San Francisco Bay Area Bike Share Data

Background Information

Bay Area Bike Share established in Aug 2013

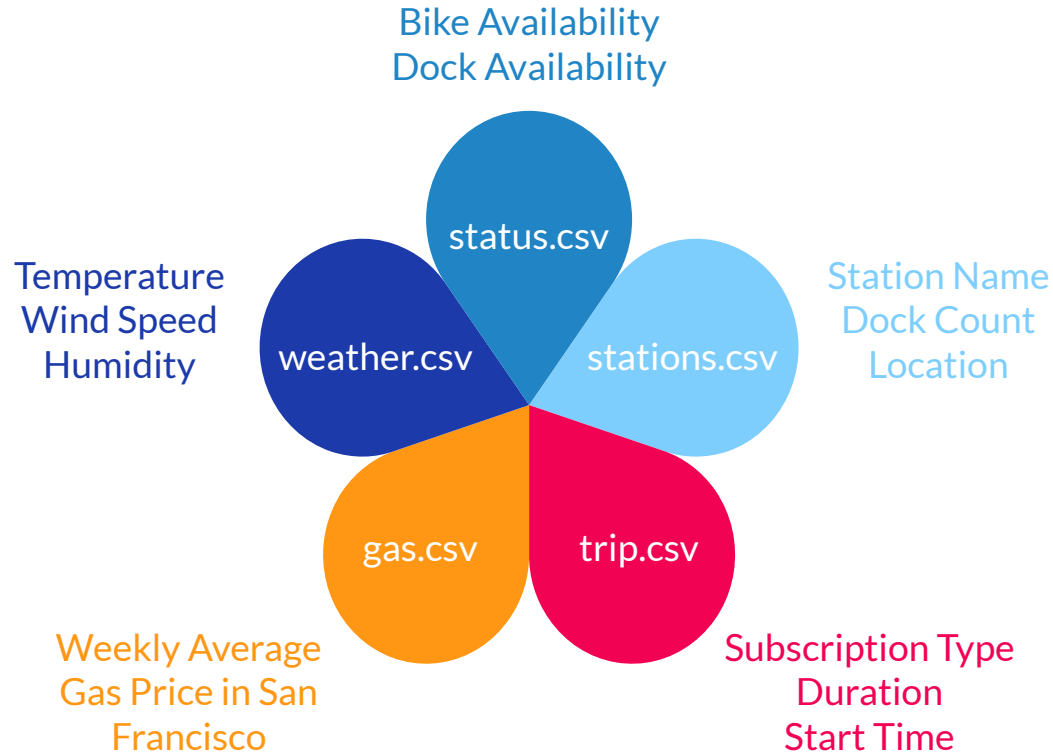Relaunched by Ford Motor Company as **Ford GoBike**

Acquired by Lyft and rebranded as **Bay Wheels**

| 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |

Dataset date range

Dockless bike share launched in the San Jose Area

Data Analysis Path

1. Factors that affect number of rentals

2. Prediction model for rentals

3. Station size and popularity

4. Number of rentals per month

5. Hourly duration and start time

6. Subscriber vs customer behavior

Dataset Overview

Bike Availability
Dock Availability

status.csv

Station Name
Dock Count
Location

stations.csv

Temperature
Wind Speed
Humidity

weather.csv

gas.csv

trip.csv

Weekly Average
Gas Price in San
Francisco
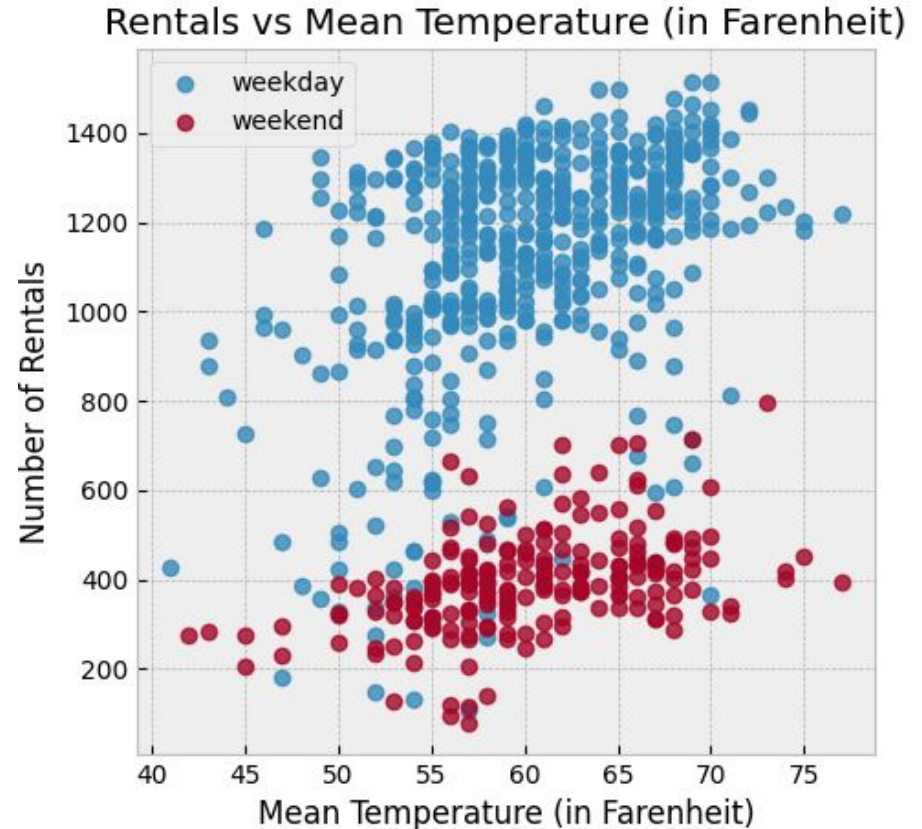
Subscription Type
Duration
Start Time

