

Bike Sharing Demand Prediction for Washington DC



Introduction



Our Prediction & Aim

Forecasting the amount of bike sharing according to weather patterns and calendar events (i.e. holidays) can ensure a sustainable business process.

The Team

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The Data



Capital Bikeshare Usage Data

Data for analysis is aggregated to yield total number of bike rentals per day (approx. 3,300 observations).

Timespan: 2011-2019

Source: [Capital Bikeshare system data](#)

All bike rentals from 2011-2019 (approx. 25 million observations).



Historic DC Weather Data

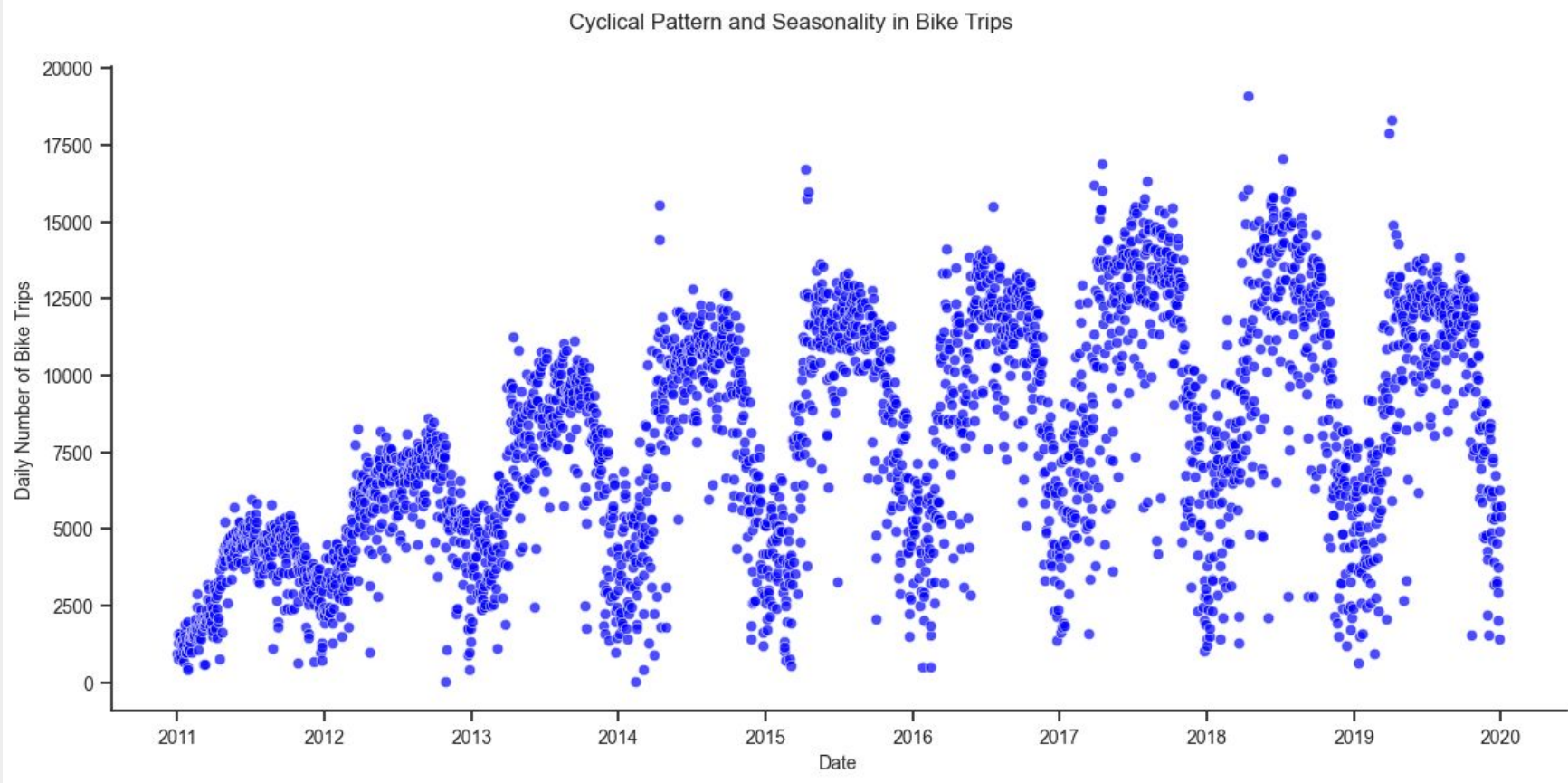
Daily data for minimum and maximum temperature, average wind speed, snow, snow depth and precipitation.

