Title of the Project: Instant Garage or Parking Spot Rental Service - ParkIn

Group Number: 03

Group Members:

Student ID	Student Name
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Introduction

One of the biggest problems in crowded and busy cities like Dhaka is today finding parking for personal vehicles. People who own private vehicles, such as cars and bikes, often face the issue of parking anytime they visit a location. The problem applies to both daily parking at work or university/college and parking while traveling to a hangout or entertainment location. Additionally, since most private automobiles are outside during the day, the majority of garages in apartments and private buildings are empty. We propose connecting these ideas together. We are introducing ParkIn, an instant garage/parking spot rent solution. There will be a mobile app in this system with two different user types. The first is the owner of the vehicle looking for parking, and the second is the owner of the garage or parking space. After a sequence of validated registrations in the system, the garage/parking spot owners make their space available for parking. Vehicle owners can view the available parking spaces/garages for parking close by and choose a spot that is closer in exchange for a minimal fee. The owner will sign a document guaranteeing the full security of the vehicles. Also, the vehicle owners can take subscription-based packages for a month. With the assistance of our system, the parking problem is handled in this manner.

Motivation

We are motivated to work on this project by the difficulty of instantly finding a suitable parking location at a fair price. Additionally, unauthorized parking on the roadways congests the flow of traffic and frequently results in fines for the car and bike owners. To solve these issues, we are bringing forward our proposal.

System Request

1. Project Sponsor

Tanjim Ahmed, MD. Mustakin Alam, M. Shafiul Alam

2. Business Need

Provide affordable and quick garage rental for parking vehicles. Meet the increasing demand for parking spots from car and bike owners, especially during rush hours.

3. Business Requirements

Using the integrated map, users will be able to search for garages, including parking spots. The full functionality of the system will be:

1. **Map Integration** - Search nearby garages for rent

2. **Rent Garage** - User can rent their preferred garage for parking

3. **Garage Rating** - Users, who've rented a garage, should be able to rate their experience

4. **Subscription** - For a specific period of time (weekly or monthly), a user can rent a garage

5. **Activity History** - Access to rent history will allow the user to check how much they were charged for renting a garage and their renting period

6. **Reward System** - Points will be rewarded for the quality of the services

7. **Payment System (Wallet System)** - Users can pay for a garage with cash, with MFS (Bkash or Nagad), or even using their credit card

4. Business Value

Tangible:

Instant Service Revenue

- About 100 automobiles on average are parked near Brac University or in the areas beside the university buildings. If we charge BDT 50/hour for a car and if we assume that the cars will reside for at least 3 hours then it would sum up to BDT 15000 a day and BDT 105,000 a week. This would eventually sum up to BDT 5,040,000 a year. We would receive a commission of 20% from the net income which will be **BDT 1,008,000** annually.

- Initially we are considering five locations for the service to start. Mohakhali, Gulshan-1, Gulshan-2, Banani and Niketon. Hence, total annual revenue from cars will approximately be = BDT 1,008,000 x 5 = **BDT 5,040,000** for our company.
- About 200 bikes on average are parked near Brac university or the areas beside the university buildings. If we charge BDT. 25/hour for a bike and if we assume that the bikes will reside for at least 3 hours then it would sum up to BDT 15000 a day and BDT 105,000 a week. This would eventually add up to BDT 5,040,000 a year. We would receive a commission of 20% from the net income which will be **BDT 1,008,000/-** annually.
- Initially we are considering five locations for the service to start. Mohakhali, Gulshan-1, Gulshan-2, Banani and Niketon. Thus, the total annual revenue from bikes will approximately be = BDT 1,008,000 x 5 = **BDT 5,040,000/-** for our company.

Subscription-Based Revenue:

- For cars, a monthly subscription will be charged BDT 3000.
  Estimated annual revenue for car subscription = 20 (cars) x 3000 x 20% x 12 = **BDT 144,000/-**
- For bikes monthly subscription will be charged BDT 1500.
  Estimated annual revenue for bike subscription = 30 (bikes) x 1500 x 20% x 12 = **BDT 108,000/-**

Total Revenue:

- Estimated annual total revenue initially = BDT. 5,040,000 + BDT. 5,040,000 + BDT. 144,000 + BDT. 108,000 = **BDT 10,332,000/-**

Intangible:

- Partnership with famous brands (e.g: Bkash, Nagad, etc)
- Internship programs and Workshops for interested students
- Collaboration with famous public figures

5. Special Issues or Constraints

- Verification of the ownership of the garage before registering into the system.
- Rent fare varies depending on the location and time, and hence it would be difficult to estimate the charge.

