Developing a bicyclist route choice model

Urban Studies and Planning
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Random Utility Model

Alternative Routes

Attributes

Weights

Choice
Stated Preference

Imagine you commute to work by bicycle. If route 1 and route 2 are the only available options for your commute and your travel time on each route is as given below each video, which route would you use?

Route 1: 40 Minutes
Route 2: 20 Minutes

Your Choice:

1
2

Tilahun et al. (2007)
Revealed Preference

- GPS Track
- Bike Network
  - no facility
- Attributes
  - signed bike route
  - on-street bike lane
  - bike boulevard
  - off-street path
GPS Data used for model (2007)

- Cyclists 154
  - Women 44%
  - Year-round 96%
- Trips 1464
  - Commute 30%
- Miles 5169
  - Portland 83%
Observed bike travel
Alternative generation

- GPS Track
- Bike Network:
  - no facility
- Attributes:
  - signed bike route
  - on-street bike lane
  - bike boulevard
  - off-street path
Calibrated Labeling Method

Optimize key attributes

Subject to…
Sample Alternative (1)

- Maximize bike lane use, subject to distance constraint
Sample Alternative (2)

- Relaxing distance constraint results in 2nd unique alternative.
Sample Alternative (3)

- Relaxing distance constraint further results in 3rd unique alternative.
# Attributes

<table>
<thead>
<tr>
<th>Facility</th>
<th>Intersection</th>
<th>Physical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bike Facility</td>
<td>Turns</td>
<td>Distance</td>
</tr>
<tr>
<td>Functional Class</td>
<td>Signal/Stop</td>
<td>Slope</td>
</tr>
<tr>
<td>Traffic Volume</td>
<td>Cross Volume</td>
<td></td>
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<tr>
<td>One-way</td>
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<td></td>
</tr>
</tbody>
</table>
Equivalent Distances by Facility (Non-Commute)

- Highway: 0.14
- Major arterial: 0.42
- Minor arterial: 0.82
- Bike lane: 1.00
- Bike boulevard: 1.22
- Bike path: 1.35
- Bridge bike lane: 1.41
- Bridge path: 1.81
Equivalent Distances by Features (Non-Commute)
Equivalent Distances by Facility (Non-Commute)
Equivalent Distances by Features (Non-Commute)
Equivalent Distances by Facility (90 percent random param. intervals)
Equivalent Distances by Feature (90 percent random param. intervals)
<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upslope 6%+</td>
<td>0.08</td>
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<tr>
<td>Upslope 4-6%</td>
<td>0.26</td>
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<tr>
<td>Upslope 2-4%</td>
<td>0.58</td>
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<tr>
<td>Per mile...</td>
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<tr>
<td>Cross traffic 20k+, no sig</td>
<td>0.62</td>
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<tr>
<td>Left across 20k+, no sig</td>
<td>1.07</td>
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<tr>
<td>Left across 10-20k, no sig</td>
<td>0.86</td>
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<tr>
<td>Cross traffic 10-20k, no sig</td>
<td>0.91</td>
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<tr>
<td>Cross traffic 5-10k, no sig</td>
<td>0.93</td>
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<tr>
<td>Turn</td>
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<tr>
<td>Signal</td>
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<tr>
<td>Stop</td>
<td>0.99</td>
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<td>Highway</td>
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Questions?  
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