

Assessing Seattle Mobility With Google Distance Matrix API

Daniel White • 12.06.2018
DATA 512 Final Project Presentation

Why is mobility important?

- Vital for city planners to design an equitable transit system, regardless of socioeconomic status
- Massive implications on:
 - home values
 - crime rate
 - economic development



Research Questions

- Can Google Maps Distance Matrix API be used to effectively assess mobility?
- Which neighborhoods in Seattle are underserved by the public transit network?
- Which neighborhoods in Seattle suffer from the worst traffic congestion on the morning commute?

Methodology

Data

Google Maps Distance Matrix API

- Available for free -- after requesting an API key
- Input: Origins and Destinations, similar to Google Maps search bar
- Output: travel time, travel distance
- Parameters: Mode of travel, departure time, etc.

Seattle Open Data Transit Communities

- List of 42 neighborhoods in Seattle
- Avoid any self-inflicted bias in neighborhood selection

Source: <https://developers.google.com/maps/documentation/distance-matrix/start>

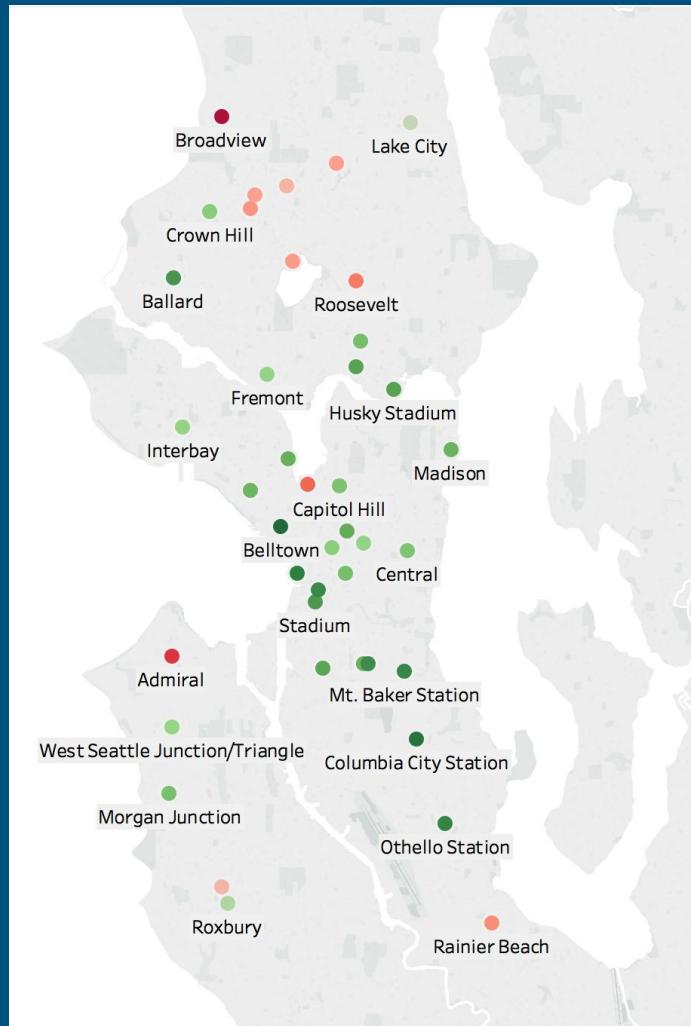
Process

- Run list of 42 neighborhoods through Distance Matrix API
- Calculate key metrics:
 - Percent Difference between Transit and Driving Times
$$(Transit Time - Drive Time) / Drive Time$$
 - Percent Difference between Driving Time in Peak vs Non-Peak
$$(Peak Time - Non-Peak Time) / Non-Peak Time$$

Findings

Transit vs. Driving Times

- North Seattle could benefit from better transit access
- South Seattle has greatly benefited from Link access
- South Lake Union has below average transit access

