I-94 Traffic Volume Analysis & Predictions

About Me

Paul Schulken

https://github.com/pschulk

Data Scientist
Civil Engineer

B.S. in Civil Engineering,
North Carolina State University

8+ Years Experience with
Government and Private Sector

Agenda

01

Business Understanding

02

Data Overview

03

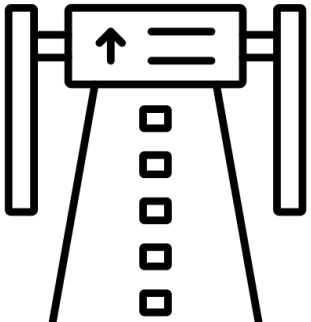
Modeling & Performance

04

Findings & Recommendations

05

Future Insights



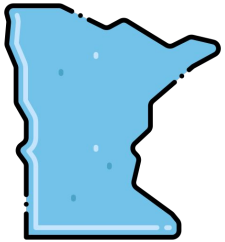
01

Business Understanding

Business Understanding

Stakeholder

Minnesota Department
Of Transportation (MnDOT)



Business Problem

Identifying Impact of Various
Features on I-94 Traffic Volume

Less Visibility, More Traffic

% Cloud Cover Most Important Factor

380 Vehicles

25% Increase in Cloud Cover = 9,500 Vehicles

Big Vegetables, Big Volume

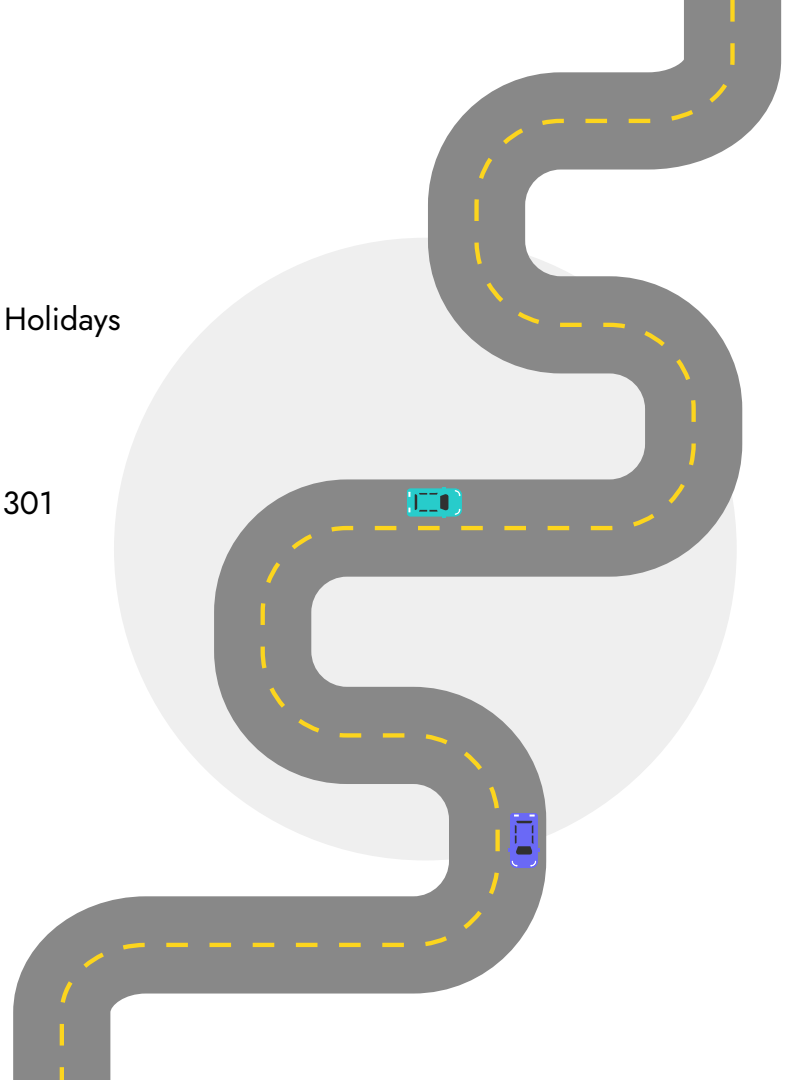
State Fair Produces Above Average Volume

