Uber ride fare prediction using regression algorithms

Importing Libraries

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

In [2]:
```
import warnings
```

In [3]:
```
warnings.filterwarnings("ignore")
```

In [4]:
```
data = pd.read_csv("/Users/shreyas/Downloads/RAW/codes/uber.csv")
```

Creating Data Copy

In [5]:
```
df = data.copy()
```

In [6]:
```
df.head()
```

Out[6]:

	Unnamed: 0	key	fare_amount	pickup_datetime	pickup_longitude	pickup_latitud
0	24238194	2015-05-07 19:52:06.0000003	7.5	2015-05-07 19:52:06 UTC	-73.999817	40.73835
1	27835199	2009-07-17 20:04:56.0000002	7.7	2009-07-17 20:04:56 UTC	-73.994355	40.72822
2	44984355	2009-08-24 21:45:00.00000061	12.9	2009-08-24 21:45:00 UTC	-74.005043	40.74077
3	25894730	2009-06-26 08:22:21.0000001	5.3	2009-06-26 08:22:21 UTC	-73.976124	40.79084
4	17610152	2014-08-28 17:47:00.000000188	16.0	2014-08-28 17:47:00 UTC	-73.925023	40.74408

In [7]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200000 entries, 0 to 199999
Data columns (total 9 columns):
 #   Column             Non-Null Count   Dtype  
---  ------             --------------   -----  
 0   Unnamed: 0         200000 non-null  int64  
 1   key                200000 non-null  object 
 2   fare_amount        200000 non-null  float64
 3   pickup_datetime    200000 non-null  object 
 4   pickup_longitude   200000 non-null  float64
 5   pickup_latitude    200000 non-null  float64
 6   dropoff_longitude  199999 non-null  float64
 7   dropoff_latitude   199999 non-null  float64
 8   passenger_count    200000 non-null  int64  
dtypes: float64(5), int64(2), object(2)
memory usage: 13.7+ MB
```

In [8]:

```
df["pickup_datetime"] = pd.to_datetime(df["pickup_datetime"])
```

In [9]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200000 entries, 0 to 199999
Data columns (total 9 columns):
 #   Column             Non-Null Count   Dtype              
---  ------             --------------   -----              
 0   Unnamed: 0         200000 non-null  int64              
 1   key                200000 non-null  object             
 2   fare_amount        200000 non-null  float64            
 3   pickup_datetime    200000 non-null  datetime64[ns, UTC]
 4   pickup_longitude   200000 non-null  float64            
 5   pickup_latitude    200000 non-null  float64            
 6   dropoff_longitude  199999 non-null  float64            
 7   dropoff_latitude   199999 non-null  float64            
 8   passenger_count    200000 non-null  int64              
dtypes: datetime64[ns, UTC](1), float64(5), int64(2), object(1)
memory usage: 13.7+ MB
```

In [11]:
```
df.describe()
```

Out[11]:

	Unnamed: 0	fare_amount	pickup_longitude	pickup_latitude	dropoff_longitude	dropof
count	2.000000e+05	200000.000000	200000.000000	200000.000000	199999.000000	19999
mean	2.771250e+07	11.359955	-72.527638	39.935885	-72.525292	3
std	1.601382e+07	9.901776	11.437787	7.720539	13.117408	
min	1.000000e+00	-52.000000	-1340.648410	-74.015515	-3356.666300	-88
25%	1.382535e+07	6.000000	-73.992065	40.734796	-73.991407	4
50%	2.774550e+07	8.500000	-73.981823	40.752592	-73.980093	4
75%	4.155530e+07	12.500000	-73.967154	40.767158	-73.963658	4
max	5.542357e+07	499.000000	57.418457	1644.421482	1153.572603	87

