Importing necessary Libaries and Loading dataset

In [14]:

```
import numpy as np
import pandas as pd
import warnings
warnings.filterwarnings("ignore")
```

In [15]:

```
import kagglehub

# Download latest version
path = kagglehub.dataset_download("yasserh/uber-fares-dataset")

print("Path to dataset files:", path)
```

```
Using Colab cache for faster access to the 'uber-fares-dataset' dataset.
Path to dataset files: /kaggle/input/uber-fares-dataset
```

In [16]:

```
import os

file_list = os.listdir(path)


csv_file_path = os.path.join(path, file_list[0])

df = pd.read_csv(csv_file_path)
display(df.head())
```

	Unnamed: 0	key	fare_amount	pickup_datetime	pickup_longitude	pickup_latitude
0	24238194	2015-05-07 19:52:06.0000003	7.5	2015-05-07 19:52:06 UTC	-73.999817	40.738354
1	27835199	2009-07-17 20:04:56.0000002	7.7	2009-07-17 20:04:56 UTC	-73.994355	40.728225
2	44984355	2009-08-24 21:45:00.00000061	12.9	2009-08-24 21:45:00 UTC	-74.005043	40.740770
3	25894730	2009-06-26 08:22:21.0000001	5.3	2009-06-26 08:22:21 UTC	-73.976124	40.790844
4	17610152	2014-08-28 17:47:00.000000188	16.0	2014-08-28 17:47:00 UTC	-73.925023	40.744085

In [17]:

```
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 [18]:

```
df.describe()
```

Out[18]:

	Unnamed: 0	fare_amount	pickup_longitude	pickup_latitude	dropoff_longitude	dropoff_
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

Data Preprocessing

In [19]:

```
df.drop(['Unnamed: 0'], axis=1, inplace=True)
```

In [20]:

```
df.drop(['key'], axis=1, inplace=True)
```

In [21]:

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

In [22]:

```
df.isnull().sum()
```

Out[22]:

	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 [23]:
```
df.dropna(inplace=True)
```

In [24]:
```
df.describe()
```

Out[24]:

	fare_amount	pickup_longitude	pickup_latitude	dropoff_longitude	dropoff_latitude	passe
count	199999.000000	199999.000000	199999.000000	199999.000000	199999.000000	19
mean	11.359892	-72.527631	39.935881	-72.525292	39.923890	
std	9.901760	11.437815	7.720558	13.117408	6.794829	
min	-52.000000	-1340.648410	-74.015515	-3356.666300	-881.985513	
25%	6.000000	-73.992065	40.734796	-73.991407	40.733823	
50%	8.500000	-73.981823	40.752592	-73.980093	40.753042	
75%	12.500000	-73.967154	40.767158	-73.963658	40.768001	
max	499.000000	57.418457	1644.421482	1153.572603	872.697628	

In [25]:
```
df.head(2)
```

Out[25]:

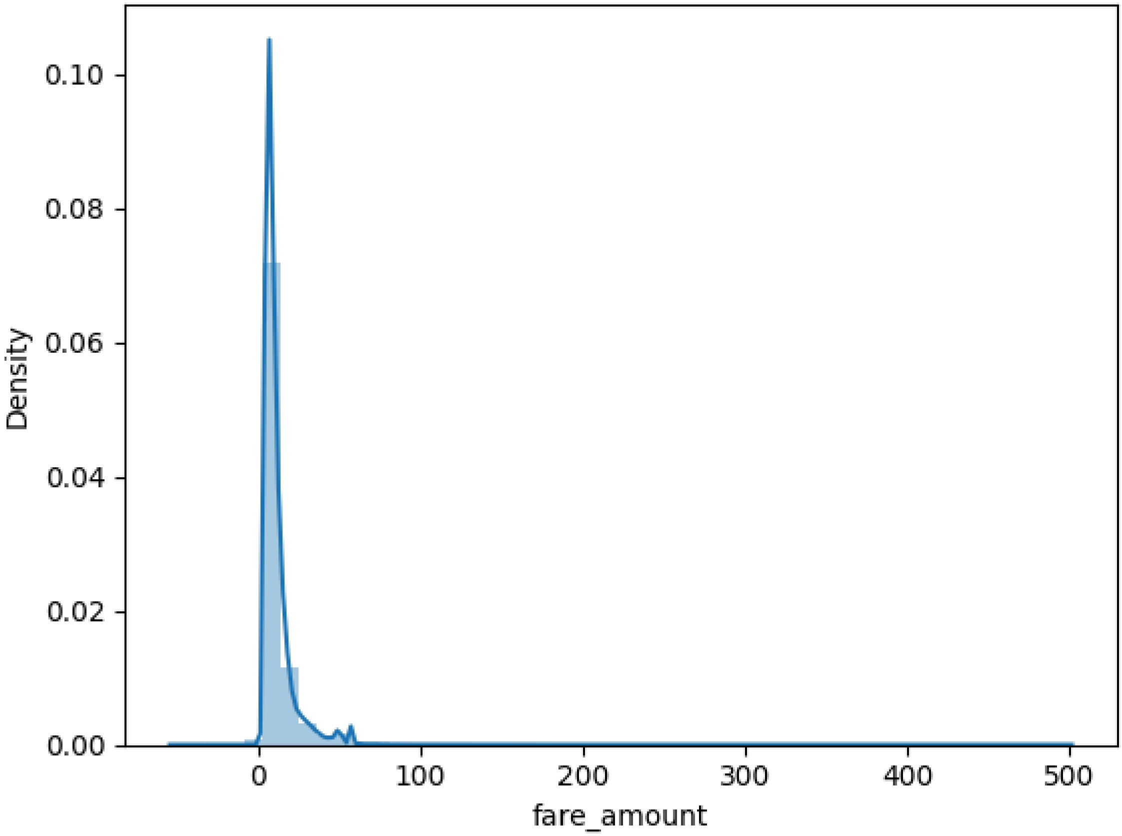
	fare_amount	pickup_datetime	pickup_longitude	pickup_latitude	dropoff_longitude	dropoff_lat
0	7.5	2015-05-07 19:52:06+00:00	-73.999817	40.738354	-73.999512	40.7
1	7.7	2009-07-17 20:04:56+00:00	-73.994355	40.728225	-73.994710	40.7

Exploratory Data Analysis(EDA)

In [26]:
```
import seaborn as sns
```

In [27]:
```
sns.distplot(df['fare_amount'])
```

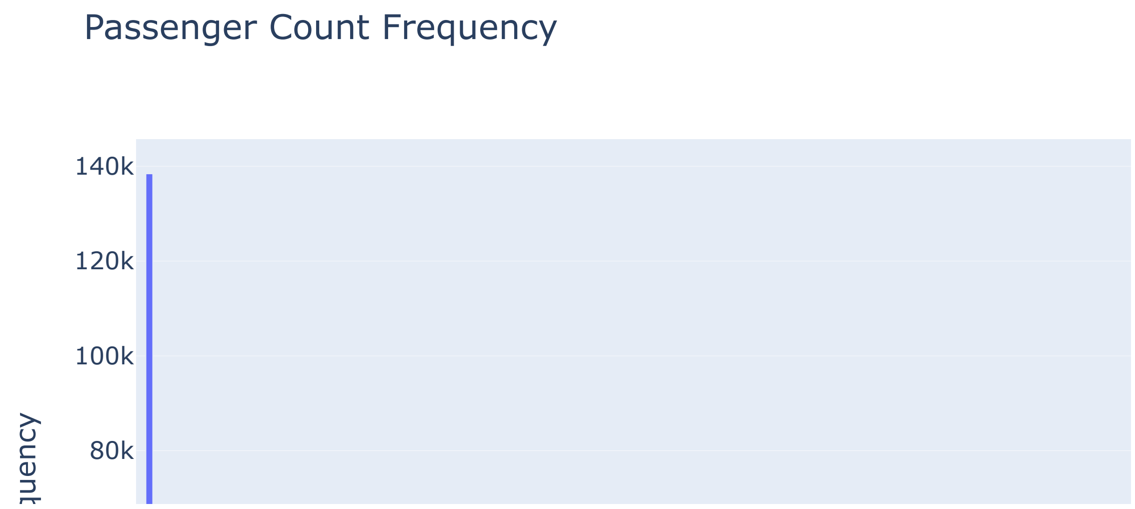
Out[27]:
```
<Axes: xlabel='fare_amount', ylabel='Density'>
```



