Use of Truck GPS Data for Freight Forecasting

Innovations in Travel Modeling
May 10, 2010

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Presentation Overview

Purpose

To improve truck trip generation rates with GPS data and disaggregate employment data

Overview

1. GPS Data

2. Grocery Store Trip Generation

3. On-going efforts

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GPS Truck Data

Data

Grocery Store Trip Generation

On-going Efforts

Source

Washington State Department of Transportation (WSDOT) and University of Washington (UW)

Performance measures program

Description

2,500 trucks per day

Starts, stops,15 minute reads when moving
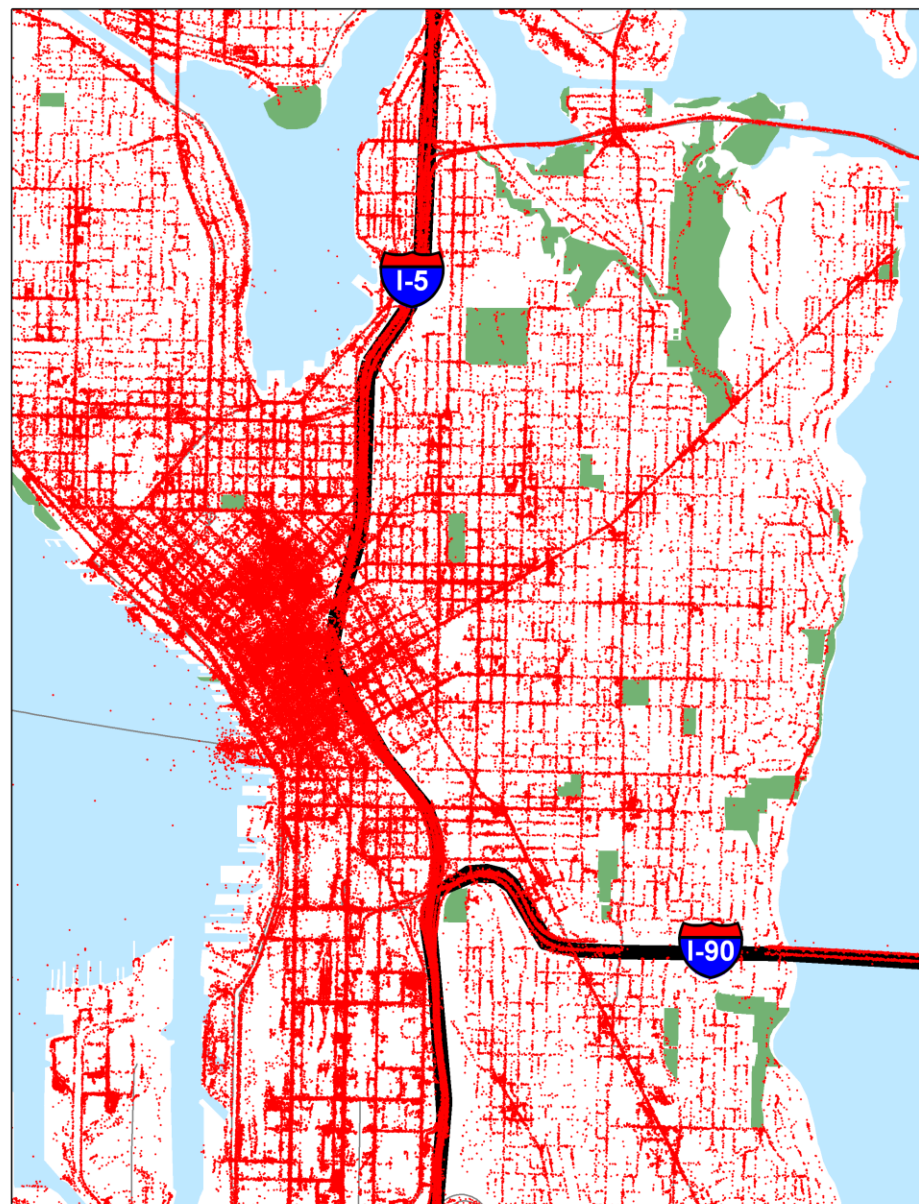
> 3,000,000 records per month

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Geo-Coding

Trucks travel everywhere!