02

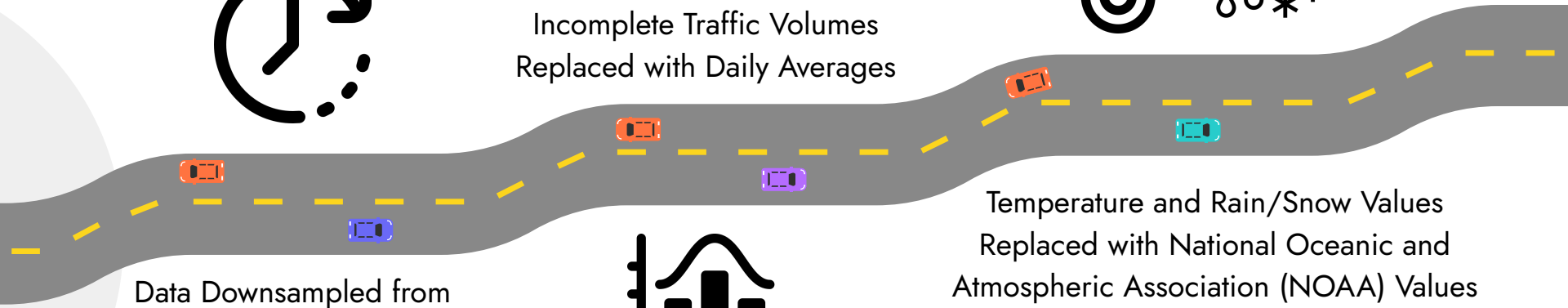
Data Overview

Data Overview

- Data
  - Hourly I-94 Westbound Traffic Volume, Weather, Holidays
  - 48,024 Entries from Oct. 2012 - Sep. 2018
- Source
  - MnDOT Automatic Traffic Recorder (ATR) Station 301
  - OpenWeatherMap
- Limitations
  - Did not Include Accident/Collision Data
  - Required Modification for Complete Time Series



