



Use of Truck Data for Freight Forecasting

NATMEC
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Presentation Overview

Purpose

To improve truck model and trip generation rates

Overview

1. Truck Counts
2. Motivation
3. GPS Data
4. Grocery Store Trip Generation
5. On-going efforts

Vehicle Counts



Truck Counts

Motivation

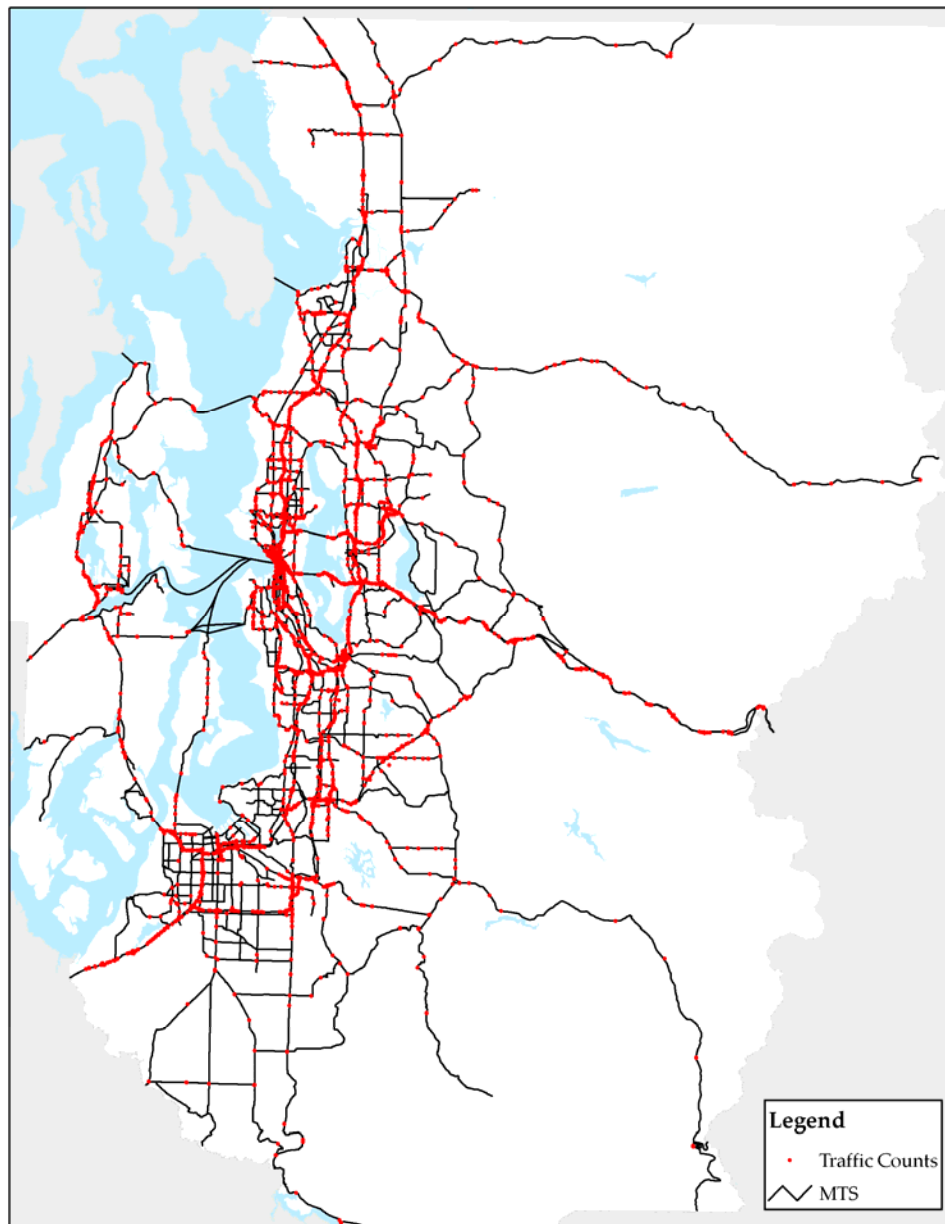
Data

Grocery Store Trip
Generation

On-going Efforts

Currently Obtained Data:

- 4,368 observation points on the Metropolitan Transportation System (MTS)
- 754 contain information about trucks



Count Types

Data Type	Sub-type	Jurisdiction/Agency
Classification	Complete	Auburn, Bothell, Everett, Pierce & Snohomish Counties, PSRC
	Truck only	Port of Tacoma
AWDT	With truck percentage	WSDOT, Fife
	With peak periods	Lynnwood, Seattle
	By direction	Renton, Shoreline, Tacoma
	Combined directions	Bellevue, Redmond
ADT	With truck class	Seattle (Heffron study)
	By direction	King & Kitsap Counties
	Combined directions	Covington, Kirkland, Lakewood, Puyallup
Peak Period/s		Federal Way, Woodinville

Truck Counts

Motivation

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Truck Count Locations



Truck Counts

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On-going Efforts

		Freeway	Major Arterial	Minor Arterial	Total
King	Number of Counts	99	130	177	406
	Percent of Total	10%	15%	22%	15%
Kitsap	Number of Counts	7	15	21	43
	Percent of Total	12%	18%	19%	17%
Pierce	Number of Counts	39	51	56	146
	Percent of Total	11%	25%	32%	20%
Snohomish	Number of Counts	24	38	97	159
	Percent of Total	13%	32%	24%	23%
Total	Number of Counts	169	234	351	754
	Percent of Total	10%	19%	24%	17%