1.

External Factors

Impact on Number of Rentals

Temperature

▷ Upward trend
▷ Most between 50° - 70°
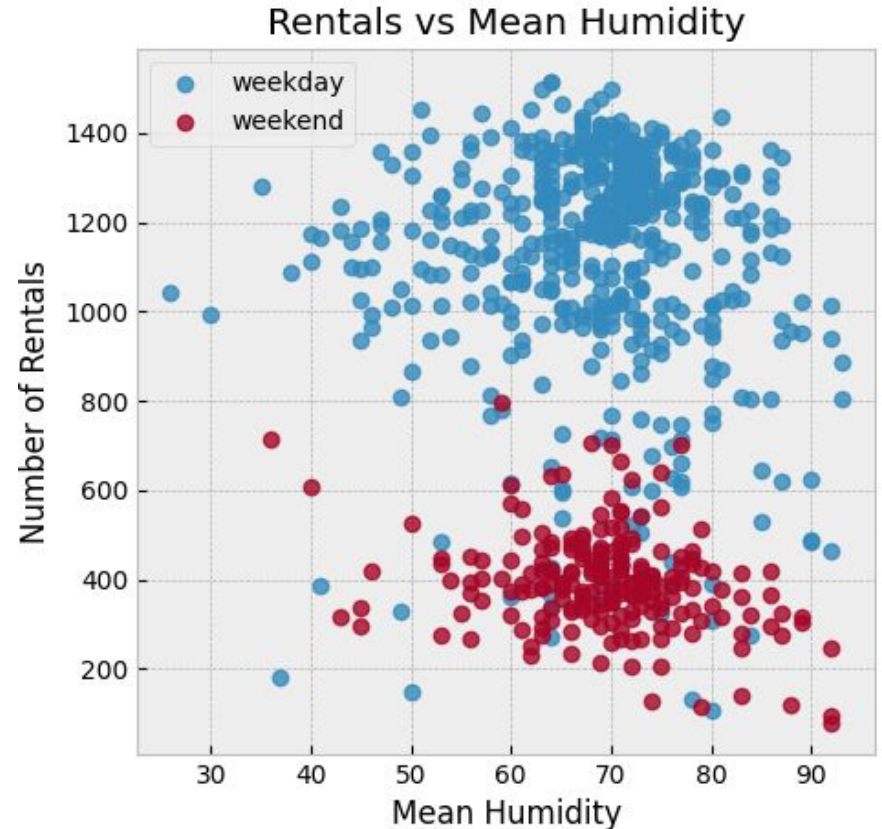▷ No data past 80°

More rentals on warmer days

Rentals vs Mean Temperature (in Farenheit)

Humidity

▷ Slight downward trend
▷ Most between 60% - 80%
▷ > 65% is uncomfortable
▷ Tapers off > 80%
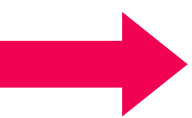
Less rentals on very humid days
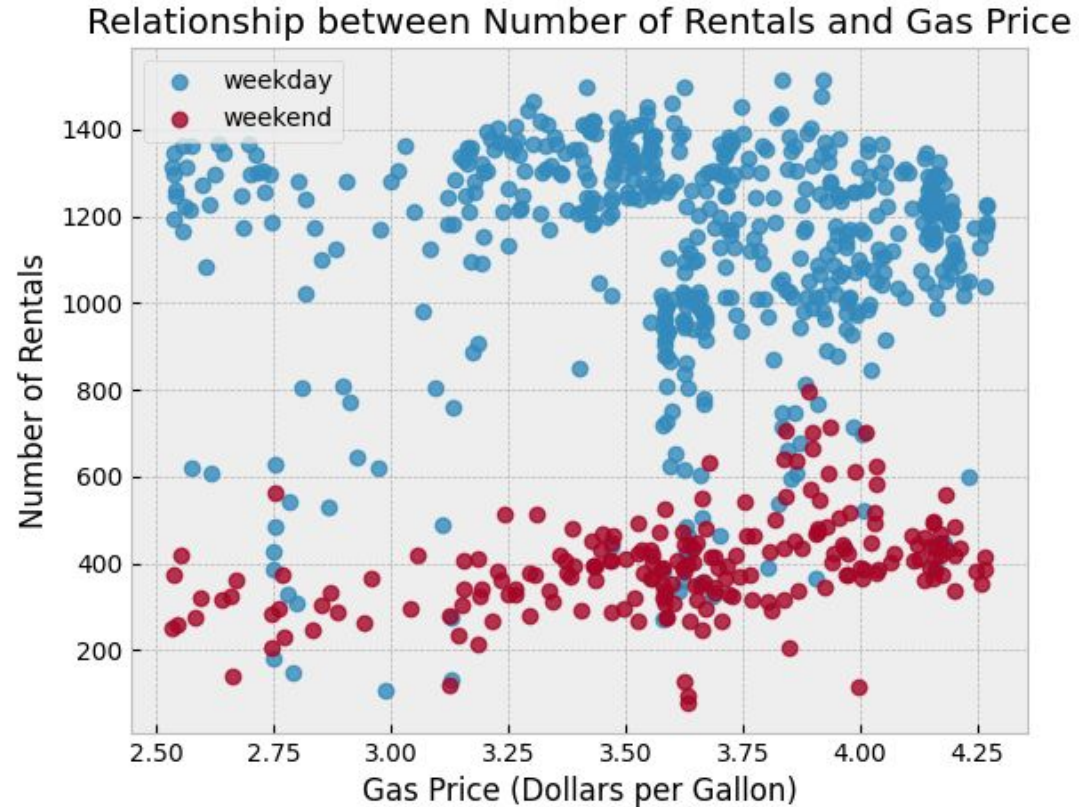