```
In [28]: import plotly.express as ply
```

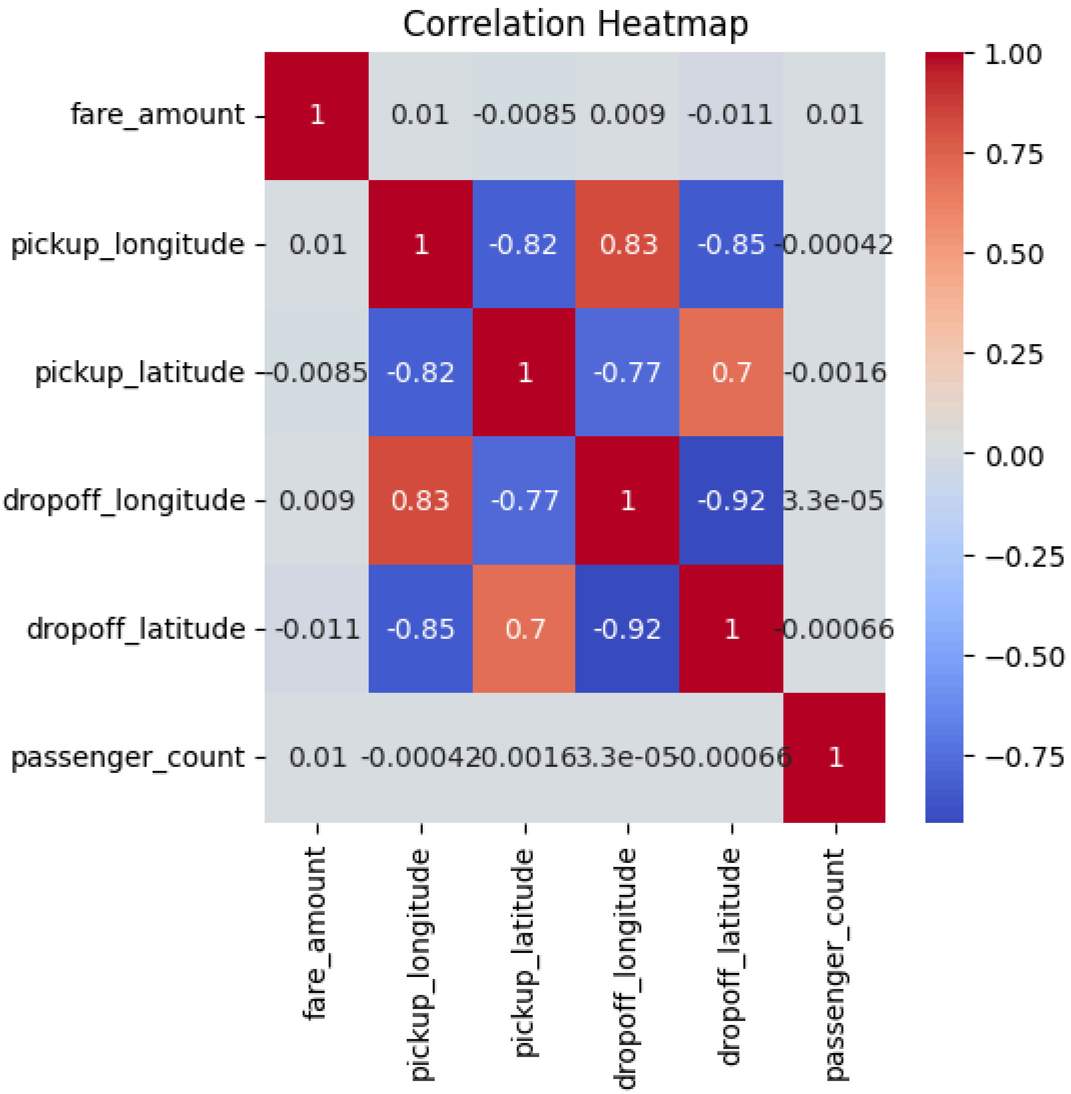
```
In [29]: import plotly.express as px

         fig = px.bar(df['passenger_count'].value_counts().reindex(),
                      y ='count',
                      labels ={'index' : 'Passenger Count' , 'count' :'Frequency'},
                      title = 'Passenger Count Frequency')
         fig.show()
```



```
In [30]: import matplotlib.pyplot as plt

         plt.figure(figsize=(5,5))
         sns.heatmap(df.drop('pickup_datetime', axis=1).corr(), annot=True,cmap='coolwarm')
         plt.title('Correlation Heatmap')
         plt.show()
```



In [31]:

```
y = df['fare_amount']
X = df.drop('fare_amount', axis=1)
```

In [32]:

```
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.25, random_state=42
)
```

In [33]:

```
X_train.head(2)
```

Out[33]:

	pickup_datetime	pickup_longitude	pickup_latitude	dropoff_longitude	dropoff_latitude	p
21743	2012-02-15 19:17:00+00:00	-73.995638	40.728353	-73.999792	40.734570	
124554	2013-10-11 02:31:00+00:00	-73.958847	40.712110	-73.982250	40.723785	

In [34]:

```
X_test.head(2)
```

Out[34]:

	pickup_datetime	pickup_longitude	pickup_latitude	dropoff_longitude	dropoff_latitude	p
134253	2010-02-17 01:53:16+00:00	-74.001323	40.751616	-73.987327	40.736004	
124141	2012-06-17 15:31:28+00:00	-73.981624	40.780713	-73.990445	40.775239	

Linear Regression

In [35]:

```
X_train.drop(['pickup_datetime'],inplace=True,axis=1)
X_test.drop(['pickup_datetime'],inplace=True,axis=1)
```

In [36]:

```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score
```

In [37]:

```
model = LinearRegression()
model.fit(X_train, y_train)
```

Out[37]:

```
▾ LinearRegression
LinearRegression()
```

In [38]:

```
y_pred = model.predict(X_test)
```

In [39]:

```
accuracy = r2_score(y_test, y_pred)
print("Accuracy:", accuracy)
```

```
Accuracy: 0.00027413984252O6709
```

In [ ]:

```
rmse = np.sqrt(mean_squared_error(y_test, y_pred))
print("RMSE:", rmse)
```

```
RMSE: 10.118882409501472
```

Random Forest

In [40]:

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

In [41]:

```
forest = RandomForestRegressor(n_estimators=100, random_state=42)
forest.fit(X_train, y_train)
```

Out[41]:

```
▾ RandomForestRegressor
RandomForestRegressor(random_state=42)
```

In [42]:

```
y_predf = forest.predict(X_test)
```

In [43]:

```
rms = np.sqrt(mean_squared_error(y_test, y_predf))
print("RMSE:", rms)
```

```
RMSE: 5.399966771084085
```

Conclusion : The provided data is nonlinear so the Random Forest Classifier works more effeciently than linear regressor model

In [ ]: