

Ad-Sposure

Predicting Advertising Truck Exposure

Massy Farkhondeh



HaulerAds



HaulerAds



Hauler Ads

- Provide billboards on delivery trucks
- Wireless device
 - Unique identifier



HaulerAds



Objective

- Predict the number of people exposed to advertising trucks in Ontario



HaulerAds



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- Enhance ads. campaign



HaulerAds



Objective

- Predict the number of people exposed to advertising trucks in Ontario



- Enhance ads. campaign

*Sell more ads. space
Revenue*

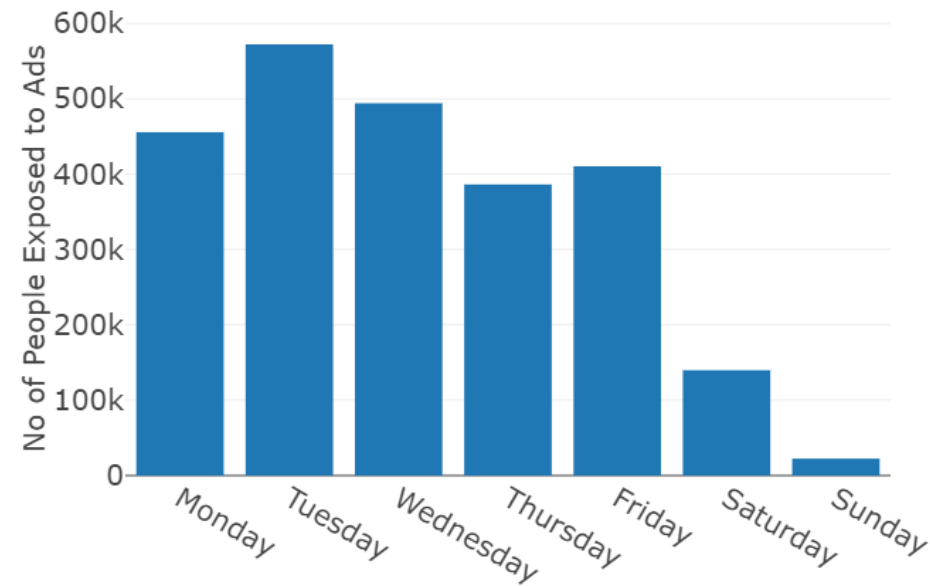
Data

- Data points \approx 3M
- Delivery schedule and timelines not provided

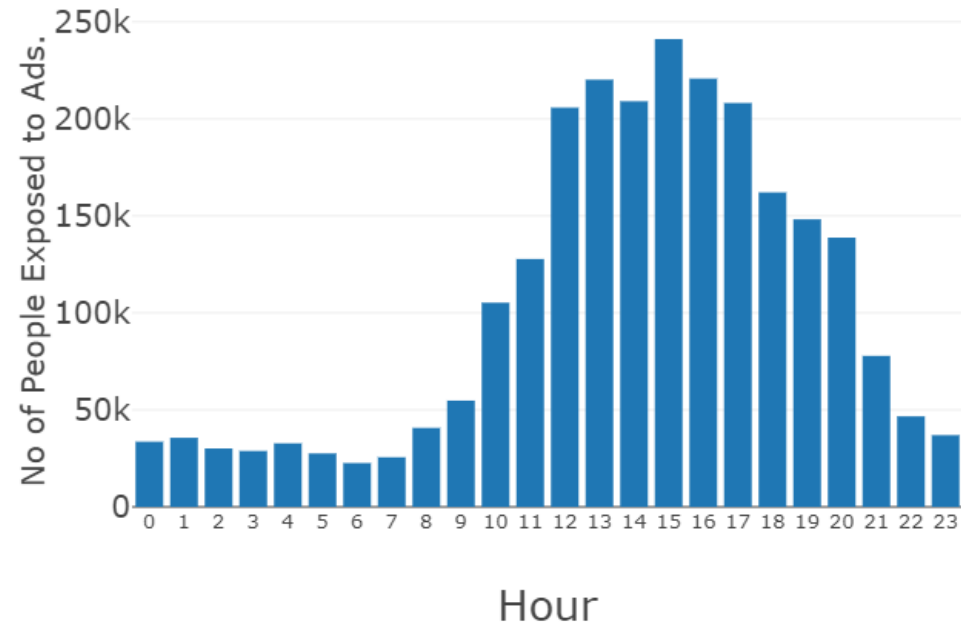
Time	Lat.	Lon.	Truck#	Unique address	City	Weekday	Speed [km/h]
2019-04-20 13:18:31	43.6594	-79.6872	59	d4:e6:b7: db:94:5b	Brampton	Saturday	90