Timespan: 2011-2019

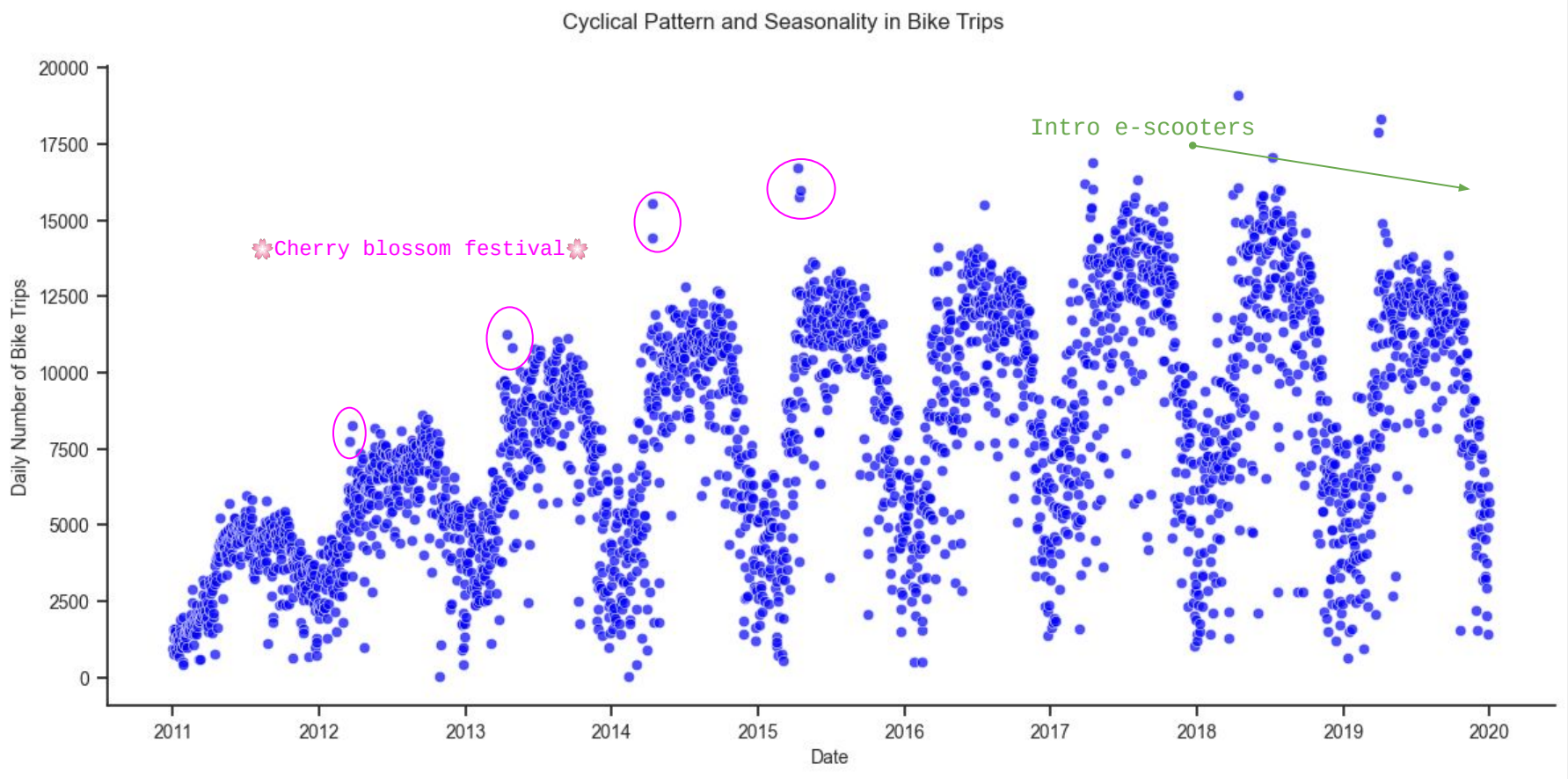
Source: [National Oceanic and Atmospheric Administration](#)

Station: Washington Reagan Airport (5 km from Downtown)

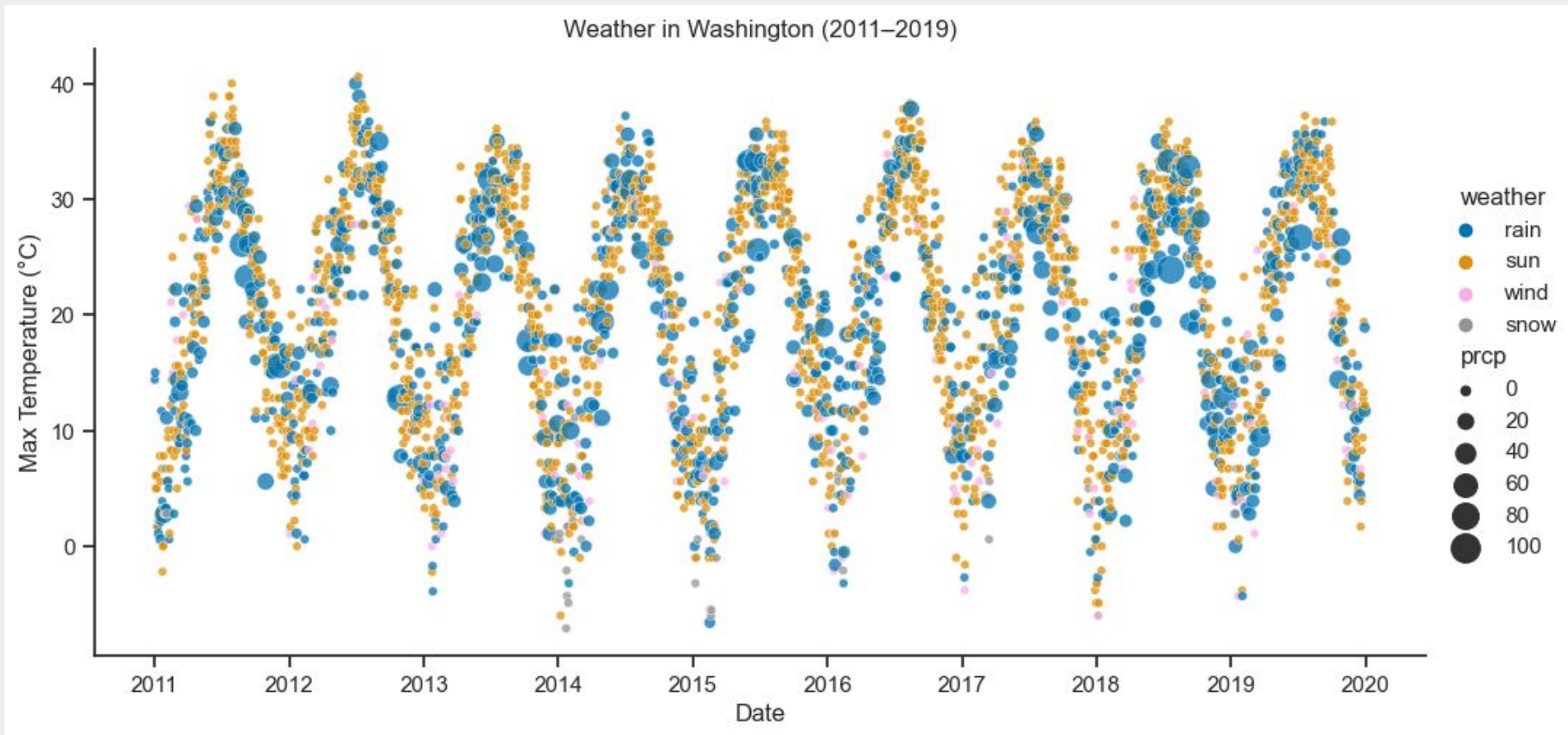
Exploratory Data Analysis I - Seasonality of Bike Trips



Exploratory Data Analysis I - Seasonality of Bike Trips



Exploratory Data Analysis II - Weather Data



Performance

Linear Regression error rate
(MAPE): **11.4% (Baseline)**

Avg. no of bikes/day (2019): **9311**

Forecasted avg. no of bikes/day
(2019): **8250**

Variable revenue per bike: **\$2.00**
(\$1.00 to unlock, average bike trip
of 20 mins, \$0.05/min)

Forecasted variable revenue loss:
\$2,122/day (\$774,530/year)

Random Forest error rate (MAPE): **5.6%**

Avg. no of bikes/day (2019): **9311**

Forecasted avg. no of bikes/day
(2019): **8790**

Variable revenue per bike: **\$2.00**
(\$1.00 to unlock, average bike trip
of 20 mins, \$0.05/min)

Forecasted variable revenue loss:
\$1,042/day (\$380,330/year)

Future Work



- Forecasting demand for bike routes, stations.
- Hourly demand predictions to yield insights on dynamic pricing.
- Incorporate pricing data & competitor analysis.

Thank You!

Do you have any questions?