Data Modifications

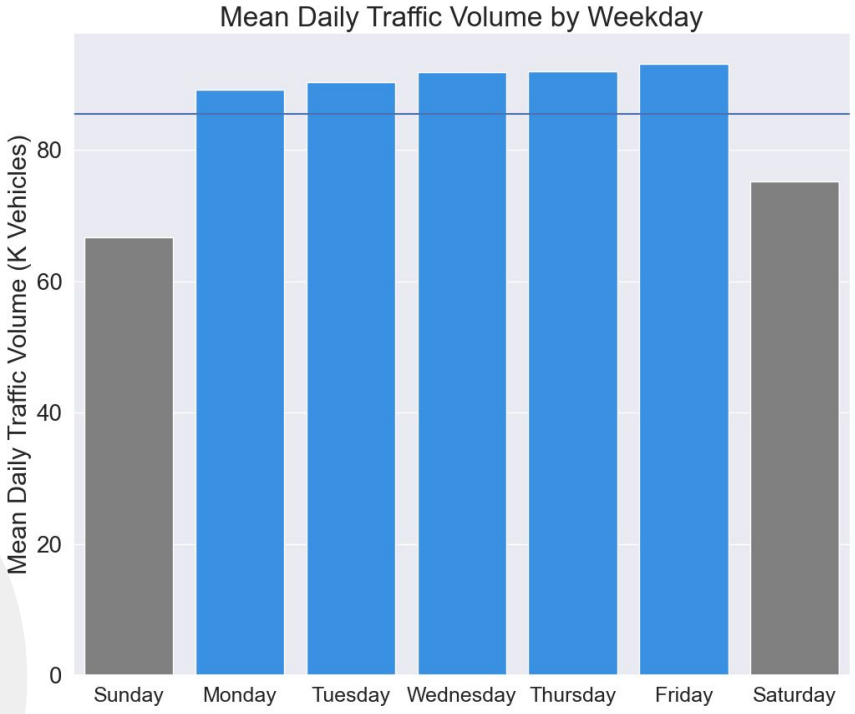


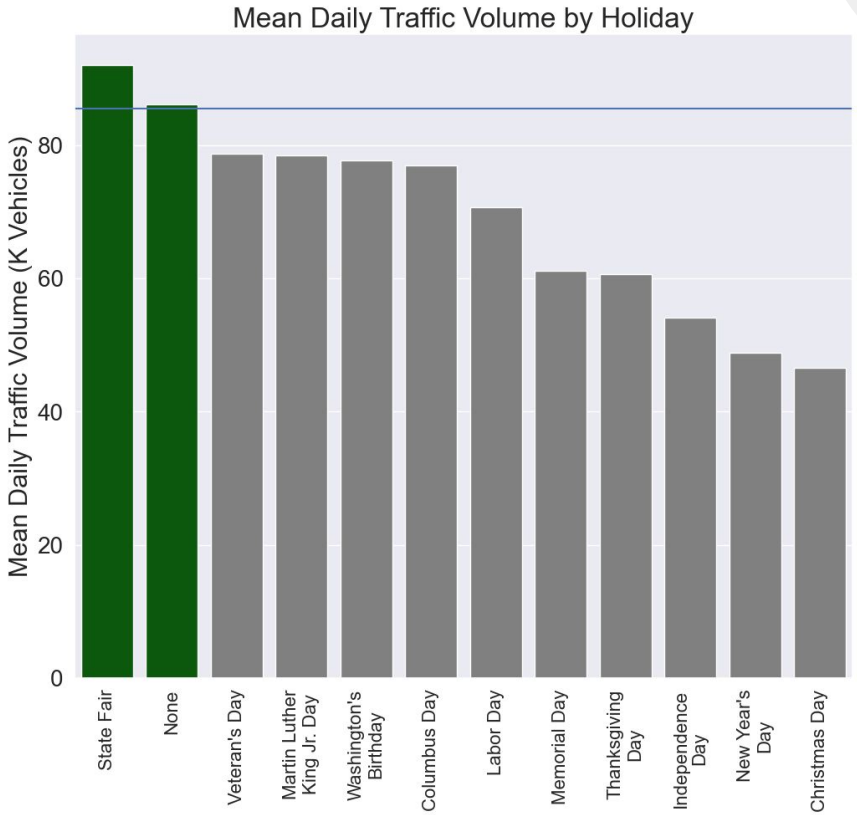
Data Downsampled from Hourly to Daily Values

Incomplete Traffic Volumes Replaced with Daily Averages

Temperature and Rain/Snow Values Replaced with National Oceanic and Atmospheric Association (NOAA) Values