Overall Ads Exposure in Ontario

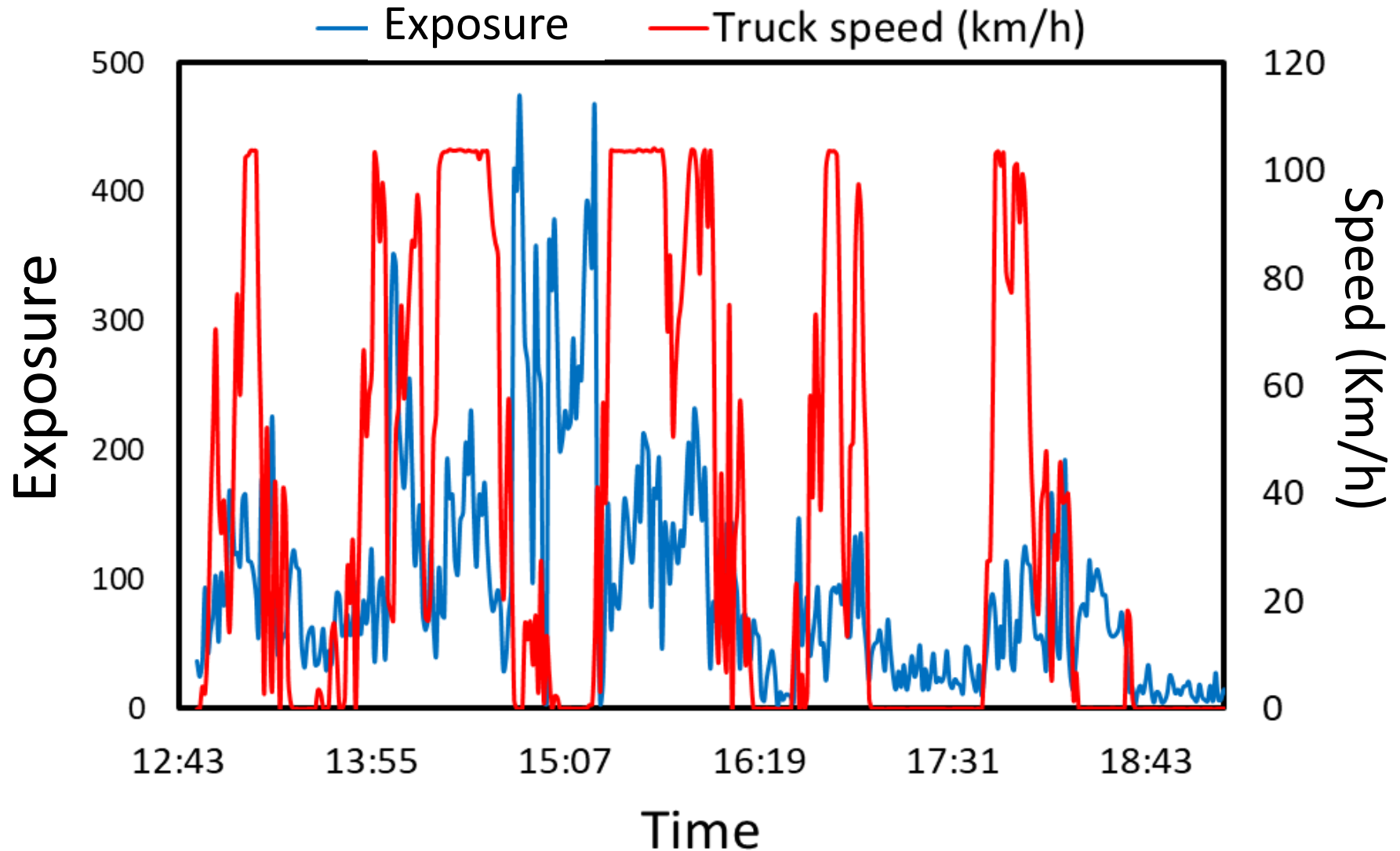
Week Day Exposure



Hourly Exposure



Exposure [29/4/2019]



