GPS Probe Data for Transportation Planning
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## GPS Probe Data for Transportation Planning

### Contents

1. New ways of measuring travel speeds and patterns
   - Consumer Navigation as a data source for transportation planning

2. Making GPS measurements available and usable
   - The first steps

3. Combining with other data sources, such as Census
   - How far can we go?
Navigation

Consumer

Automotive

Business Solutions

Map Database

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The Connected Car

- Large scale introduction of connected devices
- Multiple content & service options
- Co-branding
Business Solutions

- Navigation
- Communication
- Fleet management

Environmental responsibility
Driver feedback to reduce fuel use and CO₂ emissions
Real-Time Traffic
Real Time Traffic Data Sources & Fusion

General Data Sources

The best real time traffic information on highways, major roads and secondary roads.

Data Fusion

Note: Not all data sources are available or used in every country
Historical Traffic Data
Anonymous GPS measurements

TomTom HOME

Mobile App

In Dash Navigation

BUSINESS SOLUTIONS

CONNECTED PND
TomTom Historical Database

- Over 4 trillion data points collected since 2007
- Over 4 billion new data points collected each day
- Some roads driven over 20,000 times
Historical Traffic Products

Speed Profiles
Intelligent data for optimal route planning

Custom Travel Times & Custom Area Analysis
Highly granular speed information

Custom Probe Counts
Indicator of relative traffic volumes
Speed Profiles
• Better route-time planning with proven long-term knowledge

Benefits
• Improved fastest route calculation and ETA
• Time-specific forecasting of travel times on road links

Use Cases
• PND & Smartphone navigation
• Internet mobility portal
• Logistics scheduling (standard and just-in-time delivery planning)

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Custom Travel Times

• Detailed analysis of road or route traffic performance

Benefits

• Detailed understanding of route travel times by time of day

• Ability to study effects of network changes in before / after studies

Use Cases

• Travel time reliability

• Traffic engineering (traffic light / junction performance)

• Background information for major infrastructure changes

• Model validation
Custom Area Analysis
Historical travel times and speeds over a broad network of roads

Benefits
• Detailed travel times by time of day
• Extraction of wide networks to shape files

Use Cases
• Performance measures
• Traffic engineering
• Model validation

Image shows GIS representation of Custom Area Analysis - evening Rush Hour speeds in Orlando

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Traffic Stats internet portal
Online access to historical traffic information

Features

• Access to TomTom historical traffic products from any internet enabled computer anywhere – anytime

• Reports available within 24 hours

• Data can be downloaded for use in other applications

• Currently offered:
  Custom Travel Times
  Custom Area Analysis
Origin Destination based on GPS navigation

Benefits
• Large database
• Trips can be distilled based on clear set of criteria
• Routes used for trips known
• Completely anonymous

Challenges
• Completely anonymous
• No trip purpose
• No household characteristics
• Some known biases for consumer (vs. fleet) use patterns
Representativeness
Distribution by time of day

![Hour of day vs Share of daily trips graph showing the distribution of daily trips by time of day for different data sources: Travel survey, TomTom FCD, and Connected TomTom FCD. The graph indicates that the share of daily trips is highest during the midday hours, with a peak around 12 PM for the Travel survey and a slight delay for the other two data sources.]
Example output forms

Southbound trip destinations, Mast 2
Enterprise Census 2010 Prototype

Census 2010 block boundaries

Aligned through rubber-sheeting technology to Multinet
Research example:
Visitors to Burlington Mall by household income of origin census block
Next steps:

- Identification of all systematic biases
- Create correction and expansion methods
- Validate use of Census data
- Identify most valuable use cases
- Define standardized output forms

Current projects underway:
- Netherlands: outdoor advertising
- France: toll road analysis
- California: modeling
- Virginia: modeling and planning
Thank you.

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