Visualizing Traffic Volume



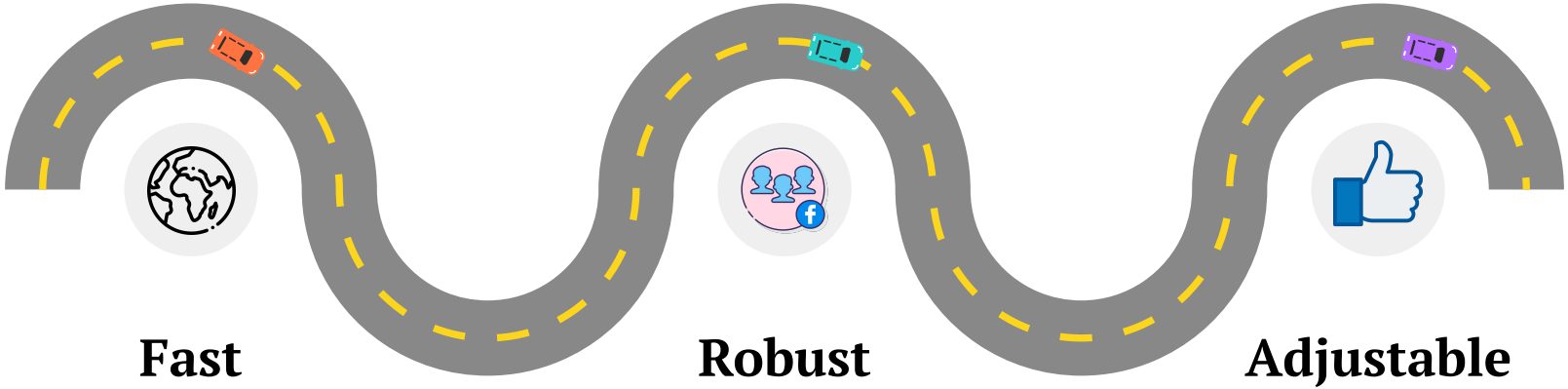


Mean Daily Traffic Volume Across Dataset:
85,493 Vehicles/Day

03

Modeling & Performance

Prophet Model



Fast

Open-Source Software
for General Forecasting Purposes

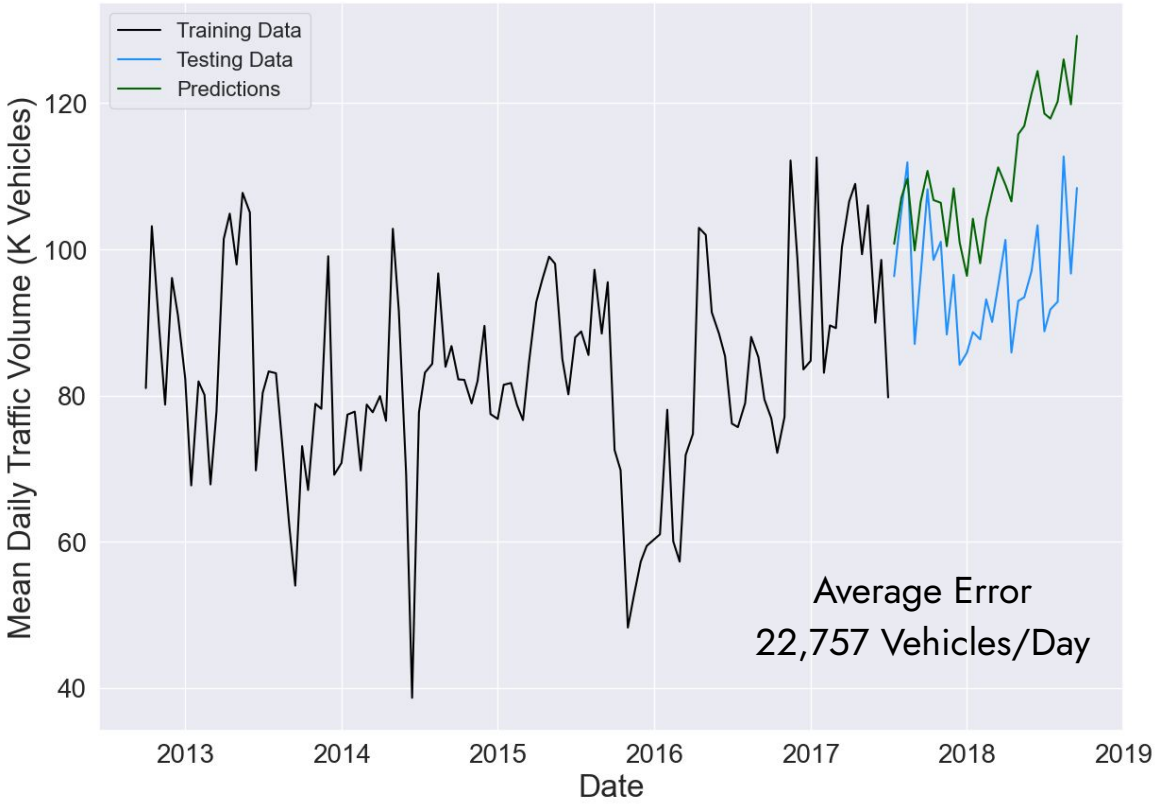
Robust

Works with Seasonality,
Holidays, and Outliers