System Requirement Analysis

Functional Requirements:

1. Map Integration
   1.1 The System will search through the map for empty parking spots or garages.
   1.2 The System will use the map to highlight significant locations.

2. Garage/Parking Spot Management
   2.1 Users can select an empty parking spot/garage to rent instantly.
   2.2 Users can subscribe for a spot for a specific period of time.
   2.3 Users can rate the spot for the service.
   2.4 Users can lodge complaints about the service taken.
   2.5 Users can pay using cash, with MFS (Bkash or Nagad), or using a card.
   2.6 Users can look through their activity history.

3. Reward System
   3.1 The System will reward points to the users (both Garage/Spot owner and tenant).
   3.2 Users can exchange points for discounts or different offers.

4. Registration
   4.1 Users can register as either parking spot owners or tenants.
   4.2 Users can add descriptions and images of their owned parking spots.

5. Login
   5.1 Users can login to their respective accounts (spot owner or tenants).
   5.2 System will verify the user login credentials.
   5.3 System will send an error message if the login credentials do not match the database.

Nonfunctional Requirements:

1. Operational
   1.1 The system should run on mobile devices and smartphones.
   1.2 The system should support a consistent GPS connection.

2. Performance
   2.1 The System should update the map with empty parking spots within 30 seconds.
   2.2 The system should be able to handle 1000 requests initially every 5 minutes.

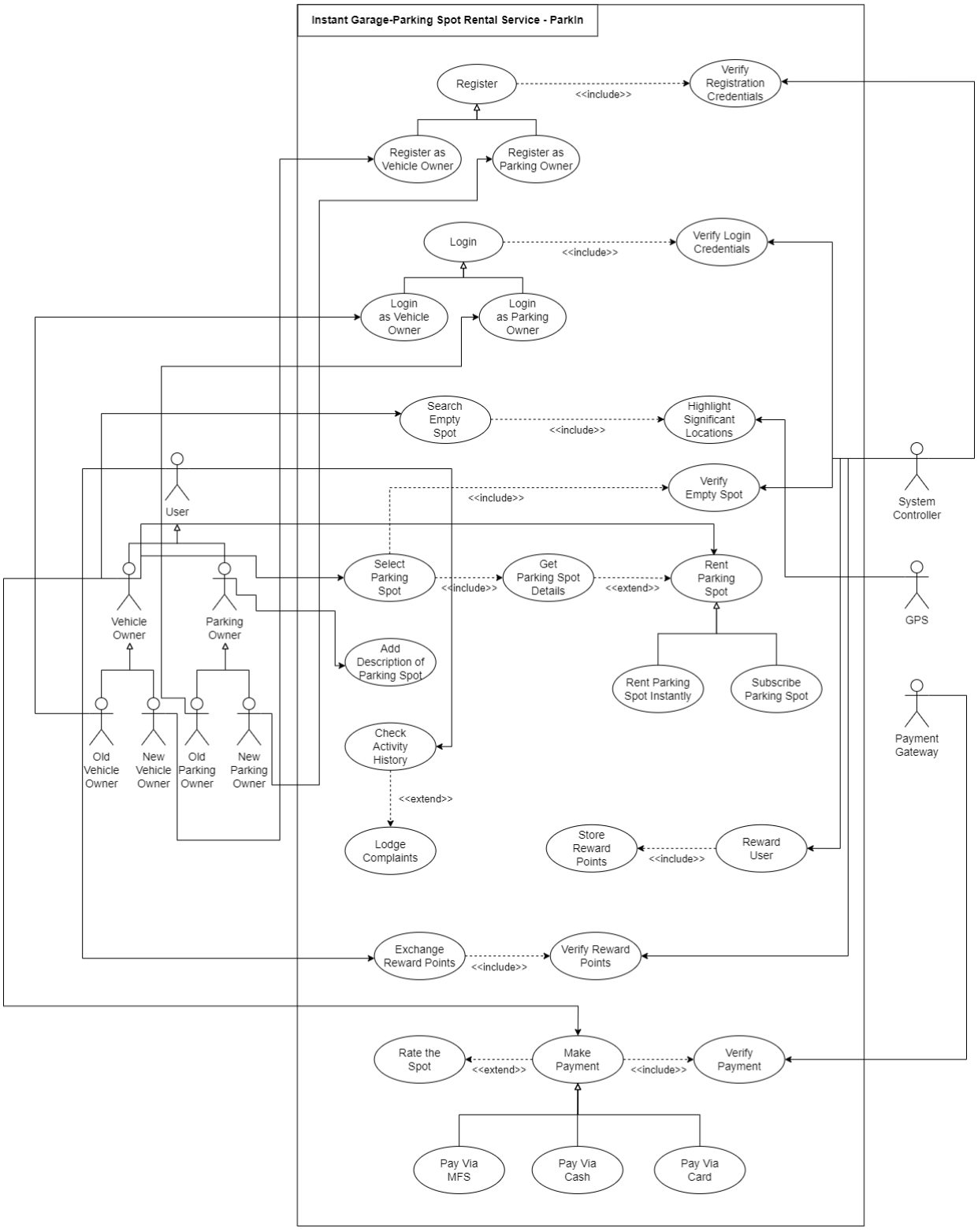
3. Security
   3.1 User cannot access the other user's (garage or parking spot owner) information until the other user accepts the User's request.
   3.2 The User (spot owner) will have to provide lawful paperwork in order to form an agreement with ParkIn (information will be confidential).

