Uber Fares Dataset Analysis

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MUgSS Datathon, 3/11/23

Goal

What is the best strategy for uber drivers to take orders?

– At what time in a given week the fare rate/miles is the highest?

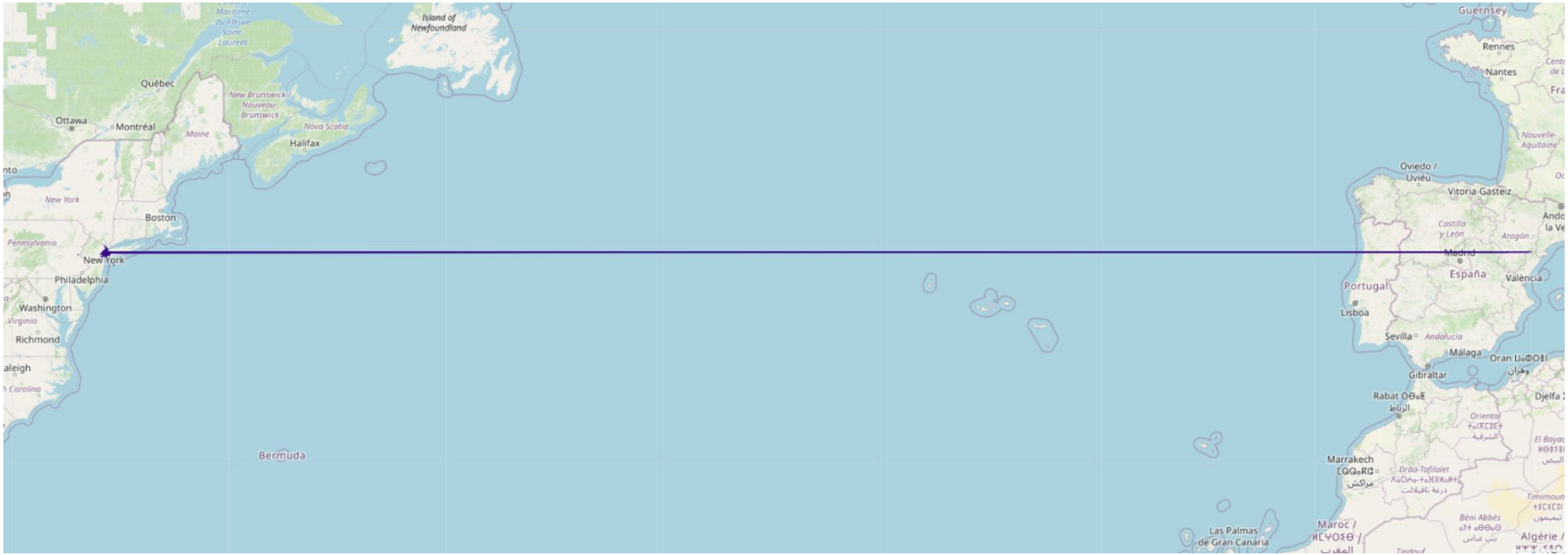
– At what locations they should pick-up the passengers?

Data Cleaning

- Remove geographical location that doesn't make sense.
  (Pickup & Drop-off latitude and longitude = 0)

- Translate & parse pickup-datetime into a more friendly format for later data manipulation
  (2015-05-07 19:52:06 UTC => Year: 2015, Month: 05, Weekday: 3, Hour: 19)

- Add "distance" column to the dataset based on each records' Pickup & Drop-off location
- Remove "distance" that doesn't make sense(with standard deviation)


Island of Newfoundland
Québec
Ottawa
Montréal
Maine
New Brunswick / Nouveau-Brunswick
Nova Scotia
Halifax
New York
Boston
Pennsylvania
New York
Philadelphia
Washington
Virginia
Richmond
Bermuda
Guernsey
Rennes
Nantes
Oviedo / Uviéu
Vitoria-Gasteiz
Castilla y León
Aragón
Madrid
España
Valencia
Portugal
Lisboa
Sevilla
Andalucía
Málaga
Gibraltar
Rabat
Marrakech
Las Palmas de Gran Canaria
Maroc /
Algérie /