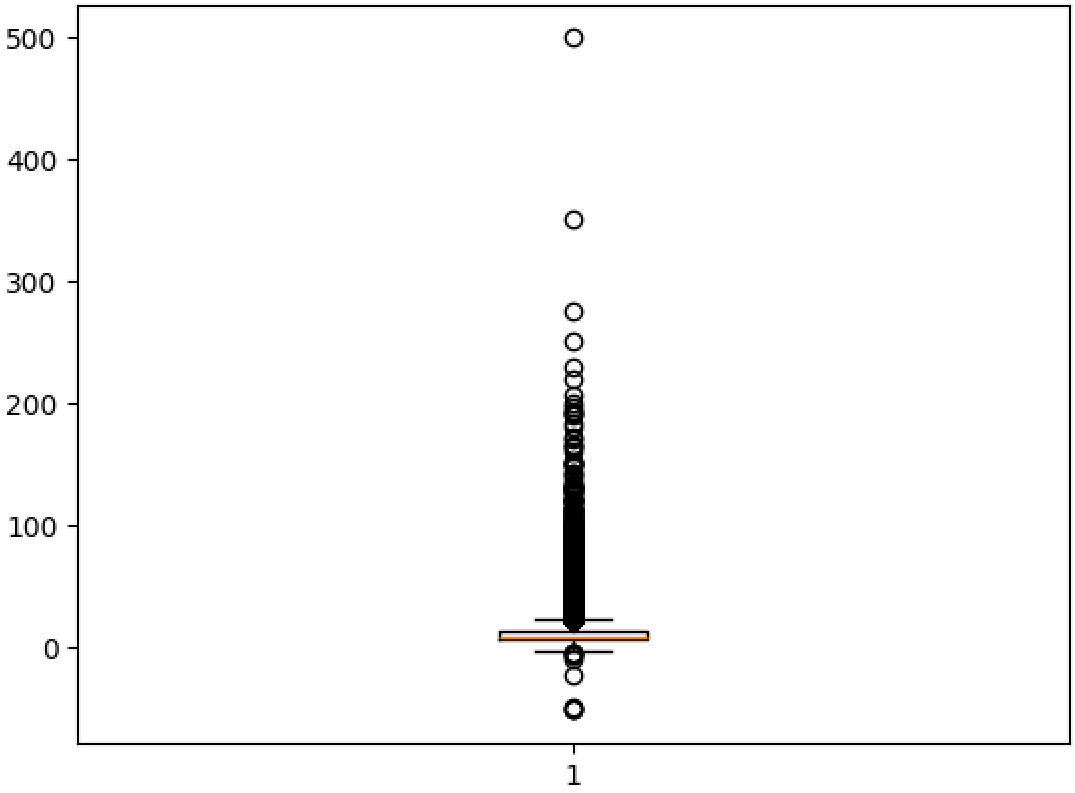
In [12]:
```
df.isnull().sum()
```

Out[12]:
```
Unnamed: 0           0
key                  0
fare_amount          0
pickup_datetime      0
pickup_longitude     0
pickup_latitude      0
dropoff_longitude    1
dropoff_latitude     1
passenger_count      0
dtype: int64
```

In [13]:
```
df.dropna(inplace=True)
```

In [14]:
```
plt.boxplot(df['fare_amount'])
```

Out[14]:
```
{'whiskers': [<matplotlib.lines.Line2D at 0x165f8b890>,
  <matplotlib.lines.Line2D at 0x165f3c6d0>],
 'caps': [<matplotlib.lines.Line2D at 0x165f3d2d0>,
  <matplotlib.lines.Line2D at 0x165f3e050>],
 'boxes': [<matplotlib.lines.Line2D at 0x12f66a790>],
 'medians': [<matplotlib.lines.Line2D at 0x165f3ea50>],
 'fliers': [<matplotlib.lines.Line2D at 0x165f3f5d0>],
 'means': []}
```



Remove Outliers

In [15]:
```
q_low = df['fare_amount'].quantile(0.01)
q_hi = df['fare_amount'].quantile(0.99)

df = df[(df["fare_amount"] < q_hi) & (df["fare_amount"] > q_low)]
```

In [16]:
```
df.isnull().sum()
```

Out[16]:
```
Unnamed: 0           0
key                  0
fare_amount          0
pickup_datetime      0
pickup_longitude     0
pickup_latitude      0
dropoff_longitude    0
dropoff_latitude     0
passenger_count      0
dtype: int64
```

In [17]:
```
from sklearn.model_selection import train_test_split
```

In [18]:
```
X = df.drop("fare_amount", axis=1)
```

In [20]:
```
y = df['fare_amount']
```

In [21]:
```
X['pickup_datetime'] = pd.to_numeric(pd.to_datetime(X['pickup_datetime']))
```

In [22]:
```
X = X.loc[ : , X.columns.str.contains('^Unnamed')]
```

In [23]:
```
x_train, x_test, y_train, y_test = train_test_split(X, y, test_size = 0.2, ran
```

In [24]:
```
from sklearn.linear_model import LinearRegression
```

In [25]:
```
lrmodel = LinearRegression()
```

In [26]:
```
lrmodel.fit(x_train, y_train)
```

Out[26]:
```
LinearRegression()
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
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In [27]:
```
predict = lrmodel.predict(x_test)
```

In [28]:
```
from sklearn.metrics import mean_squared_error
```

In [29]:
```
lrmodelrmse = np.sqrt(mean_squared_error(predict, y_test))
```

In [30]:

```
print("RMSE error for the model is: ", lrmodelrmse)
```

```
RMSE error for the model is:  8.063863046328835
```

In [31]:

```
from sklearn.ensemble import RandomForestRegressor
```

In [32]:

```
rfrmodel = RandomForestRegressor(n_estimators=100, random_state=101)
```

In [33]:

```
rfrmodel.fit(x_train,y_train)
```

Out[33]:

```
RandomForestRegressor(random_state=101)
```

In a Jupyter environment, please rerun this cell to show the HTML representation or trust the notebook.
On GitHub, the HTML representation is unable to render, please try loading this page with nbviewer.org.

In [34]:

```
rfrmodel_pred = rfrmodel.predict(x_test)
```

In [35]:

```
rfrmodel_rmse = np.sqrt(mean_squared_error(rfrmodel_pred, y_test))
```

In [36]:

```
print('RMSE value for random Forest is:', rfrmodel_rmse)
```

```
RMSE value for random Forest is: 9.757713738069647
```