NYCDOT’S EXPERIENCE WITH BIG DATA AND USE IN TRANSPORTATION PROJECTS

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Who we are and what we do...

NYCDOT’s *Modeling & Data Analysis* unit supports the Agency’s internal planning, project development, analysis and technical review processes, and coordinates/partners with external agencies on regional projects and planning.

- analytical support focusing on traffic flow and capacity
- static and dynamic simulation (macro-, meso-, micro-)
- development of analytical techniques
- management and evaluation of historic and real-time ITS data
NYCDOT currently leverages various archived and real-time datasets:

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Data analysis tools:
SQL Server, ArcGIS, SPSS, TaxiVis, Excel Pivot Tables, PHP & MySQL
Medallion Taxi GPS

- GPS in over 13,000 taxi cabs (TLC vehicles)
- Each fare trip is recorded; approx. 15 million/month
- Since 2008, over 1 billion records have been stored and analyzed
- Data are geo-referenced monthly by NYCDOT
- The data provide numerous insights:
  - Spatial and Temporal Trip Distributions
  - Origin-Destination Patterns
  - Trip Length and Travel Times
  - Intra-zonal, Inter-zonal and corridor-wide travel speeds
- Useful for Before-After project evaluations

One Month Taxi Trip Dataset
MTA/NYCT Bus Time

www.mta.info

- GPS devices on entire MTA NYCT and MTA Bus fleet in the 5 Boros
- Currently over 6 million records per day
- Gathers bus activity and position at 30-second frequency
- Includes data for corridors and crossing where other travel time data are not typically gathered
- Coverage of the Outer Boroughs in addition to Manhattan
- Specific vehicle, route and time-of-day data can be isolated and analyzed
- Useful for Before-After project evaluations
Uses of Data

**Trends Analysis**
Annual travel speeds, trip activity, VMT, VHT

**Project Monitoring and Evaluation**
Roadway changes, traffic calming, SBS projects

**Maintenance & Protection of Traffic (MPT) Planning**
Closures, turn prohibitions, and diversion routing

*MPT Example:*

For the Times Square Reconstruction origin-destination patterns of taxi trips from zones in Midtown (shown in yellow) through the MPT area (shown in green) were used to identify likely diversion routes during construction closures...
Bus Time application

Looking at effects of construction zone on Lexington Avenue outside GCT

Before (dark) / During (light)
Citywide application of data
Medallion Taxi GPS Data

Data Analysis & Visualization Examples
Geo referencing trips to zones

Manhattan CBD = zones 1-5, from the Battery to 60th Street
A different way to look at the Taxi Speed Calendar (2013)
Spatial view of taxi speeds

The data shown in the map are based on GPS data for short trips (up to a half mile) from typical weekdays (excluding major holidays) between 9 a.m. and 4 p.m. Speeds are calculated for small zones using the median speed for taxi trips in each zone. Data reflect these average zonal speeds, not speeds for individual streets...
Identification of typical and atypical conditions

June 16, 2011
Typical Thursday

June 23, 2011
Special Event Thursday
Future potential for TLC breadcrumb data
NYCDOT Pilot Project
THANK YOU!

Special thanks to the NYC Taxi and Limousine Commission and MTA / New York City Transit / MTA Bus

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