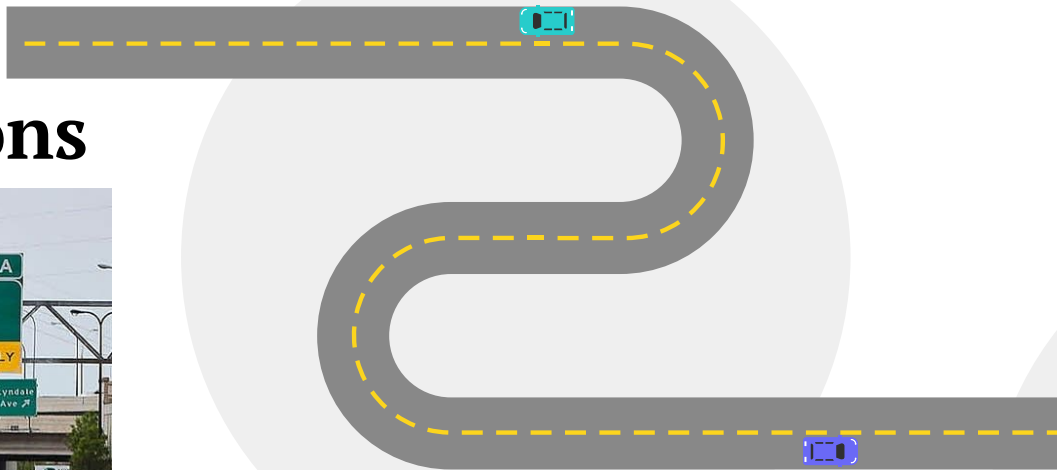


I-94 Traffic Volume Analysis & Predictions



About Me

Paul Schulken

Data Scientist
Civil Engineer

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

8+ Years Experience with
Government and Private Sector



<https://github.com/pschulk>

Agenda

01

**Business
Understanding**

02

**Data
Overview**

03

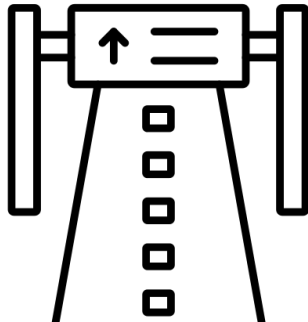
**Modeling &
Performance**

04

**Findings &
Recommendations**

05

**Future
Insights**



The background features a light gray surface with stylized winding roads in dark gray with yellow dashed center lines. Three small cars are visible: an orange car on a road in the bottom left, a purple car on a road in the top right, and a small portion of a third car is visible at the top center. Large, light gray circular shapes are also present in the corners.

01

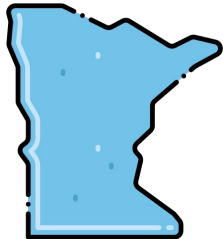
Business Understanding

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



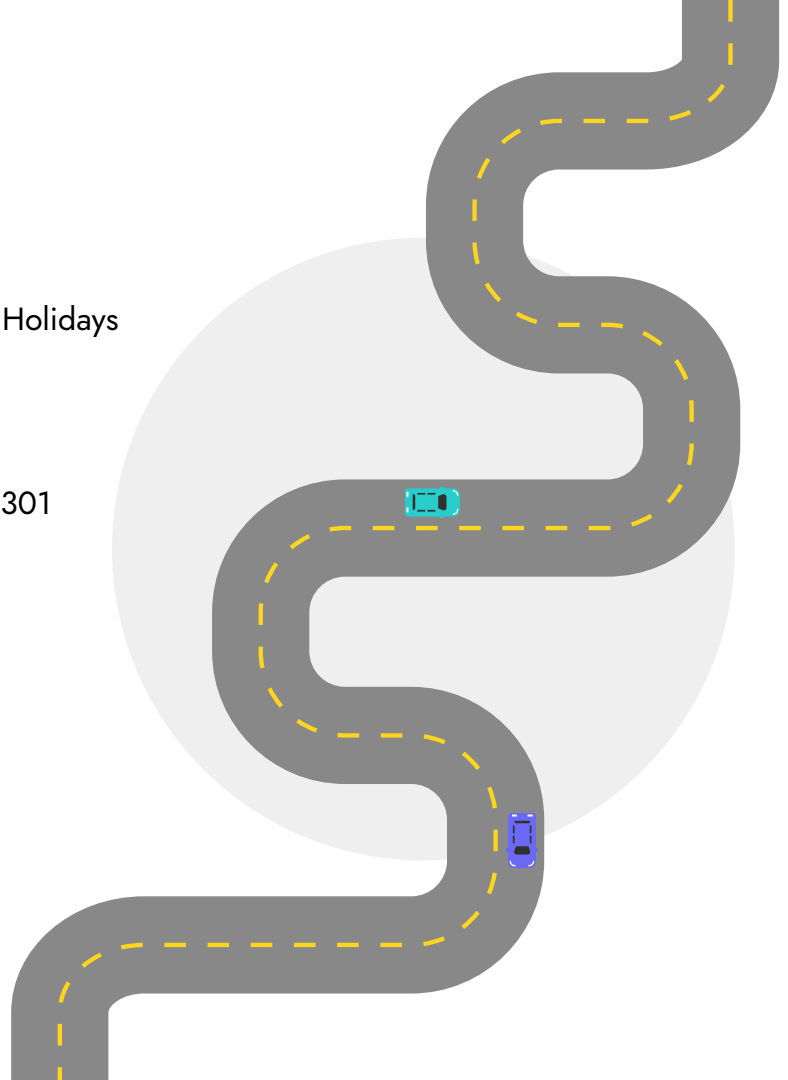
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02

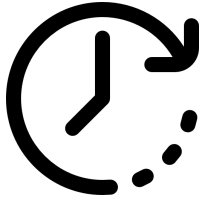
Data Overview

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

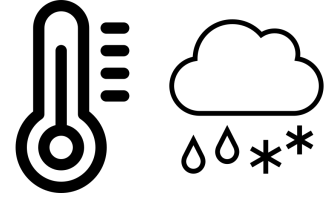


Data Modifications



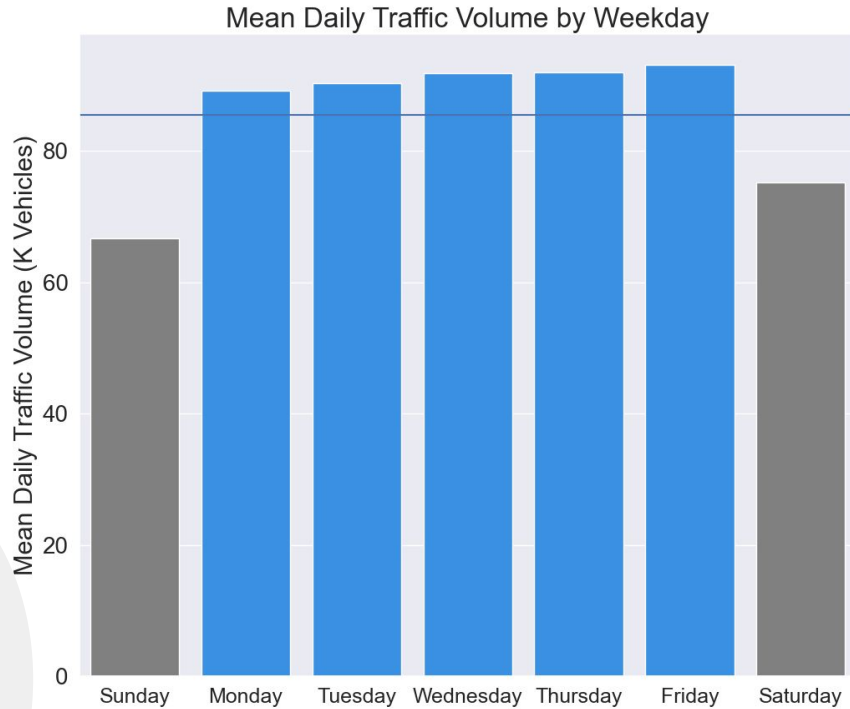
Data Downsampled from
Hourly to Daily Values

Incomplete Traffic Volumes
Replaced with Daily Averages

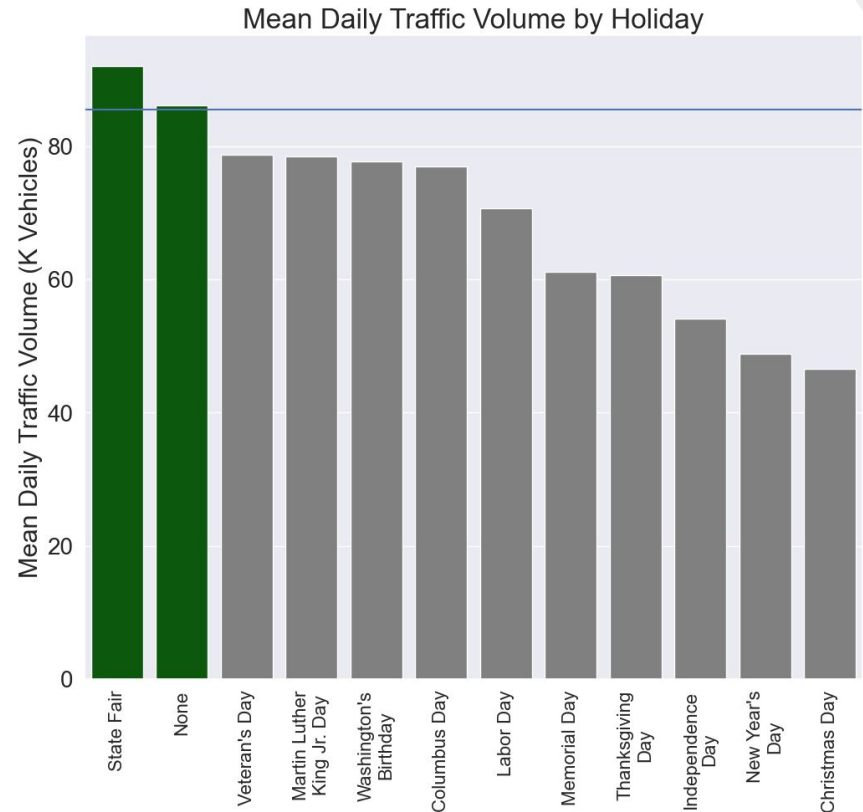


Temperature and Rain/Snow Values
Replaced with National Oceanic and
Atmospheric Association (NOAA) Values

Visualizing Traffic Volume



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

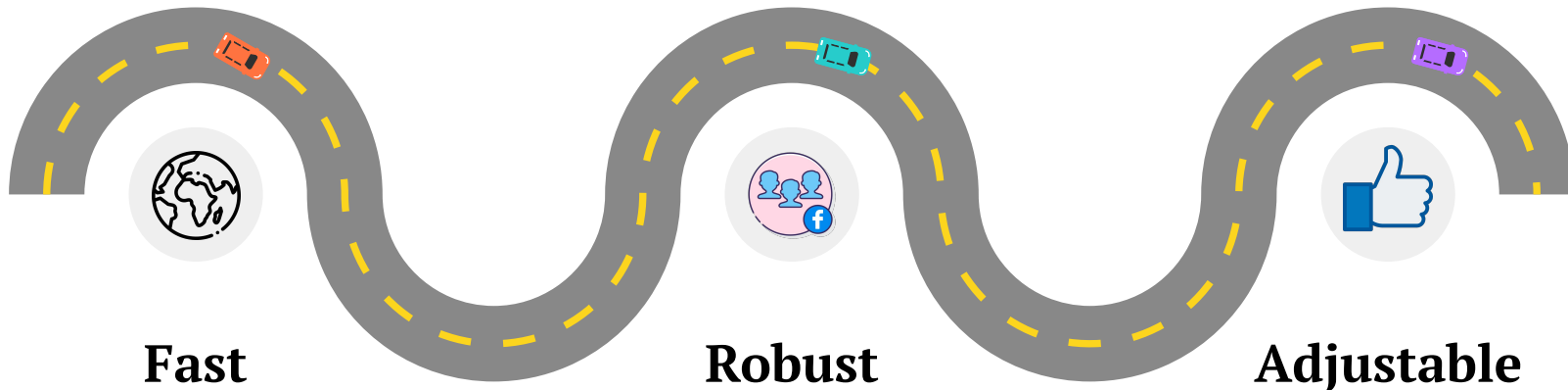


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03

Modeling & Performance

Prophet Model



Open-Source Software
for General Forecasting Purposes

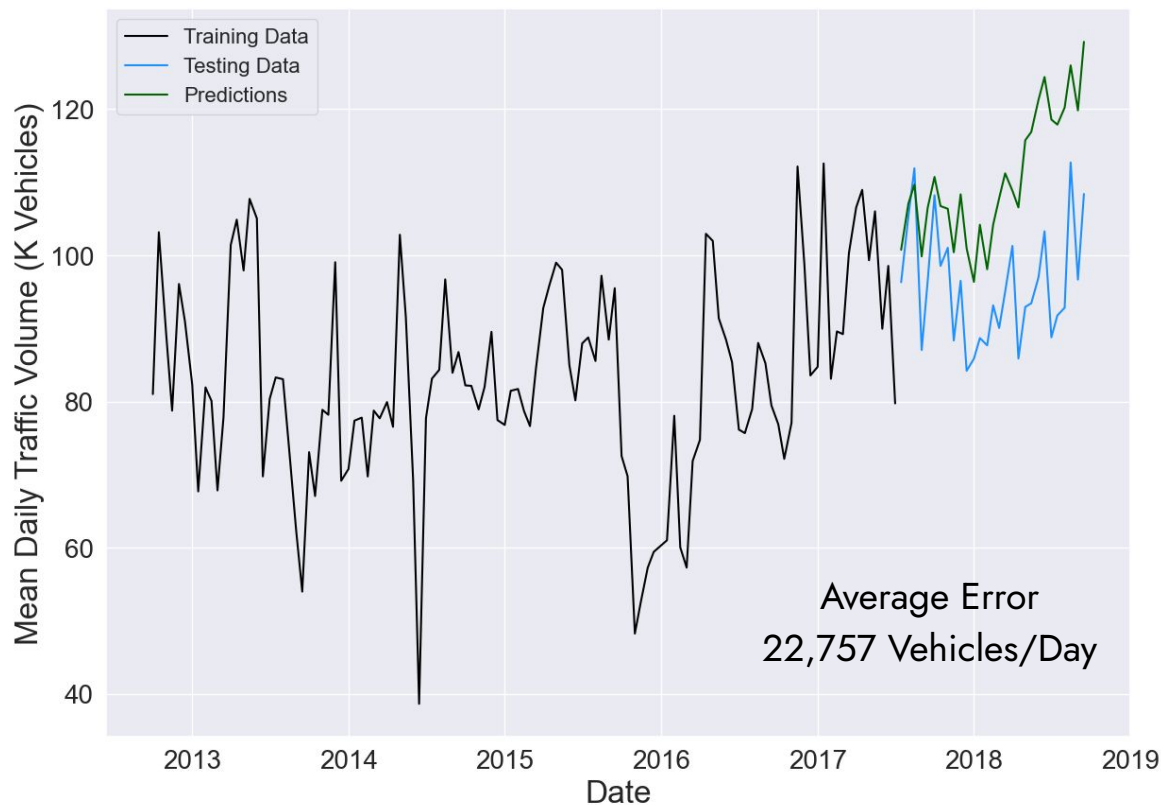
Works with Seasonality,
Holidays, and Outliers

Ability to Tune Based on
Domain Knowledge

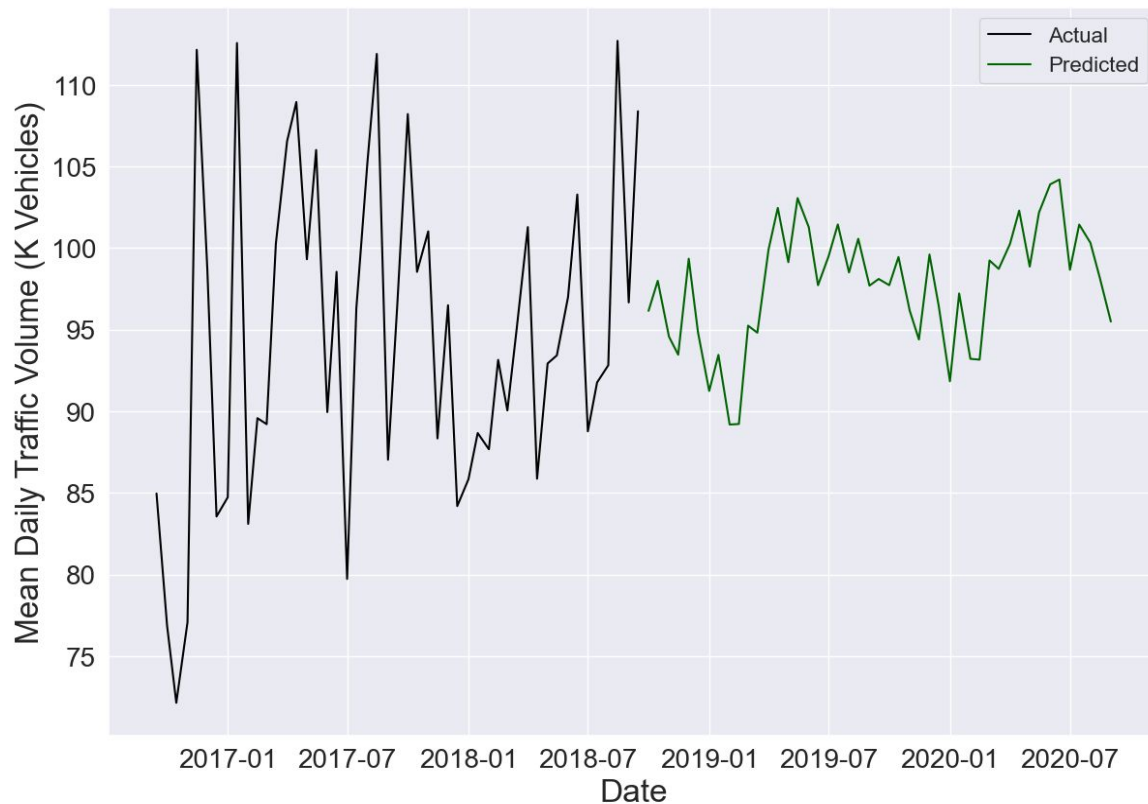
You can trust us
with your data.



Train/Test Split



Predictions for 10/2018 - 09/2020

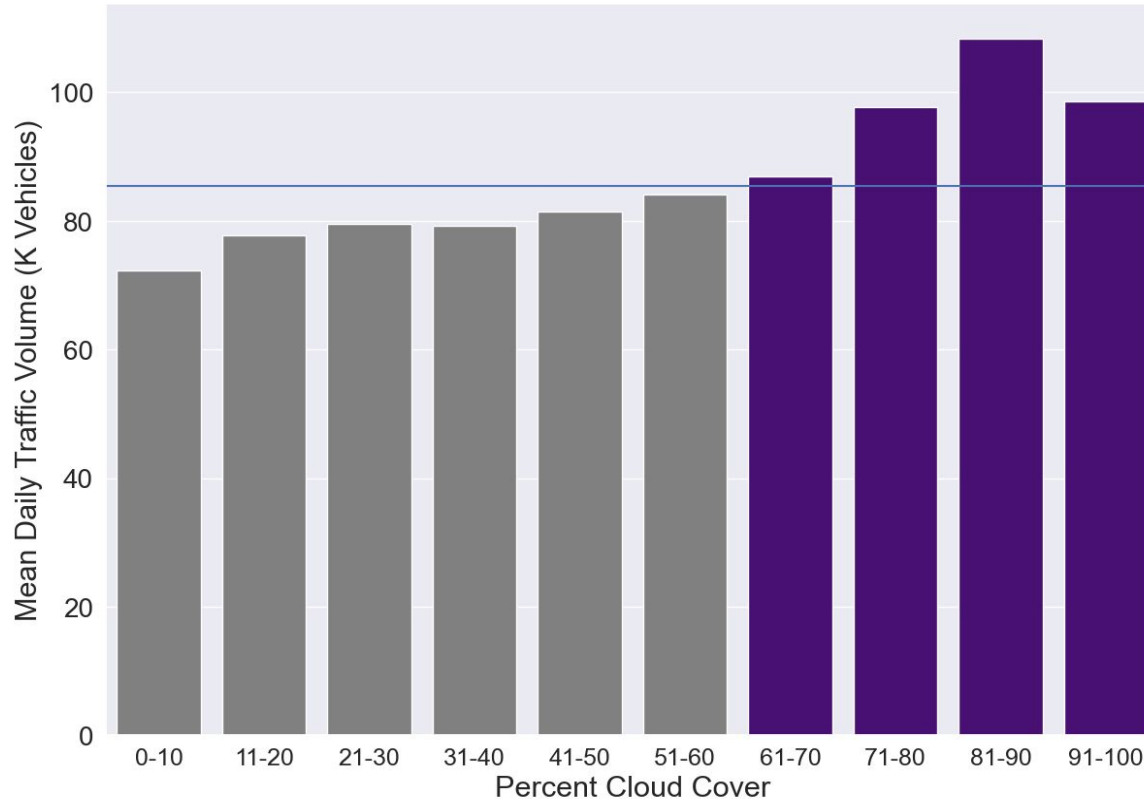


The background features a light gray surface with stylized winding roads in dark gray with dashed yellow lines. Three small cars are visible: an orange car on the left, a purple car on the right, and a small blue car at the top. Large, light gray circular shapes are also present in the corners.

04

Findings & Recommendations

Purple Rain Percent Cloud Cover

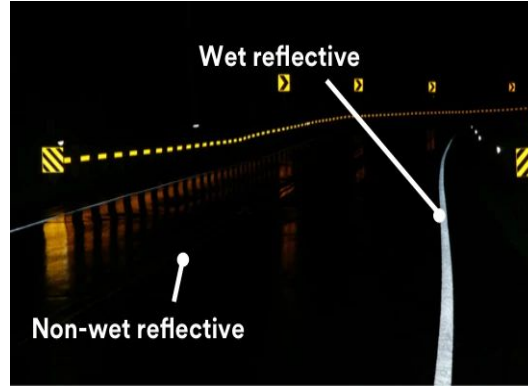


Recommendations



Lighting

Installation of
High-Mast Lighting



Reflectivity

Inspection of Reflectors,
Markings, and Signage



Public Transit

Promote Alternate Options
For High-Volume Events



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05

Future Insights

Future Insights



The diagram features a central white circle containing the text 'Future Insights'. Surrounding this circle is a thick, grey border with a dashed yellow line running along its inner edge, resembling a road. Five circular nodes are positioned around the perimeter of this border. Each node contains a black and white icon. Between the nodes, small, colorful car icons (cyan, purple, orange, and blue) are placed on the dashed line, suggesting a clockwise flow. The nodes are connected to text labels positioned outside the circular border: 'Collision Data' at the top-left, 'Expanded Holidays' at the top-right, 'Impact of Light Rail' at the bottom-right, 'Complete Traffic Counts' at the bottom-left, and 'Future Insights' in the center.

**Collision
Data**

**Expanded
Holidays**

**Impact of
Light Rail**

**Complete Traffic
Counts**

Thank You

Paul Schulken

<https://github.com/pschulk>

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