4. Cultural And Political
   4.1 The payment system should be in BDT.
   4.2 The system will follow laws associated with the state's tenancy law.
   4.3 The system will follow BRTA parking law.

Description for Use-case Diagram:

The use-case diagram contains the use cases of the system. There is a total of 29 use cases in the diagram; 8 of them are coming as an included use case and 3 of them are extended. The diagram has a total of 4 actors who interact with the system. They are the User, System Controller, GPS, and Payment Gateway. Users are generalized to Vehicle Owners and Parking Owners. They are further generalized to Old and New. The User interacts as a primary actor with the system and the rest of the actors are secondary actors.

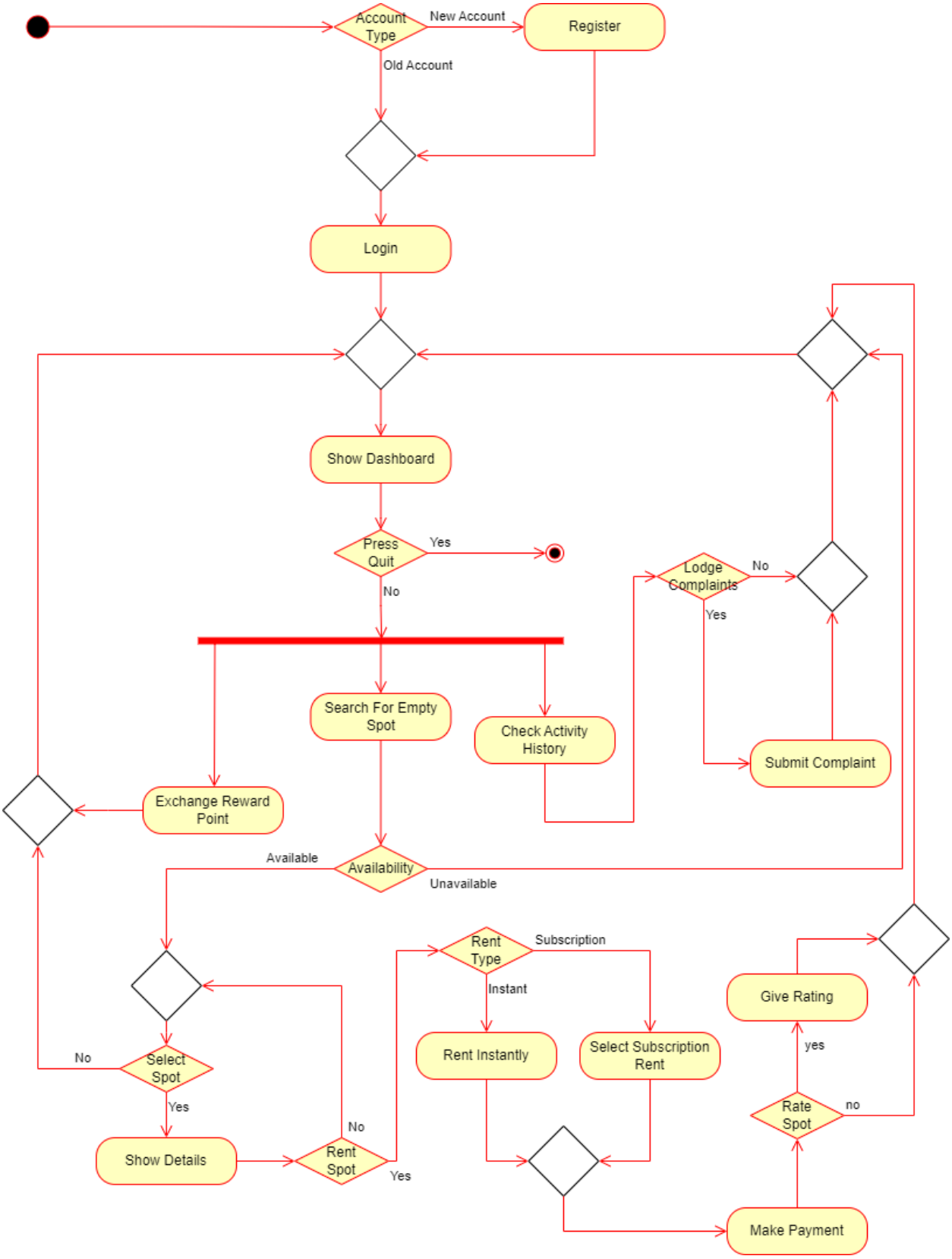
Use-case Diagram



Description for Activity Diagram:

There is a total of 12 activities in the activity diagram. There are multiple decision and join nodes in the diagram. The activities start with the decision of Account types. It takes decisions based on New and Old Accounts. The activities come to an end with the Press Quit decision. The rest of the activities are initiated in between.

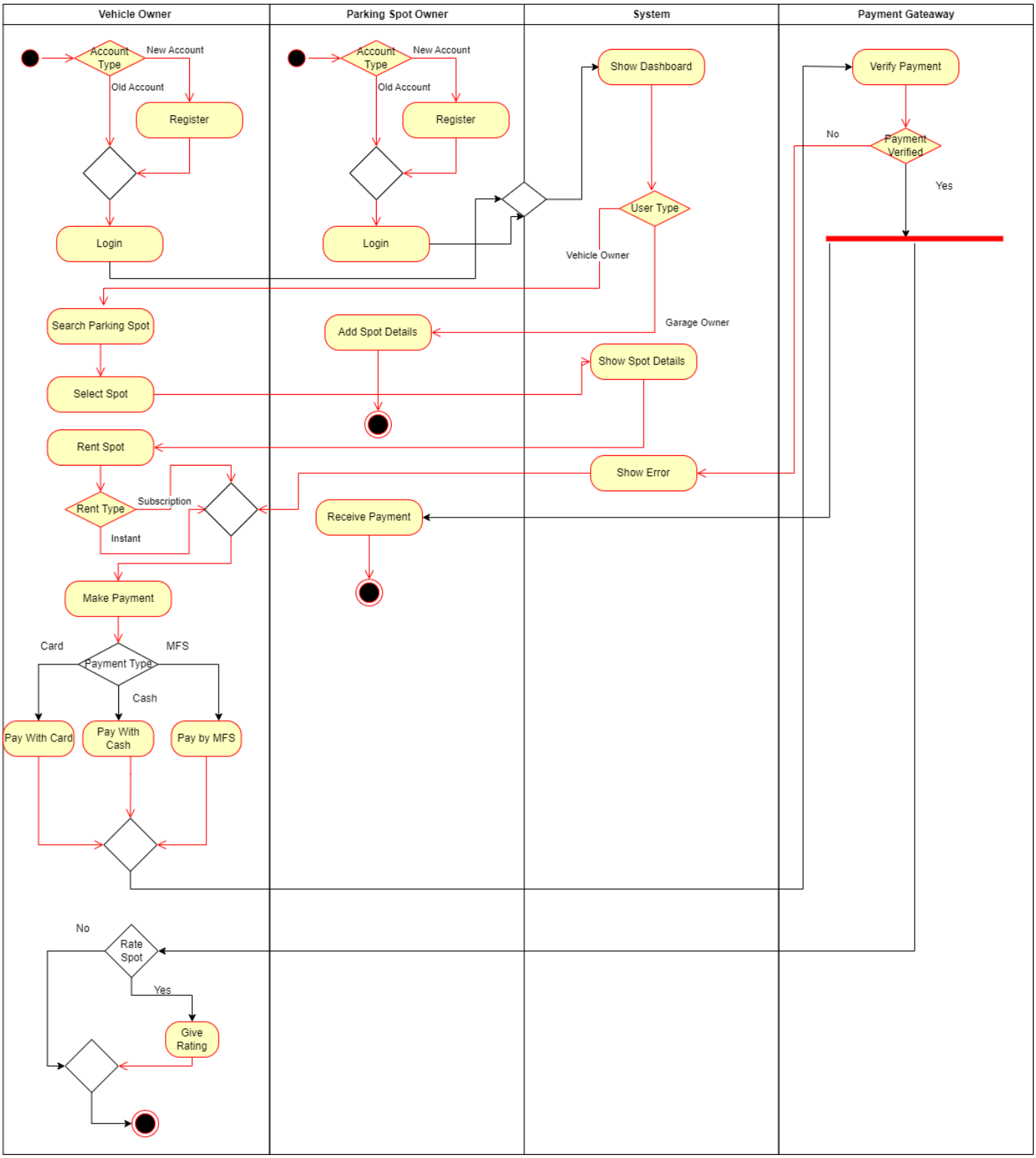
Activity Diagram



Description for Activity Diagram (Swimlane):