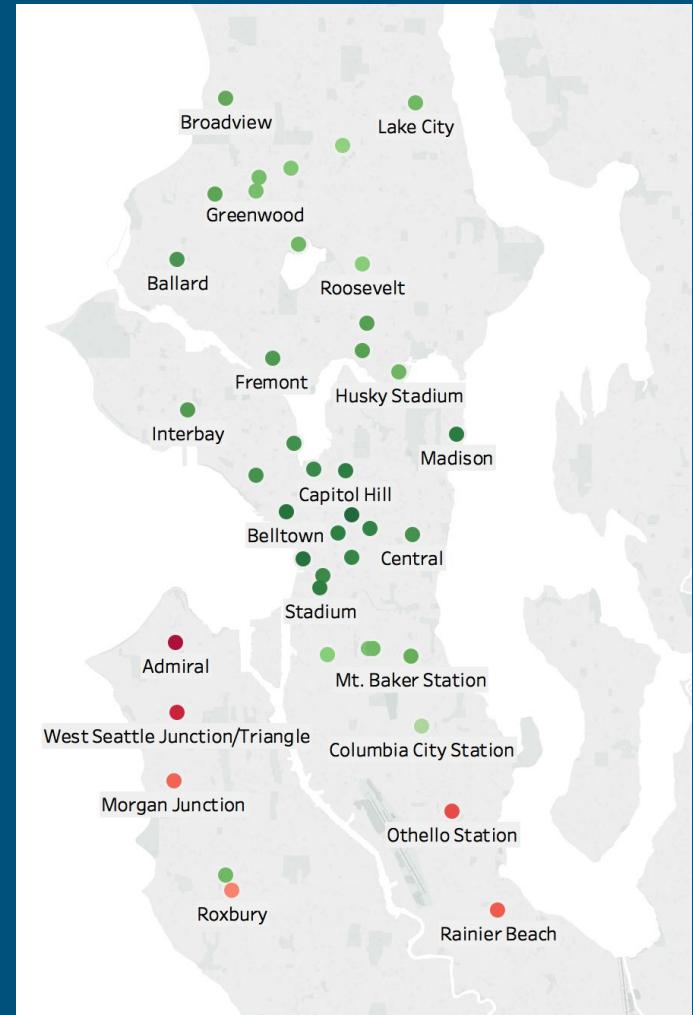


Driving Time Peak vs. Non Peak