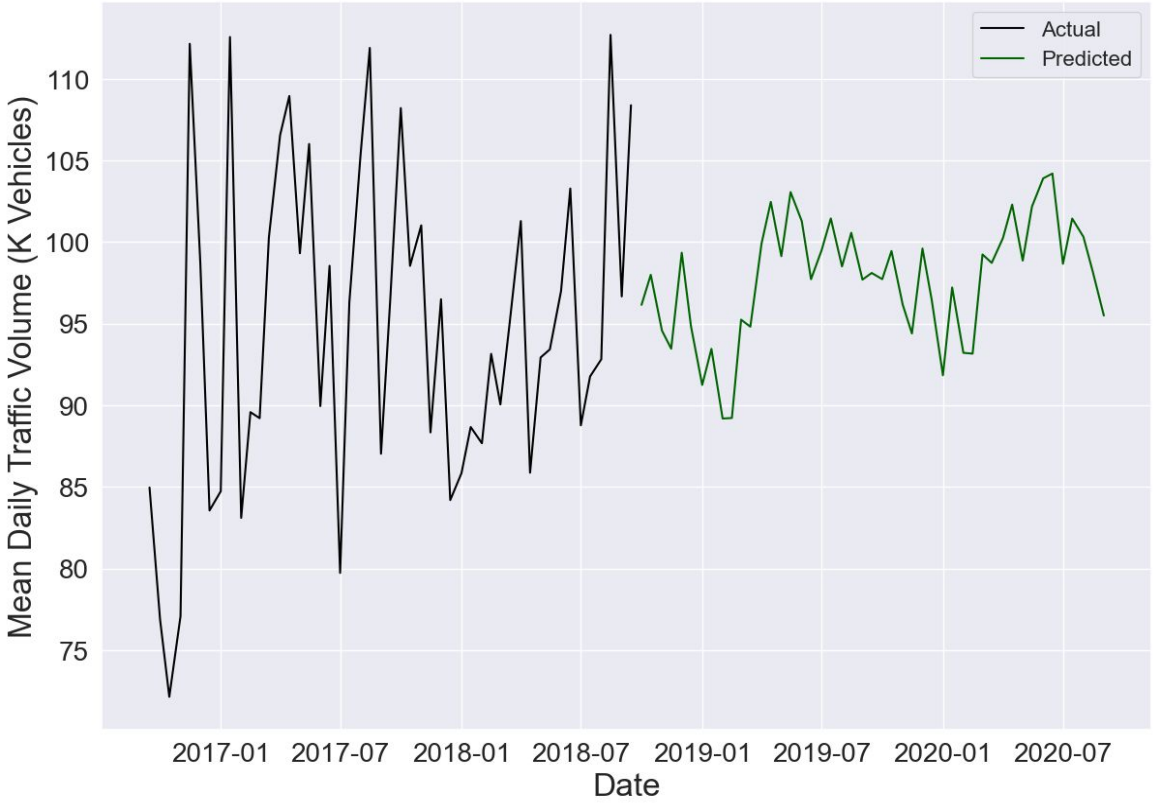
Adjustable

Ability to Tune Based on
Domain Knowledge

Train/Test Split



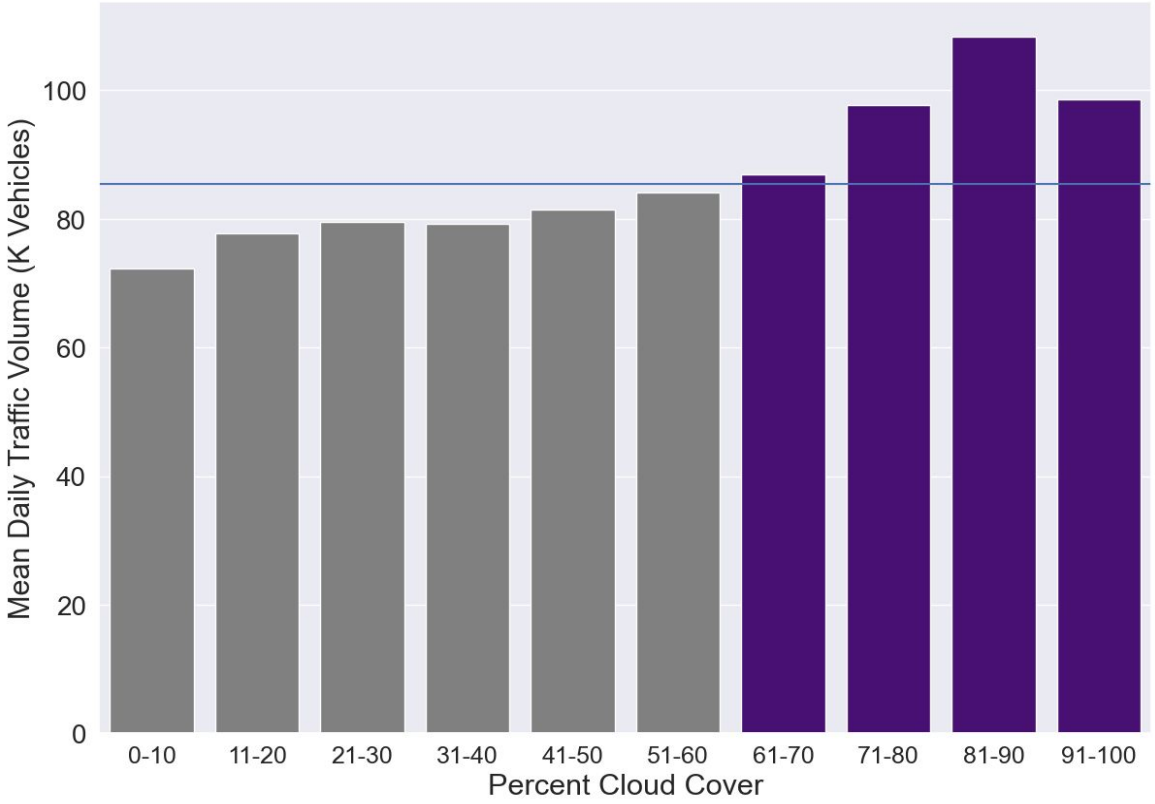
Predictions for 10/2018 - 09/2020



04

Findings & Recommendations

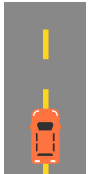
Purple ~~Rain~~ Percent Cloud Cover