In the swim-lane activity diagram, the activities are separated with swim lanes. All the activities of vehicle owners are placed in the vehicle owner part. Similarly other activities are also separated with swim lanes. Here, the two types of accounts are shown separately.

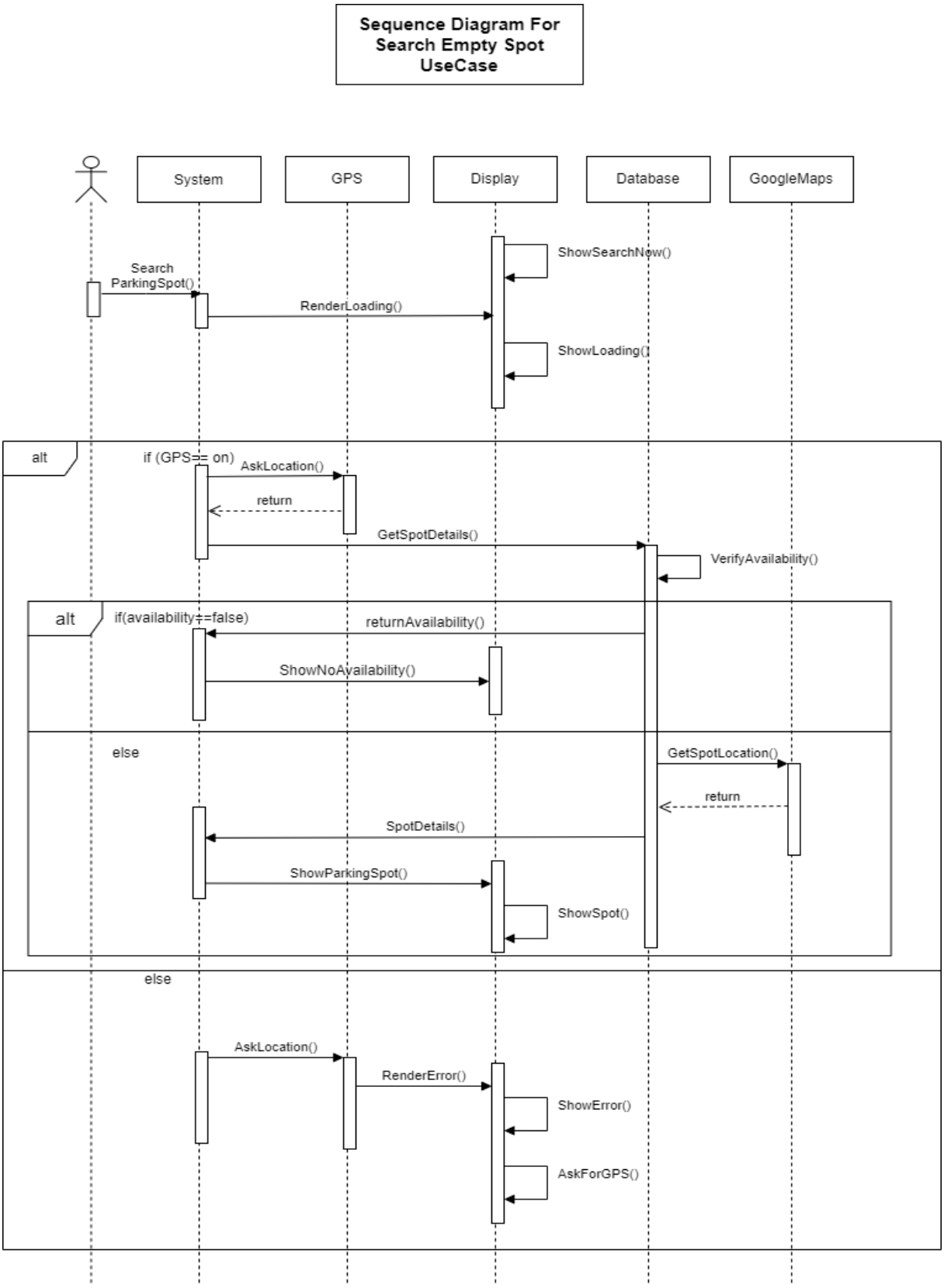
Activity Diagram (Swimlane)



Description for Sequence Diagram for Search Empty Spot:

There are 6 objects in this sequence diagram. The user interacts with the system. The system fetches data from the other objects. The GPS provides the location of the users, the Database provides data, the Display shows the information, and Google Maps provides the location of the parking spots. The operations take place sequentially. There are two alternative boxes in the diagram, and one of them is nested.

