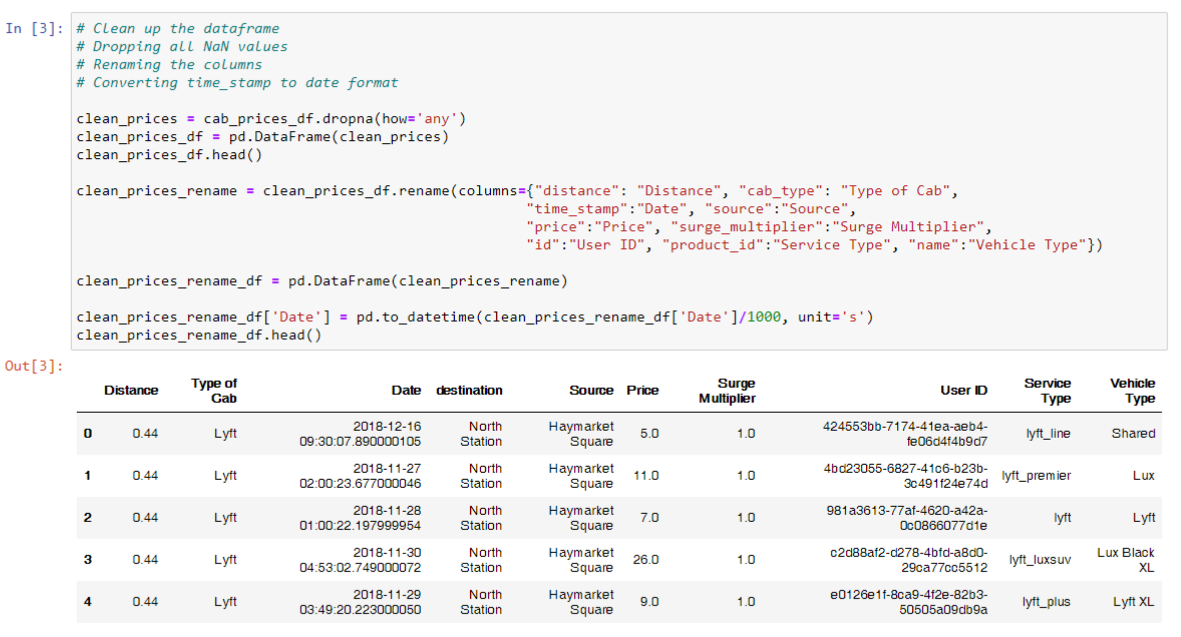
UBER VS LYFT

Comparison Between Rivals in Boston, MA

WHERE DO I FIND THE DATA SOURCE ?

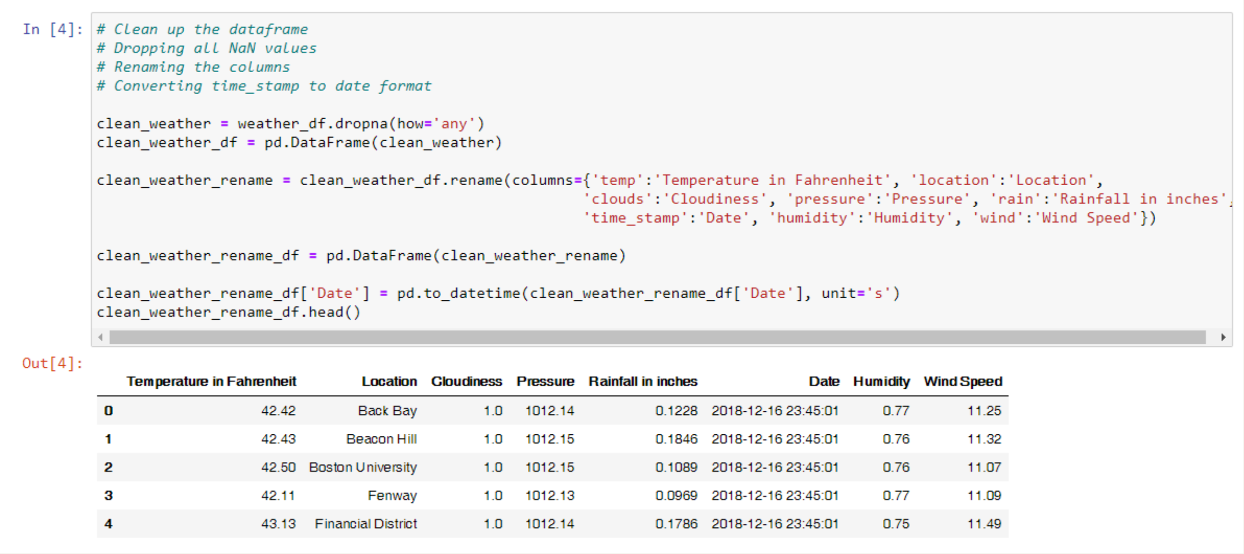
Find the data source from Kaggle, and they had a great source that predicts the cab prices for Uber vs. Lyft in Boston, MA.



```
In [3]: # Clean up the dataframe
        # Dropping all NaN values
        # Renaming the columns
        # Converting time_stamp to date format

        clean_prices = cab_prices_df.dropna(how='any')
        clean_prices_df = pd.DataFrame(clean_prices)
        clean_prices_df.head()

        clean_prices_rename = clean_prices_df.rename(columns={"distance": "Distance", "cab_type": "Type of Cab",
                                                              "time_stamp":"Date", "source":"Source",
                                                              "price":"Price", "surge_multiplier":"Surge Multiplier",
                                                              "id":"User ID", "product_id":"Service Type", "name":"Vehicle Type"})

        clean_prices_rename_df = pd.DataFrame(clean_prices_rename)

        clean_prices_rename_df['Date'] = pd.to_datetime(clean_prices_rename_df['Date']/1000, unit='s')
        clean_prices_rename_df.head()
```

