

ActiveAI



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Toronto on the Move

Toronto's bike-share system sees pandemic boost

OLIVER MOORE > URBAN AFFAIRS REPORTER

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TORONTO | News

Toronto is significantly expanding its bike-sharing network



Chris Fox CP24 Web Content Writer
Contact

How Toronto's Bike Share ridership kicked into high gear during COVID-19

Bike Share is poised to expand to all corners of the city and add discounted passes for low-income residents.

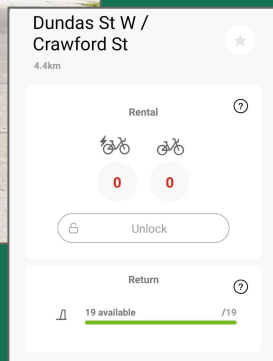


Bikeshare Dilemma

Matching demand with supply at each of the Toronto's 625 stations 24/7

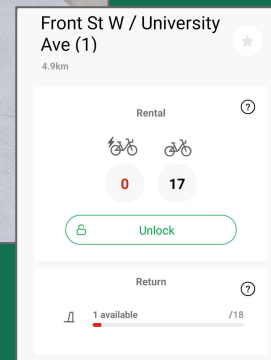
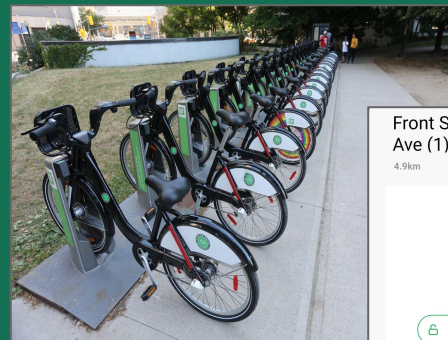
Empty Bike Stations

at Pick Up



Full Bike Stations

at Drop Off



ActiveAI team wants to advise the City on which stations to classify as high demand (i.e., Dispatch) stations and high supply (i.e., Receiving) stations based on time of year, time of week, time of day, and more.



Data Pull and Feature Engineering

Data Sources

- Bike Share Toronto Ridership
- Bike Share Toronto
- Weather Data
- Google Maps API

Data Cleaning + Transformation

- Drop trips less than 120 seconds
- Bin time into 6 four-hour category

Feature Engineering

- Holidays, Weekend, Lockdown
- One Hot Encoded
- Calculated distance to nearest transit station

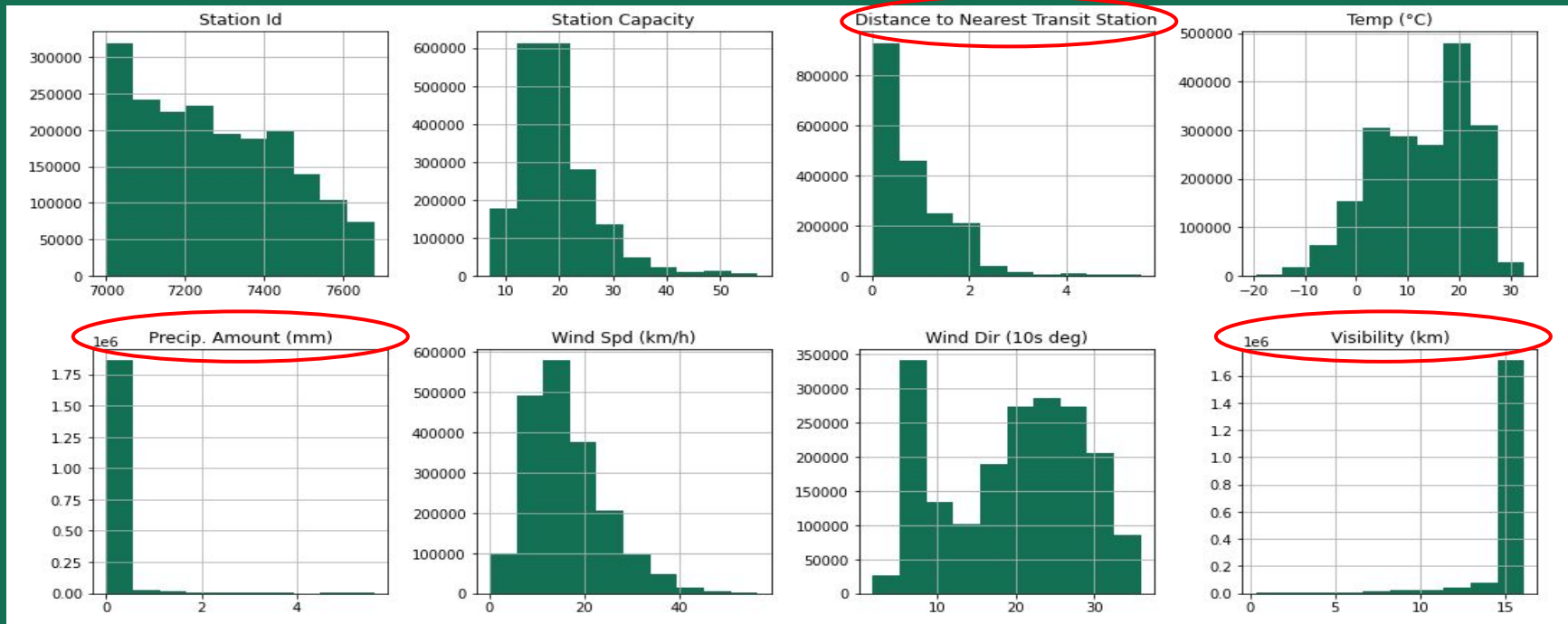
6.6M rows × 24 columns → 1.9M rows × 78 columns

Time Span: January 2020 to March 2022

Exploratory Data Analysis (EDA)



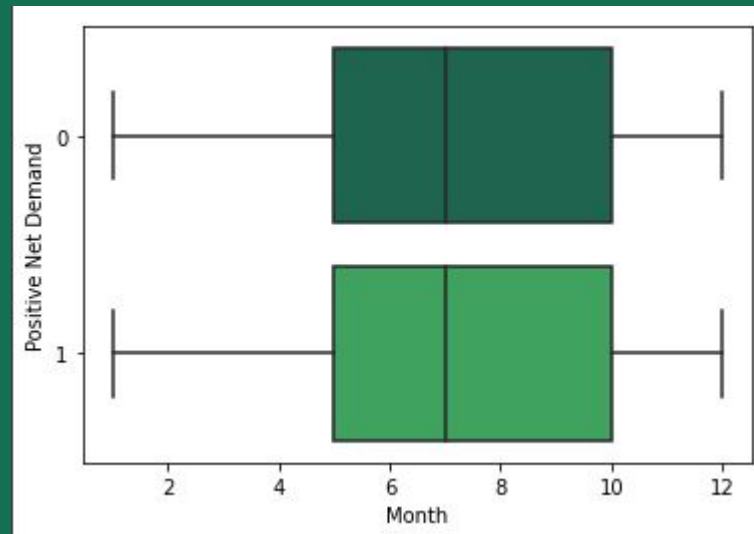
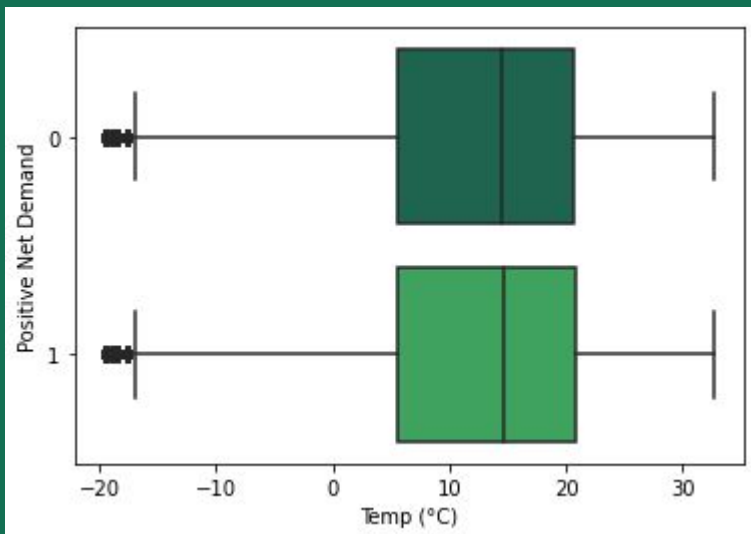
Correlation between aggregated station activity (pick up or drop off) and **visibility**, **precipitation**, **distance from nearest transit station**.



Weather and Time of Year Trends



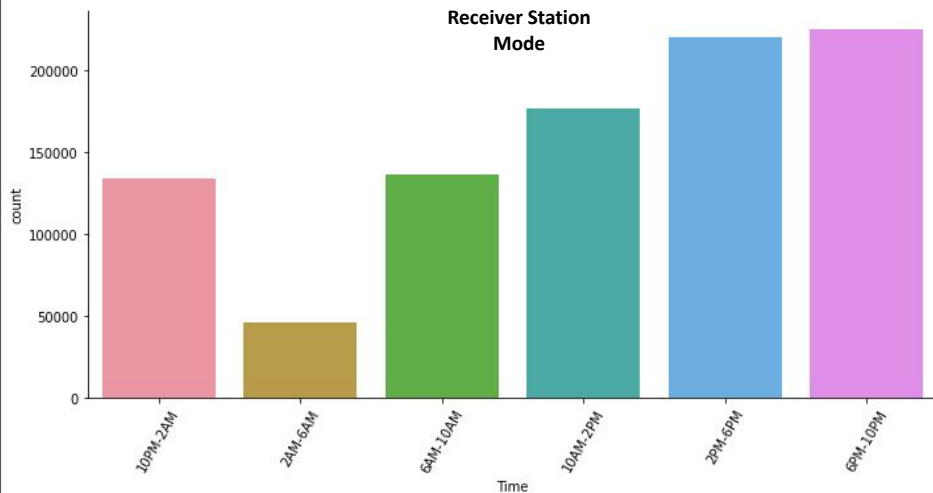
Warmer equals more riders, colder equals less



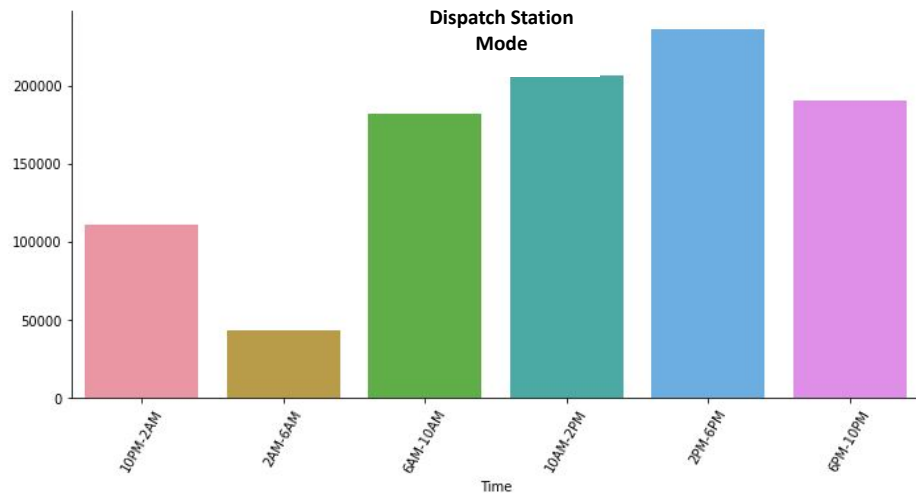
Dispatch vs Receiver Mode Stations



Receiver Station Mode



Dispatch Station Mode

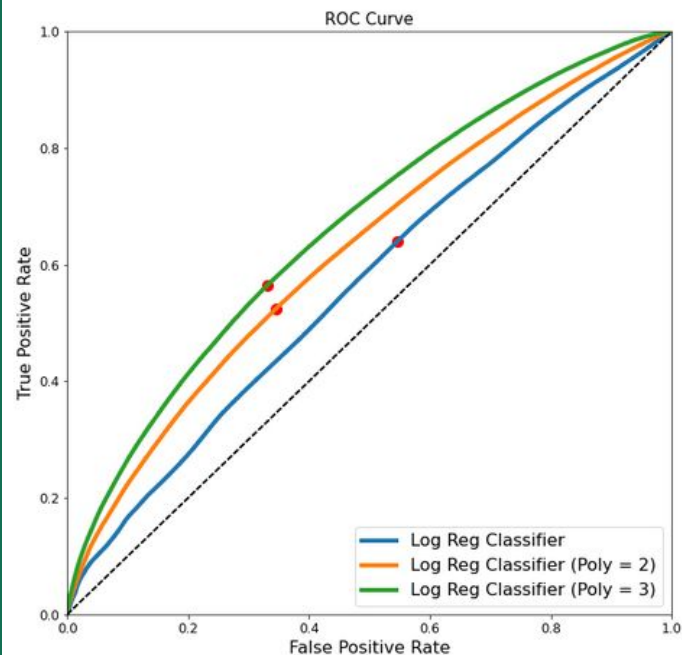


Modeling & Hyperparameter Tuning

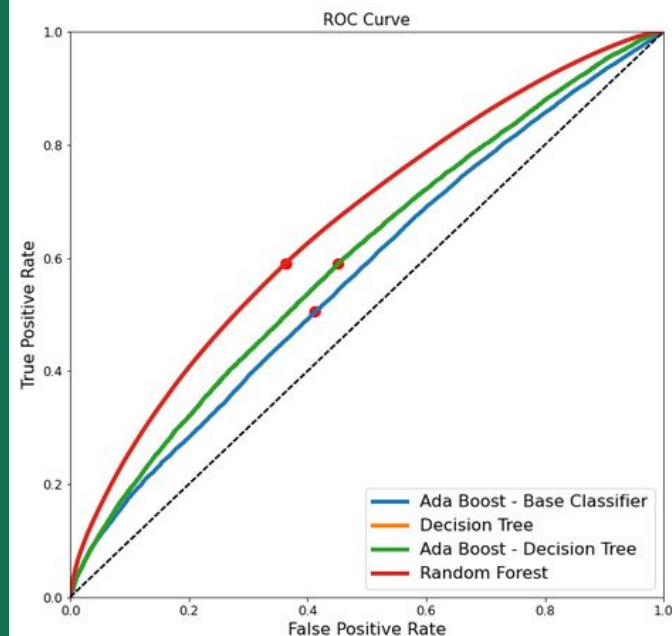


Models attempted

Log Reg Classifier ROC AUC Score - 0.569
Log Reg Classifier (Poly = 2) ROC AUC Score - 0.625
Log Reg Classifier (Poly = 3) ROC AUC Score - 0.664



Ada Boost - Base Classifier ROC AUC Score - 0.57
Decision Tree ROC AUC Score - 0.659
Ada Boost - Decision Tree ROC AUC Score - 0.599
Random Forest ROC AUC Score - 0.659



Best Model