Cooperative Data Sharing



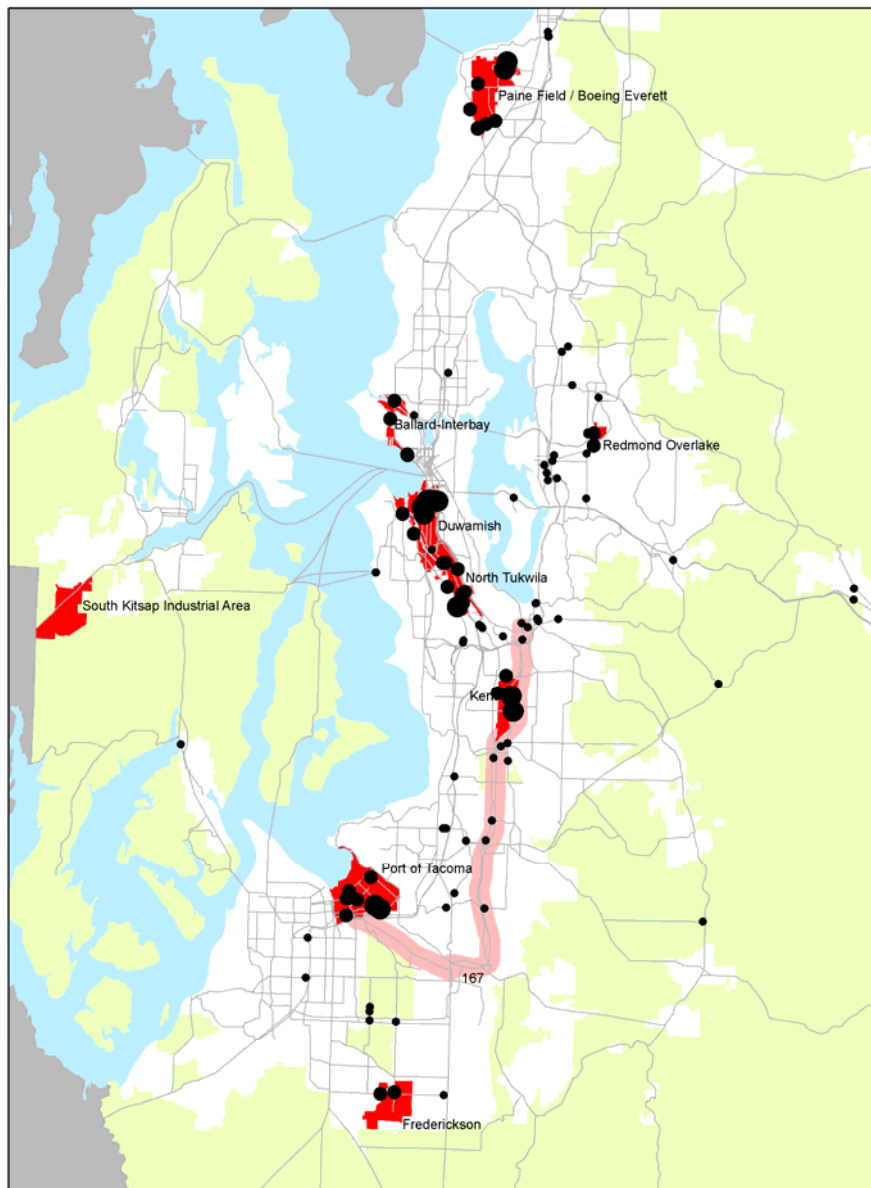
Truck Counts

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On-going Efforts



Model Validation

Truck Counts

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On-going Efforts

Facility Type	Count	Volume	Locations	Difference	Percent Difference
Freeways	552,755	960,468	186	407,714	74%
Arterials	679,012	267,427	581	(411,585)	-61%
Total	1,231,767	1,227,895	767	(3,871)	0%

GPS Truck Data

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

Truck Counts

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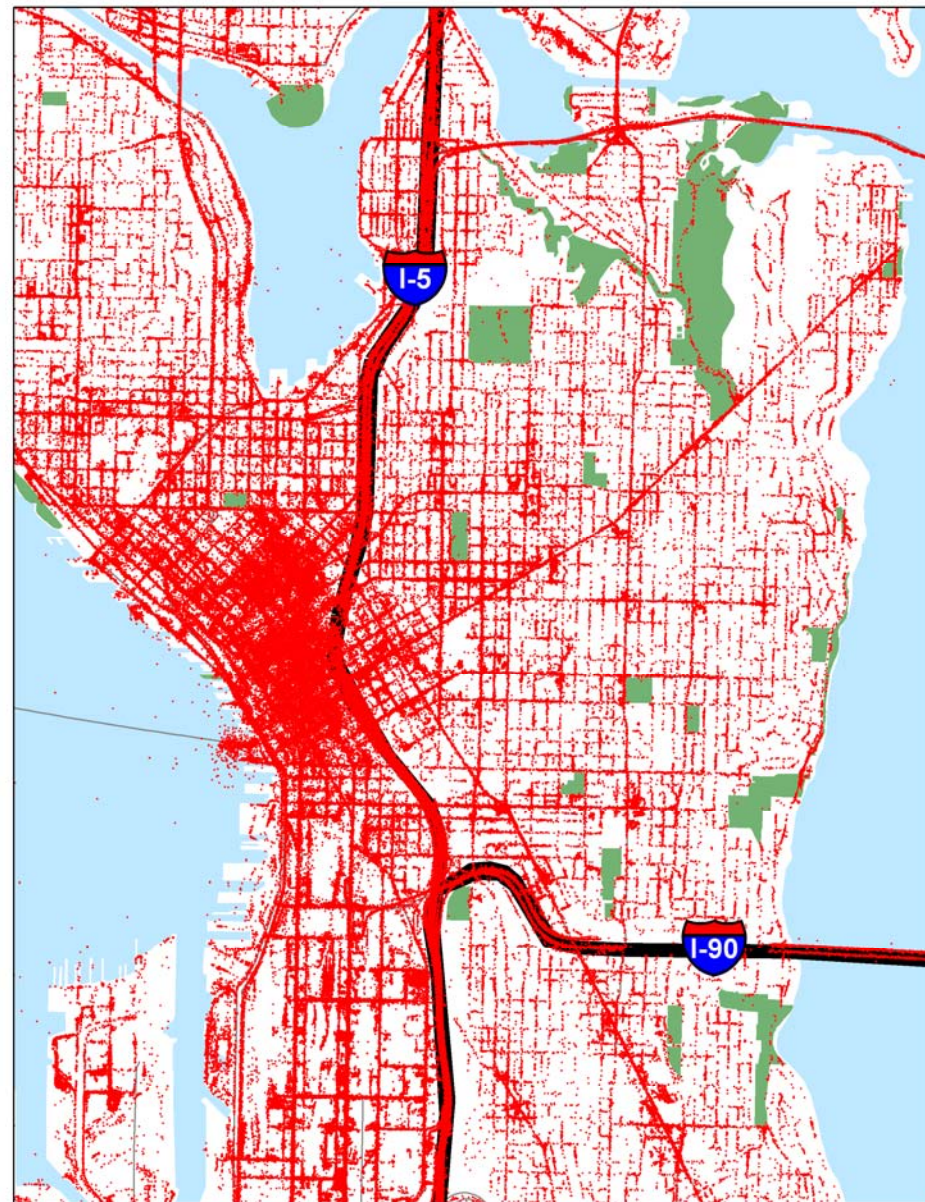
Geo-Coding

