IBTTA2018 BALTIMORE
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IBTTA
TOLLING. MOVING SMARTER.

Using Machine Learning to Forecast MaaS Adoption

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The Problem

- Anticipating and preparing for changes in how people travel on roadways
  - MaaS
  - CAVs
  - Individuals less likely to own a vehicle
- What does that mean for a toll operator?
  - Road design
  - Technology
  - Capacity
  - Congestion
  - Customer experience

The Solution

- Understand past and current customer behavior to predict future behavior
  - Where will CAVs and MaaS-directed traffic arrive first?
- Utilize machine learning to handle the Big Data processing and decisioning

The (Big) Data

Trip transaction data

- Calculating and classifying trips

Account data

- Account type
  - Commercial/Personal
  - Transponder/LPR

Geographic data

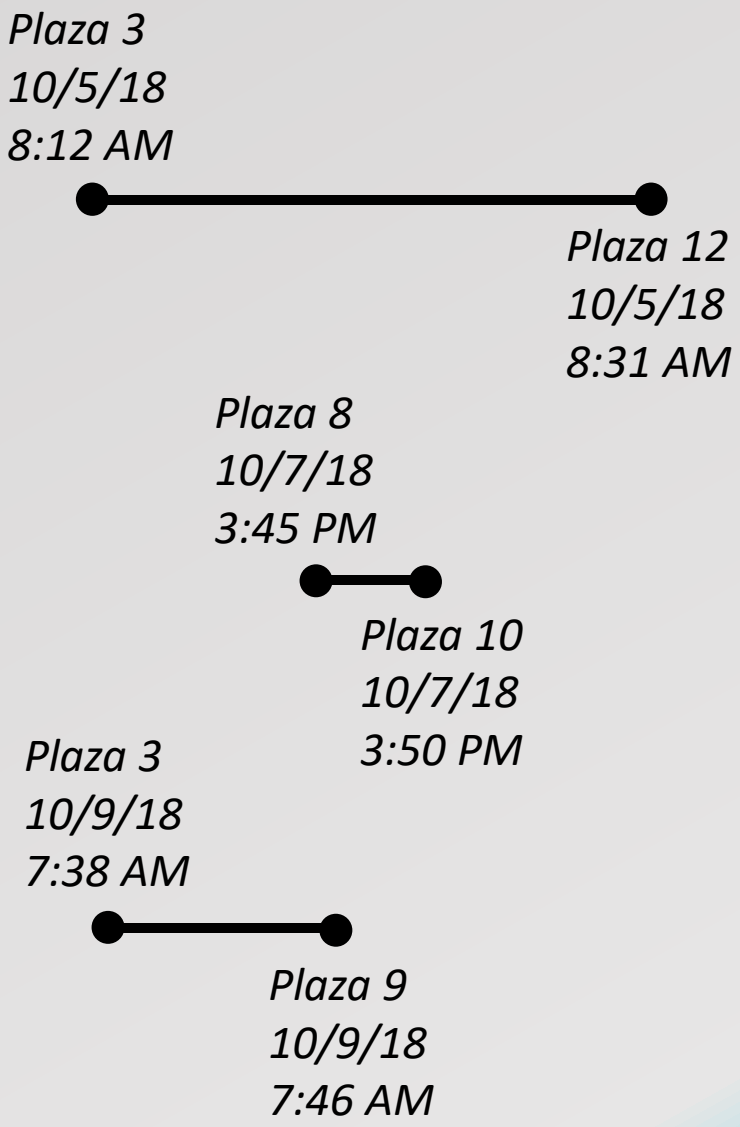
- Location of customers and toll plazas

Demographic data

- Age, income, family status, price sensitivity, tech savviness, hobbies and interests

Evaluating Trips

- For each trip:
  - Unique customer ID
  - Timestamp
  - Origin and Destination (O/D)
- Aggregate trips to the customer level



Classifying Trips

- For each customer, determine:
  - Consistency
  - Frequency
  - Day of week
  - Time of day
  - "Home" plaza
  - "Work" plaza
  - Nearest plaza
  - Most frequently used plazas

- The ATD (Abnormal Trip Detector)
  - Evaluates whether trips are likely Rideshare trips