Rentals vs Mean Humidity

Gas Prices

▷ Weekday: no trend
▷ Weekend: slight upward trend
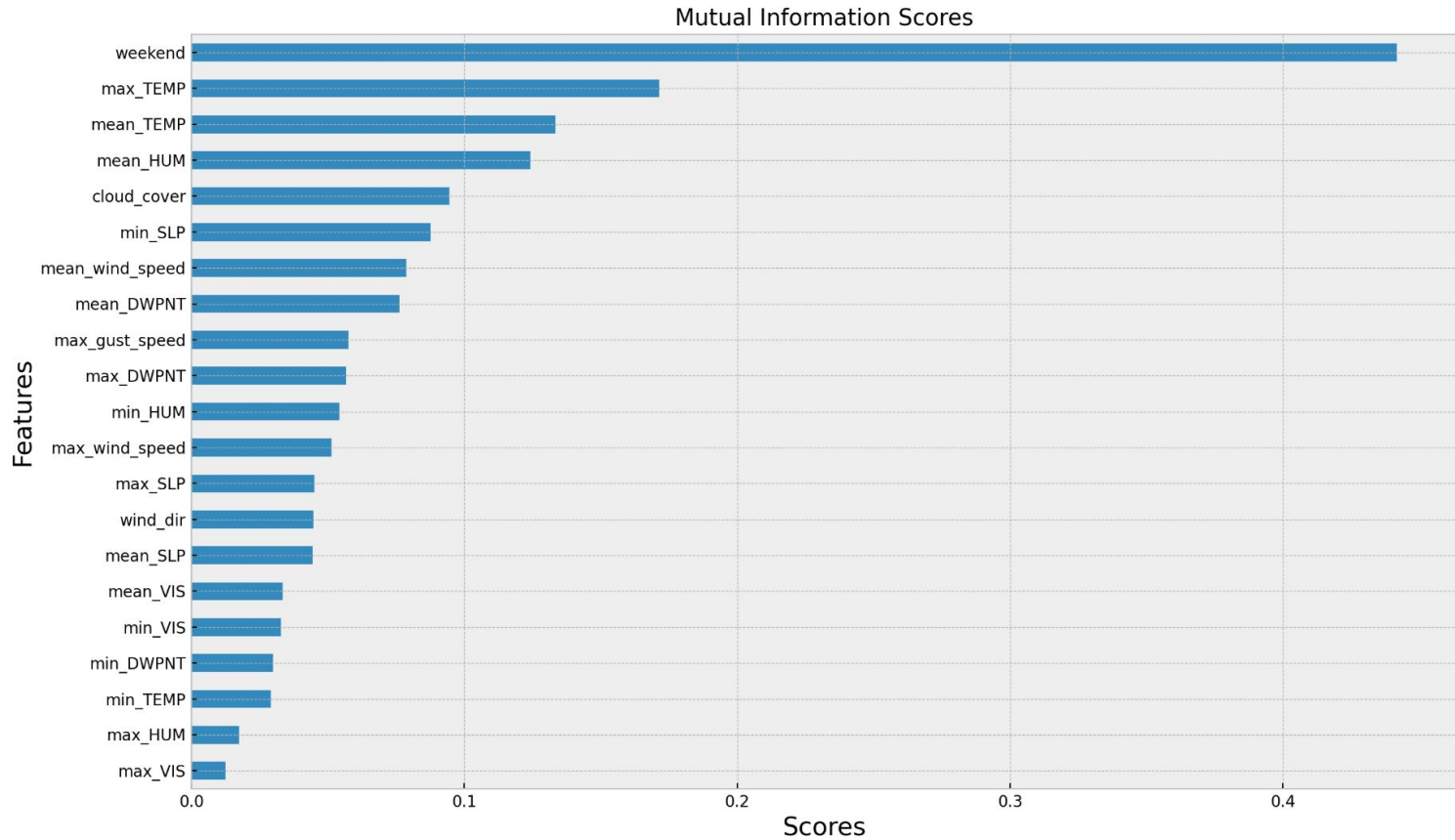
More leisure rentals when gas prices are higher


Relationship between Number of Rentals and Gas Price

2.

Prediction Model

Number of Rentals per Day

Mutual Information Scores

Most features are not strongly correlated with the number of rentals.

RMSE for Models

	Training Set RMSE	Validation Set RMSE
Linear Regression Model	196.57	201.47
Random Forest Model	95.62	178.16
Neural Network Model	163.52	191.16

Example Prediction: 1147 Rentals

Weather Information

cloud_cover=2.6
wind_dir_degree=309.8
weekend=False
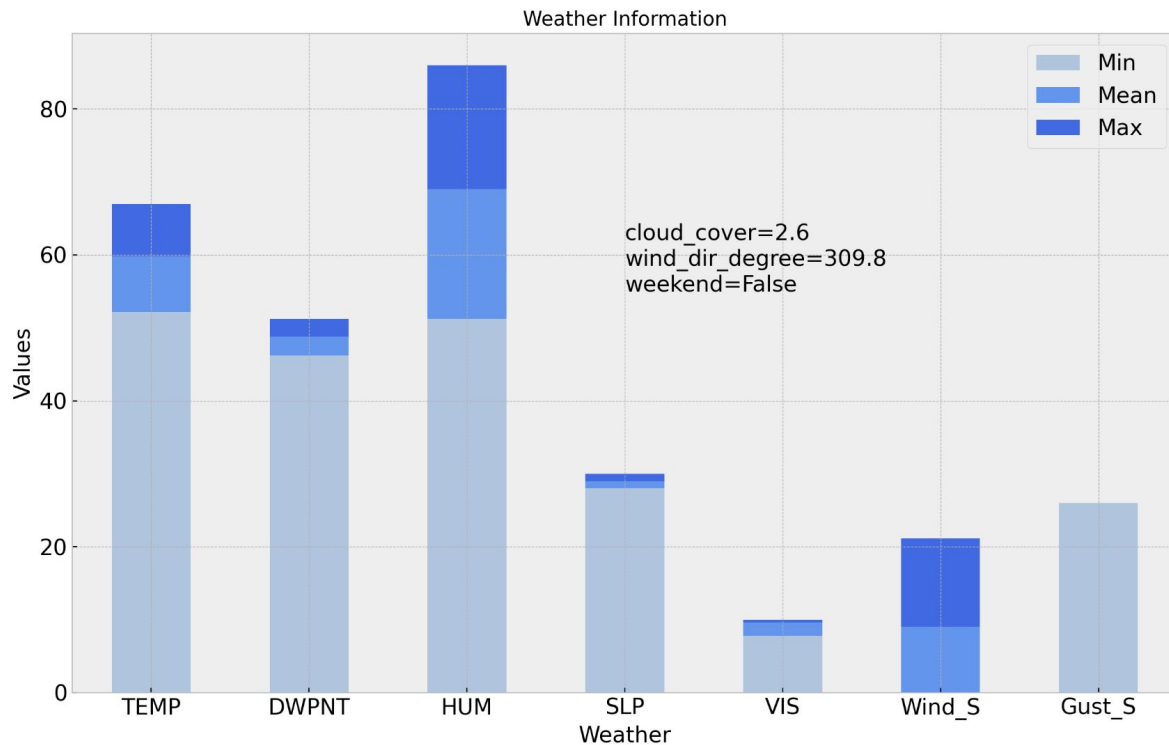
3.

Stations

Size and Popularity

Station Popularity

Rank	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
1	San Francisco Caltrain	San Francisco Caltrain	San Francisco Caltrain	San Francisco Caltrain	San Francisco Caltrain	Embarcadero at Sansome	Embarcadero at Sansome
2	San Francisco Caltrain 2	San Francisco Caltrain 2	San Francisco Caltrain 2	San Francisco Caltrain 2	San Francisco Caltrain 2	Henry Bridges Plaza	Henry Bridges Plaza
3	Temporary Transbay Terminal	Temporary Transbay Terminal	Henry Bridges Plaza	Henry Bridges Plaza	Henry Bridges Plaza	Market at 4th	Market at 4th
4	Harry Bridges Plaza	Harry Bridges Plaza	Temporary Transbay Terminal	Temporary Transbay Terminal	Temporary Transbay Terminal	Embarcadero at Bryant	Embarcadero at Bryant
5	Steuart at Market	2nd at Townsend	2nd at Townsend	Market at Sansome	2nd at Townsend	2nd at Townsend	2nd at Townsend