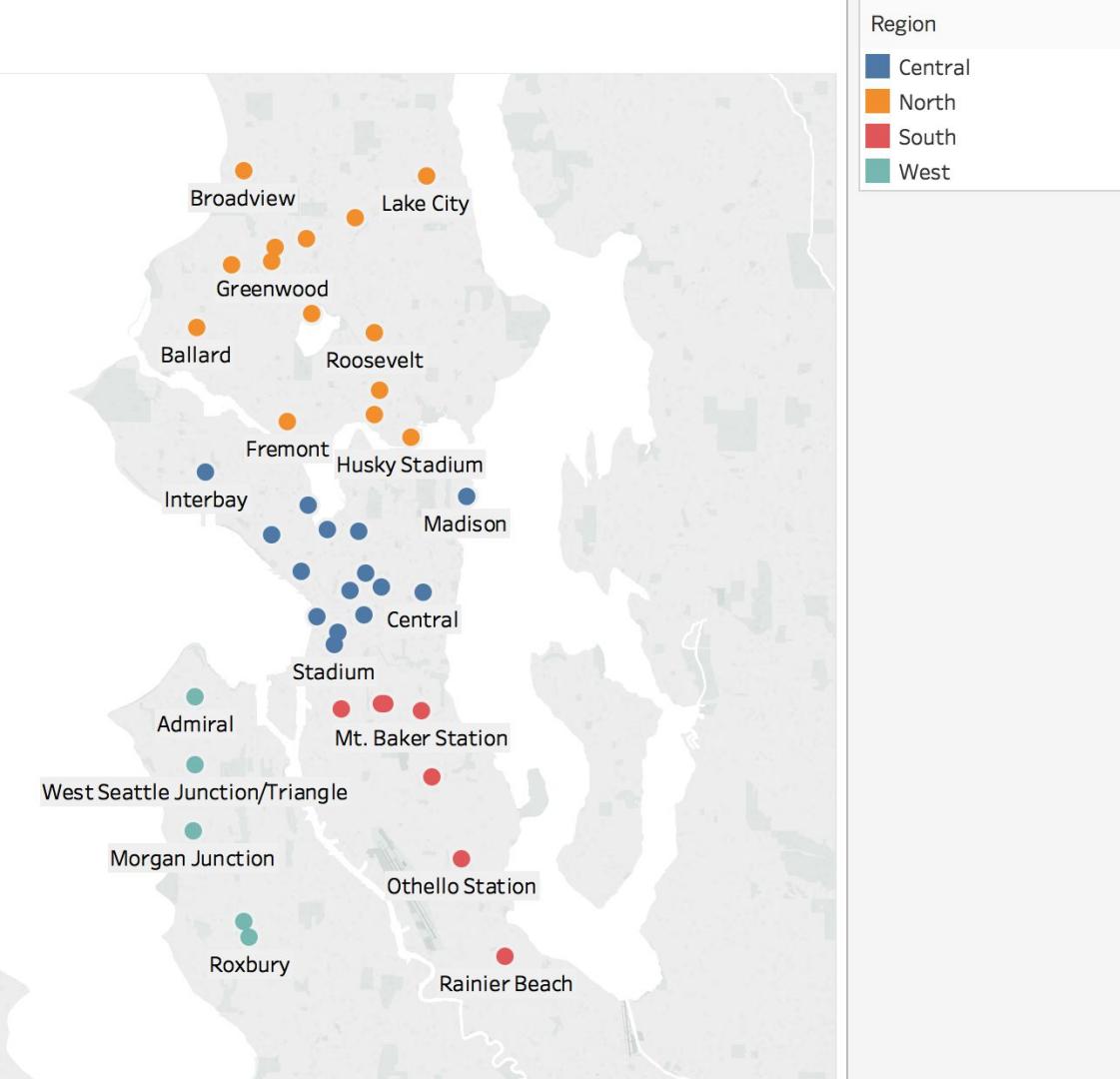
Traffic is worst in West Seattle and South Seattle neighborhoods

Traffic from North Seattle was noticeably better

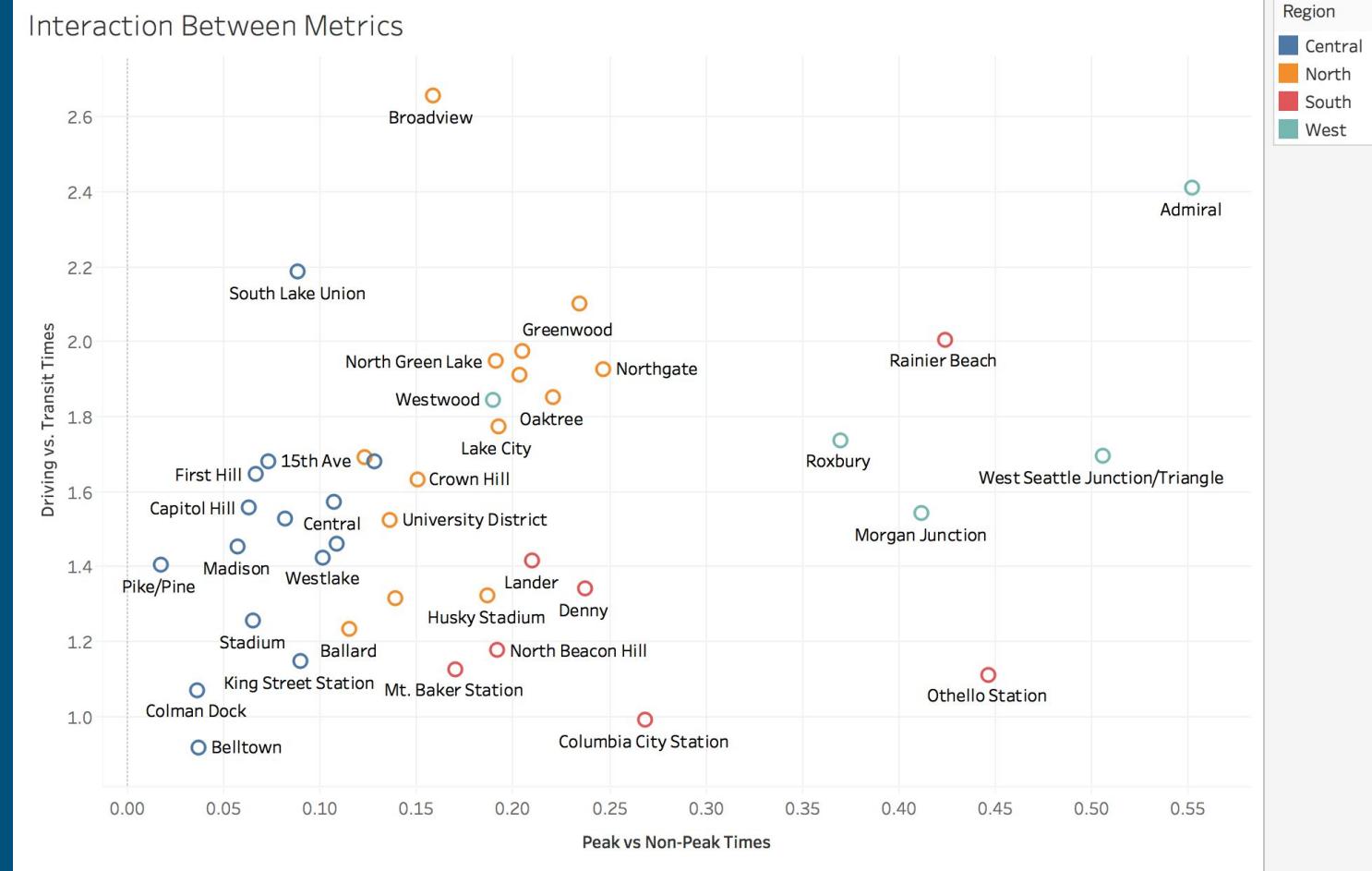
Likely due to southbound express lanes for the morning commute.