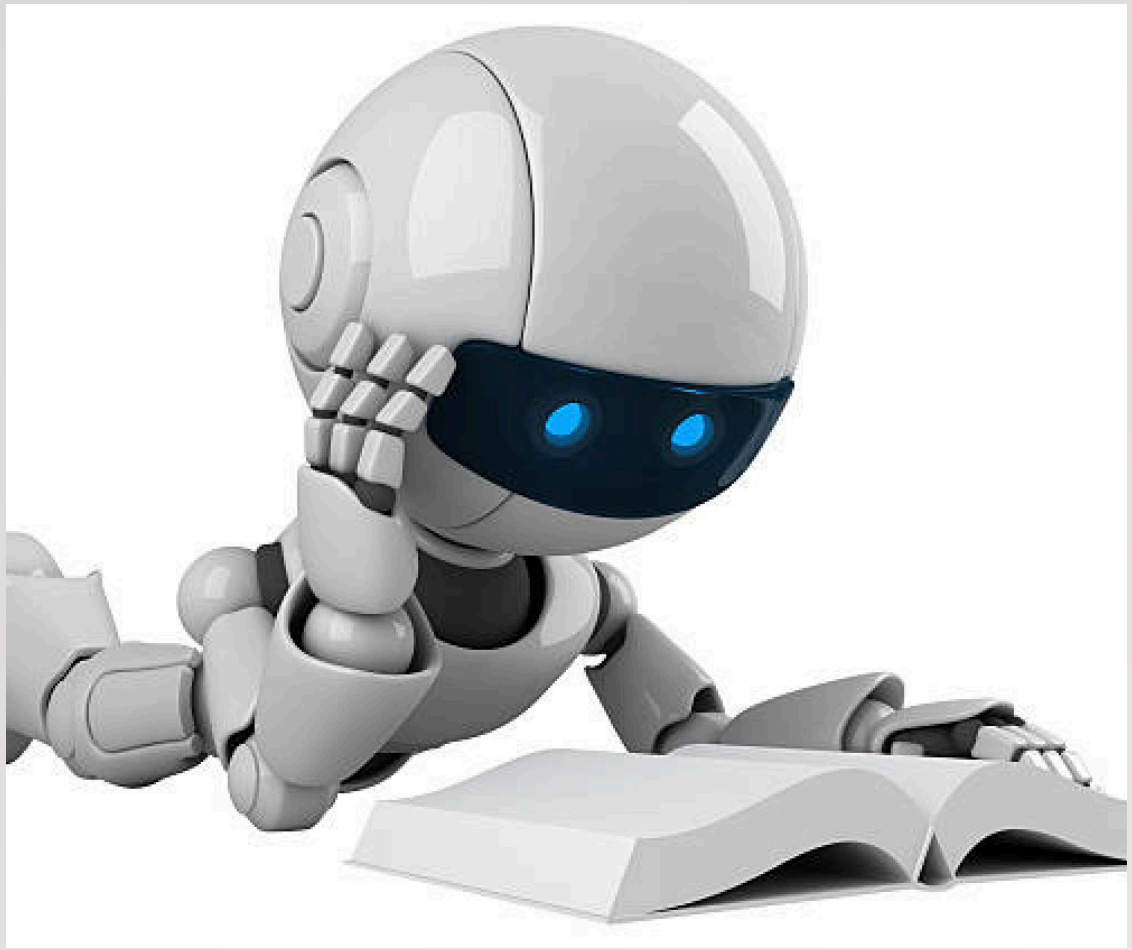
Abnormal Trips

How do you classify 1 billion trips?

