Analyzing NYC Traffic Violations By Precinct From 2013-23

CSE 6242 Final Project
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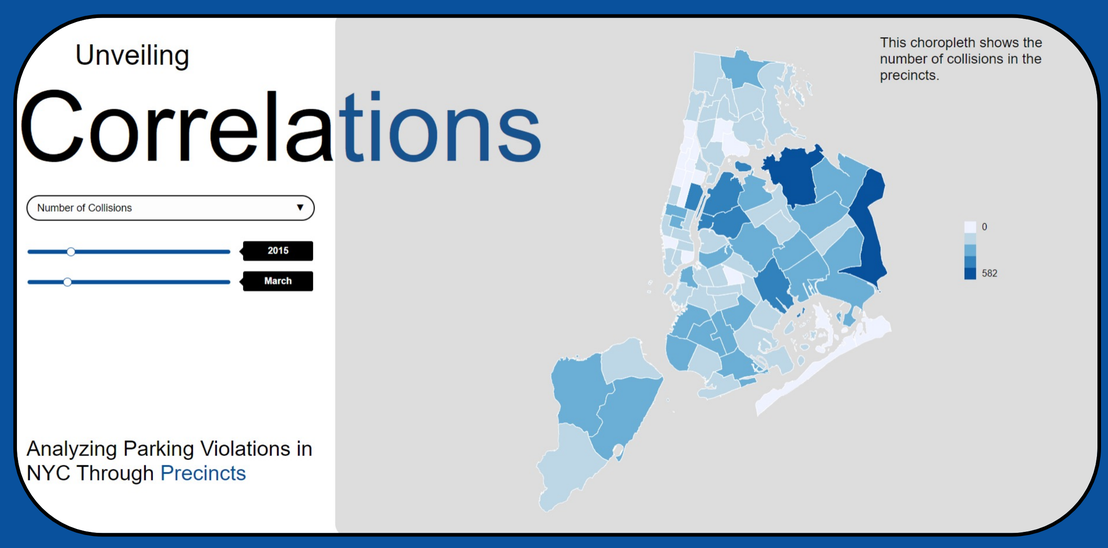
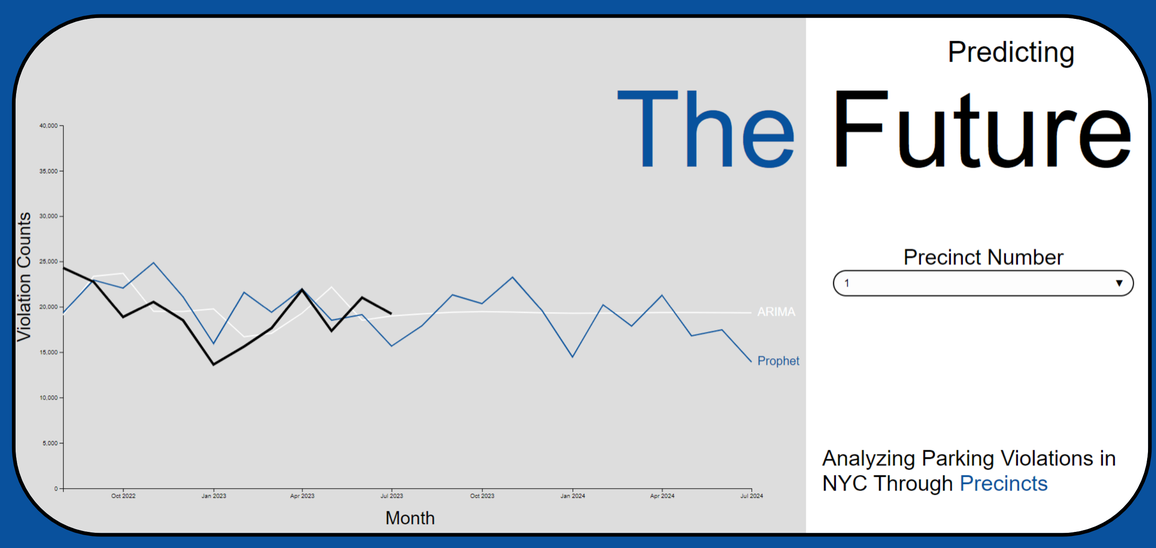
Motivation and Introduction

- **Inadequate Policies:** Analyzing the traffic violations can help policymakers determine ways to address challenges in traffic congestion
- **Insufficient Parking Infrastructure:** Areas with common traffic violations can be studied to determine restoration for parking infrastructure
- **Parking Patterns:** Precinct-specific patterns can be unveiled to aid urban planning and policymaking to enhance urban living

Data Description

- **NYC Parking Violation Dataset:** Contains detailed information on parking and traffic violations in NYC from 2013 to 2023
  - 10 files that total 24.7 GB, each file contains roughly 10-20 million rows, totaling 119.4 million timestamped data points, each with 43 features
- **NYPD Archives:** Collisions and summonses traffic data from 2011 to 2023
  - 120 files totaling 5.38 GB





Approaches

- **Novel Data and Features:** A new combination of datasets and features to unearth new correlations amongst parking and traffic violations
- **Precinct-Wise Analysis:** Policymakers are enabled to prioritize various initiatives dependent on precincts
- **Time Series Forecasting:** Forecasting parking violation rates enables analysis of the impact of implementing policies over time
- **Interactive Visualization:** A choropleth map of the NYC precincts to visualize features of traffic violations

Experiments

- **Time Series Models:** Trained models on data from 2013-2022, then used 2023 for RMSE evaluation
  - **ARIMA:** Most models were ARIMA(1/2/3, 0/1, 0) with no seasonality, not fit for long-term forecasts, RMSE of 6612.4
  - **Prophet:** Used the out-of-the-box hyperparameters, predicts changes in trend very frequently, more suitable for long-term forecasts, RMSE 6628.2
- **User Feedback:** To gauge effectiveness of interactive choropleth map we surveyed GT students on
  - **Visual Appeal:** 3.94 out of 5
  - **Interaction Ease:** 4.24 out of 5
  - **Understandability:** 4.12 out of 5