Pipeline

X

City

Day of Week

Time

Truck speed

Pipeline

X

City

Day of Week

Time

Truck speed



Y

Impression/h
A, B, C, D, E, F

Class Imbalance

Oversampling

Pipeline

X

City

Day of Week

Time

Truck speed

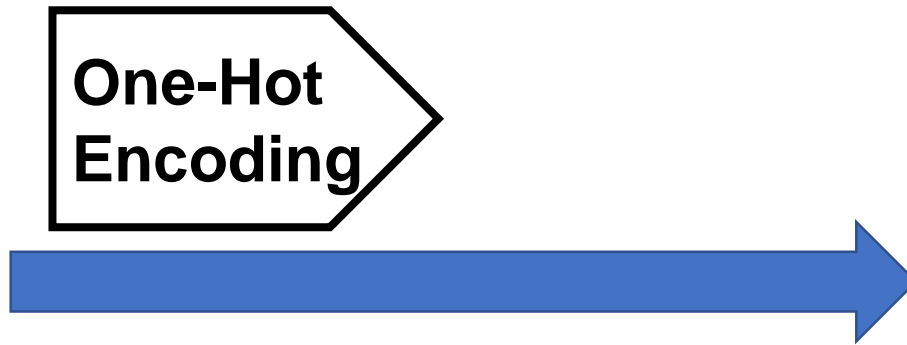
One-Hot
Encoding

Y

Impression/h
A, B, C, D, E, F

Class Imbalance

Oversampling



Pipeline

X

City

Day of Week

Time

Truck speed

One-Hot
Encoding

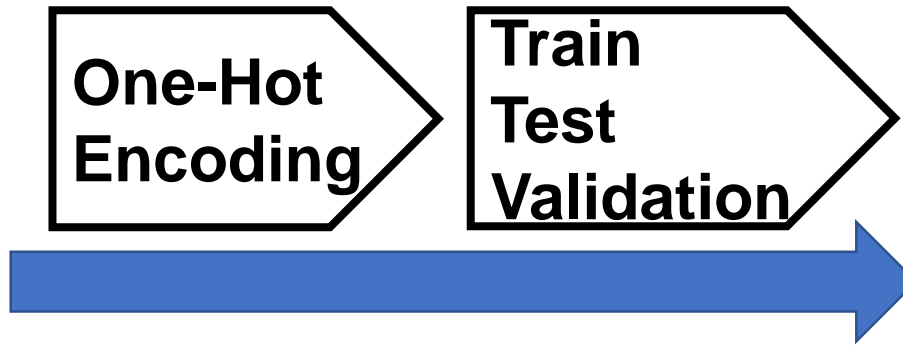
Train
Test
Validation

Y

Impression/h
A, B, C, D, E, F

Class Imbalance

Oversampling



Random Forest Classification

❑ Train, test & validation

- Model accuracy:
87 %

❑ Important features

- Truck speed
- Time of day

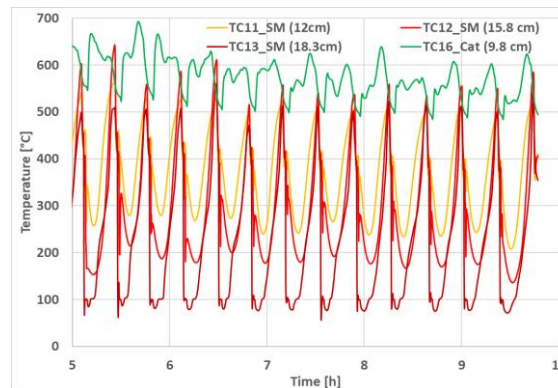
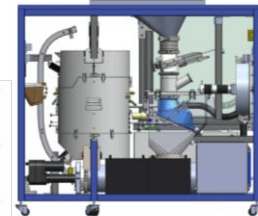
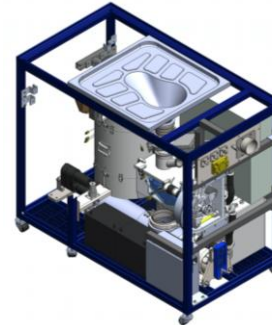


