Residential Transit Accessibility

A Neighborhood-Scale Accessibility Change Database for Commercial, Educational, and Recreational Activity

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General Structure



Feature Datasets

- CostSource (for creating time surfaces)
 - Contains freeways, major arterials, arterials, streets, light rail lines, and bus lines
- VectorSource (for buffering time surfaces)
 - Contains commercial addresses, bike routes, parks, trails, and schools
- AddressZoneSource (for Zonal Statistics)
 - Contains residential address data, taxlots (with relationship classes), metro boundary, and neighborhood boundaries

Raster Datasets

- Flat File
 - Raster Catalogs are best used for adjoining, not coincident raster datasets (they obscure layers)
 - Cost Time Surfaces for three instances
 - Road Driving Time, Transit Time, and Accessibility Disparity

 Rminutes, Tminutes, and Dminutes
 - Each cost surface has 5 derived accessibility surfaces
 - Travel Time buffered to classes in VectorSource dataset
 - Commercial addresses, bike routes, parks, trails, and schools

Sample Workflow

- Create Time Cost Surfaces (with CostSource feature dataset)
 - Road network and transit network
- Buffer Time Cost Surfaces (to VectorSource feature dataset)
 - Commercial, Recreational, and Educational sources
- Determine change in Accessibility
 - Subtract transit network times from road network times
- Compute Zonal Statistics
 - Reveal accessibility differences for transit riders across zones
- Exploratory Data Analysis or Regression Analysis
 - Taxlot data included
 - Could determine a relationship between housing cost and accessibility change

Driving Cost Source Data



Driving Cost Source Data

- Cost Impedances were defined by the map unit
 - Miles per Hour converted to impedance per foot
 - Freeway 50 mph .00022727273 min/ft
 - Major Arterial 40 mph .00028409090 min/ft
 - Arterial 30 mph .00037878788 min/ft
 - Street 20 mph .00056818182 min/ft
 - Walking (null case) 3 mph .00378787879 min/ft

Driving Cost Surface



Transit Cost Source Data



Transit Cost Source Data

- Cost Impedances for bus lines and light rail lines "inherited" the impedances of coincident streets
- 5 mph penalty in impedance to account for stops
- If no coincident streets, assumption of 15 mph (lowest level in street hierarchy minus 5 mph)
- Locations not on the network were null (3 mph)

Transit Cost Surface



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Driving Cost Surface for Commercial Activity

Driving Cost Surface for Commercial Activity



Transit Cost Surface for Commercial Activity



Transit Cost Surface for Commercial Activity



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Change in Transit Accessibility to Commercial Activity



Other Transit Accessibility Surfaces

- Safe(r) Personal Transit
 - Bike Routes
- Recreation
 - Parks
 - Trails
- Education
 - Schools
- List can be expanded in future

Change in Transit Accessibility to Bicycle Routes





Change in Transit Accessibility to Parks

Change in Transit Accessibility to Trails





Change in Transit Accessibility to Schools

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Change in Transit Accessibility to Commerce

Change in Transit Accessibility to Parks





Change in Transit Accessibility to Schools



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