Neighborhoods by Region



Worse Transit



Worse Traffic

Discussion

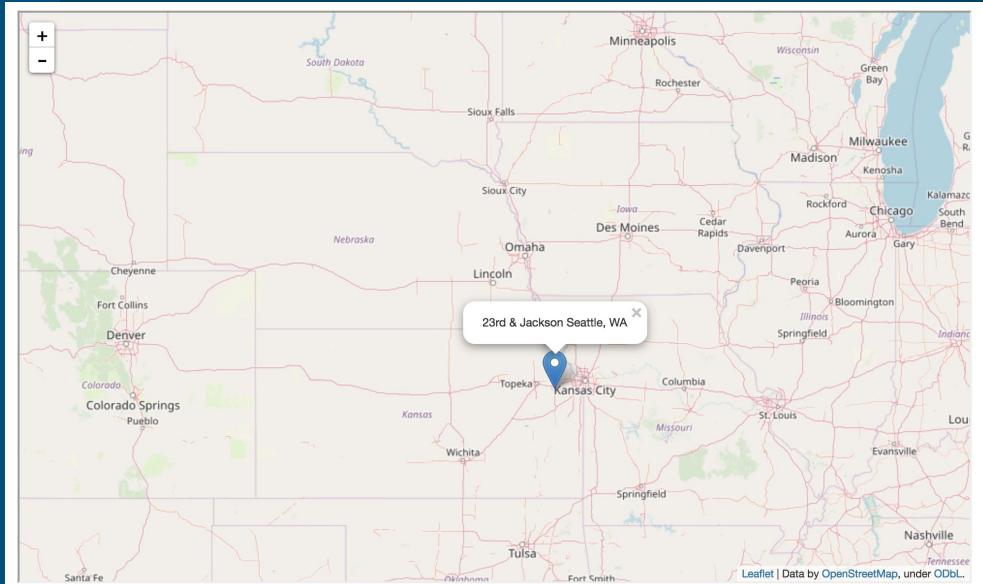
Study Limitations

1. Location Accuracy!

- a. API miscues, inconsistent interpretation of place names

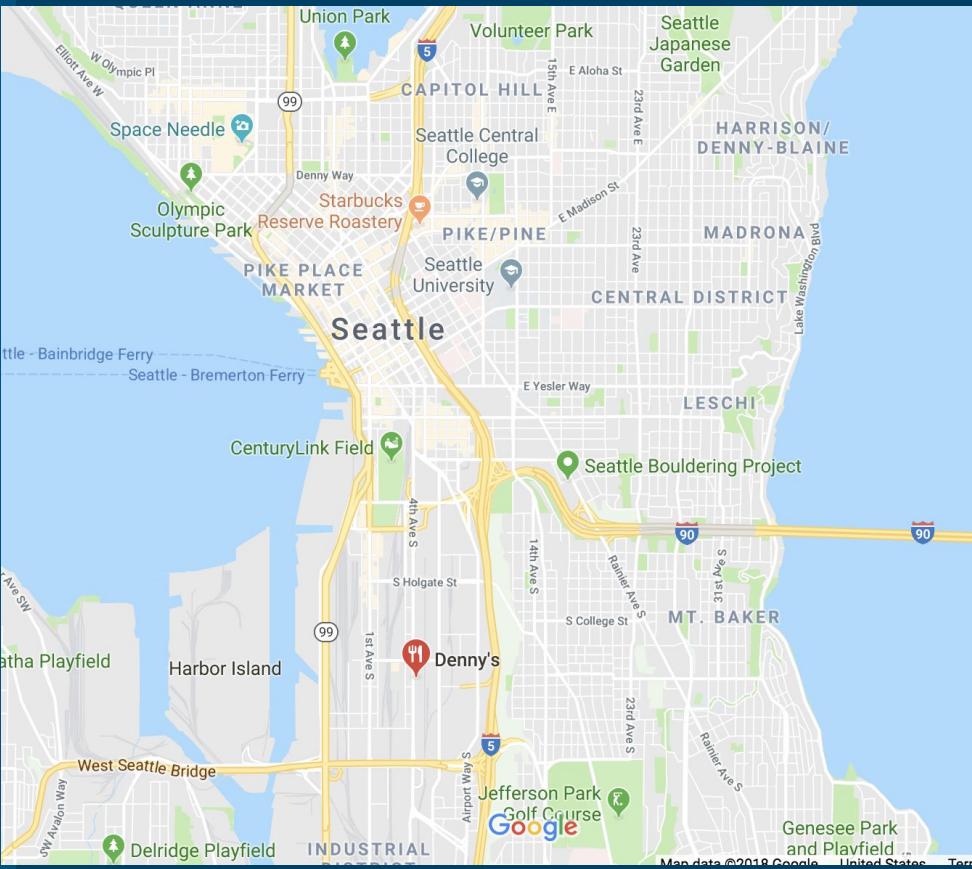
API Miscues

“23rd & Jackson Seattle, WA”



API Miscues

“Denny Seattle, WA”