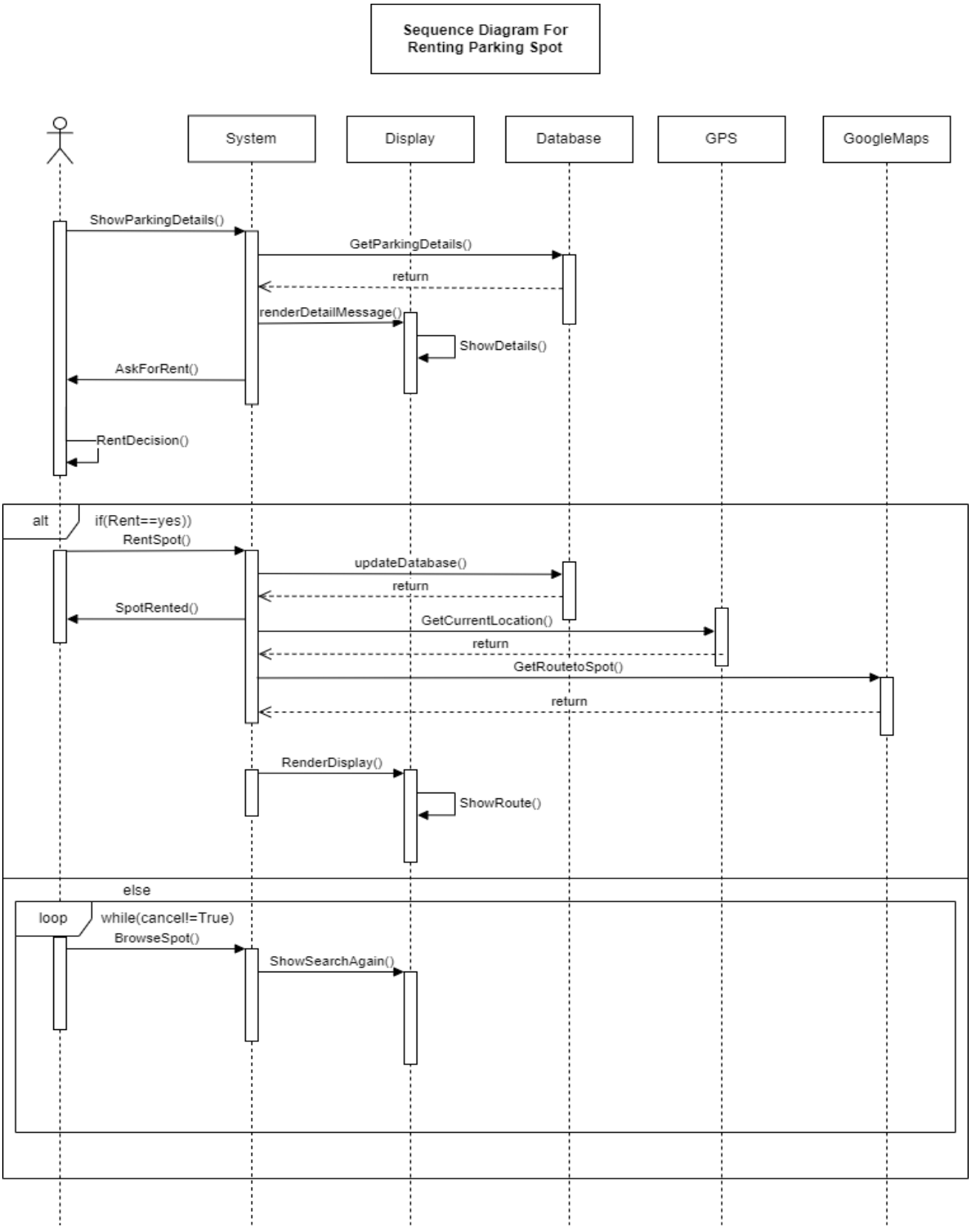
Sequence Diagram for Search Empty Spot



Description for Sequence Diagram for Renting Parking Spot:

There are 6 objects in the Renting Parking Spot sequence diagram. The user interacts with the system. The system fetches data from the other objects. The GPS provides the location of the users, the Database provides data, the Display shows the information, and Google Maps provides the location of the parking spots. The operations take place sequentially. There is one alternative box in the diagram. Also, there is a loop that allows the user to search the user cancels the search.