Out[3]:

	Distance	Type of Cab	Date	destination	Source	Price	Surge Multiplier	User ID	Service Type	Vehicle Type
0	0.44	Lyft	2018-12-16 09:30:07.890000105	North Station	Haymarket Square	5.0	1.0	424553bb-7174-41ea-aeb4-fe06d4f4b9d7	lyft_line	Shared
1	0.44	Lyft	2018-11-27 02:00:23.677000046	North Station	Haymarket Square	11.0	1.0	4bd23055-6827-41c6-b23b-3c491f24e74d	lyft_premier	Lux
2	0.44	Lyft	2018-11-28 01:00:22.197999954	North Station	Haymarket Square	7.0	1.0	981a3613-77af-4620-a42a-0c0866077d1e	lyft	Lyft
3	0.44	Lyft	2018-11-30 04:53:02.749000072	North Station	Haymarket Square	26.0	1.0	c2d88af2-d278-4bfd-a8d0-29ca77cc5512	lyft_luxsuv	Lux Black XL
4	0.44	Lyft	2018-11-29 03:49:20.223000050	North Station	Haymarket Square	9.0	1.0	e0126e1f-8ca9-4f2e-82b3-50505a09db9a	lyft_plus	Lyft XL



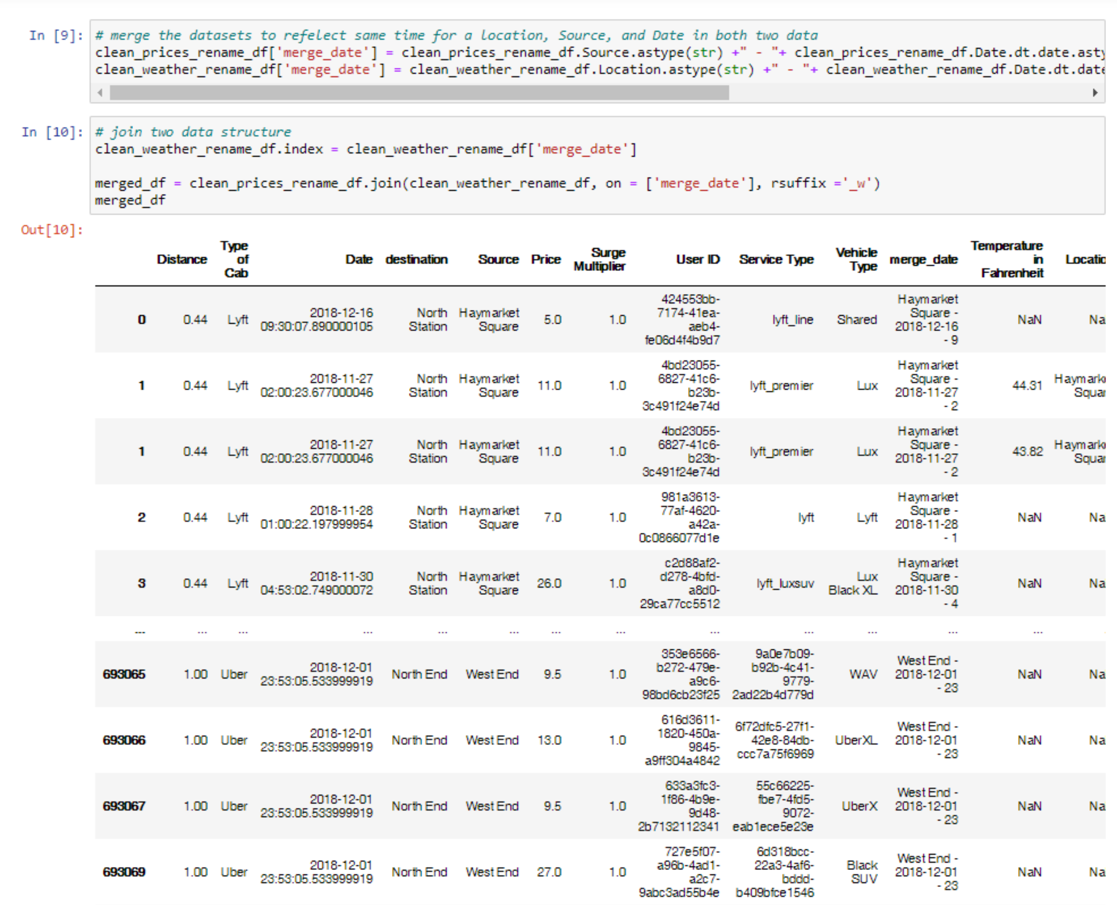
```
In [4]: # Clean up the dataframe
        # Dropping all NaN values
        # Renaming the columns
        # Converting time_stamp to date format

        clean_weather = weather_df.dropna(how='any')
        clean_weather_df = pd.DataFrame(clean_weather)

        clean_weather_rename = clean_weather_df.rename(columns={'temp':'Temperature in Fahrenheit', 'location':'Location',
                                                                'clouds':'Cloudiness', 'pressure':'Pressure', 'rain':'Rainfall in inches',
                                                                'time_stamp':'Date', 'humidity':'Humidity', 'wind':'Wind Speed'})

        clean_weather_rename_df = pd.DataFrame(clean_weather_rename)

        clean_weather_rename_df['Date'] = pd.to_datetime(clean_weather_rename_df['Date'], unit='s')
        clean_weather_rename_df.head()
```

Out[4]:

	Temperature in Fahrenheit	Location	Cloudiness	Pressure	Rainfall in inches	Date	Humidity	Wind Speed
0	42.42	Back Bay	1.0	1012.14	0.1228	2018-12-16 23:45:01	0.77	11.25
1	42.43	Beacon Hill	1.0	1012.15	0.1846	2018-12-16 23:45:01	0.76	11.32
2	42.50	Boston University	1.0	1012.15	0.1089	2018-12-16 23:45:01	0.76	11.07
3	42.11	Fenway	1.0	1012.13	0.0969	2018-12-16 23:45:01	0.77	11.09
4	43.13	Financial District	1.0	1012.14	0.1786	2018-12-16 23:45:01	0.75	11.49

CLEANING UP THE DATA

MERGING DATA TOGETHER

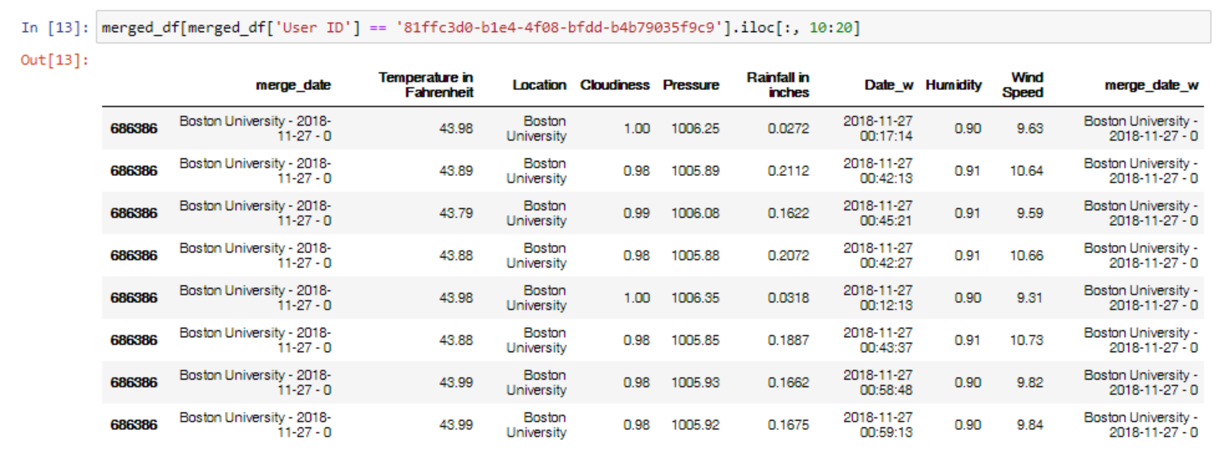


```
In [9]: # merge the datasets to refelect same time for a location, Source, and Date in both two data
        clean_prices_rename_df['merge_date'] = clean_prices_rename_df.Source.astype(str) +" - "+ clean_prices_rename_df.Date.dt.date.asty
        clean_weather_rename_df['merge_date'] = clean_weather_rename_df.Location.astype(str) +" - "+ clean_weather_rename_df.Date.dt.date
```

```
In [10]: # join two data structure
         clean_weather_rename_df.index = clean_weather_rename_df['merge_date']

         merged_df = clean_prices_rename_df.join(clean_weather_rename_df, on = ['merge_date'], rsuffix ='_w')
         merged_df
```

Out[10]:

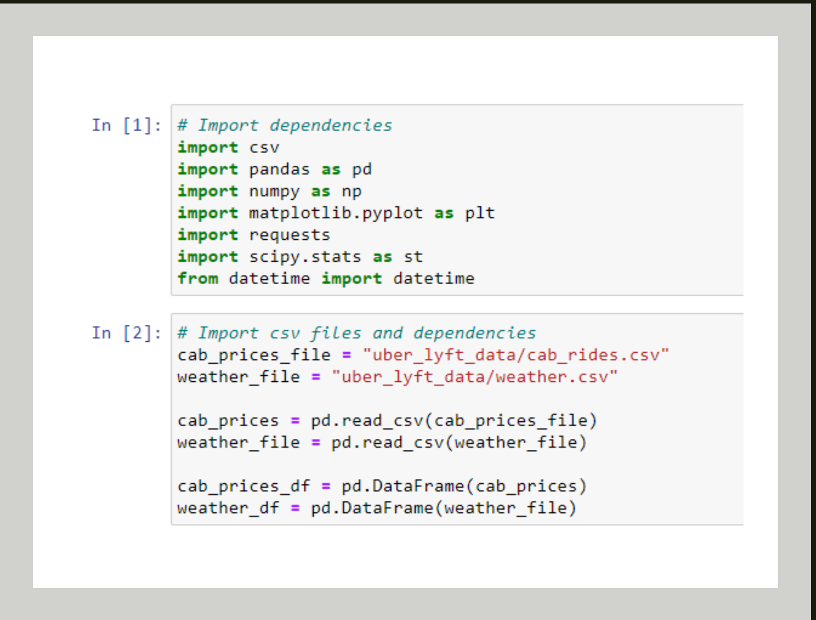
	Distance	Type of Cab	Date	destination	Source	Price	Surge Multiplier	User ID	Service Type	Vehicle Type	merge_date	Temperature in Fahrenheit	Locatio
0	0.44	Lyft	2018-12-16 09:30:07.890000105	North Station	Haymarket Square	5.0	1.0	424553bb-7174-41ea-aeb4-fe06d4f4b9d7	lyft_line	Shared	Haymarket Square - 2018-12-16 - 9	NaN	Na
1	0.44	Lyft	2018-11-27 02:00:23.677000046	North Station	Haymarket Square	11.0	1.0	4bd23055-6827-41c6-b23b-3c491f24e74d	lyft_premier	Lux	Haymarket Square - 2018-11-27 - 2	44.31	Haymark Squar
1	0.44	Lyft	2018-11-27 02:00:23.677000046	North Station	Haymarket Square	11.0	1.0	4bd23055-6827-41c6-b23b-3c491f24e74d	lyft_premier	Lux	Haymarket Square - 2018-11-27 - 2	43.82	Haymark Squar
2	0.44	Lyft	2018-11-28 01:00:22.197999954	North Station	Haymarket Square	7.0	1.0	981a3613-77af-4620-a42a-0c0866077d1e	lyft	Lyft	Haymarket Square - 2018-11-28 - 1	NaN	Na
3	0.44	Lyft	2018-11-30 04:53:02.749000072	North Station	Haymarket Square	26.0	1.0	c2d88af2-d278-4bfd-a8d0-29ca77cc5512	lyft_luxsuv	Lux Black XL	Haymarket Square - 2018-11-30 - 4	NaN	Na
...	...	...	...	...	...	...	...	...	...	...	...	...	
693065	1.00	Uber	2018-12-01 23:53:05.533999919	North End	West End	9.5	1.0	353e6566-b272-479e-a9c6-98bd6cb23f25	9a0e7b09-b92b-4c41-9779-2ad22b4d779d	WAV	West End - 2018-12-01 - 23	NaN	Na
693066	1.00	Uber	2018-12-01 23:53:05.533999919	North End	West End	13.0	1.0	616d3611-1820-450a-9845-a9ff304a4842	6f72dfc5-27f1-42e8-84db-ccc7a75f6969	UberXL	West End - 2018-12-01 - 23	NaN	Na
693067	1.00	Uber	2018-12-01 23:53:05.533999919	North End	West End	9.5	1.0	633a3fc3-1f86-4b9e-9d48-2b7132112341	55c66225-fbe7-4fd5-9072-eab1ece5e23e	UberX	West End - 2018-12-01 - 23	NaN	Na
693069	1.00	Uber	2018-12-01 23:53:05.533999919	North End	West End	27.0	1.0	727e5f07-a96b-4ad1-a2c7-9abc3ad55b4e	6d318bcc-22a3-4af6-bddd-b409bfce1546	Black SUV	West End - 2018-12-01 - 23	NaN	Na