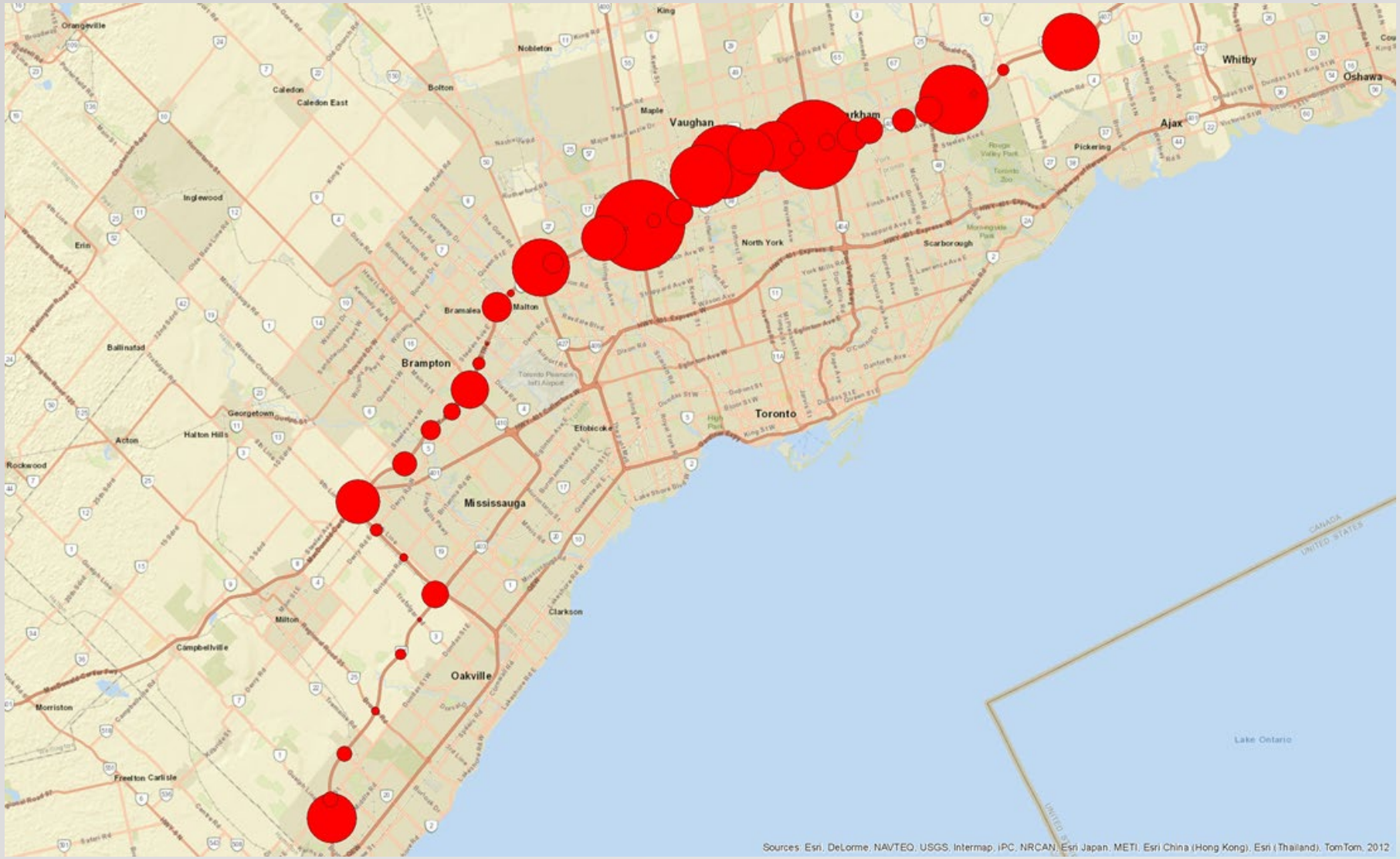
Machine Learning

- Machine Learning
  - *artificial intelligence that allows a computer to identify patterns and learn from data with little human intervention*

- The MLRA (Machine Learning Rideshare Algorithm) evaluates every trip and every customer to identify which are rideshare



Mapping Rideshare Usage and Potential MaaS Adoption



Implications for Tollways

- Predict where CAV and MaaS adoption will first impact tollways
- Plan for CAV and MaaS-enabled roadway needs
  - Lane width, markings, and signage
  - Smart roadways
    - Amount of broadband needed
  - Congestion points and peak times
  - CAVs providing road maintenance/conditions data to toll agency

Next Steps

- Continue to train the algorithm
  - More data, more tollways, more cities
  - Primary research
- Identify/infer rideshare customers
  - Insights into behavior, preferences, transportation needs
- Implement roadway changes based on the algorithm

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Thank you!

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