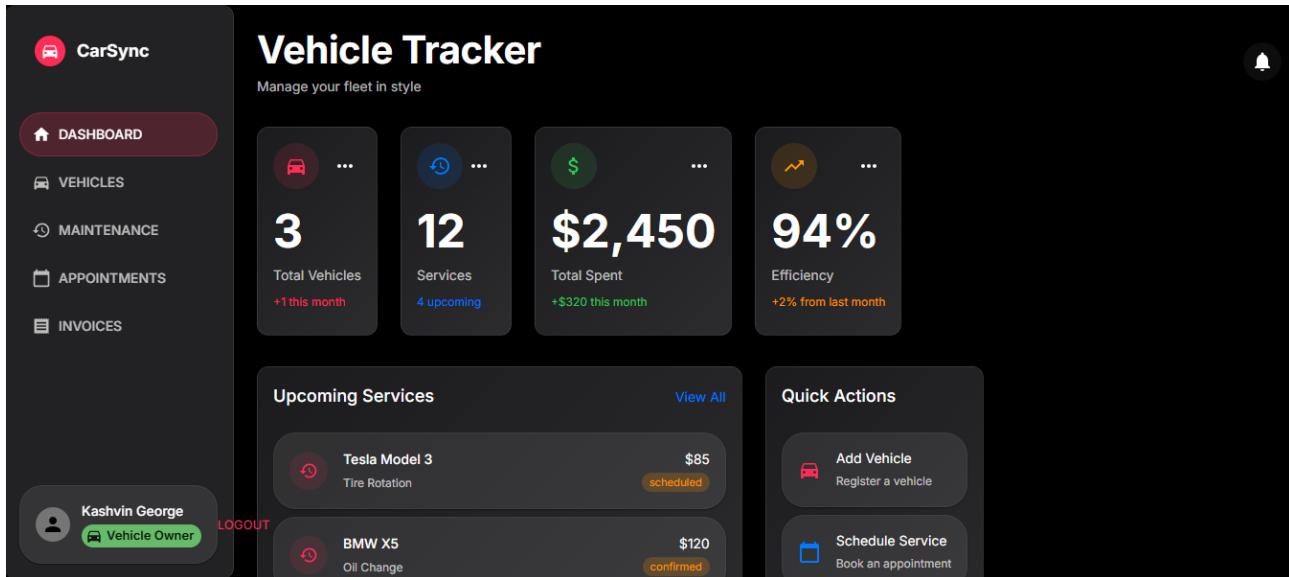
(Registration)



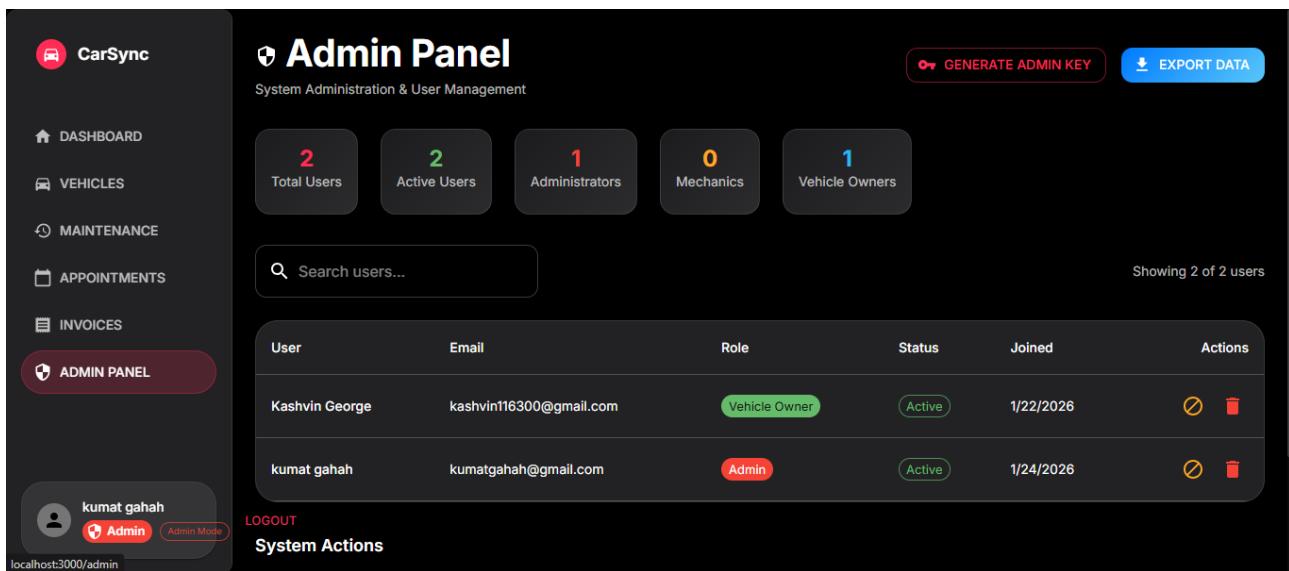
(Role-based access)