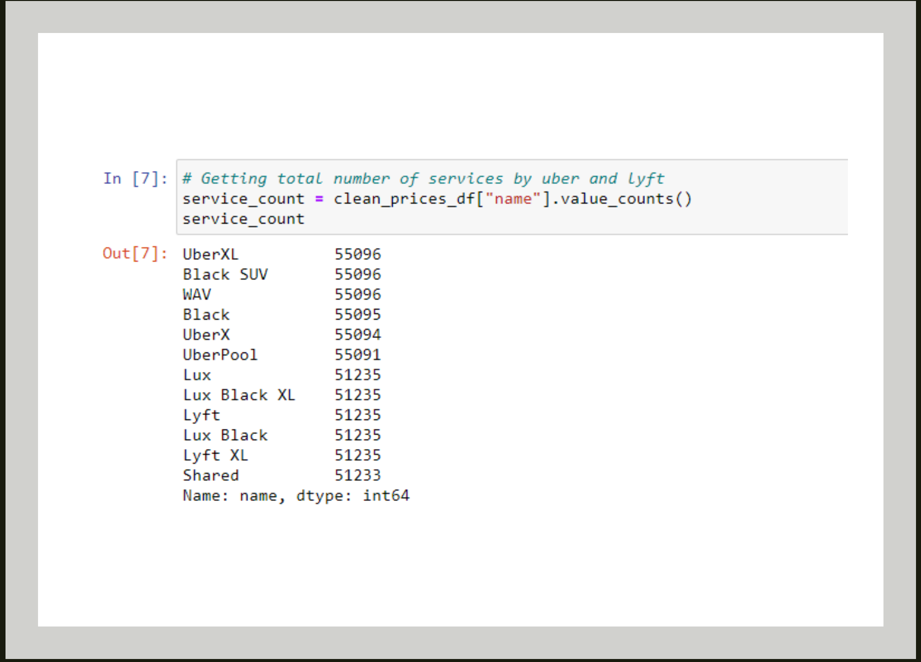
```
In [13]: merged_df[merged_df['User ID'] == '81ffc3d0-b1e4-4f08-bfdd-b4b79035f9c9'].iloc[:, 10:20]
```

Out[13]:

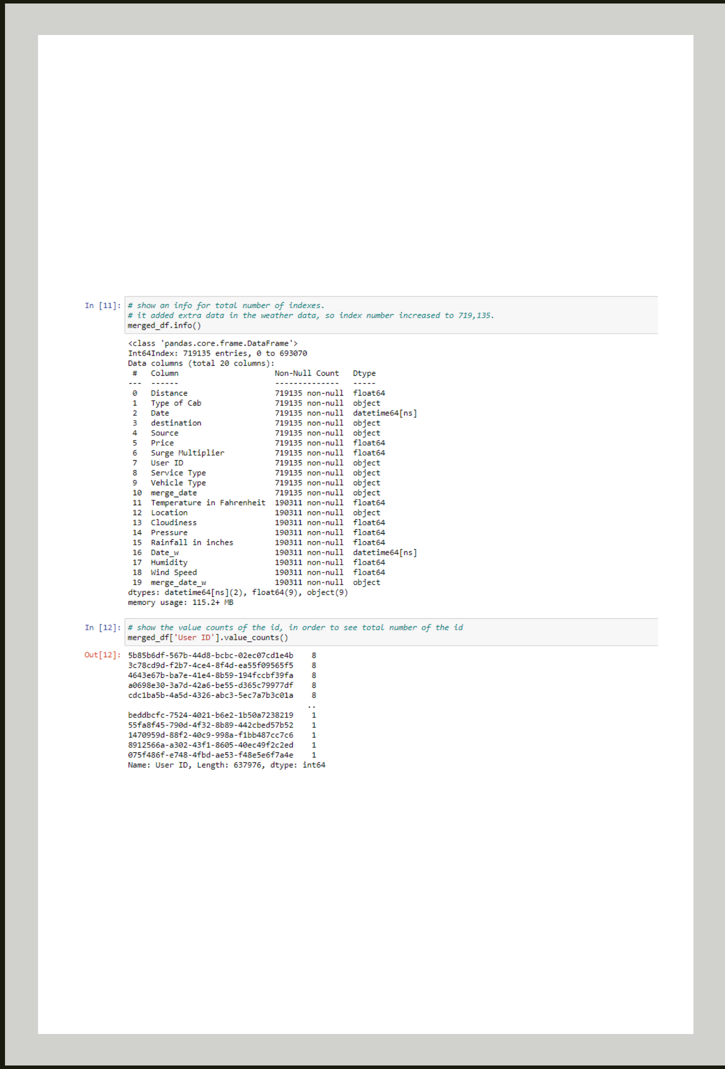
	merge_date	Temperature in Fahrenheit	Location	Cloudiness	Pressure	Rainfall in inches	Date_w	Humidity	Wind Speed	merge_date_w
686386	Boston University - 2018-11-27 - 0	43.98	Boston University	1.00	1006.25	0.0272	2018-11-27 00:17:14	0.90	9.63	Boston University - 2018-11-27 - 0
686386	Boston University - 2018-11-27 - 0	43.89	Boston University	0.98	1005.89	0.2112	2018-11-27 00:42:13	0.91	10.64	Boston University - 2018-11-27 - 0
686386	Boston University - 2018-11-27 - 0	43.79	Boston University	0.99	1006.08	0.1622	2018-11-27 00:45:21	0.91	9.59	Boston University - 2018-11-27 - 0
686386	Boston University - 2018-11-27 - 0	43.88	Boston University	0.98	1005.88	0.2072	2018-11-27 00:42:27	0.91	10.66	Boston University - 2018-11-27 - 0
686386	Boston University - 2018-11-27 - 0	43.98	Boston University	1.00	1006.35	0.0318	2018-11-27 00:12:13	0.90	9.31	Boston University - 2018-11-27 - 0
686386	Boston University - 2018-11-27 - 0	43.88	Boston University	0.98	1005.85	0.1887	2018-11-27 00:43:37	0.91	10.73	Boston University - 2018-11-27 - 0
686386	Boston University - 2018-11-27 - 0	43.99	Boston University	0.98	1005.93	0.1662	2018-11-27 00:58:48	0.90	9.82	Boston University - 2018-11-27 - 0
686386	Boston University - 2018-11-27 - 0	43.99	Boston University	0.98	1005.92	0.1675	2018-11-27 00:59:13	0.90	9.84	Boston University - 2018-11-27 - 0



```
In [1]: # Import dependencies
        import csv
        import pandas as pd
        import numpy as np
        import matplotlib.pyplot as plt
        import requests
        import scipy.stats as st
        from datetime import datetime

In [2]: # Import csv files and dependencies
        cab_prices_file = "uber_lyft_data/cab_rides.csv"
        weather_file = "uber_lyft_data/weather.csv"

        cab_prices = pd.read_csv(cab_prices_file)
        weather_file = pd.read_csv(weather_file)

        cab_prices_df = pd.DataFrame(cab_prices)
        weather_df = pd.DataFrame(weather_file)
```



```
In [7]: # Getting total number of services by uber and Lyft
        service_count = clean_prices_df["name"].value_counts()
        service_count

Out[7]: UberXL          55096
        Black SUV       55096
        WAV             55096
        Black           55095
        UberX           55094
        UberPool        55091
        Lux             51235
        Lux Black XL    51235
        Lyft            51235
        Lux Black       51235
        Lyft XL         51235
        Shared          51233
        Name: name, dtype: int64
```