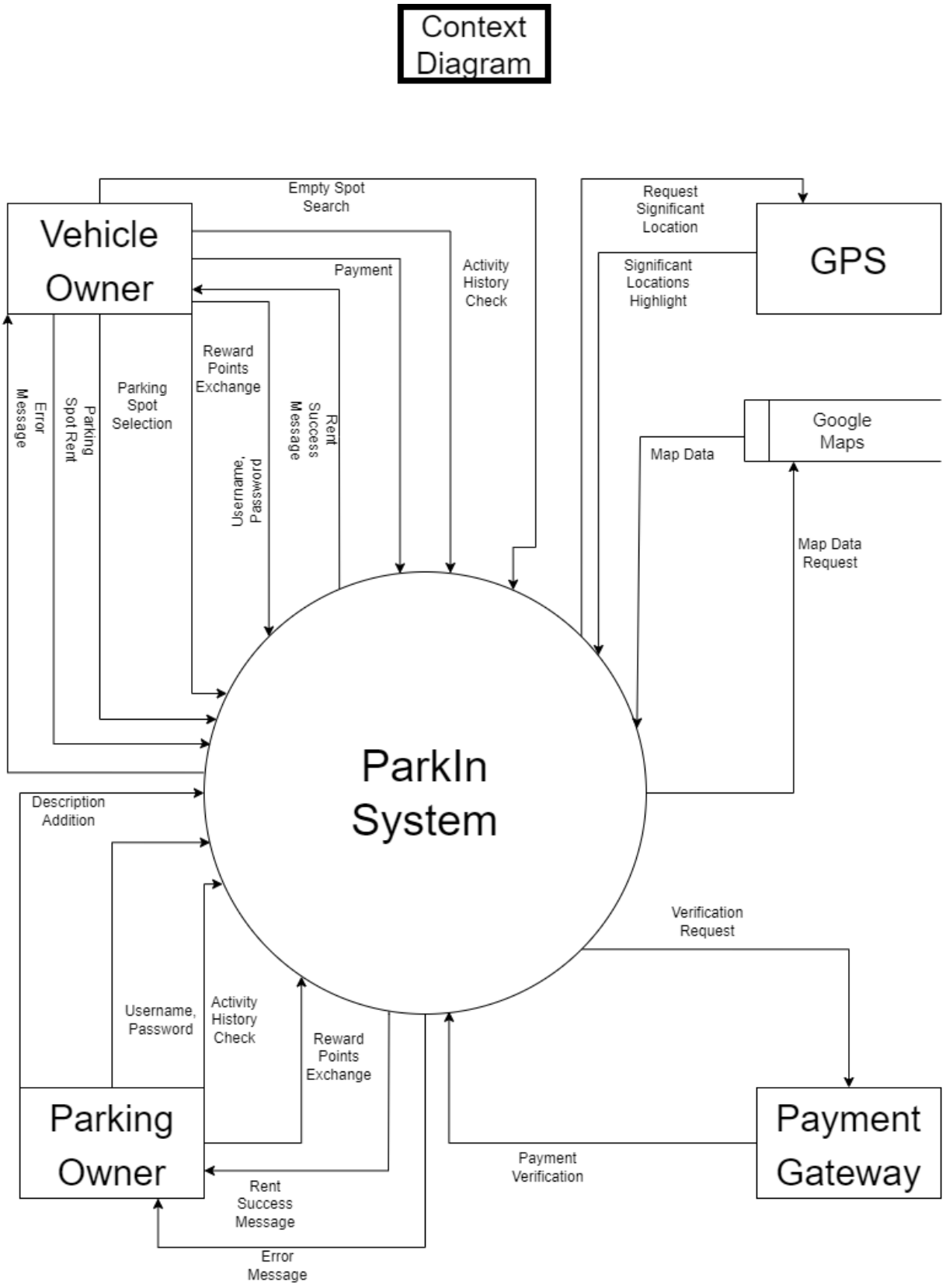
Sequence Diagram for Renting Parking Spot



Description for DFD (Context Diagram):

The context diagram shows the level 0 view of the system. There are 4 external agents and a data store. There are numerous incoming and outgoing data in the system. The 4 external agents are Vehicle Owner, Parking Owner, GPS, and Payment Gateway. The only data store here is Google Maps which provides the map data to the system.

