Visualization and Analysis of Trip Origin and Destination Data in GIS

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Urban Campus

- University of Minnesota, Twin Cities MN, Campus
2014 Origin and Destination (OD) Study

- Green Line LRT and change of travel behavior
- Survey conducted November 18 - December 29, 2014
- Representative sample collected from active Twin Cities students, faculty, and staff
- Mode and OD results used to support committee transit planning efforts
Apply macroscopic zoning concept to microscopic level

Divided campus area into 85 zones based on building function
Survey Data Overview

• Origin, destination and % of transportation mode of all trips during typical semester week

• Use aggregated # of trips as the demand indicator for specific origin and destination (OD) pair under specific mode of transportation

• Calculate destination mode share as the land use indicator
### Why Visualizing OD Data?

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Why using GIS?

• Existing University Enterprise GIS platform

• Geoanalysis

• Flexible visualization
GIS Modeling

• Create 7,225 (85x85) line features using Python codes

• Associate # of trips by transportation mode data with line features

• Offset O and D lines for cleaner visualization
Highly Demanded OD Visualization and Analysis of Trip Origin and Destination Data in GIS

Number of Trips
- 19.9 - 23.5
- 23.6 - 30.8
- 30.9 - 42.7
- 42.8 - 62.7
- 62.8 - 103.6

Highly Demanded OD

Dinkytown

Biomedical District

Coffman Union

West Bank

Health/Medical

St. Paul Student Center area

Visualization and Analysis of Trip Origin and Destination Data in GIS

Parking and Transportation Services
University of Minnesota
Cross Area OD Overview

Typical Weekday Daily # of Trips:
1. Line thickness reflects "Total" demand.

Total; Total Transit (%); UofM Transit (%);

- Dinkytown Area
  - 12,848; 2,329 (18%); 1,025 (8%);
  - 2,681; 1,587 (59%); 1,347 (50%);

- East Bank Area
  - 14,812; 5,306 (36%); 2,946 (20%);

- West Bank
  - 5,961; 2,310 (47%); 2,001 (34%);

- Como Area
  - 321; 148 (46%); 25 (8%);

- St. Paul Campus
  - 1,692; 1,223 (72%); 1,019 (60%);
  - 7,721; 5,263 (68%); 4,577 (59%);

Areas:
1. EBank Area
2. Dinkytown Area
3. WBank
4. St Paul
5. Como

Map showing trip origins and destinations in various areas of Minneapolis, with noting that line thickness reflects total demand.
New Shuttle Routes with OD Overlay

Note:
1. Line thickness reflects “Total” demand
2. Typical Weekday Daily # of Trips
   Total; Total Transit (%); UofM Transit (%);

Campus Shuttle Service Recommendation Fall 2015

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Other Implementations

Destination mode share
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Destination Demand - All Mode

Destination Density - All Mode

(Demand Weighted by Zone Land Area)

Other Implementations

Destination Demand by Mode

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Summary

• Detailed mode and OD data in GIS database

• Visualization for decision making appropriate when roadway system and demand pattern is less complex
Questions?

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