Recommendation

- ☐ Optimizing routes
- ☐ Number of trucks
- ☐ Weekend
- ☐ Time of exposure

Massy Farkhondeh

PhD CHEMICAL ENGINEERING SANITATION

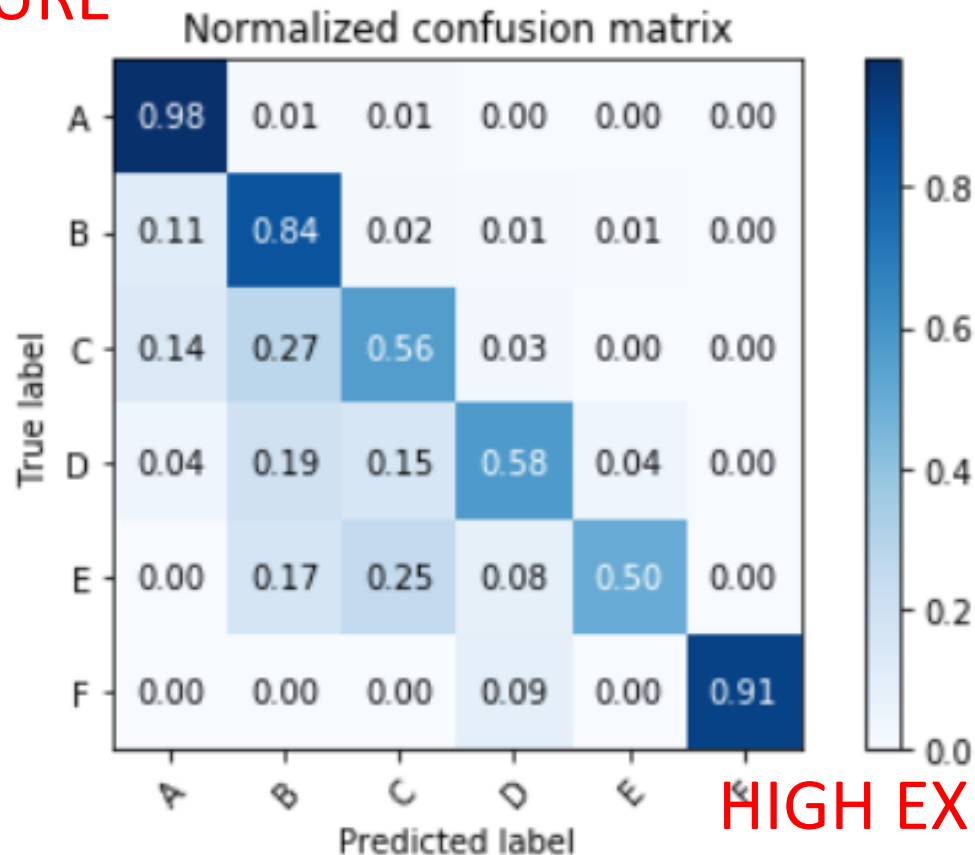


MELINDA & BILL GATES FOUNDATION

APPENDIX

Random Forest Classification

