

Team Papaya

Requirements

Adam, David, Ethan, Jasper, Matt

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Document Overview

This document outlines team Papaya's list of requirements for the proposed product and it that delineates in a logical manner what the development of the product entails, including user needs, high-level technical components, and product's features. This was done through research of similar products, informal information gathering such as targeted interviews, use cases, and groups meeting where the intent was to narrow down the product's feature to a multi-tier list with categories such as primary, secondary, and tertiary.

Furthermore, this document explains any changes done to the project plan including a brief rationale that justifies the decisions made by Team Papaya.

Project Updates

Overview

Since the start of the project, Team Papaya has gathered relevant information to initialize a conceptual idea of the product. Though, the low-level components of the product have not materialized thus far, since the idea has been shapeless in nature due to the diversity of ideas that Papaya has had. Nevertheless, the main high-level functionality of the product has remained intact; to identify which parking lots have available parking spots. Any other changes to the product such as features and interfaces will be outlined herein.

Project Plan Update

Team Papaya's project plan has had minor changes based on work demanded by current and upcoming deliverables. Changes as follows;

- Tasks have been split into multiple subtasks.
- Multiple team members can now be formally made responsible for the same task or subtask depending on the estimated amount of work required to complete.
- Tasks and sub-tasks are now formally assigned, by the acting task delegator, to the rest of the team members through Trello.

Data Collection

Overview

Team Papaya gathered valuable information with the aim to narrow down what the product requirements entail, based on similar product research and informal interviews.

Background Research

Competitors

Parkopedia: <https://en.parkopedia.ca/>

Parkopedia is a leading provider of parking information, technology, and solutions and has been operating since 2007. The company offers a range of services through their website and mobile applications aimed at making parking easier and more efficient. Some of their services include a global parking database, real-time parking information obtained through computer vision and sensor data, and a range of parking-related APIs. Parkopedia's APIs provide parking information such as parking space availability, pricing, entrance and exit coordinates, and more. These features could potentially be used to expand some aspects of our project in the future.

Streetline: <https://www.streetline.com>

Streetline is a company that has more than 20 years of experience in real-time parking availability in North America. The company mainly deploys its services on establishments such as universities. The technologies that are used by Streetline consist of in-house tools such as machine-learning models, cameras, and infrastructure-less sensing such as "*software development kit (SDK)*" which is a software library embedded in a mobile app that captures location and motion automatically and it is 100% anonymous. This SDK is a feature that our team would benefit from in further iterations, as it would allow the product to gather information in real-time to improve the accuracy of the product.

Informal Interviews

Team Papaya interviewed individuals that would be potential users of our system. This included faculty, students, and general staff. Based on the results of the interviews, team Papaya has established the following necessary features for the system as perceived by the users.

- The product must provide accurate parking availability information.
- A forecast of estimated availability projected on any time of the day.
- The interface and presented information must be understandable at a glance.
- Users must be able to set preferred parking lots.
- The system must have minimal latency and quick load time.

Project Requirements

Overview

In this section, Team Papaya outlines what the various types of product requirements are, based on data collection and through various iterations of use cases and activity diagrams.

Product Summary

Our product is an information system that analyzes VIU parking lot footage which lets users know how likely they are to find parking spots in each lot. Features of the product are calculating current and future parking lot availability from images that are collected on 5-minute intervals. These images will also be shown to users to allow them to give fair judgment on how our system handled the calculation which should be accurate within 10%. This is being developed for all members of VIU such as the students and staff, and as such they will be given the opportunity to select their preferred parking lot location(s) to fit their needs. If users choose to create an account they will be able to track their session in the system and continue to show their preferred parking lot availability across devices. If the user also enters their estimated time on campus they will be shown what potential future lot availability looks like. The product will be friendly to new users and easy to access the parking lot images and availability desired.

Requirements

Functional Requirements

1. Calculate current parking lot availability
2. Forecast future parking lot availability
3. Retrieve images of parking lots on a 5 minute intervals
4. CRUD (Create, Read, Update, Delete) Accounts

Non-Functional Requirements

1. CRUD (Create, Read, Update, Delete) Session Information
2. Forecast lot availability is accurate within 10%
3. Prevent web vulnerabilities such as SQL injections
4. Account information stored privately
5. Response time is within 4 seconds
6. Choosing lot preference such as General or Staff

Interface Requirements

1. Easy to visually verify parking availability
2. Entered info is easy to access and error correct

Users

User 1: General Parking

The “General Parking” user is someone who drives to and parks at VIU, and has a general parking permit or pays to park. This user is interested in quickly and efficiently finding a parking spot in one of VIU’s general parking lots. They may prioritize convenience and proximity to their destination in relation to a general parking lot.