Automation of GPS read coding to road network

Coding based on proximity to roadway and heading

60% match

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Defining Origins and Destinations

Data

Grocery Store Trip Generation

On-going Efforts

Intentional stops need to be separated from traffic-related stops

Used 3-minute dwell time to differentiate

Which stops are of interest? i.e. parking location vs actual destination

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Sample Data

Data

Grocery Store Trip Generation

On-going Efforts

Examined data from Fall 2008

One month of data results:

- 3,000,000 reads

- 358,000 trips

- 16 mile average trip distance

- 21 minute average travel time

- 34 miles per hour average speed

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Grocery Stores & Distribution Centers

Data

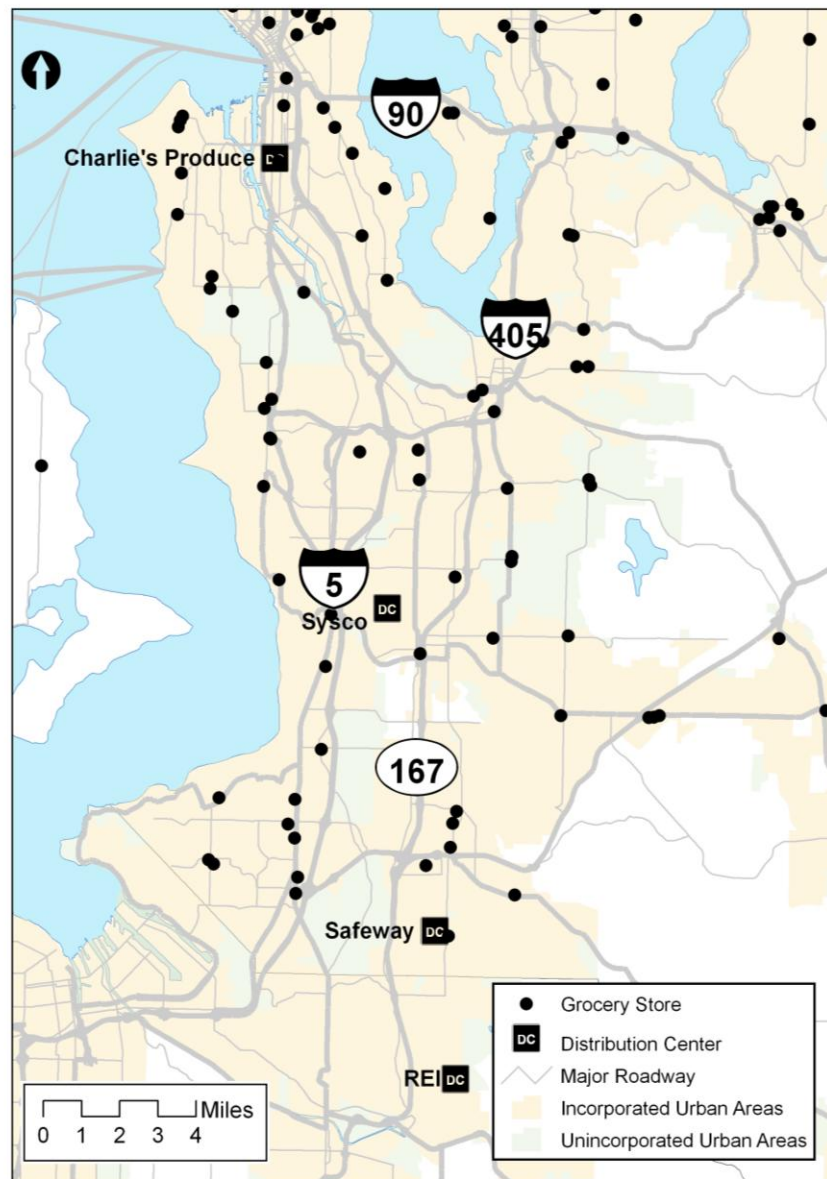**Grocery Store Trip Generation**

On-going Efforts

Considered "Large" grocers

- ~50-100K SF

- Independents and chains

Did not include

- Big-Box

- Convenience stores

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Grocery Truck Statistics

Over 91 days:

- 2,400 trucks (26 trucks per day)

- 22,000 tours (242 tours per day)

- 215,000 trips (2362 trips per day)

- 9 tours per truck

- 0.1 tours per truck per day

- 10 trips per tour

- 2 trips to major grocer

Data

Grocery Store Trip Generation

On-going Efforts

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Grocery Truck Trips by Area Type

Data

Grocery Store Trip Generation

On-going Efforts

Land Use	Average Truck Trips per Day
Metropolitan Cities	12.4
Core Cities	12.1
Larger Cities	8.4
Smaller Cities	6.6
Unincorporated Urban Areas	7.3
Rural	3.9

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Grocery Truck Validation

Data

Grocery Store Trip Generation

On-going Efforts

GPS dataset is subset of all trucks

McCormack et al (2010) grocery trip generation study

- Favorable comparison to interview information (10 to 12 daily trucks)

- But half of observed manual counts (18 trucks per day)

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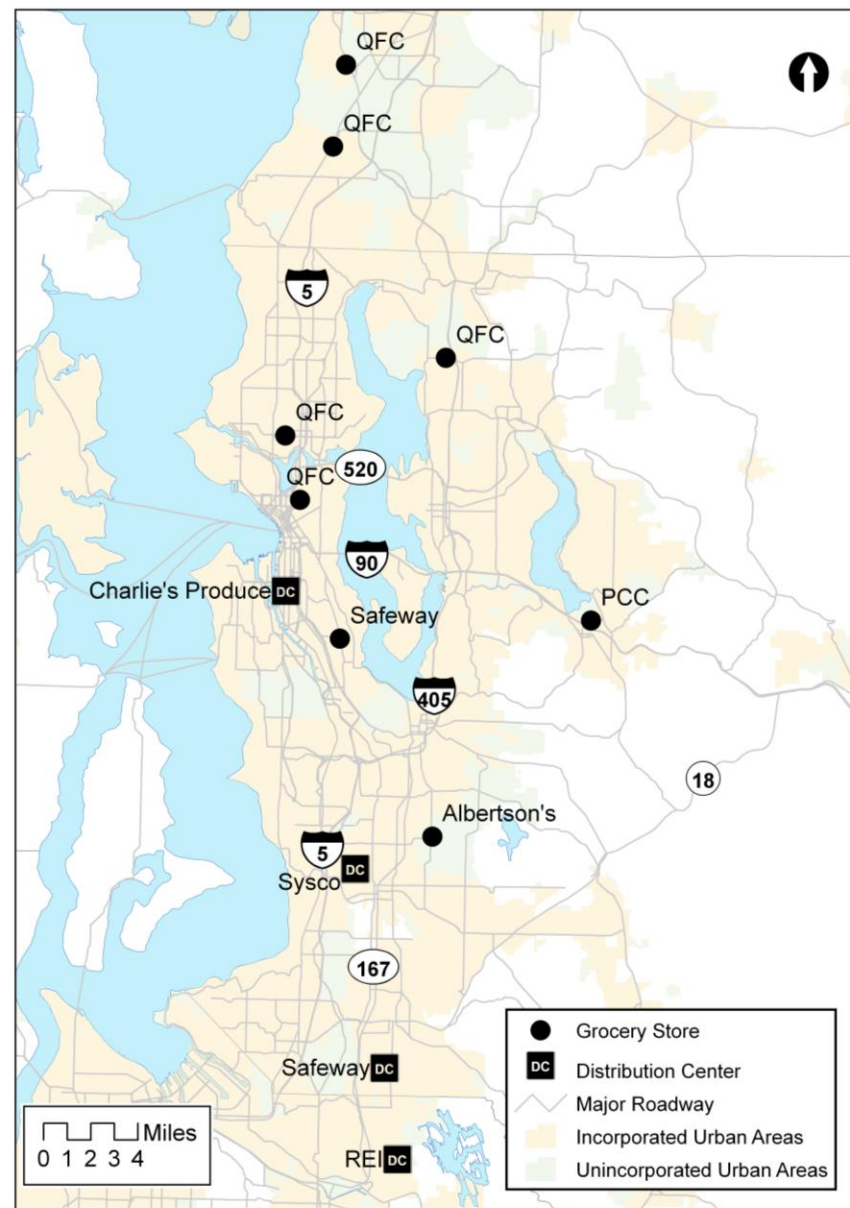
Transferability to Other Sectors

Data

Grocery Store Trip Generation

On-going Efforts

Manual traffic counts for each sector is cost prohibitive

Need weighting factor so GPS truck data can represent all truck trips

Potential approaches:

- Traffic counts (cordon, zone, or link)

- Total truck population

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Potential Outcomes

Data

Grocery Store Trip Generation

On-going Efforts

Data Products

Truck trips and tours disaggregated by employment sectors, land use types, and times of day

Average trip and tour lengths

Speed data and route choice

Uses

Calibration

- Aggregate distribution models

- Aggregate trip generation models

Air Quality studies/modeling

Potential for commodity flow model

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Prospects and Limitations

Data

Grocery Store Trip Generation

On-going Efforts

Improving quality of GPS data

National availability

But,

It's not cheap

May not have desired granularity

Research in nascent stage

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Thank You

Data

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