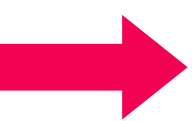# Station Popularity

▷ Weekday: Caltrain
▷ Weekend: Coastal

Weekday rides are for commute

Weekend rides are along the coast for scenery
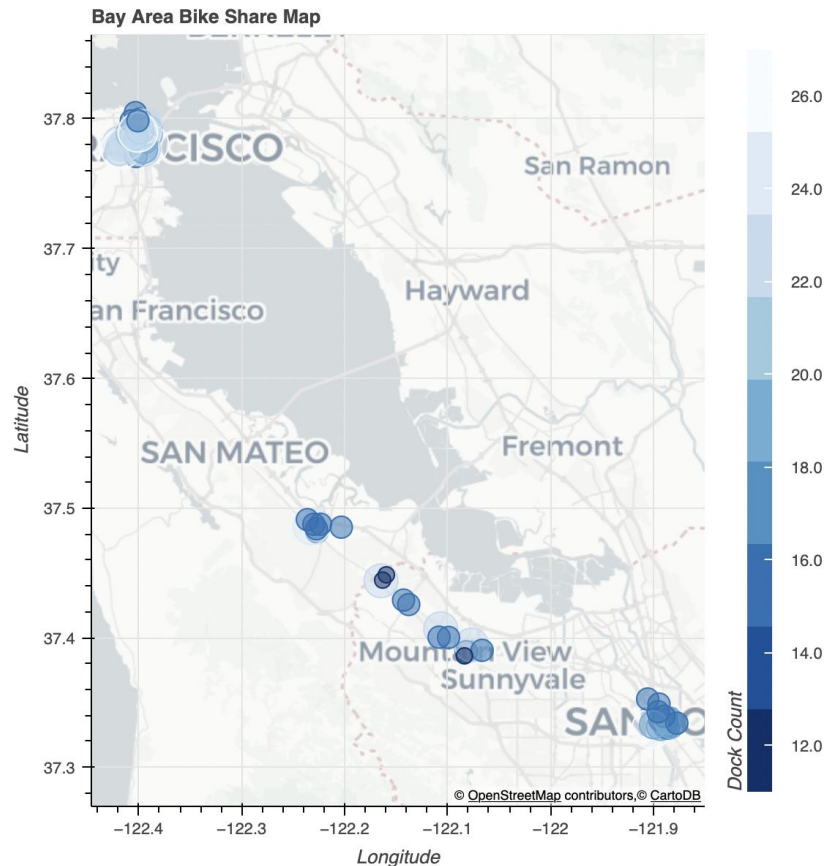

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Station Size