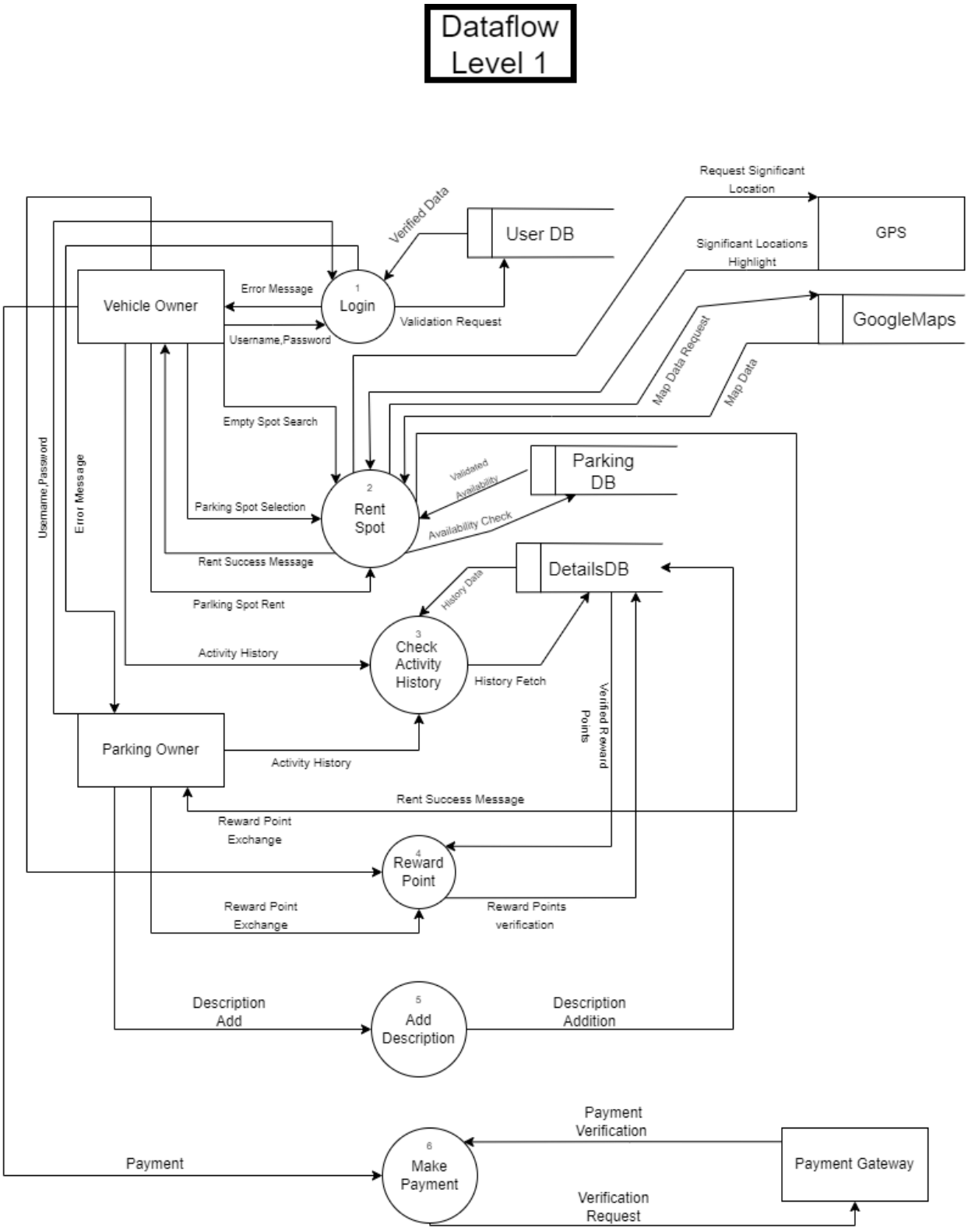
DFD (Context Diagram)



Description DFD (Level-1 Diagram):

The level 1 diagram shows that there are 6 processes available in the system. Also, there are 4 external agents and 4 data stores. The external agents and the data stores are communicating with the processes. The Rent Spot process looks like the most used process in the diagram. Every process here has at least one incoming and one outgoing data flow. The balancing with the Context diagram is ensured in the diagram.

DFD (Level-1 Diagram)



Conclusion

To conclude, we can state that our ParkIn will be beneficial for people who own private vehicles and frequently drive those vehicles to work or educational facilities. Since Bangladesh's population is growing quickly, more private vehicles are being registered every day, which creates an issue with parking during peak hours. Therefore, ParkIn will be useful to those who are in the unfortunate situation of not having secure parking during certain hours.