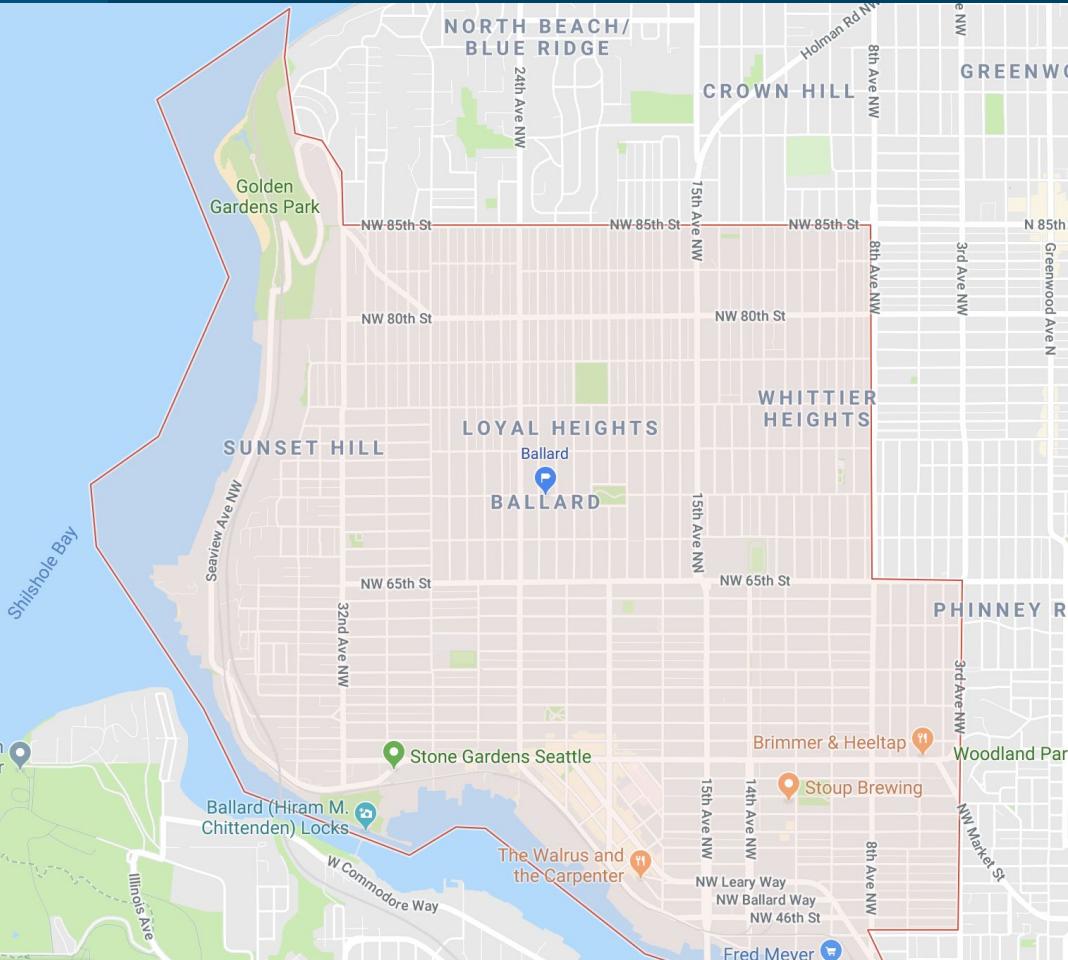
Limitations

1. Location Accuracy!

- a. API miscues, inconsistent interpretation of place names
- b. Precise location of inputted neighborhood

Location Precision

“Ballard Seattle, WA”



Limitations

1. Location Accuracy!

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2. Potential Bias in Neighborhood Selection

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2. Potential Bias in Neighborhood Selection

- a. Transit Stations in South Seattle

Limitations

1. Location Accuracy!

- a. API miscues, inconsistent interpretation of place names
- b. Precise location of inputted neighborhood

2. Potential Bias in Neighborhood Selection

- a. Transit Stations in South Seattle
- b. More even distribution of neighborhoods

Conclusion

- 1. Distance Matrix is decent proxy for assessing mobility**

Some issues to be resolved with location accuracy and appropriate representative sample

- 2. Underserved neighborhoods in terms of transit access?**

North Seattle and South Lake Union

- 3. Worst traffic on the morning commute?**

West Seattle and South Seattle

Future Study

1. Better representative neighborhoods sampling
2. Larger dataset
3. Explore trends during evening commute hours
4. Try similar approach on different cities



Thanks!