▷ Total number of docks per station
▷ Lighter color and bigger circle ⇒ larger station

Largest stations are in San Francisco

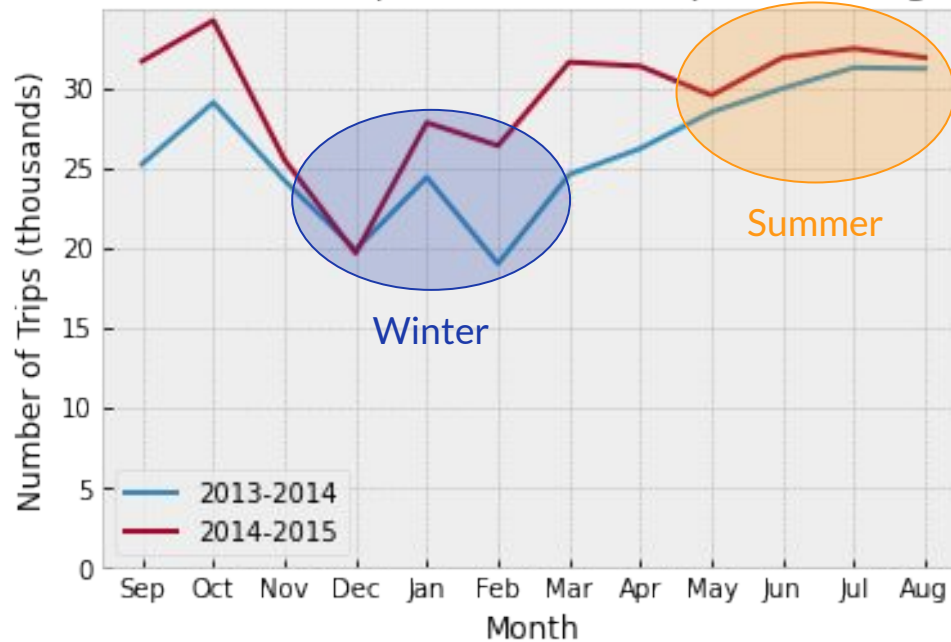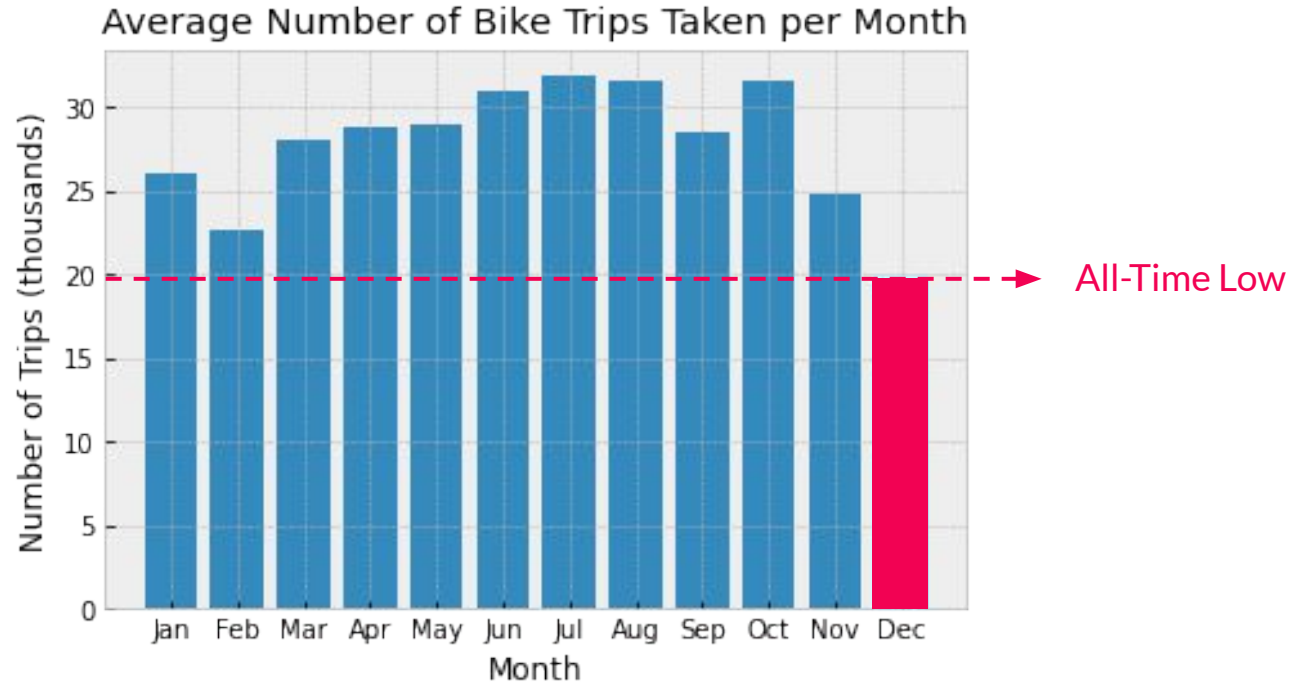Bay Area Bike Share Map