6.3 User Management Subsystem Screens

User Profile screen



User List (Admin)



6.4 Vehicle Management Subsystem Screens

Add Vehicle Screen

CarSync

My Vehicles

Add New Vehicle

Make (e.g., Toyota) *: **2026**

Model (e.g., Camry) *: **Sedan**

Color: **Gasoline**

License Plate *: **dd/mm/yyyy**

Vehicle Ty...: **Last Service Date**

Fuel Type *: **dd/mm/yyyy**

Current Mileage *: **mi**

Last Service Mileage: **mi**

Insurance Expiry *: **dd/mm/yyyy**

Registration Expiry *: **dd/mm/yyyy**

Notes

Kashvin George **Vehicle Owner**

CANCEL **ADD VEHICLE**

Edit Vehicle Screen

Edit Vehicle

Make (e.g., Toyota) *: **bmw**

Model (e.g., Camry) *: **316i**

Year *: **2015**

Color: **black**

License Plate *: **wbb6741**

Vehicle Ty...: **Sedan**

Fuel Type *: **Gasoline**

Current Mileage *: **50000** **mi**

Last Service Mileage: **40000** **mi**

Last Service Date: **23/01/2025**

Insurance Expiry *: **23/01/2026**

Registration Expiry *: **25/07/2027**

Notes

CANCEL **UPDATE VEHICLE**

6.5 Service Booking Management Subsystem Screens

View Appointments

The screenshot shows the 'Appointments' screen of the CarSync mobile application. The top navigation bar includes icons for Dashboard, Vehicles, Maintenance, Appointments (selected), and Invoices. A profile section for 'Kashvin George' (Vehicle Owner) with a 'Logout' button is at the bottom left. The main content area has a title 'Appointments' and a subtitle 'Schedule and track your vehicle services'. It features four summary cards: 'Upcoming' (0), 'Pending' (0), 'Completed' (0), and 'Cancelled' (0). Below these are tabs for 'UPCOMING' (selected), 'PENDING REVIEW', 'COMPLETED', and 'CANCELLED/REJECTED'. A table header with columns 'Vehicle & Service', 'Date & Time', 'Mechanic', 'Status', and 'Actions' follows. A message 'No upcoming appointments' is displayed below the table.

Add Appointments

The screenshot shows the 'Book New Appointment' screen of the CarSync mobile application. The top navigation bar and profile section are identical to the previous screen. The main content area has a title 'Appointments' and a subtitle 'Schedule and track your vehicle services'. A large central form titled 'Book New Appointment' contains fields for 'Service Type' (selected 'Oil Change - 1 hour - \$80-120'), 'Appointment Date*' (dd/mm/yyyy), 'Preferred Time' (09:00 AM), and 'Urgency' (Normal). An 'Additional Notes' input field is also present. At the bottom are 'CANCEL' and 'BOOK APPOINTMENT' buttons. A message 'No upcoming appointments' is displayed below the form.

6.6 Service Tracking Subsystem Screen

View completed/pending/incomplete services.

The screenshot shows the 'Maintenance Log' section of the CarSync app. On the left is a sidebar with icons for Dashboard, Vehicles, Maintenance (which is selected and highlighted in red), Appointments, and Invoices. The main area has a header 'Maintenance Log' with a 'LOG MAINTENANCE' button. Below is a table with columns: Vehicle, Service Type, Date, Mileage, Cost, Status, and Actions. Three entries are listed:

Vehicle	Service Type	Date	Mileage	Cost	Status	Actions
Toyota Camry	Oil Change	1/10/2024	45,500 miles	\$89.99	completed	
Honda Civic	Tire Rotation	1/5/2024	25,500 miles	\$45.00	completed	
Ford F-150	Brake Service	1/2/2024	75,500 miles	\$325.50	completed	

6.7 Invoice & Payment Management Subsystem Screens

Invoice Viewing Page

The screenshot shows the 'Invoices' section of the CarSync app. The sidebar is identical to the previous screenshot. The main area has a header 'Invoices' with a subtitle 'Manage invoices, payments, and billing'. It features four summary cards: Total Revenue (\$610.94), Paid (\$98.09), Pending (\$354.80), and Total Invoices (3). Below is a navigation bar with tabs: ALL INVOICES (selected), PAID (1), PENDING (1), OVERDUE (1), and RECENT. A table lists invoices with columns: Invoice #, Customer, Vehicle, Service, Date, Due Date, Amount, Status, and Actions. One invoice is shown in detail:

Invoice #	Customer	Vehicle	Service	Date	Due Date	Amount	Status	Actions
INV-763284	John Smith john@example.com	Toyota Camry 2020 ABC123	Oil Change & Filter Replacement	Jan 25, 2026	Feb 24, 2026	\$98.09	PAID	

View Invoice Details

Invoice Details - INV-763284

INVOICE DETAILS

Invoice Date: January 25, 2026
Due Date: February 24, 2026
Service: Oil Change & Filter Replacement
Mechanic: Mike Johnson

ITEMS

Description	Quantity	Unit	Unit Price	Total
Full Synthetic Oil 5W-30	5	quart	\$12.00	\$60.00
Premium Oil Filter	1	each	\$15.00	\$15.00
Labor - Oil Change Service	0.5	hour	\$50.00	\$25.00
Shop Supplies Fee	1	each	\$5.99	\$5.99
			Subtotal:	\$89.99
			Tax:	\$8.10

CLOSE DOWNLOAD PDF PRINT

6.8 Notification Management Subsystem Screens

Successfully paid notification.

INV-
T763284 Robert Davis Ford F-150
robert@example.com 2021 Tire Rotation &
TRK456 Jan 11, 2026 Jan 21, 2026 \$454.80 PAID
Payment of \$354.80 processed successfully! X

Successfully logged in notification

localhost:3000 says
Login successful! Welcome back!

OK

7 Component Design

7.1 Main Components

1. CarSync System (Core Component)

This is the component that integrates all subsystems. It coordinates interactions between vehicle owners, mechanics/workshops, and admins while ensuring secure authentication and smooth data flow across services.

2. Vehicle Owner Component

This component represents the functionalities available to vehicle owners. It allows owners to manage their vehicles, create and manage service bookings, and view/download invoices.

- Vehicle: Manages vehicle-related data such as registration details and ownership.
- Booking Service: Handles service booking creation, updates, and cancellations.
- External Interfaces:
 - BookingManagement: Used to manage booking operations.
 - InvoiceService: Used to receive, view and download invoices.

3. Mechanic / Workshop Component

This component supports workshop operations and services. It connects booking information with actual service records and invoicing.

- Services: Manages available services and records completed service details.
- Invoice: Generates and manages invoices after service completion.
- Interfaces:
 - ServiceRecord: Maintains records of services performed.
 - InvoiceService: Provides invoice generation and processing.
 - UserManagement: Coordinates with user-related services when required.

