

Traffic Predictions in the Twin Cities

Predicting traffic volume on westbound I-94 at Minnesota DoT ATR
Station 301

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MSiA 423 Final Project

Motivation

- Minneapolis-St. Paul (MSP) Metropolitan Area
 - Population of over 3.1 million people [1]
 - Commuters lose 52 hours each year stuck in traffic [2]
- Interstate 94 runs through the heart of downtown Minneapolis and St. Paul



Source: Wikimedia Commons [3]

- This web application seeks to help MSP-area commuters plan their commute by predicting traffic volume, specifically at Minnesota DoT ATR Station 301 along I-94.

Demo

msia423-512816222.us-east-1.elb.amazonaws.com

Data and RDS

Data Source

- Data source from the UCI Machine Learning Repository
- Contains counts of traffic volume on westbound I-94 at Minnesota DoT ATR Station 301 per hour
- Spans 2012-2018 and contains information on the weather conditions such as temperature, percentage of cloud cover, precipitation totals, and more.
- <https://archive.ics.uci.edu/ml/datasets/Metro+Interstate+Traffic+Volume>

RDS Usage

- Store the history of user queries in order to display top 5 most popular queries
- Store the number of likes and dislikes the application has received
- Store the most recent prediction

Model and Success Criteria

Model

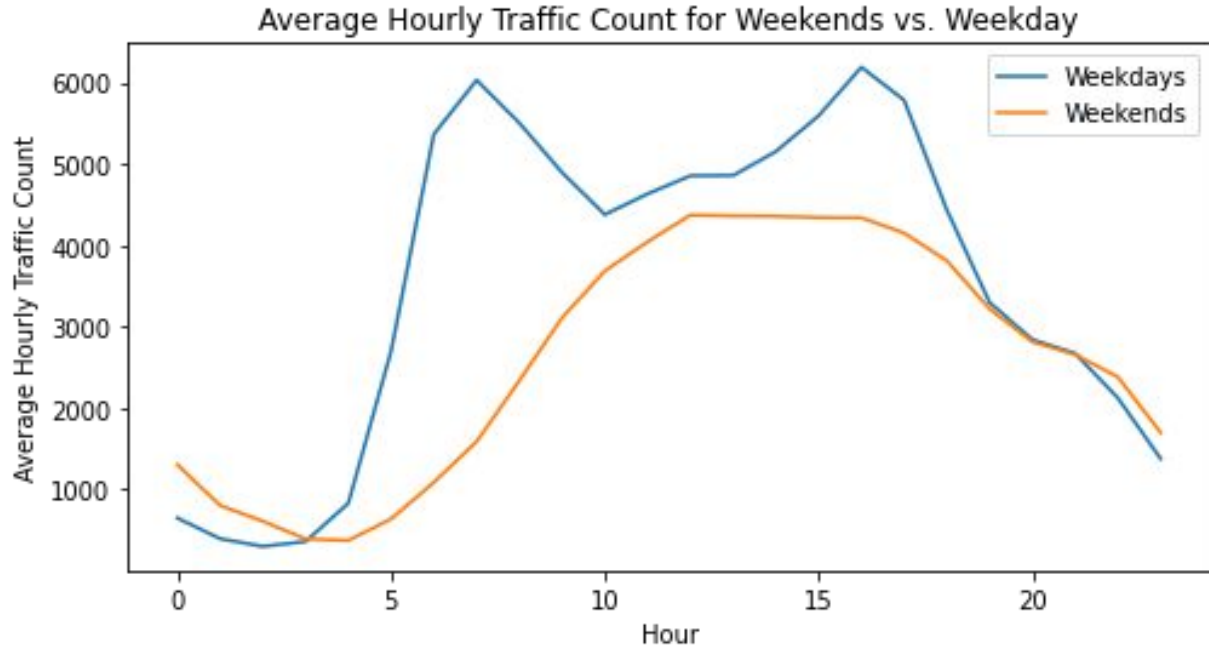
- Random Forest Regressor
- 30 Estimators
- Online Model
- Predictors include:
 - Temperature
 - Percentage of cloud cover
 - Weather description (categorical)
 - Month
 - Hour
 - Day of week (categorical)
 - Holiday (binary)
 - Hourly rainfall (log-transformed)

Project Success

- Proposed Success Criteria: 5-fold cross validation **$R^2 = 0.8$**
- Actual Performance: Test **$R^2 = 0.924$**
 - Forced to eliminate cross-validation from the pipeline because it selected models too large to be loaded by the web app.
- Business Success: At least **75%** likes

Insights

- Hour is the most significant predictor followed by whether or not it is a weekend
- Weekdays have large rush-hour peaks
- Weekends have a more gradual cyclical pattern



Contact Information and References

Thank you! Please contact me with any further questions at
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[1] Metropolitan Council. (2020). *2019 Final Population and Household Estimates*.

[https://metro council.org/Data-and-Maps/Publications-And-Resources/Files-and-reports/2019-Population-Estimates-\(FINAL,-July-2020\).aspx](https://metro council.org/Data-and-Maps/Publications-And-Resources/Files-and-reports/2019-Population-Estimates-(FINAL,-July-2020).aspx)

[2] Reilly, M. (2020, March 11). It's not just you; traffic really is getting worse. *Minneapolis/St. Paul Business Journal*.

<https://www.bizjournals.com/twincities/news/2020/03/11/its-not-just-you-traffic-really-is-getting-worse.html>

[3] Wikimedia Commons. (2008). [https://commons.wikimedia.org/wiki/File:I-94_\(MN\).svg](https://commons.wikimedia.org/wiki/File:I-94_(MN).svg)