Methodology

- EDA
- Map Projection
- Regression analysis

Regression Analysis

```
Coefficients:
                   Estimate Std. Error t value Pr(>|t|)
(Intercept)       -1.286e+03  2.395e+01 -53.690  < 2e-16 ***
pickup_longitude   1.297e-01  2.593e-02   5.000 5.73e-07 ***
pickup_latitude    1.164e-01  6.209e-02   1.874   0.0609 .
dropoff_longitude  3.534e-02  2.653e-02   1.332   0.1828
dropoff_latitude   2.694e-02  6.145e-02   0.438   0.6611
passenger_count    6.820e-02  1.583e-02   4.309 1.64e-05 ***
year               6.479e-01  1.189e-02  54.485  < 2e-16 ***
month              1.090e-01  6.426e-03  16.969  < 2e-16 ***
weekday            2.065e-02  1.133e-02   1.823   0.0683 .
hour              -3.124e-02  3.383e-03  -9.233  < 2e-16 ***
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 9.72 on 196029 degrees of freedom
Multiple R-squared:  0.01626,   Adjusted R-squared:  0.01621
F-statistic:   360 on 9 and 196029 DF,  p-value: < 2.2e-16
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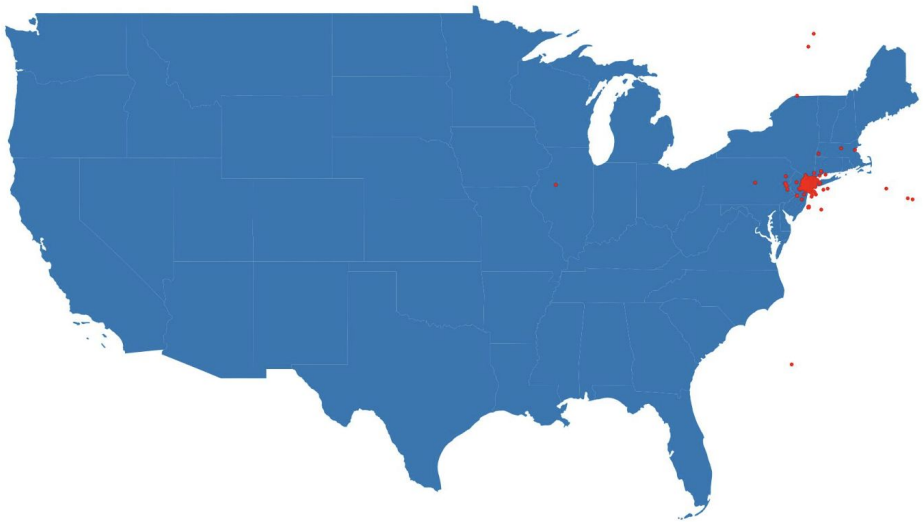
Response Variable: fare
Predictor Variables: pickup location, drop off location, number of passengers, year, month, weekday, and hour

Estimate slopes are small
R-squared: 0.01626

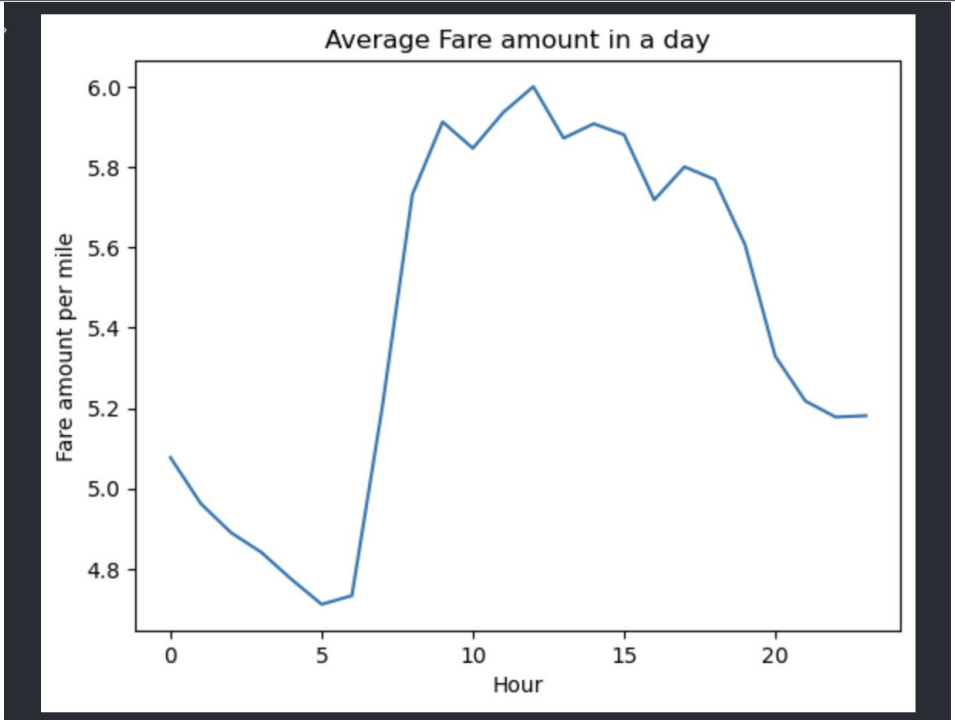
Regression Analysis

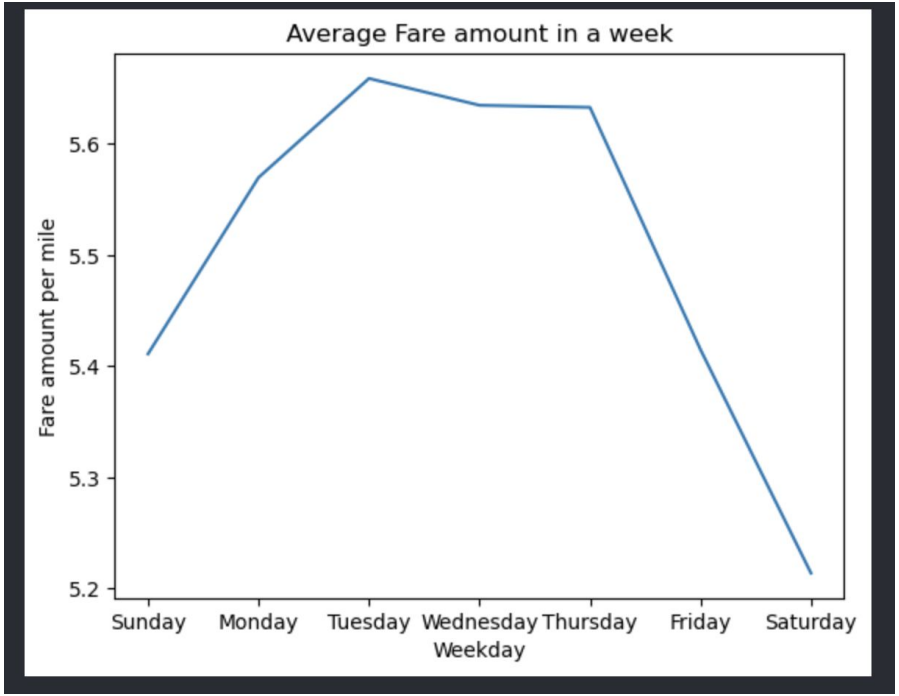


Understanding the Dataset:
1. Location in large scale (based on longitude and latitude) and the day of a week do not seem to influence the amount of fare.
2. There are evidence that hour of a day and number of passenger influence fare rate.
3. By plotting the data on a map, we find out that most orders in the data set located in NYC.

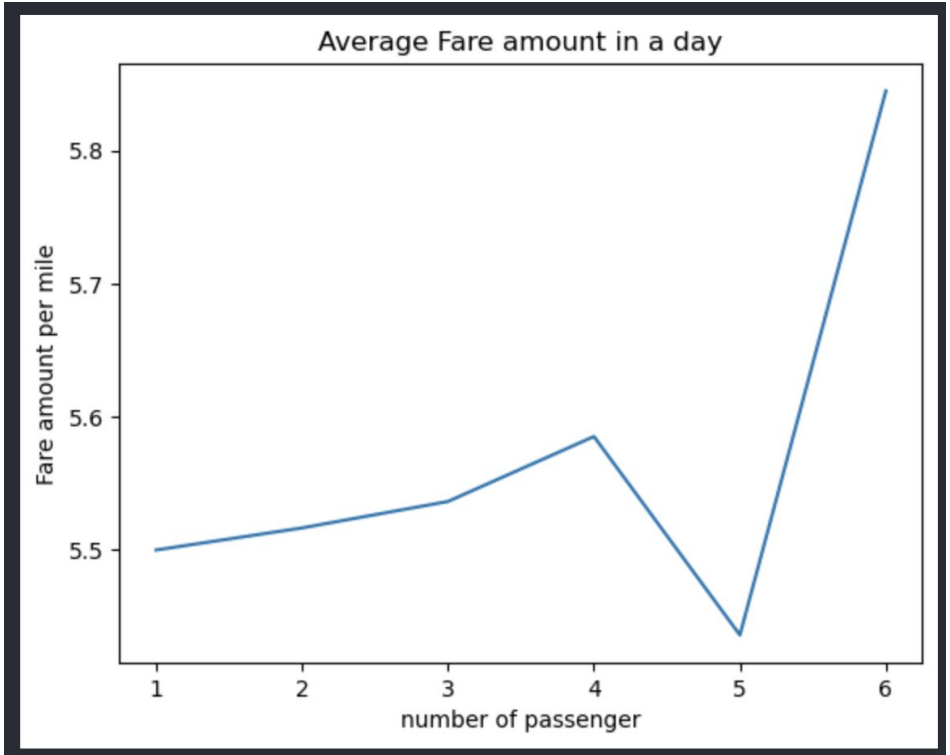
Based on these findings, we continued the following research.

Results and Findings