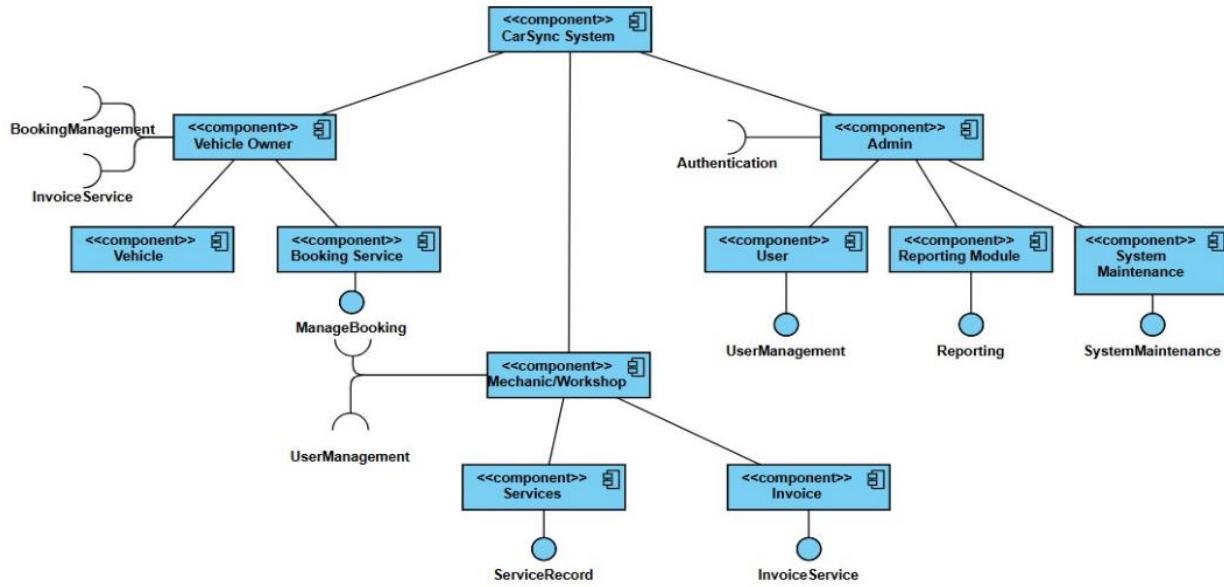
4. Admin Component

The admin component provides administrative control over the system. It is responsible for authentication, system monitoring, and reporting.

- User: Manages user accounts, roles, and permissions.
- Reporting Module: Generates system reports such as usage statistics and service analytics.
- System Maintenance: Handles system configuration, updates, and maintenance tasks.
- Interfaces:
 - Authentication: Ensures secure access.
 - UserManagement: Manages users across the system.
 - Reporting: Provides analytical reports.
 - SystemMaintenance: Ensures system stability and upkeep.

Components	Subcomponents	Related Subsystems
CarSync System	-	Authentication, System Integration
Vehicle Owner	Vehicle, Booking Service	BookingManagement, InvoiceService
Admin	User, Reporting Module, System Maintenance	ServiceRecord, InvoiceService, UserManagement
Mechanic/Workshop	Services, Invoice	Authentication, UserManagement, Reporting, SystemMaintenance
Booking Service	-	ManageBooking
Services	-	ServiceRecord
Invoice	-	InvoiceService
Reporting Module	-	Reporting
System Maintenance	-	SystemMaintenance

7.1.1 Component



1. CarSync System (Main System Component)

Description:

The CarSync System is the core system that integrates all user roles (Vehicle Owner, Mechanic/Workshop, Admin) and their related services. It coordinates authentication, booking, service records, invoicing, and administrative management.

2. Vehicle Owner Component

Description:

Represents the vehicle owner user role. This component allows vehicle owners to manage their vehicles, create service bookings, and view invoices.