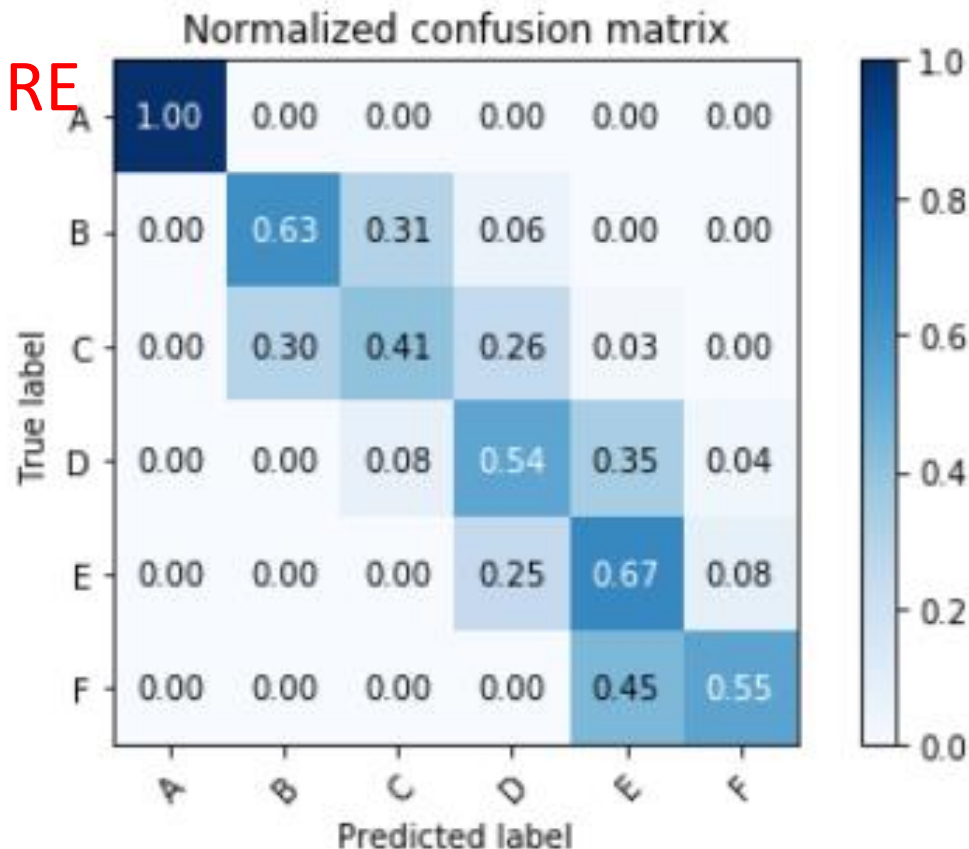
LOW EXPOSURE



HIGH EXPOSURE

Logistic Regression

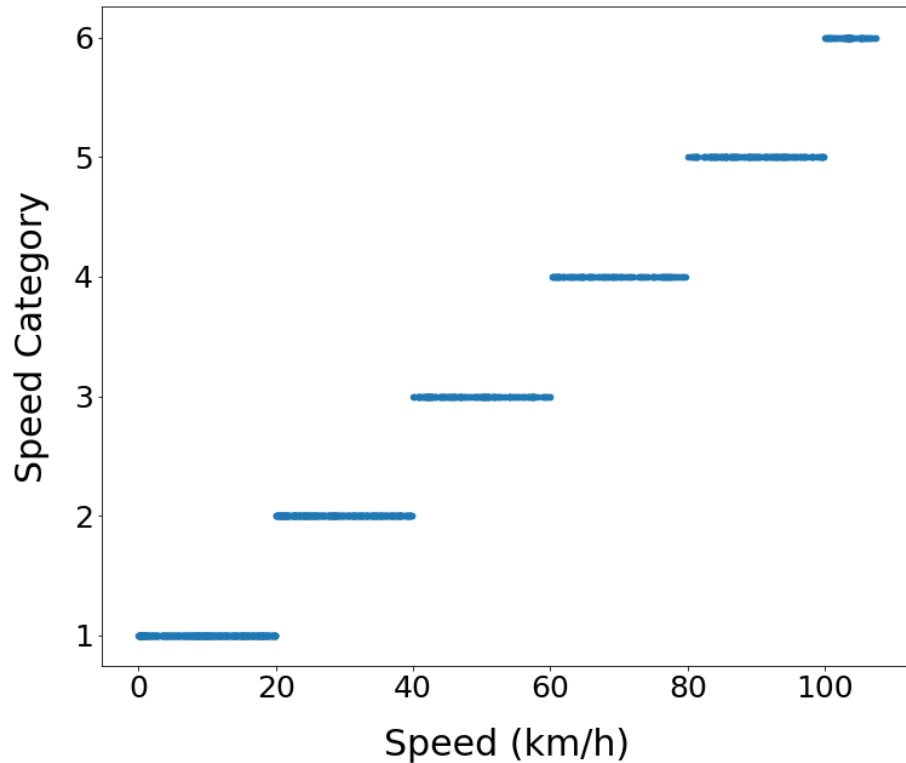
LOW EXPOSURE



HIGH EXPOSURE

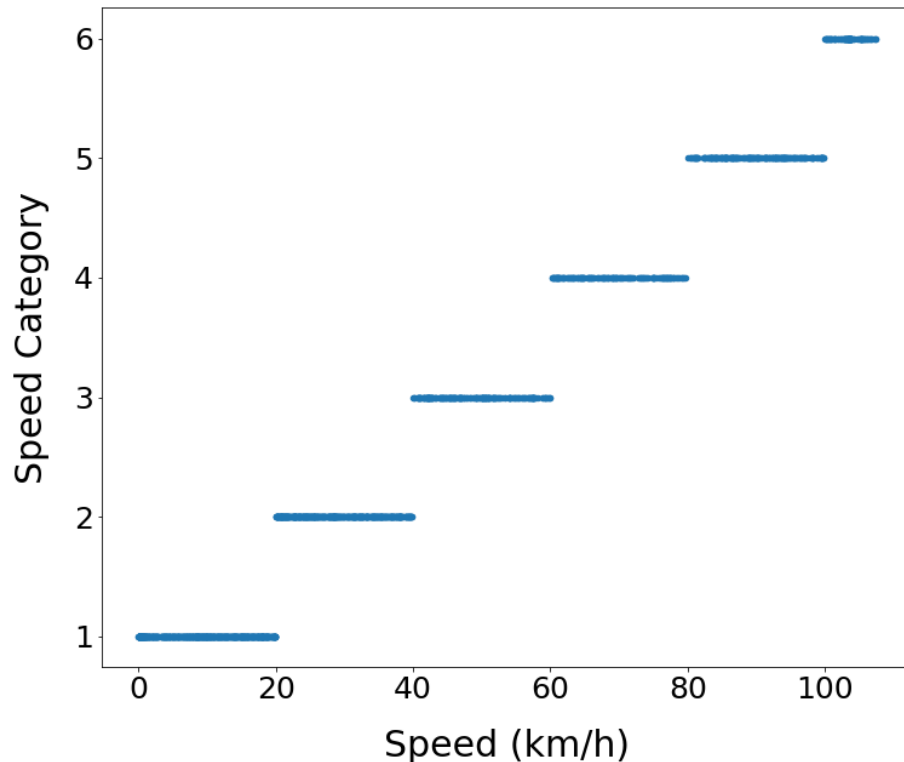
Data Preprocessing/Feature Engineering

Truck Speed Category



Data Preprocessing/Feature Engineering

