Seattle Mobility Index Project
What is mobility?

The ability to reach everyday destinations with your choice of mode, affordably and reliably.
From mobility data to mobility indices

Google Distance Matrix API
PSRC Household Travel Survey
Census Employment Data
City of Seattle Open Data
Raw Mobility Data: **Google Maps API**

Distance & duration for multiple destinations and transport modes

- **Duration and Distance**
  
  Estimate travel time and distance based on a recommended route.

- **Modes of Transport**
  
  Specify the mode of transport to use when calculating distance and travel time.

- **Traffic**
  
  Use current and historical traffic to predict travel times.

23 Min. 4.7 Miles
Calibration and Training Data: **PSRC Survey**

Puget Sound Regional Council Household Travel Survey

- 3,000 households
- 30,000 trips

**Trip Attributes**
- Time
- Distance
- Purpose
- Mode
- Block Group

**Household Attributes**
- Income
- Homeownership
- Race
- Gender
- Distance
Measure and identify disparity in mobility to drive policy
Measure and identify disparity in mobility

- Understand mobility at a granular level
- Provide baseline mobility measures
- Quantify impact of changes in transportation systems
Where do people go?
Origins

Unit of Analysis: Census Block Group

- Granular geographic division
- Typically 600-3000 people
- Seattle: 481 block groups
Destinations

LOCAL LOCATIONS

- school
- supermarket
- destination park
- urban village
- hospital
- library
- post office
- pharmacy
- cafe

CITYWIDE LOCATIONS

- employment center
- public college
- point of interest
Market Basket of Destinations

- Best-scoring combination of destinations informed by PSRC Household Travel Survey and Census employment data
- Final basket: 12 local and 13 citywide destinations
Mobility Indices

- Mode Choice Index
- Affordability Index
- Reliability Index

Availability of Options
Transportation Costs
Statistical Variation
Availability of modes to reach each destination in the market basket

Travel Time Threshold

- Car: 30 minutes
- Train: 60 minutes
- Bicycle: 45 minutes
- Walking: 45 minutes
Mode Choice Index
Affordability Index

Relative cost to reach destinations in the market basket

- $0.56 / mile + Parking Cost
- $2.75 / trip
- $0.15 / mile
- $0 / mile
- $14.10 / hr
Affordability Index

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Reliability Index

Consistency in travel duration at a given time

Travel Time (Minutes)

Percent under 85th percentile

85th Percentile

Total trips in one month

0 5 10 15 20 25 30 35 40
Reliability Index
Seattle Mobility Scores
Case study: University District
Average  |
City Average |

Average  |
City Average |

Average  |
City Average |
Average 78 | City Average 72

Average 57 | City Average 48

Average 47 | City Average 24
Using indices to make predictions
Can we predict drive-alone behavior?

<table>
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<tr>
<th>Predictors</th>
<th>80% Accuracy</th>
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Different people, different needs
5 Travel Personas

**GOAL**  Understand people with different mobility patterns

**METHOD**  K-Means clustering

**DATA**  PSRC household travel survey data

**RESULT**  Identified 5 different personas
Persona A

Persona B

Household Income Over $75,000

- Driving: 70%
- Transit: 33%
- Biking: 16%
- Walking: 46%

Household Income Over $75,000:

- 28%
- 67%
Persona A

Persona B

Household Income Over $75,000
- 67%
- 28%

Going to work
- 24%
- 38%
Case study: University District
Mode choice comparison

Baseline  78
  Average

Persona B  64
  Average
Affordability comparison

Baseline: Average 57
Persona B: Average 48
Contributions
Status Quo  Frontier

Isolated measurement  Granular and comprehensive measurement
Status Quo vs Frontier

- Isolated measurement vs Granular and comprehensive measurement
- Expensive vs Low cost, scalable, and reproducible

Data designed for collaboration and correlation
Status Quo

- Isolated measurement
- Expensive
- Difficult cross-domain collaboration

Frontier

- Granular and comprehensive measurement
- Low cost, scalable, and reproducible
- Data designed for collaboration and correlation
Next Steps

- Get full data set for reliability index
- Add new modes
- Baseline
Who is this for and how can it be used?

City of Seattle

Other cities

Transportation researchers & policy analysts

Community organizations & Nonprofits