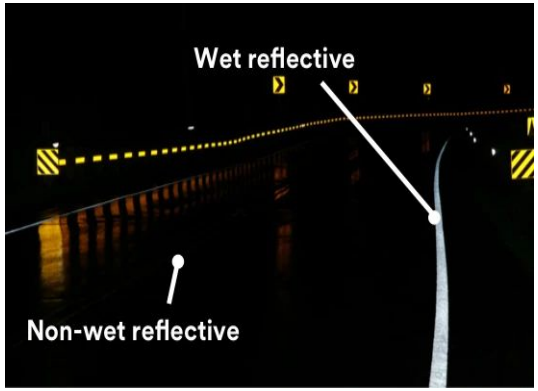


Recommendations

Lighting

Installation of
High-Mast Lighting



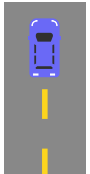


Reflectivity

Inspection of Reflectors,
Markings, and Signage

Public Transit

Promote Alternate Options
For High-Volume Events



05

Future Insights

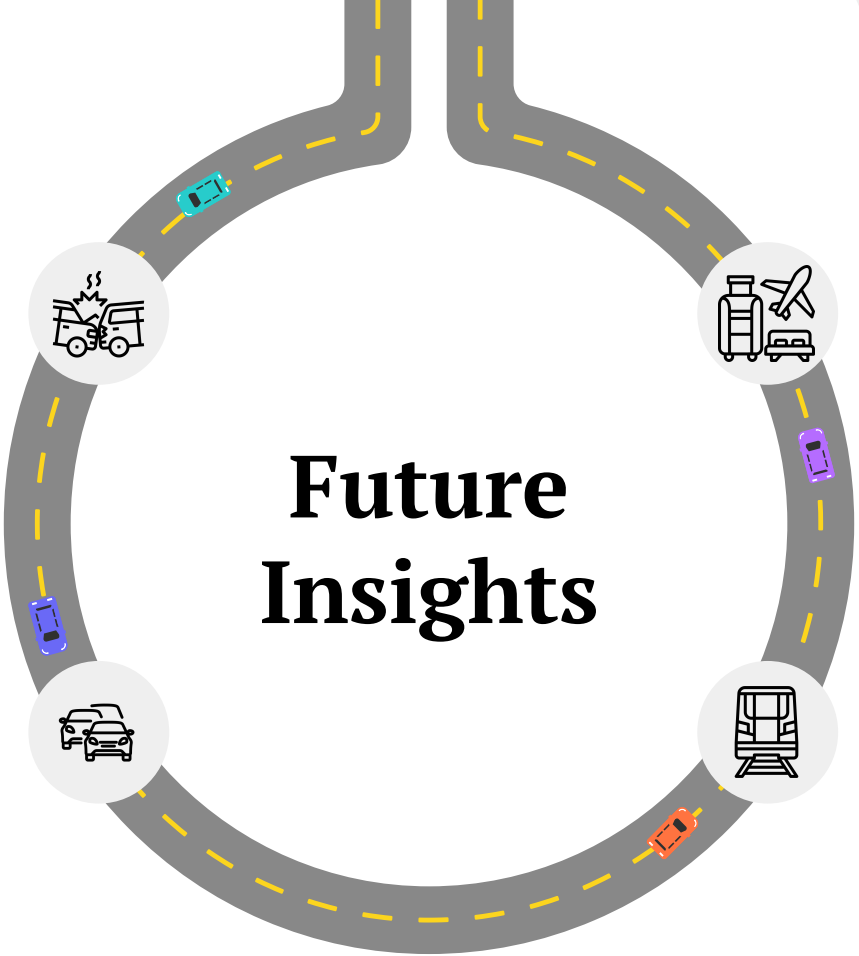
Future Insights

Collision Data

Expanded Holidays

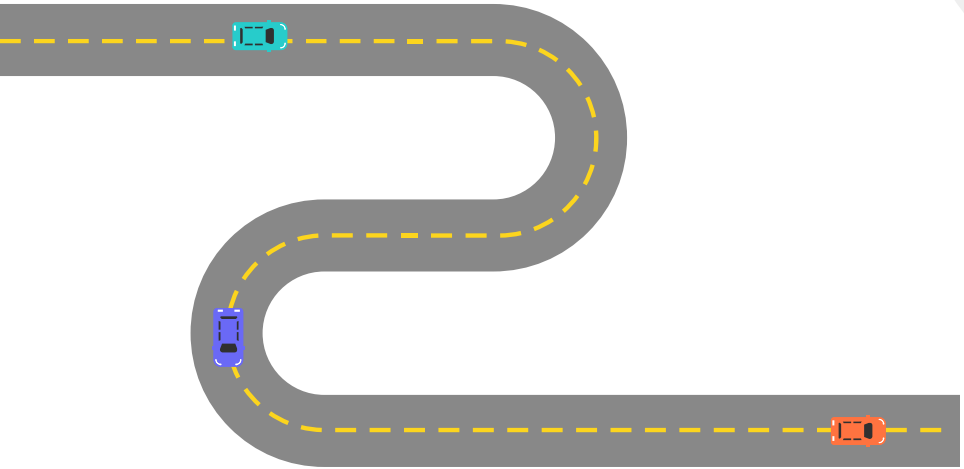
Complete Traffic Counts

Impact of Light Rail



Thank You

Paul Schulken
https://github.com/pschulk



CREDITS: This presentation template was created by **Slidesgo**, and includes icons by **Flaticon**, and infographics & images by **Freepik**