Functional Specification

Background

The problem being addressed

Finding parking in the Seattle area can sometimes be an arduous task. Free street parking is difficult to find, can be on narrow streets, and time-limited in residential zones often to 2 hours. Paid street parking is often just as difficult to find.

Our solution is to create an interactive API using the Seattle Annual Parking Study, which records street parking usage at various times of day on streets throughout the city, to create a suggestion for most-likely-available streets to park in based on a user's inputted destination.

User Profile

Who uses the system. What they know about the domain and computing (e.g., can browse the web, can program in Python)

The users of this system are drivers in Seattle looking to find an ideal place to park. These users are of no particular domain, but are familiar with basic application interfaces with search/filter features to access further information. Additionally, user are should have a basic level of map comprehension and be able to use a map to navigate to their destination.

Data Sources

What data you will use and how it is structured.

- **Data set 1: Annual Parking Study Data**
    - Data Source:

      This data set is from Seattle's Open Data Program which makes data generated by the city of Seattle openly available to the public.

Annual Parking Study Data | City of Seattle Open Data portal

https://data.seattle.gov/Transportation/Annual-Parking-Study-Data/7jzm-ucez/data

- Description:

  The Annual Parking Study Data is a manual study of citywide paid parking with a temporal coverage from 2014-2019. Most of the data was collected in the spring of each year and includes some in the summer. The purpose of this survey was to determine hourly parking occupancy for most paid blockfaces in Seattle.

  Note: A blockface is defined as one side of a block between road intersections, and often features a sidewalk.

- Data structure:
  - Number of observations: 167,799
  - Variables used:
    - Elmntkey: unique key for each observation
    - Study Area: name of area in study
    - Unitdesc: parking area/street description
    - Parking_Spaces: number of parking spaces available
    - Total_Vehical_Count: number of vehicles present
    - Subarea_Label:
    - Peak_Hour: is it a peak hour?
    - Time Stamp: time survey was conducted
- Data use:
  - We use this data set to create a parking recommendation system. We create a function to find best block to park with highest availability for a given location and time.

- **Data set 2: Seattle Streets**
  - Data Source:

This is a public data set from the Seattle City GIS Program.

> Seattle Streets | City of Seattle Open Data portal
> https://data.seattle.gov/dataset/Seattle-Streets/b856-55i2

- Description:

  This data set was created in October of 2020 and published by the Seattle Department of Transportation. The Streets Layer is a representation of the City's Street Network Database (SND) showing drivable public streets within the Seattle City limits, symbolized by arterial classification.

- Data Structure:
  - Number of observations: 23,806
  - Variables used:
    - Unitdesc: Structured description of the Street location
    - Shape_length: ESRI field that stores information about the length of a feature in GIS
- Data use:

  In this data set, we use the Unitdesc attribute and its corresponding geographic Shape_length to get the coordinates of the Unitdesc for the streets in the parking data.

Use Cases

Describing at least two use cases. For each, describe: (a) the objective of the user interaction (e.g., withdraw money from an ATM); and (b) the expected interactions between the user and your system.

Use Case #1:

a) Objective: Find best place to park near University of Washington

b) Expected interactions:

- User opens the link to our web application

- User enters location of destination: University of Washington
- User enters distance willing to park from destination
- System presents top N streets/areas to park
- User looks through top N choices and makes decision where to park
- User is redirected to Google Maps for directions to parking destination

Use Case #2:

a) Objective: Find hourly average number of free spaces for 'DEXTER AVE N BETWEEN VALLEY ST'

b) Expected interactions:

- User opens link to our web application
- User enters street name
- System presents a map that filters/highlights user input on map
- User hovers the street and a histogram appears
- System presents histogram of hourly average number of free spaces for given street