User 2: Staff Parking

The “Staff Parking” user is someone who works as staff or faculty at the VIU and has a staff parking permit which allows them to park in either of the staff or general parking lots. This user may opt to park in a general lot if their preferred staff lot is full, and as such they would benefit from having visibility of both the staff and general lot availability so they can find the most convenient available spot.

Use Cases

Use Case	Description	User(s) associated with it
Create account	Users can create a personal account within the parking availability app.	1, 2
View account information	Users can view their personal account information at any time.	1, 2
Edit account information	Users can update their personal account information as needed.	1, 2
Input parking information	Users can input their parking information into the app for tracking and for parking forecast prediction.	1, 2
Edit parking information	Users can modify their parking information as needed.	1, 2
View parking information	Users can view their parked car information for their parking session.	1, 2
Set lot preference	Users can set their preferred parking lot(s).	1, 2
Check general parking availability	Users can check the availability of parking spots for any of the general lots at VIU at any time.	1, 2
Check parking availability forecast	Users can check the future availability of parking spots for VIU parking lots, as pertains to their parking permits (general or staff).	1, 2
Check staff parking availability	Users can check the availability of parking spots for any of the staff lots at VIU at any time.	2

Use Cases Diagrams

As you can see in the use case diagrams below, all of our users share the same use cases. Although both user groups share the same use cases, they are different because staff parking users have access to additional parking lots general parking users do not.