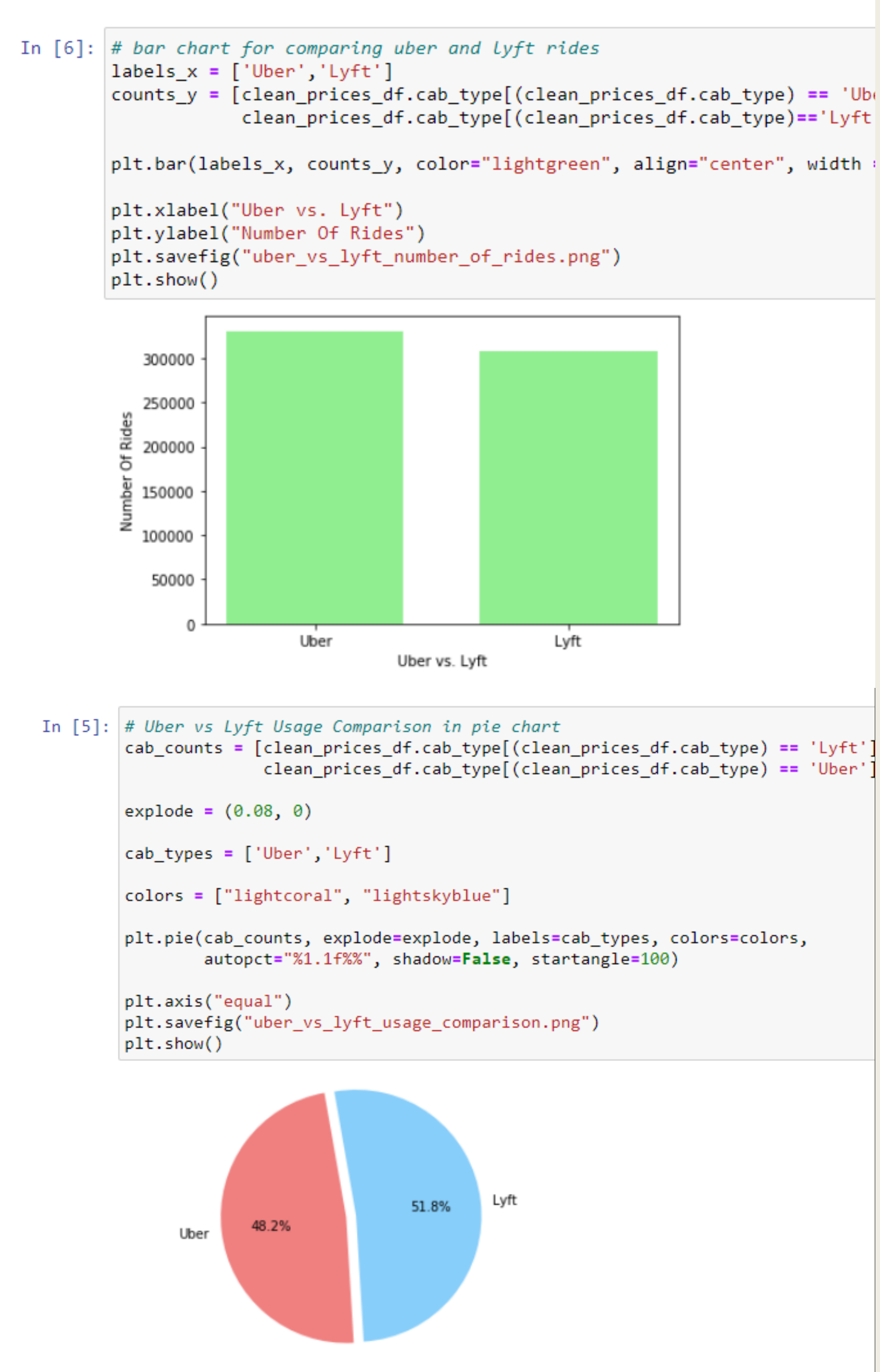
```
In [11]: # show an info for total number of indexes.
         # it added extra data in the weather data, so index number increased to 719,135.
         merged_df.info()

         <class 'pandas.core.frame.DataFrame'>
         Int64Index: 719135 entries, 0 to 693070
         Data columns (total 20 columns):
          #   Column                    Non-Null Count   Dtype
         ---  ------                    --------------   -----
          0   Distance                  719135 non-null  float64
          1   Type of Cab               719135 non-null  object
          2   Date                      719135 non-null  datetime64[ns]
          3   destination               719135 non-null  object
          4   Source                    719135 non-null  object
          5   Price                     719135 non-null  float64
          6   Surge Multiplier          719135 non-null  float64
          7   User ID                   719135 non-null  object
          8   Service Type              719135 non-null  object
          9   Vehicle Type              719135 non-null  object
          10  merge_date                719135 non-null  object
          11  Temperature in Fahrenheit 190311 non-null  float64
          12  Location                  190311 non-null  object
          13  Cloudiness                190311 non-null  float64
          14  Pressure                  190311 non-null  float64
          15  Rainfall in inches        190311 non-null  float64
          16  Date_w                    190311 non-null  datetime64[ns]
          17  Humidity                  190311 non-null  float64
          18  Wind Speed                190311 non-null  float64
          19  merge_date_w              190311 non-null  object
         dtypes: datetime64[ns](2), float64(9), object(9)
         memory usage: 115.2+ MB

In [12]: # show the value counts of the id, in order to see total number of the id
         merged_df['User ID'].value_counts()

Out[12]: 5b85b6df-567b-44d8-bcbc-02ec07cd1e4b    8
         3c78cd9d-f2b7-4ce4-8f4d-ea55f09565f5    8
         4643e67b-ba7e-41e4-8b59-194fccbf39fa    8
         a0698e30-3a7d-42a6-be55-d365c79977df    8
         cdc1ba5b-4a5d-4326-abc3-5ec7a7b3c01a    8
                                                ..
         beddbcfc-7524-4021-b6e2-1b50a7238219    1
         55fa8f45-790d-4f32-8b89-442cbed57b52    1
         1470959d-88f2-40c9-998a-f1bb487cc7c6    1
         8912566a-a302-43f1-8605-40ec49f2c2ed    1
         075f486f-e748-4fbd-ae53-f48e5e6f7a4e    1
         Name: User ID, Length: 637976, dtype: int64
```

Importing and Finding Objects…

- Importing the dependencies and files
- Finding necessary services for Uber and Lyft
- Finding the total values, after merging the data together

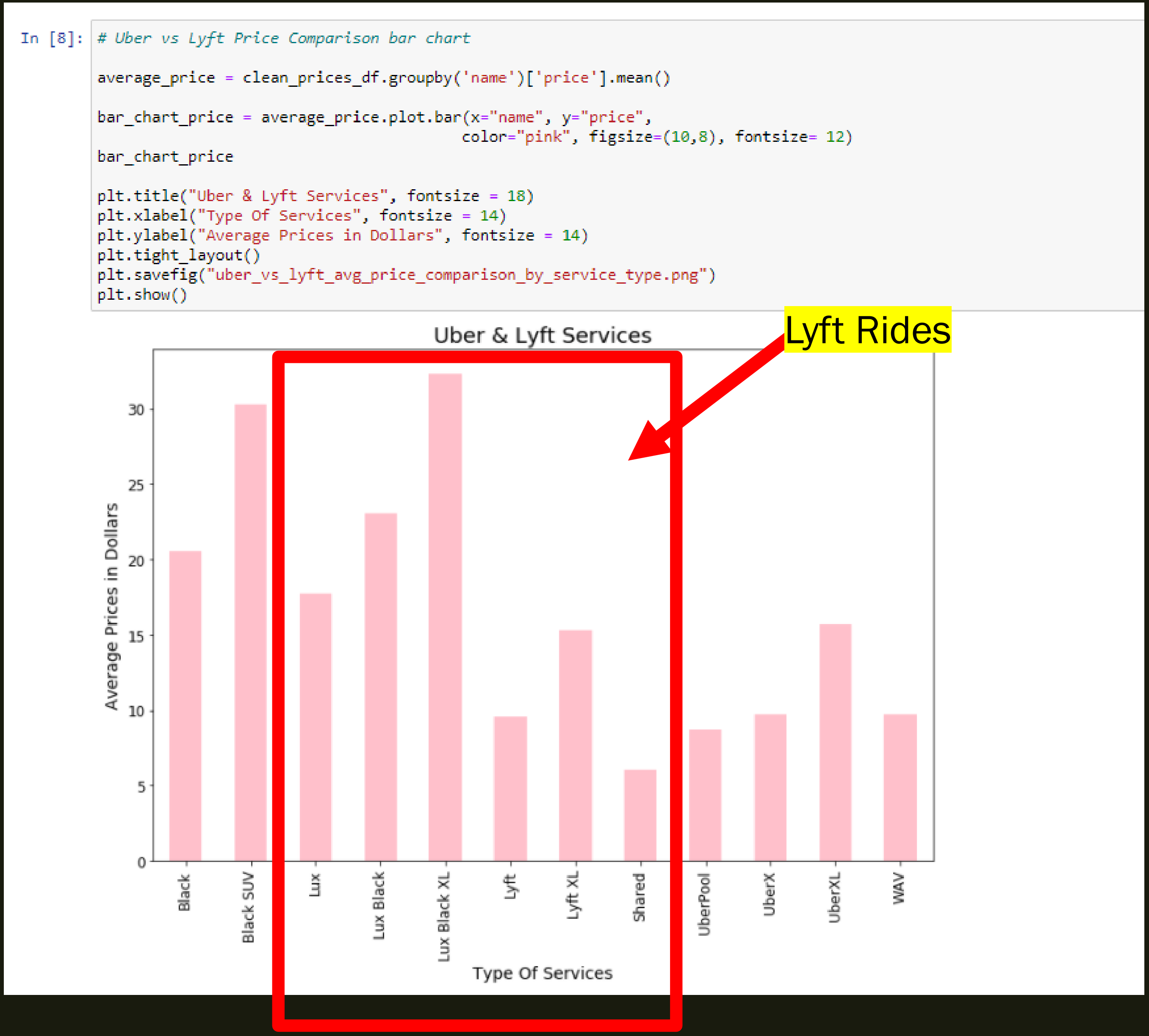
Questions: Is there more Uber users than Lyft users?

- Yes, there are more rides with Uber than Lyft rides.
- However, I find out that Lyft has silently more users than Uber users in percentages in the pie chart.



```
In [6]: # bar chart for comparing uber and lyft rides
        labels_x = ['Uber','Lyft']
        counts_y = [clean_prices_df.cab_type[(clean_prices_df.cab_type) == 'Ub
                    clean_prices_df.cab_type[(clean_prices_df.cab_type)=='Lyft

        plt.bar(labels_x, counts_y, color="lightgreen", align="center", width

        plt.xlabel("Uber vs. Lyft")
        plt.ylabel("Number Of Rides")
        plt.savefig("uber_vs_lyft_number_of_rides.png")
        plt.show()
```

```
In [5]: # Uber vs Lyft Usage Comparison in pie chart
        cab_counts = [clean_prices_df.cab_type[(clean_prices_df.cab_type) == 'Lyft']
                      clean_prices_df.cab_type[(clean_prices_df.cab_type) == 'Uber']

        explode = (0.08, 0)

        cab_types = ['Uber','Lyft']

        colors = ["lightcoral", "lightskyblue"]

        plt.pie(cab_counts, explode=explode, labels=cab_types, colors=colors,
                autopct="%1.1f%%", shadow=False, startangle=100)

        plt.axis("equal")
        plt.savefig("uber_vs_lyft_usage_comparison.png")
        plt.show()
```

