Assigning Traffic Volumes through Spatial Interpolation

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Example: Locations of Traffic Counts

Assigning Traffic Volume Data through Spatial Interpolation
Why is a Traffic Counts Map Important?

1. Traffic count map is a highly requested map at MAG by member agencies and general public:
   - Transportation planning study
   - Economic development
   - Private business/real-estate

2. Only a sample of traffic counts is collected, impossible to cover every road segment

3. Need for a methodology to convert available data sources into a region wide traffic counts map
Data Inputs and Software

Input Data:

• Network dataset
• Traffic counts database (TCD)

Software:

• ArcInfo
• Python
• ArcGIS server
Scope of the Databases

- Number of freeway routes with count locations: 16
- Number of count locations on freeways: 85
- Number of arterial routes with count locations: 189
- Number of count locations on major arterials: 1,024
What is an Arterial Route?

Route 1301

Brown Rd

Lost Dutchman Rd
What is a Freeway Route?

Inflection Points

Start Point/End Point

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The Methodology in a Nutshell

1. Data Preparation
2. Assign count locations to roadway segments
3. Loop through routes and interpolate between data points
4. Map results and review

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Data Preparation

• Both freeways and arterials
  Unique route identifiers

• Freeway routes only:
  • Right segment in vertical route
  • Lower segment in horizontal routes
  • Inner segment in loops
  • Left segment in vertical route
  • Upper segment in horizontal routes
  • Outer segment in loops
Grouping of Freeway Links

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How To Choose the Search Radius?
Example of a Route Showing Count Locations
Distance-Based Interpolation

\[ V = V_1 + D_1 \times \frac{(V_2 - V_1)}{(D_1 + D_2)} \]

- **D1** – distance to closest detector; **D2** – dist. to second closest one
- **V1** – volume of closest detector; **V2** – vol. of second closest one
Interpolation Along a route

\[ V = 2200 \times 0.38^2 + 17600 \times 1.88^2 \]
Traffic Volume from Count Locations Versus Traffic Volume from Interpolation
Final Map of Total Traffic Volume
Region Wide Map of Traffic Volume
Conclusions

1. Successful and efficient procedure

2. Methodology can be adapted to leverage other datasets:
   • Future year networks and counts
   • Other type of traffic data (speed, percentage of trucks)

3. Implementation is possible in a different software environment
What’s Next?

• Integration
  • Spatial interpolation between points with known traffic within one horizon year network
  • Temporal interpolation between transportation network from different horizon years
  • Building web-based mapping service to publish the results
Questions?

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