Multidimensional Assessment of First and Last Mile Transit Problems

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Goals and Motivation

- We examine the last mile component of a transit trip
- First/Last problem: The issues around bridging the gap between activity locations and transit stations.

Motivation

- Accessibility: Ease of reaching desirable destinations.
  - A measure that combines land use and transportation
  - Earlier work: Mapping Metropolitan Chicago’s Accessibility (http://access.uic.edu)
- Extension: Mapping the Last Mile (under development)
Motivations

- Ease
- Accessibility
- Professional, Scientific and Technical Service Jobs

45 minutes Transit Accessibility
Professional, Scientific and Technical Service Jobs
Motivations

45 minutes Transit Accessibility
Manufacturing Jobs
Motivations

45 minutes Transit Accessibility
Transportation and Warehousing Jobs
The Transit Last-Mile Problem

- The last mile problem focuses on the difficulties in bridging the gap between the first/last transit stop and an activity location.

- Often characterized by means of distance/travel time or the availability/quality of infrastructure.

- We often treat these travel time thresholds as if they are the same in all environments.

- However, the experience of a short walk to or from a transit stop can be very different depending on where it is taking place.
source: http://www.denverpost.com/politics/cj_29534469/denver-residents-push-city-take-charge-needed-sidewalk
Assessing Last Mile Issues

- A web-based stated preference study
- A revealed preference study using CMAP’s Travel Tracker data
- A focus group using regional stakeholders
- Data driven assessment for interactive mapping
Assessing Last Mile Issues

Based on behavior of travelers

A web-based stated preference study

A revealed preference Study using CMAP’s Travel Tracker data

A focus group using regional stakeholders

Data driven assessment for interactive mapping

Based on infrastructure/transit system
SP Takeaways: Values for last mile transit component

- Based on a logit choice model. Average first-mile distances on base trip was ~8 minutes.

- Walk time, safety, and sidewalk quality all important in informing choice

- A shift in 1 scale of the safety perception has the same impact as a 6.2 minute increase in travel time.

- Sidewalk availability/absence had the same impact as 5.9 minutes increase in travel time.
RP Takeaways: Values for last mile transit component

Preferences depend on a variety of factors including origin and destination level accessibility.

Origin safety is an important part of choice and, all things equal, unsafely deters non-motorized and transit use.

For a 10% reduction in crime, a Compensating Variation (CV) as high as $0.50-$2.72/trip.
System Wide Analysis (Process)

- Open Street Maps
- General Transit Feed Specification (GTFS)
- Network/Graph created in Open Trip Planner
- Travel time matrix
- Travel Time Components
- Last Mile Choropleth Map
- Accessibility Choropleth Map
- Accessibility
- Isochrone Map
- Land Use data
- External data
- Intermediate outputs
- Final outputs
System Wide Analysis

- Travel time components for all OD pairs in the metropolitan area computed
  - First mile distance and time
  - Last mile distance and time
  - Transit travel time
  - Number of transfers
    - Transfer times (including any walk times between stations)
  - Different ways of aggregating
System Wide Analysis

- Work in progress ...
  - Unequal number of reachable destinations by tract
  - Excessive travel times for some ODs, but cutoffs can be arbitrary too
  - Results by destination type will vary
  - Developing indices by destination area/type
Summary

• The first/last mile transit problem is multi-dimensional
  • multiple approaches to examining the problem
    • from a user perspective based on revealed and stated choice
    • from a transit system/infrastructure perspective
  • Findings show the problem goes beyond infrastructure and travel time considerations
    • Significant benefits can be had from improving the safety/perception and quality dimensions of the last mile problem
  • The last-mile travel time components vary can vary based on destination type
    • Mapping helps us identify opportunities to address local problems based on local needs
Thank You!

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Chicago Metropolitan Accessibility Explorer
http://urbanaccessibility.com

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