4.

Monthly

Number of Rentals

Monthly Number of Rentals

Number of Bike Trips Taken from Sep 2013 - Aug 2015

Average Monthly Rentals
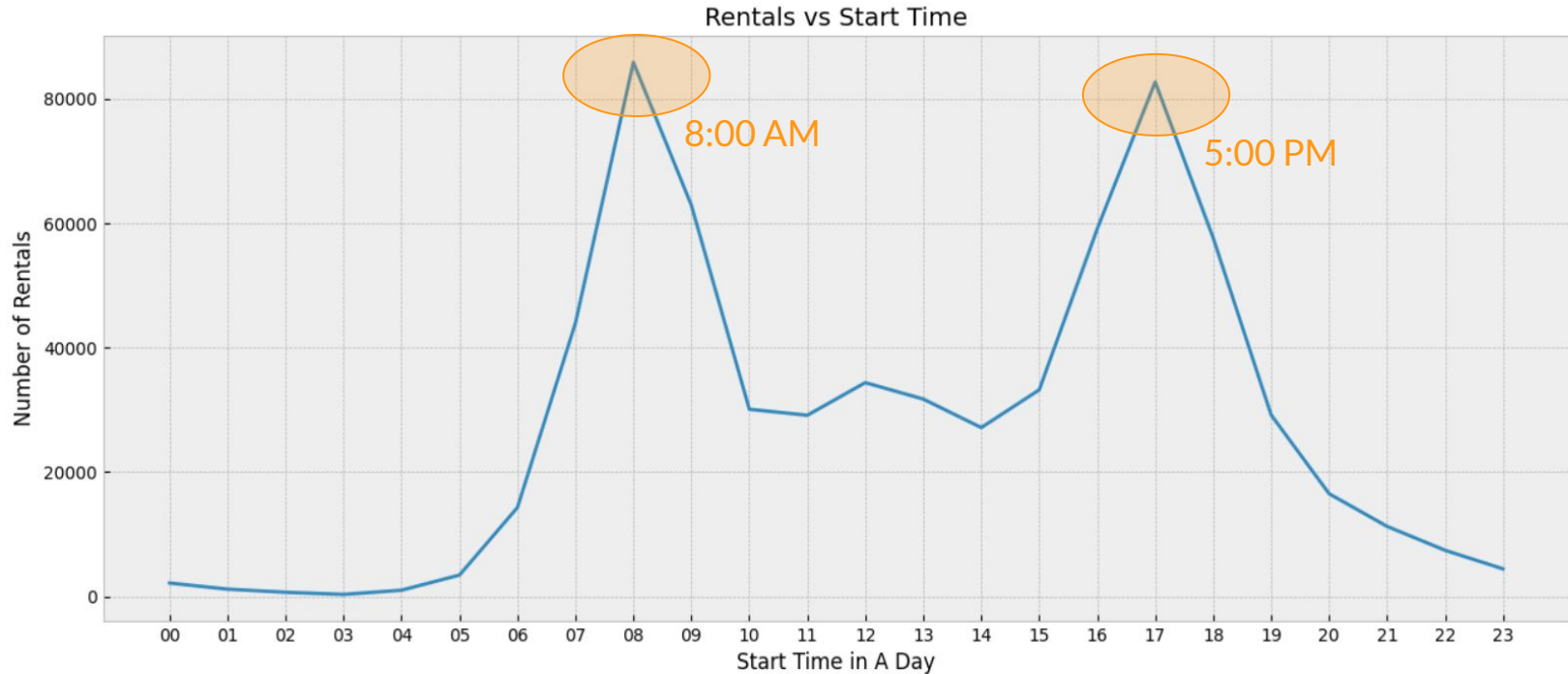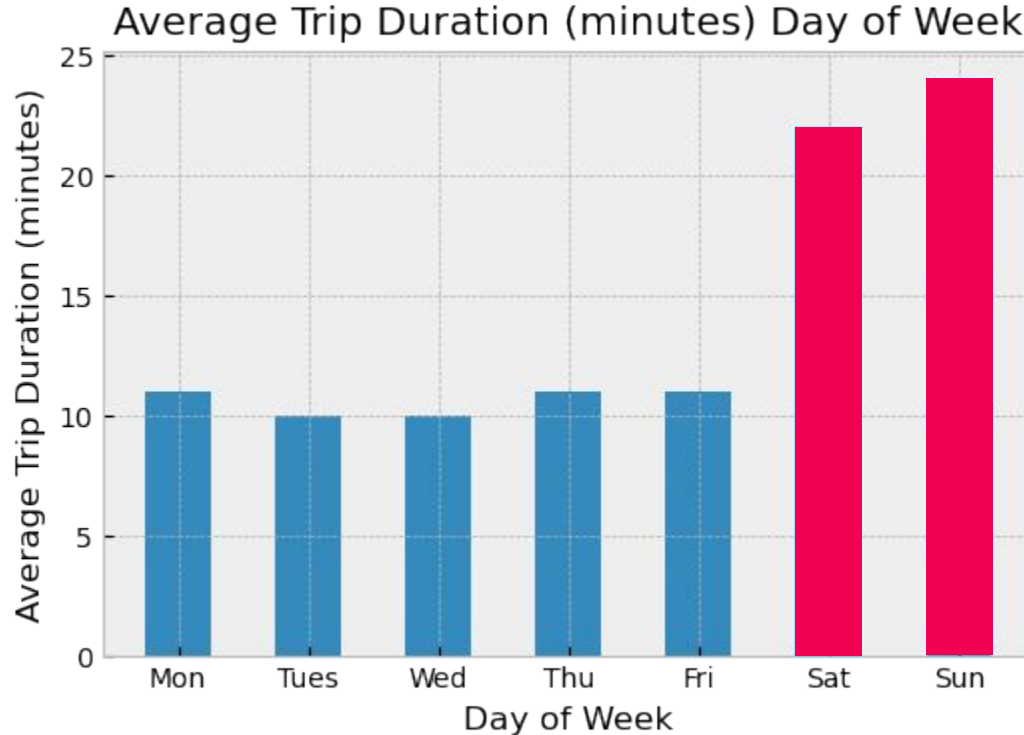
5.

Hourly

Trip Duration and Number of Rentals

When do bikers start their trips?

Rentals vs Start Time

8:00 AM

5:00 PM

Which days are the longest trips?

6.