Subcomponents & Interfaces:

- Vehicle – Stores vehicle details
- Booking Service – Handles booking creation and updates
- BookingManagement interface – Manages booking operations
- InvoiceService interface – Accesses invoice information

An example algorithm of create service booking:

1. Vehicle owner selects a vehicle
2. Chooses service type and date.
3. System checks availability
4. Booking is saved.
5. User receives confirmation.

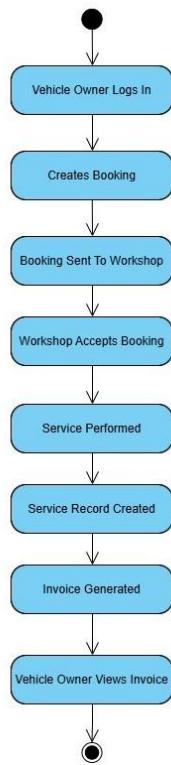
Pseudocode for service booking:

```

IF user_is_authenticated THEN
    display available_services
    IF service_selected AND date_available THEN
        create booking
        save booking
        notify mechanic
    ENDIF
ENDIF
ENDIF

```

Booking Flow Activity Diagram:



3. Vehicle Component

Description:

Stores and manages vehicle-related data belonging to the vehicle owner.

4. Booking Service Component

Description:

Handles all booking-related operations between vehicle owners and mechanics/workshops.

5. Mechanic / Workshop Component

Description:

Represents workshops or mechanics who provide vehicle services. This component interacts with bookings, service records, and invoices.

Subcomponents:

- Services
- Invoice

Interfaces Used:

- ManageBooking
- UserManagement

An example algorithm for manage booking

1. Receive booking request
2. Accept or reject booking
3. Update booking status
4. Notify vehicle owner

Pseudocode for manage booking:

```
FOR each booking_request DO
    IF workshop_available THEN
        accept booking
        update status
    ELSE
        reject booking
    ENDIF
END FOR
```

6. Services Component

Description:

Manages the service records created by the mechanic/workshop after vehicle servicing.

Interface:

- ServiceRecord

7. Invoice Component

Description:

Handles invoice creation and management for completed services.

Interface:

- InvoiceService

8. Admin Component

Description:

Represents the administrator role responsible for managing system users, reports, and maintenance.

Subcomponents:

- User
- Reporting Module
- System Maintenance

Interface:

- Authentication

9. User Component (Admin)

Description:

Handles user accounts and access control.

Interface:

- UserManagement

10. Reporting Module Component

Description:

Generates system reports for administrative analysis.

Interface:

- Reporting

11. System Maintenance Component

Description:

Ensures the system runs smoothly and securely.

Interface:

- SystemMaintenance

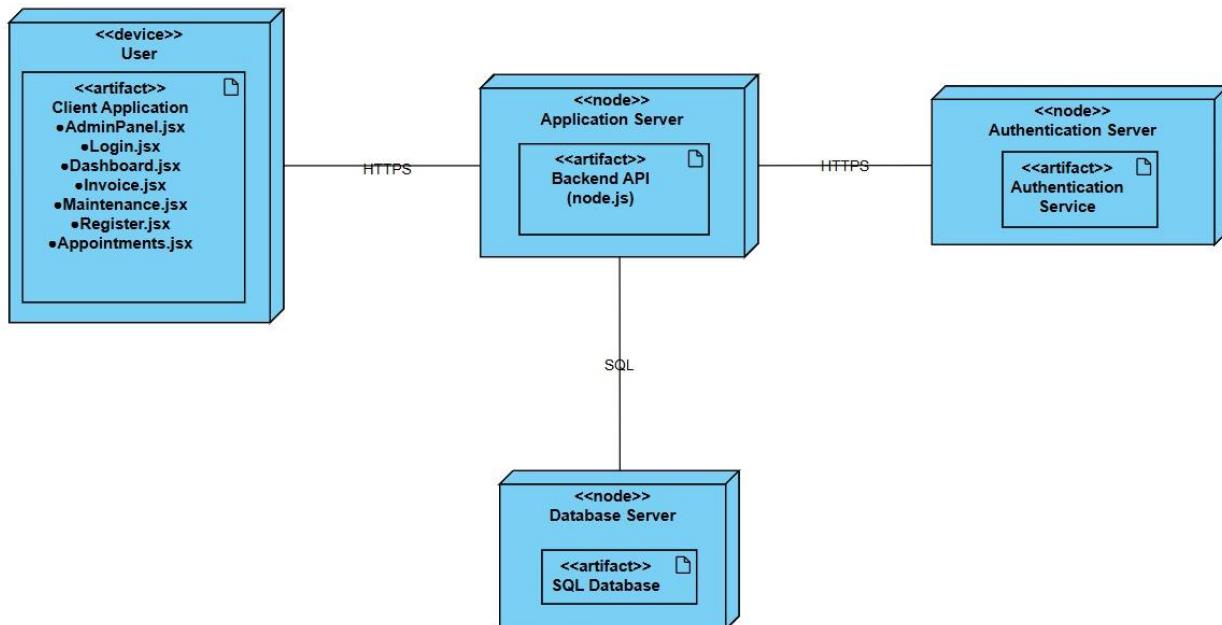
8 Deployment Design

8.1 Deployment Diagram

The deployment diagram shows the architecture of the system and how software artifacts are deployed across different nodes. The Client Application, implemented using React, is deployed on the User and consists of user interface pages such as login, dashboard, appointments, invoice, register, admin panel and maintenance. The client communicates with the Application Server over HTTPS.

The Application Server hosts the Backend API (Node.js), which handles business logic, processes client requests, communicates with the authentication service, and manages database operations. For user authentication and authorization, the backend API interacts with a separate Authentication Server over HTTPS, which provides authentication services.

Important data is stored in the Database Server, which hosts an SQL Database. The Application Server communicates with the Database Server using SQL for data retrieval and storage. This deployment demonstrates a standard client–server architecture.



9 Summary

This document outlines the software design for the CarSync Vehicle Maintenance Tracker, utilising a component-based architecture to distinguish the Vehicle Owner, Mechanic/Workshop, and Admin subsystems under the central CarSync System component. The design specifies a Client-Server model with a React frontend and Node.js backend, supported by a centralized SQL database, and defines the algorithms for key processes such as service bookings and user management. The detailed component interfaces, data structures, and deployment plans outlined in this document demonstrate that the CarSync system is fully specified and ready for the implementation phase. The design fulfills all functional requirements for a scalable, secure, and user-friendly vehicle maintenance platform.

References

1. Sequence Diagram. (n.d.). [Www.visual-Paradigm.com](http://www.visual-Paradigm.com). <https://www.visual-paradigm.com/learning/handbooks/software-design-handbook/sequence-diagram.jsp>
2. Visual Paradigm. (2019). What is Activity Diagram? [Visual-Paradigm.com](http://www.visual-Paradigm.com). <https://www.visual-paradigm.com/guide/uml-unified-modeling-language/what-is-activity-diagram/>
3. Architectural diagrams: What is, how to draw and templates. (n.d.). [Https://Miro.com/](https://Miro.com/). <https://miro.com/diagramming/what-is-software-architecture-diagramming/>
4. What is Deployment Diagram? (n.d.). [Www.visual-Paradigm.com](http://www.visual-Paradigm.com). <https://www.visual-paradigm.com/guide/uml-unified-modeling-language/what-is-deployment-diagram/>
5. <https://miro.com/diagramming/how-to-design-database-schema/>
6. Visual Paradigm. (2019). What is State Machine Diagram? [Visual-Paradigm.com](http://www.visual-Paradigm.com). <https://www.visual-paradigm.com/guide/uml-unified-modeling-language/what-is-state-machine-diagram/>
7. Visual Paradigm. (2019). What is Component Diagram? [Visual-Paradigm.com](http://www.visual-Paradigm.com). <https://www.visual-paradigm.com/guide/uml-unified-modeling-language/what-is-component-diagram/>