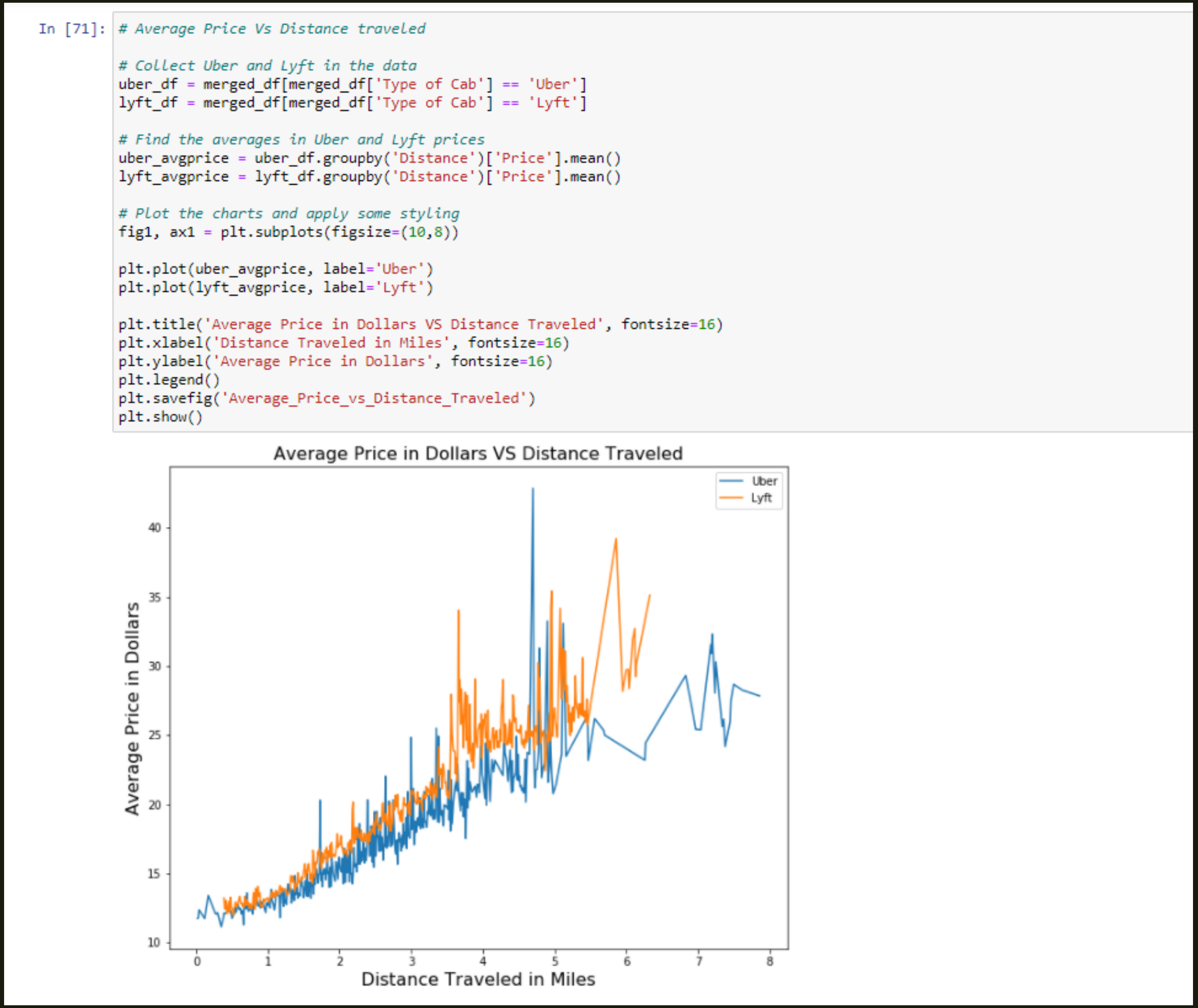


In [8]:

```
# Uber vs Lyft Price Comparison bar chart

average_price = clean_prices_df.groupby('name')['price'].mean()

bar_chart_price = average_price.plot.bar(x="name", y="price",
                                         color="pink", figsize=(10,8), fontsize= 12)

bar_chart_price

plt.title("Uber & Lyft Services", fontsize = 18)
plt.xlabel("Type Of Services", fontsize = 14)
plt.ylabel("Average Prices in Dollars", fontsize = 14)
plt.tight_layout()
plt.savefig("uber_vs_lyft_avg_price_comparison_by_service_type.png")
plt.show()
```

<u>Questions:</u> How many average prices are there in each Uber and Lyft services?

- Lyft Shared has approx. 5-6 dollars in average prices.
- Lyft Lux Black XL has slightly more than 30 dollars in average prices.
- Lyft Shared has a lowest average prices in dollars, while Lyft Lux Black XL has the highest average prices in dollars.
- Lyft Rides are in the red box.
- Uber Rides are outside of the box.



```
In [71]: # Average Price Vs Distance traveled

         # Collect Uber and Lyft in the data
         uber_df = merged_df[merged_df['Type of Cab'] == 'Uber']
         lyft_df = merged_df[merged_df['Type of Cab'] == 'Lyft']

         # Find the averages in Uber and Lyft prices
         uber_avgprice = uber_df.groupby('Distance')['Price'].mean()
         lyft_avgprice = lyft_df.groupby('Distance')['Price'].mean()

         # Plot the charts and apply some styling
         fig1, ax1 = plt.subplots(figsize=(10,8))

         plt.plot(uber_avgprice, label='Uber')
         plt.plot(lyft_avgprice, label='Lyft')

         plt.title('Average Price in Dollars VS Distance Traveled', fontsize=16)
         plt.xlabel('Distance Traveled in Miles', fontsize=16)
         plt.ylabel('Average Price in Dollars', fontsize=16)
         plt.legend()
         plt.savefig('Average_Price_vs_Distance_Traveled')
         plt.show()
```

Average Price in Dollars VS Distance Traveled
Uber
Lyft
Average Price in Dollars
10
15
20
25
30
35
40
0
1
2
3
4
5
6
7
8
Distance Traveled in Miles

- Lyft has the highest amount of average price than Uber as the distance increased.
- Both average prices are increasing as the distance traveled increases.

Summary Analysis

- **Is there more Uber users than Lyft users?**
  - *Yes, there are more rides with Uber than Lyft rides.*
  - *However, I find out that Lyft has silently more users than Uber users in percentages in the pie chart.*
- **How many average prices are there in each Uber and Lyft services?**
  - *Lyft Shared has approx. 5-6 dollars in average prices.*
  - *Lyft Lux Black XL has slightly more than 30 dollars in average prices.*
  - *Lyft Shared has a lowest average prices in dollars, while Lyft Lux Black XL has the highest average prices in dollars.*
  - *Lyft Rides are in the red box.*
  - *Uber Rides are outside of the box.*
- **Lyft has the highest amount of average price than Uber as the distance increased.**
- **Both average prices are increasing as the distance traveled increases.**