Consumer Behavior

Subscribers and Customers

Trip Duration

Day of Week Trip Duration Subscriber vs Customer

Weekend

Number of Rentals

Day of Week Trip Count Subscriber vs Customer
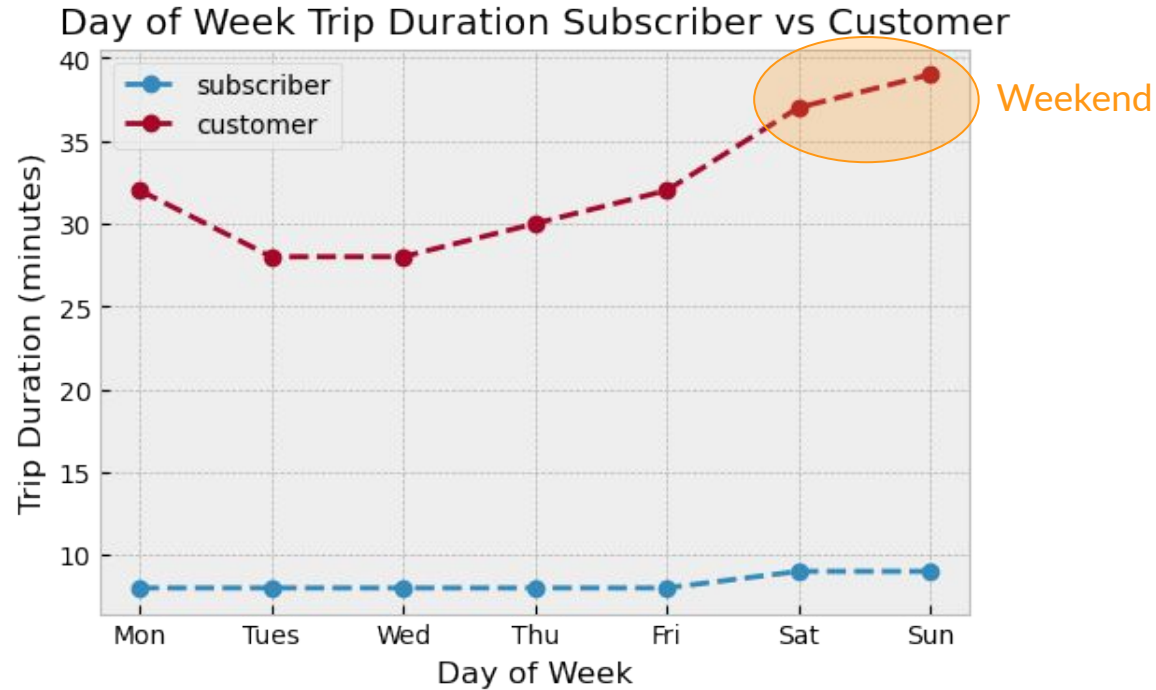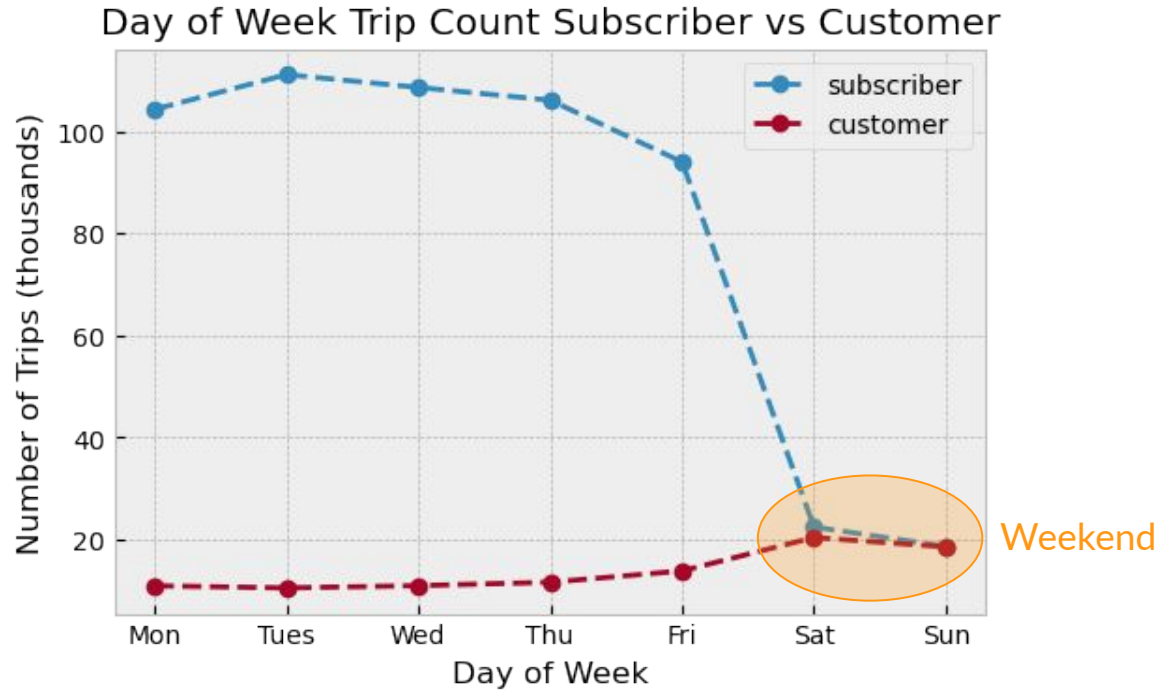
Weekend

Behavior Comparison

Subscribers

Customers

Subscribers
- Short trips (< 10 mins)
- High rentals on weekdays
- Sharp decrease in weekend rentals

Short trips from train station to office on weekdays

Customers
- Long trips (> 25 mins)
- Low rentals overall
- Slight increase in weekend rentals

Long leisure rides around the city on weekends

7.

Conclusions

Applications of the Data Analysis

Time of Week Comparison

Weekday

- Static and uniform
- Commute hours
- Short trips
- Subscribers

More bikes near Caltrain stops

Weekend

- Varying
- Mildly affected by weather
- Long trips
- Customers

Maintenance and repairs

Season Comparison

Winter

- Less rentals
- December is lowest

Decrease number of bikes

Summer

- More rentals
- More bikes needed

Increase number of bikes

Increase Profits

Allocation

▷ High demand in San Francisco (work commute)
▷ Popular stations near CalTrain

Add more bikes in San Francisco near Caltrain stops

Marketing

▷ Subscribers are constant
▷ Convert repeat customers to subscribers

Appeal to leisure activities, tourism, etc.

Thank you!

Any questions?

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