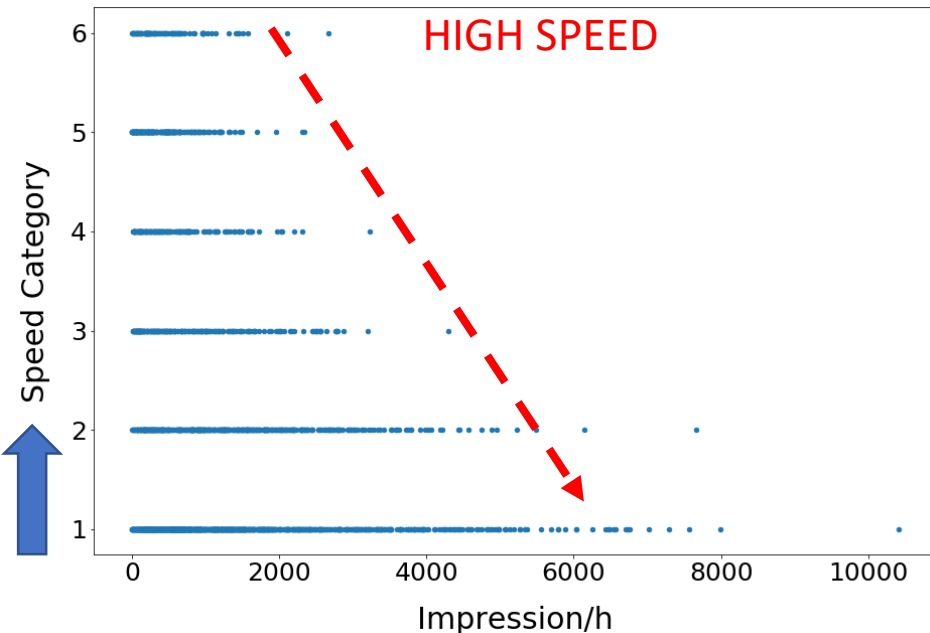
Truck Speed Category



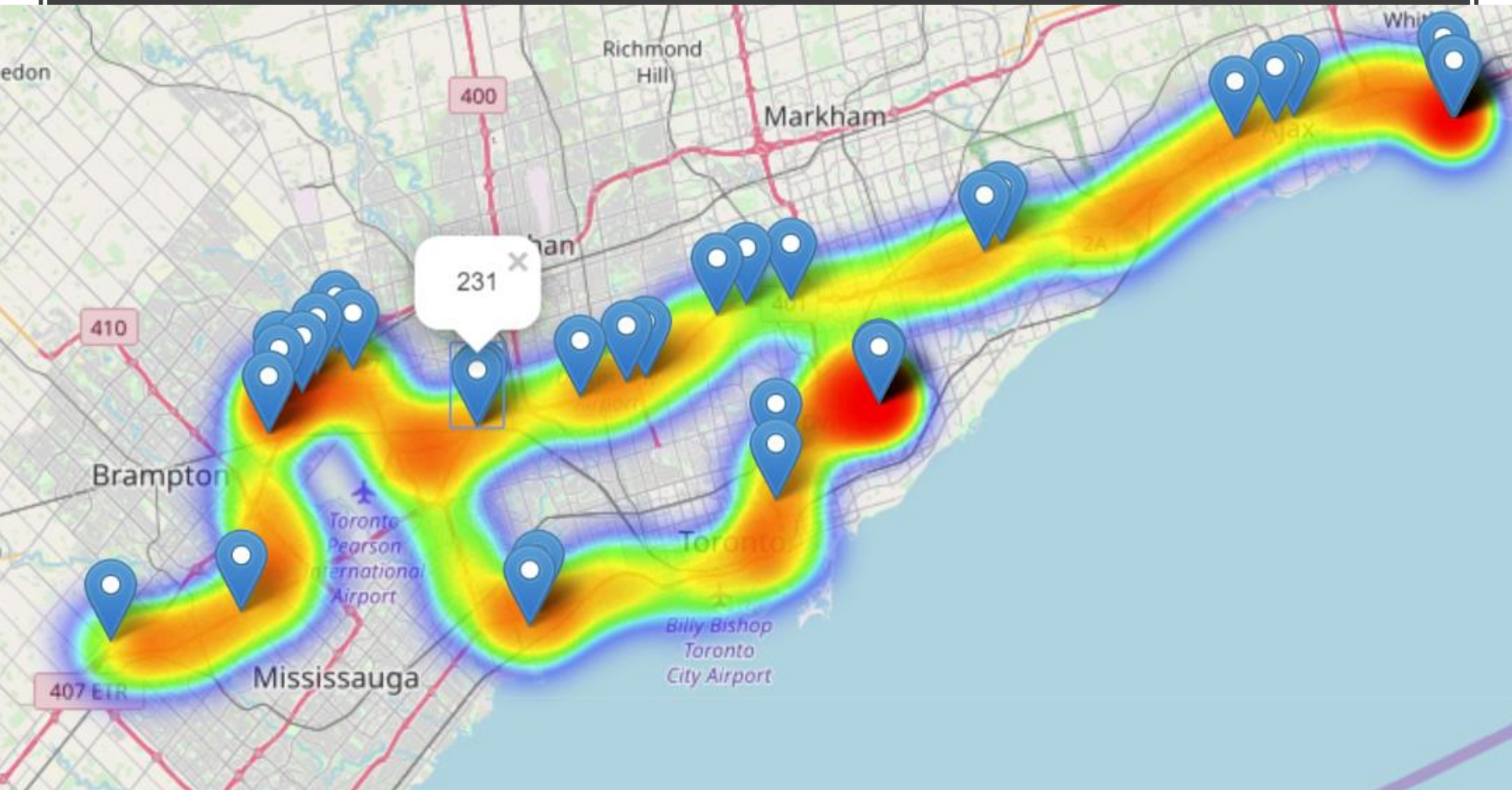
SLOW SPEED



Exposure



Interactive Heat Map



Classes

Category	Impression /h
A	0 – 1.3k
B	1.3k – 2.67k
C	2.67k – 4k
D	4k – 5.33k
E	5.33k – 6.67k
F	6.67k – 8k