Trucks travel everywhere!

Automation of GPS read coding to road network

Coding based on proximity to roadway and heading

60% match



Truck Counts

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Defining Origins and Destinations

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



Truck Counts

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Sample Data

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

Truck Counts

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Grocery Stores & Distribution Centers



Truck Counts

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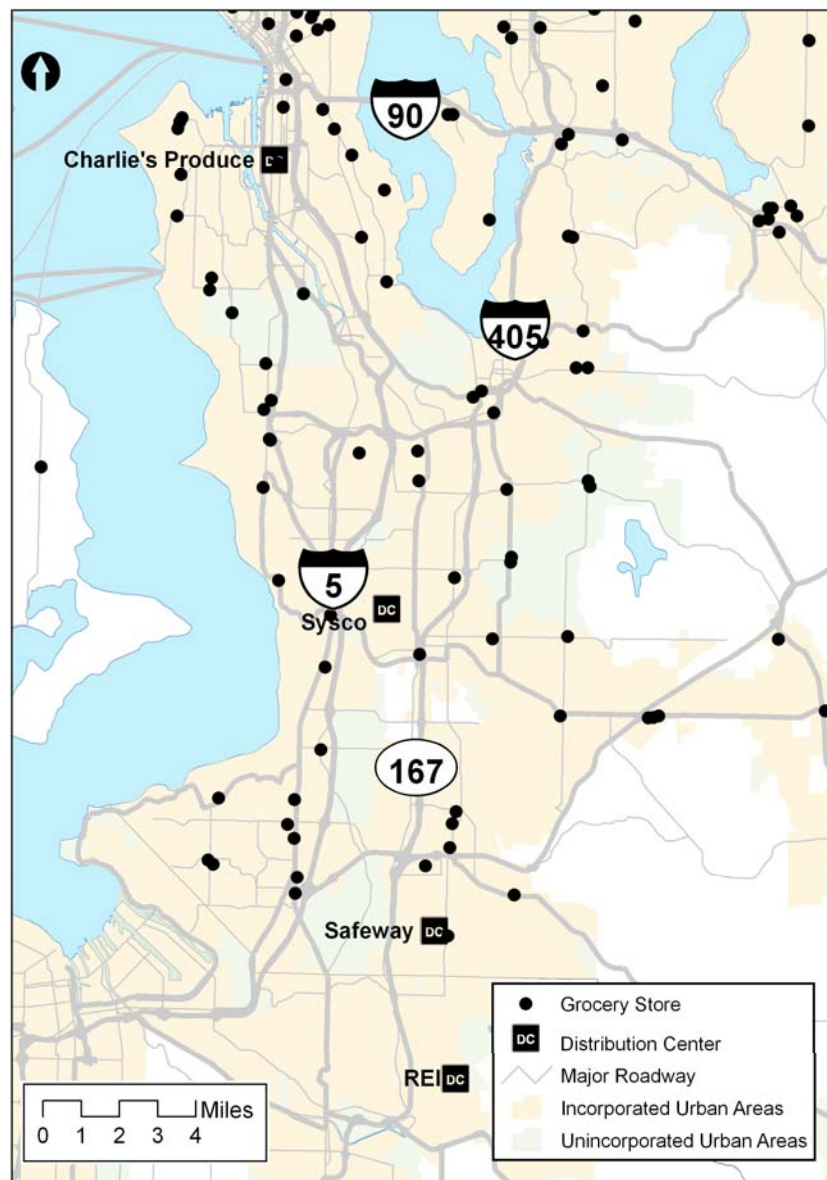
**Project with Ed
McCormack (UW) and
Maren Outwater (RSG)**

Considered “Large”
grocers

- ~50-100K SF
- Independents
and chains

Did not include

- Big-Box
- Convenience stores



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

Truck Counts

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Grocery Truck Trips by Area Type

Truck Counts

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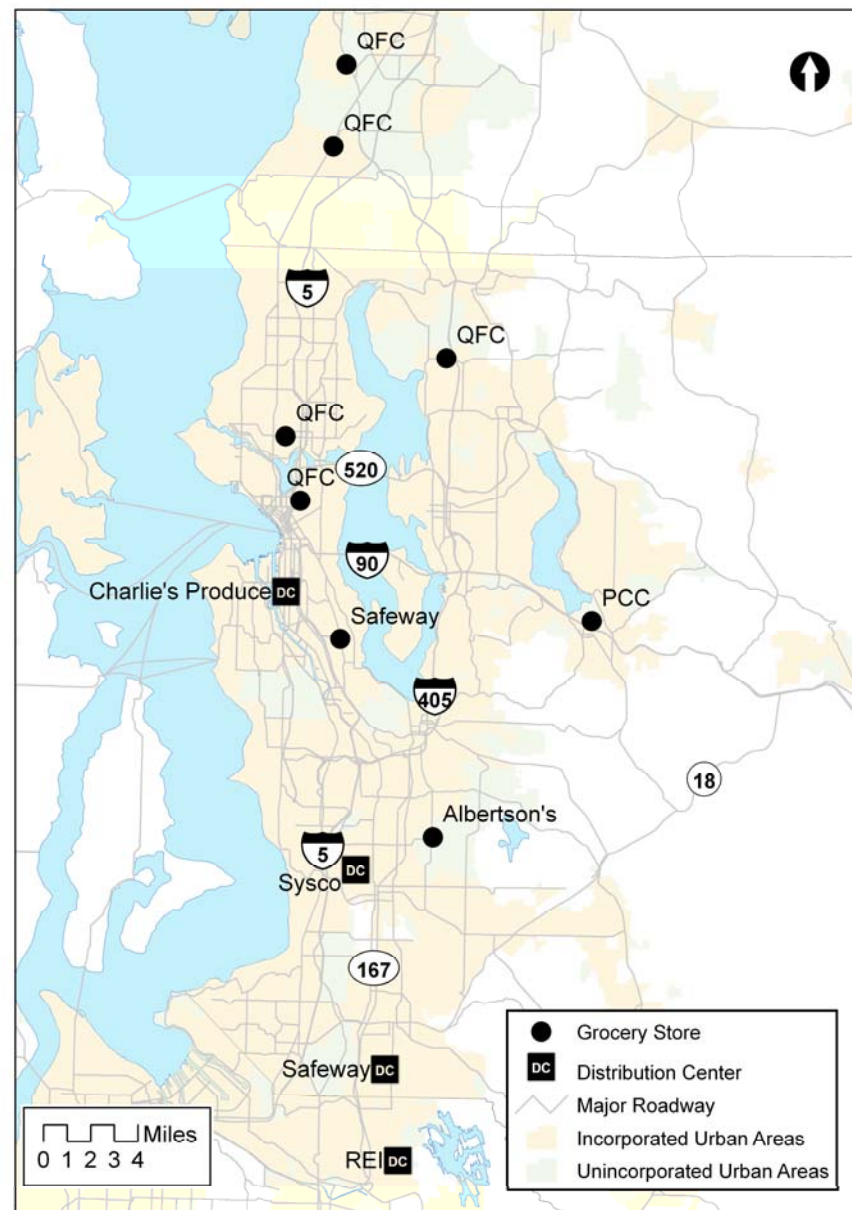
Land Use	Average Truck Trips per Day
Metropolitan Cities	12.4
Core Cities	12.1
Larger Cities	8.4
Smaller Cities	6.6
Unincorporated Urban Areas	7.3
Rural	3.9

Grocery Truck Validation

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)



Truck Counts

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Transferability to Other Sectors

Truck Counts

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Manual traffic counts for each sector is cost prohibitive

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

Potential approaches:

- Traffic counts (cordon, zone, or link)
- Total truck population

GPS Expansion Factors

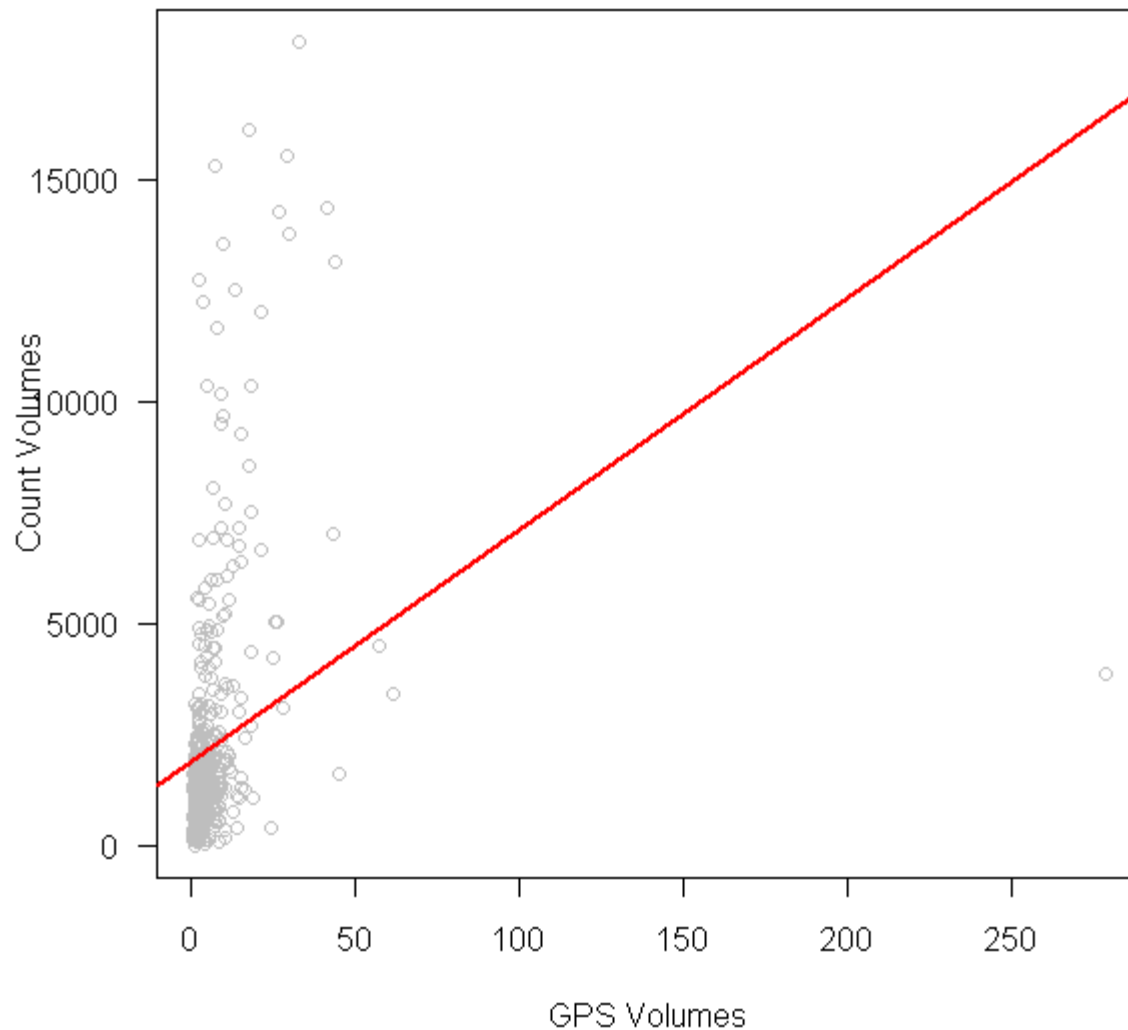
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Potential Outcomes

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

Truck Counts

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Prospects and Limitations

Improving quality of GPS data

National availability

But,

It's not cheap

May not have desired granularity

Research in nascent stage

And,

NEED MORE TRUCK COUNTS

Truck Counts

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Thank You

Truck Counts

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