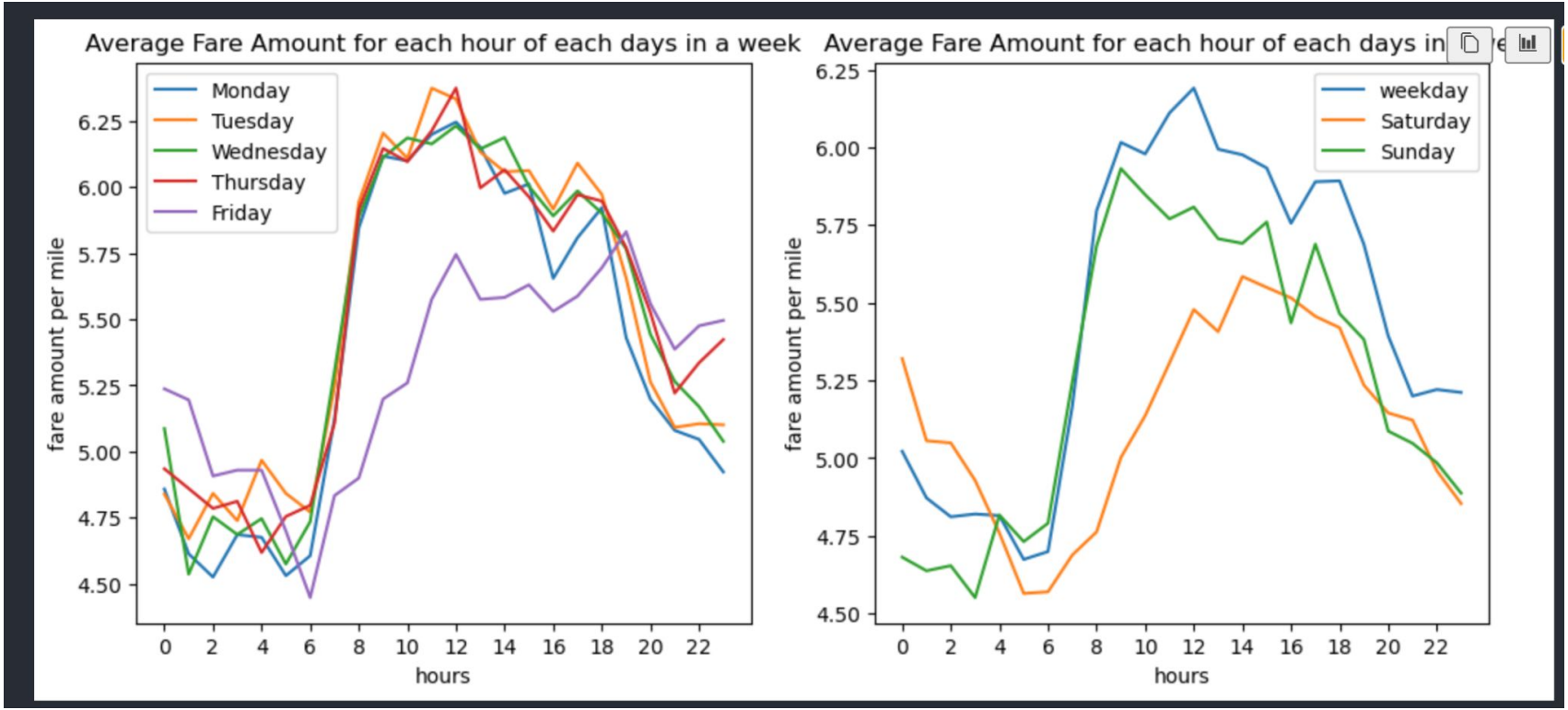




Results and Findings



Results and Findings



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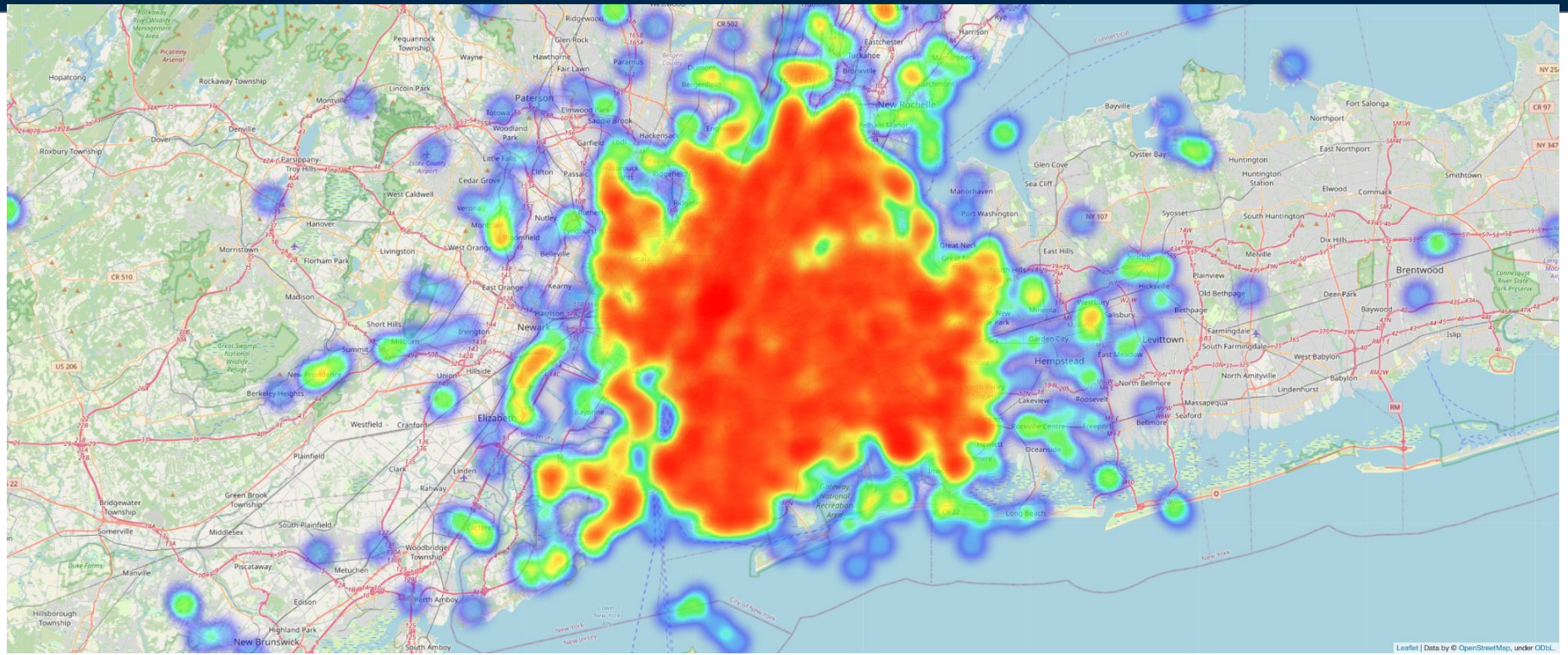
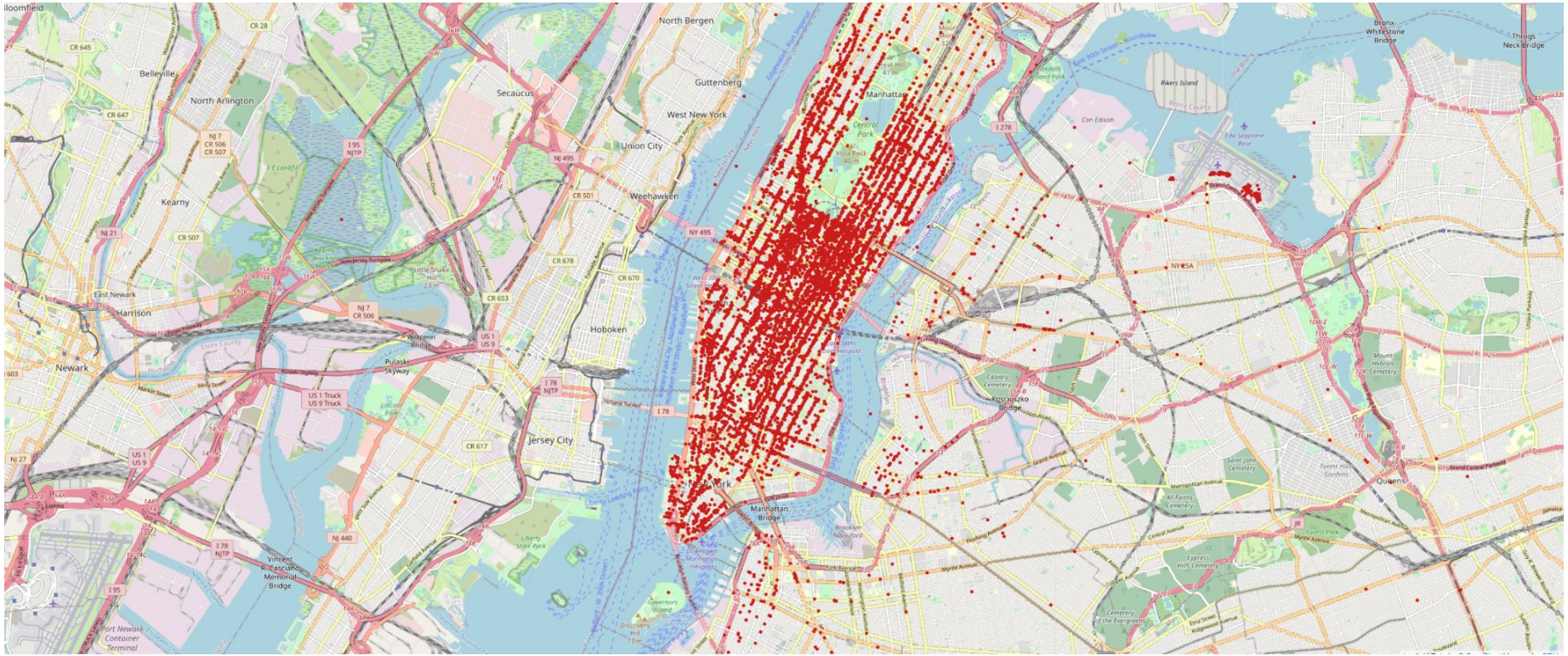


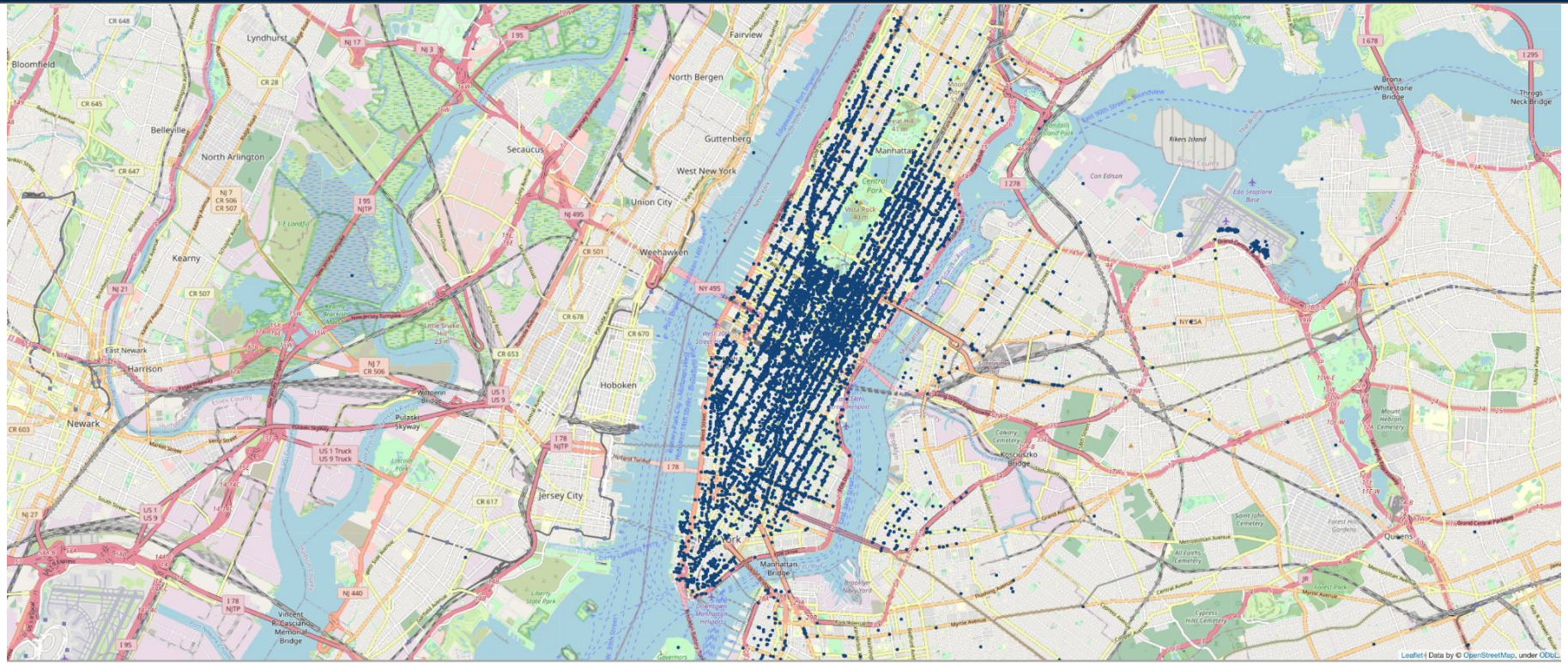
Results and Findings

Pickup Location



Results and Findings

Drop-off Location



Results and Findings

Conclusion

- Fares per mile in NYC is affected by day, time, and number of passengers
- Manhattan downtown, LaGuardia Airport, and John F. Kennedy International Airport are the three most rewarding places for the uber drivers
- Uber drivers in NYC should have different strategies between weekdays and weekends
    - For Weekdays, uber drivers should take as many orders as possible in 12 pm. The best time during weekday,from the data, is around Thursday 12 am.
    - For Saturday, they should take as many orders as possible between 12:00 am to 4 am