Costing

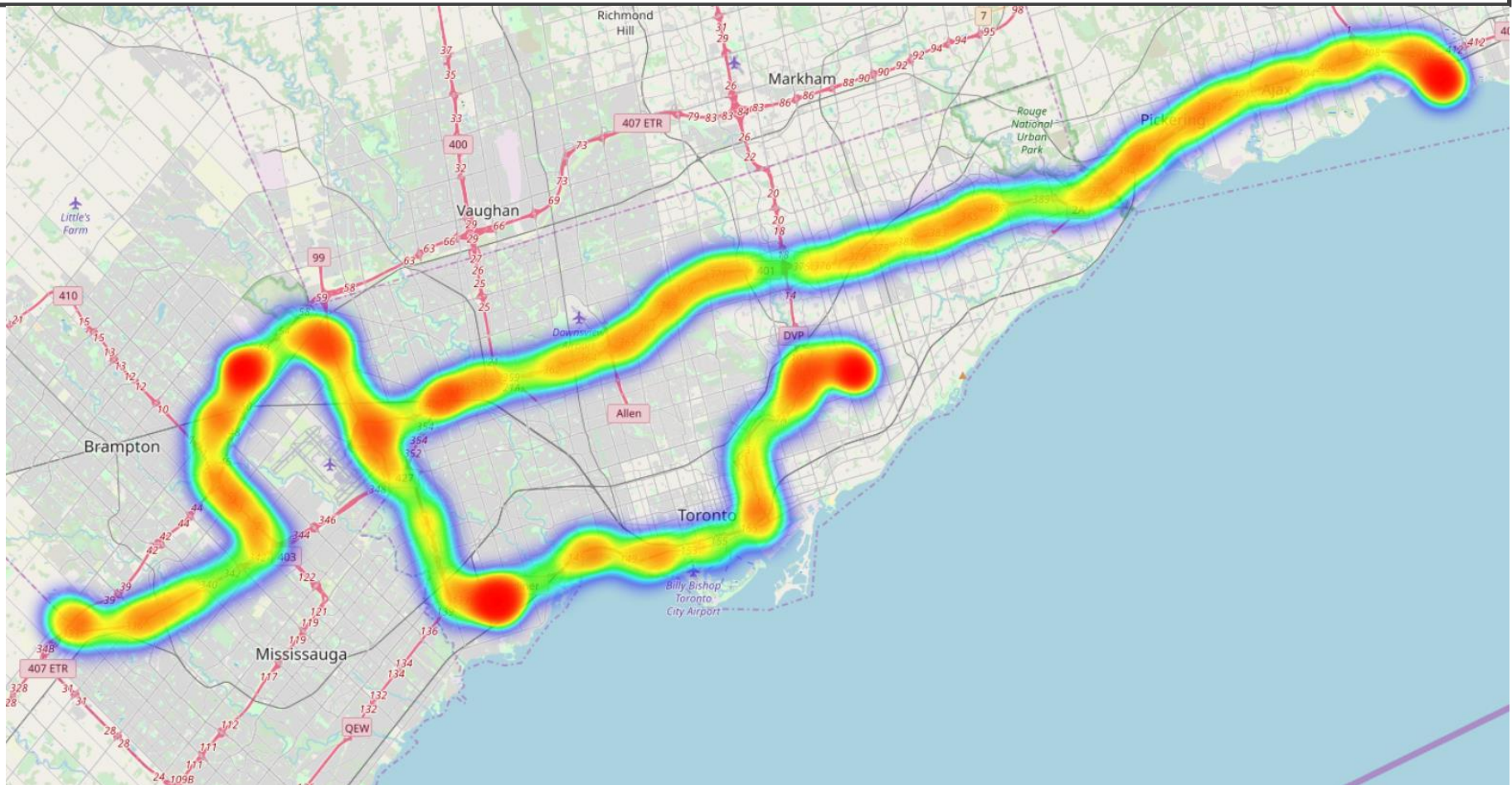
❑ Highway billboard

- 400k impressions in a month
- Costs \$2000/month

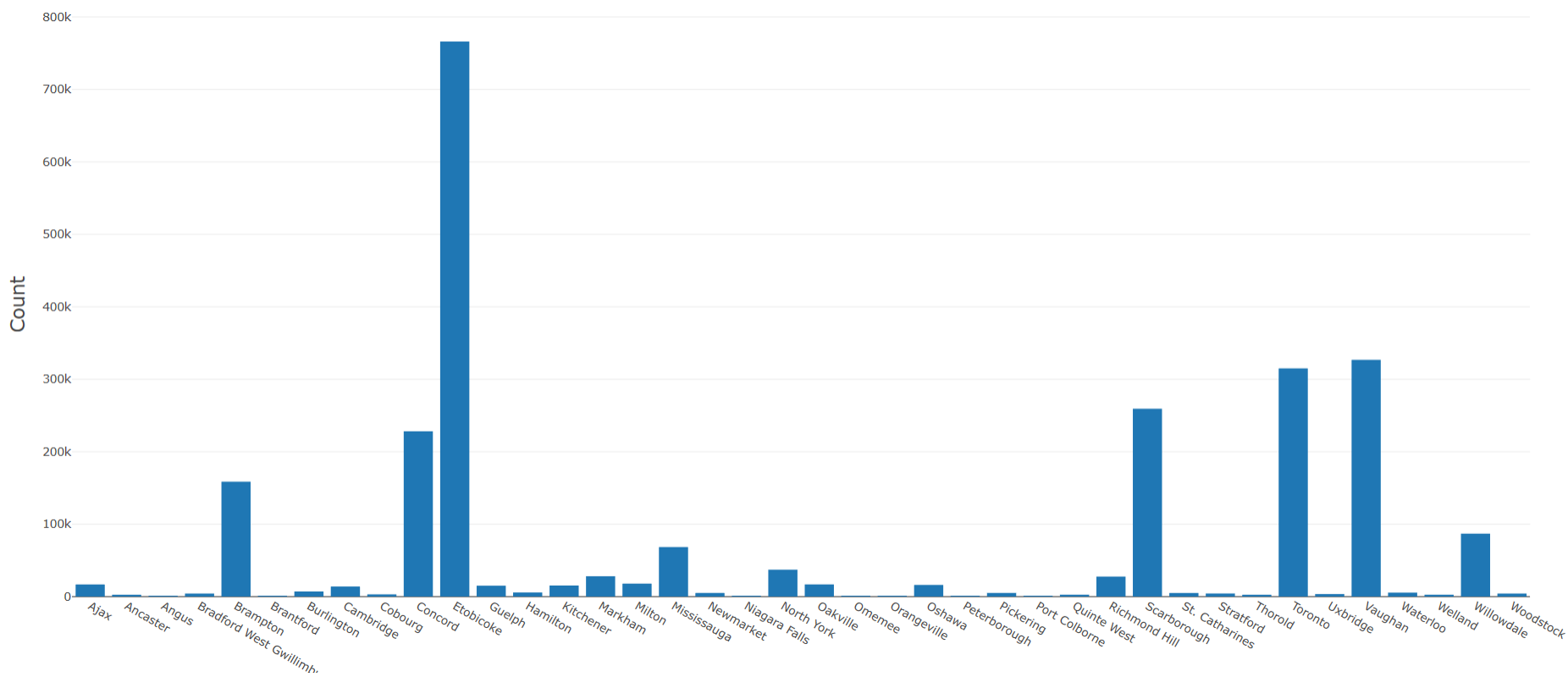
❑ Country road billboard

- 30k impressions in a month
- Costs \$600/month

Truck Route [29/04/2019]



City Impression



City Impression