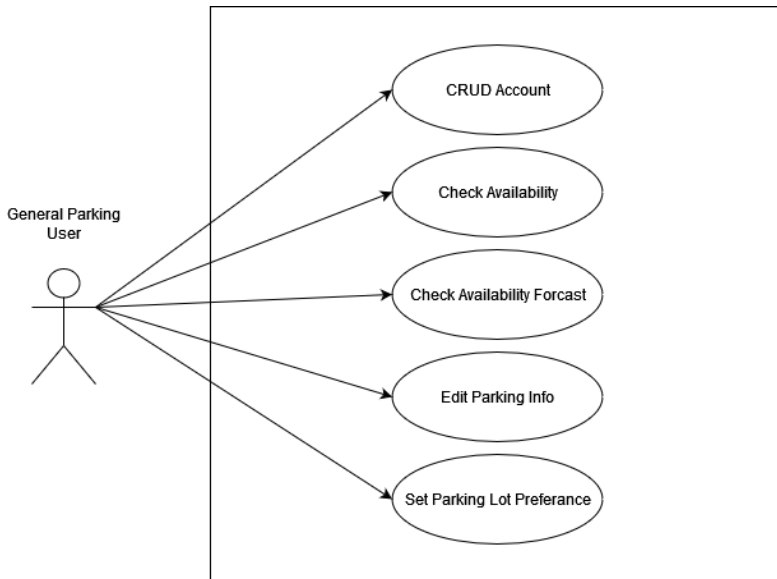


Figure 1.1 General Parking Use Case Diagram

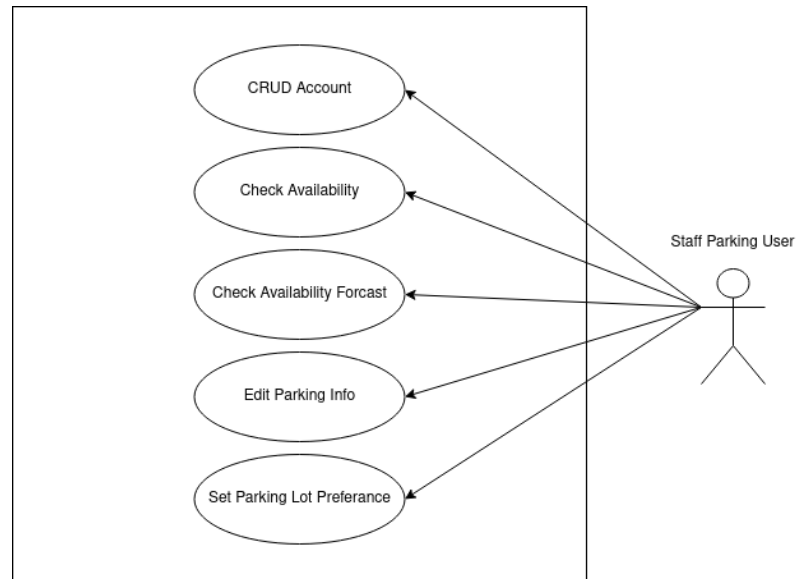


Figure 1.2 Staff Parking Use Case Diagram

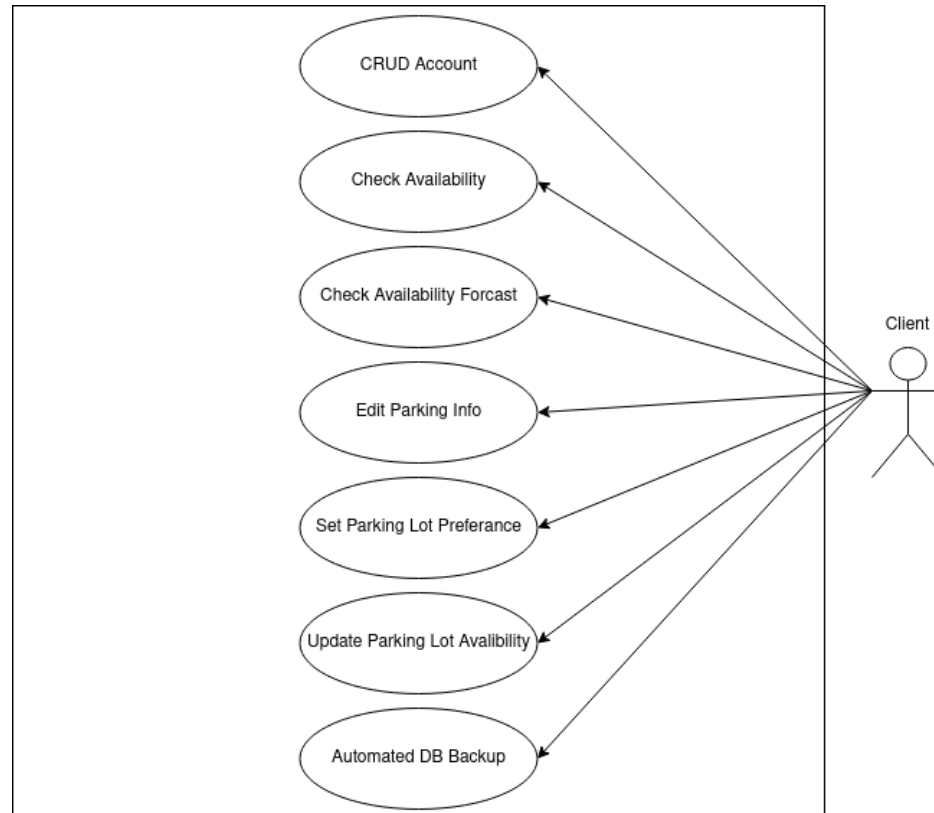


Figure 1.3 Client Use Case Diagram

Activity Diagram

The activity diagram below represents both general parking users and staff parking users completing the use cases of check availability, check availability forecast, and edit parking information.

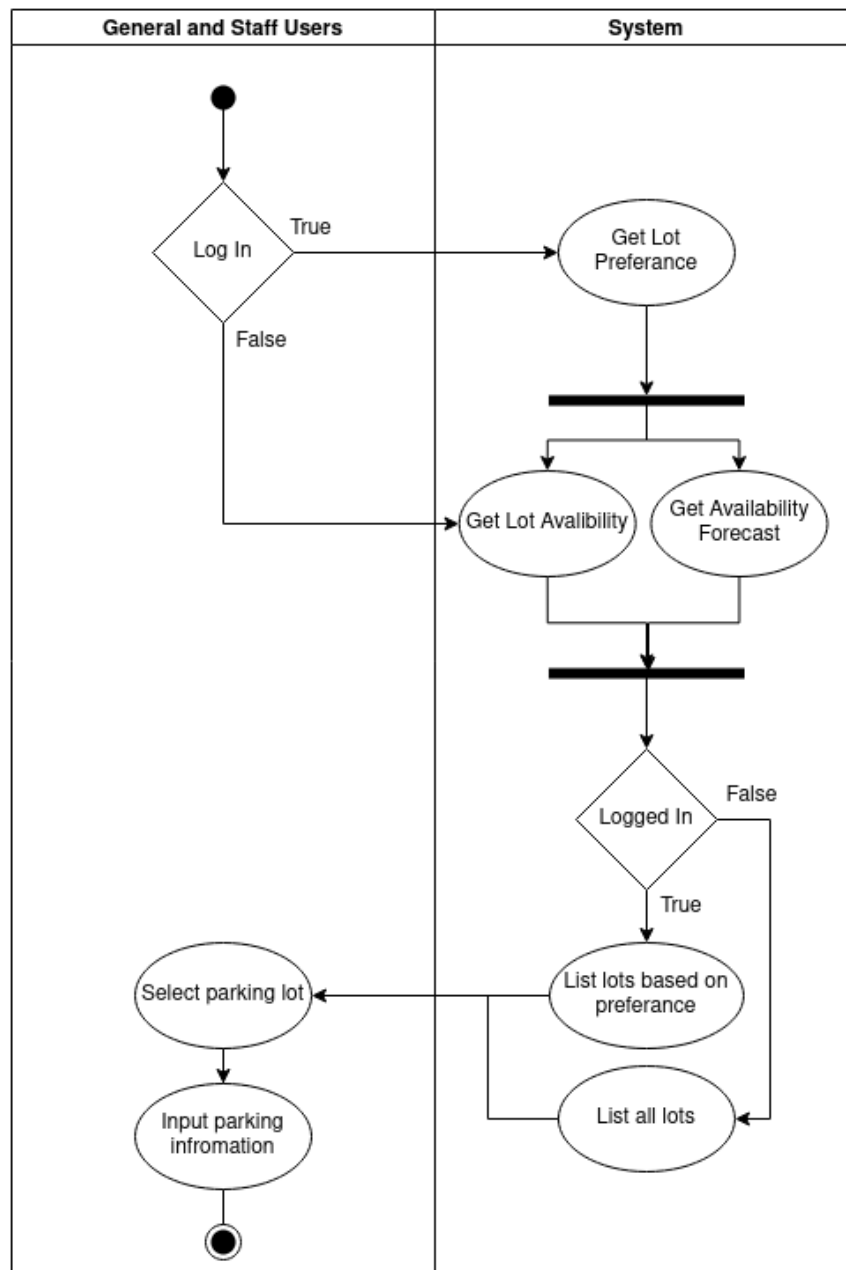


Figure 1.4 Activity Diagram

Feature Set

Based on our requirements analysis, we have identified and prioritized a set of both essential and non-essential features that our team plans to implement for the demo. This feature set reflects the most important capabilities that we believe will provide the greatest value to our users and demonstrates the full potential of our system.

Essential Features

Priority	Essential Feature	Reason for priority
1	Calculate current parking lot availability	This feature is the cornerstone of our system, and its functionality is crucial for the system to operate effectively. Without it, the system would not function.
2	Forecast future parking lot availability	This feature is also essential as it is the secondary core functionality of our system, and would be used by many of our users.
3	CRUD (Create, Read, Update, Delete) Accounts	This feature is required to get data to find the best lots based on users preferences and find out if they found parking.

Stretch Features

Priority	Stretch Feature	Reason for priority
1	Retrieve captures from live footage on a 5 minute interval	This feature would be most realistic to include for a final product but for the demo we can work with a small set of pictures.
2	CRUD (Create, Read, Update, Delete) Session Information	The sessions could afford some users privacy from creating an account but could be difficult to implement in the time we have.
3	Account information stored privately	Accounts should be stored privately on a secure server but aren't needed for the demo.

Corrections

Feedback:

The system proposes to tell users *how likely* they are to find a parking spot at a given time, but then claims to also help them *find a parking spot*. It isn't clear that one leads to the other. The purpose should be better worded to not make claims it cannot deliver on.

Correction:

Based on feedback, we've made the following revision to our project proposal by removing the additional claim of helping users find a parking spot:

Team Papaya's project idea is to develop an information system that analyzes the availability of parking lots on the VIU campus. We then use this analysis to let users know how likely they are to find a parking spot at any given time ~~to help students, faculty, and staff find a parking spot quickly.~~

Feedback:

Risk: Decrease in team morale and communication.

Type of Risk: Organizational Resource

VIU (the client's organization) is "organizational" not your team

Correction:

Initially, we found it challenging to classify this risk into one of the primary four risk categories during our risk assessment process. But after consideration, we have concluded that this risk relates to the potential loss of human resources, making it a type of resource risk.