In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestRegressor
from sklearn.preprocessing import StandardScaler
from sklearn.metrics import mean_squared_error
from sklearn.experimental import enable_iterative_imputer
from sklearn.impute import IterativeImputer
from sklearn.preprocessing import LabelEncoder
```

In [2]:
```
data = "taxi_trip_pricing.csv"
df = pd.read_csv(data)
df.head()
```

Out[2]:

	Trip_Distance_km	Time_of_Day	Day_of_Week	Passenger_Count	Traffic_Conditions	V
0	19.35	Morning	Weekday	3.0	Low	
1	47.59	Afternoon	Weekday	1.0	High	
2	36.87	Evening	Weekend	1.0	High	
3	30.33	Evening	Weekday	4.0	Low	
4	NaN	Evening	Weekday	3.0	High	

In [23]:
```
x = df.select_dtypes(include = [np.number])

impute = IterativeImputer()
x = pd.DataFrame(impute.fit_transform(x), columns = x.columns)
```

In [24]:
```
x2 = df.select_dtypes(exclude = [np.number])
```

In [25]:
```
for col in x2.columns :
    x2[col] = x2[col].fillna(x2[col].mode()[0])
```

In [26]:
```
encoder = LabelEncoder()
for col in x2.columns :
    x2[col] = encoder.fit_transform(x2[col])
```

In [27]:
```
X = pd.concat([x,x2], axis = 1)
X
```

Out[27]:

	Trip_Distance_km	Passenger_Count	Base_Fare	Per_Km_Rate	Per_Minute_Rate	Trip
0	19.350000	3.0	3.560000	0.800000	0.320000	
1	47.590000	1.0	3.517427	0.620000	0.430000	
2	36.870000	1.0	2.700000	1.210000	0.150000	
3	30.330000	4.0	3.480000	0.510000	0.150000	
4	19.722094	3.0	2.930000	0.630000	0.320000	
...	...	...	...	...	...	
995	5.490000	4.0	2.390000	0.620000	0.490000	
996	45.950000	4.0	3.120000	0.610000	0.248435	
997	7.700000	3.0	2.080000	1.780000	0.302450	
998	47.560000	1.0	2.670000	0.820000	0.170000	
999	22.850000	3.0	4.340000	1.371673	0.230000	

1000 rows × 11 columns

In [28]:
```
def outlier(col):
    Q1 = col.quantile(0.25)
    Q3 = col.quantile(0.75)

    IQR = Q3 - Q1

    Fb = Q1 - 1.5 * IQR
    Fh = Q3 + 1.5 * IQR

    return col.clip(lower = Fb, upper = Fh)

for col in X.columns :
    X[col] = outlier(X[col])


y = X['Trip_Price']
X = X.select_dtypes(include = [np.number])
```

In [29]:
```
X.head()
```

Out[29]:

	Trip_Distance_km	Passenger_Count	Base_Fare	Per_Km_Rate	Per_Minute_Rate	Trip_D
0	19.350000	3.0	3.560000	0.80	0.32	
1	47.590000	1.0	3.517427	0.62	0.43	
2	36.870000	1.0	2.700000	1.21	0.15	
3	30.330000	4.0	3.480000	0.51	0.15	
4	19.722094	3.0	2.930000	0.63	0.32	

In [30]:
```
X = X.drop(columns ='Trip_Price')
```

In [31]:
```
y
```

Out[31]:
```
0      36.262400
1      79.047866
2      52.903200
3      36.469800
4      15.618000
         ...
995    34.404900
996    62.129500
997    33.123600
998    61.209000
999    45.443700
Name: Trip_Price, Length: 1000, dtype: float64
```

In [32]:
```
x_train, x_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_
```

In [33]:
```
y_test = y_test.reset_index(drop=True)
```

In [34]:
```
y_test
```

Out[34]:
```
0      40.1740
1      44.8859
2      66.5363
3      45.2879
4      67.2451
        ...
295    26.2988
296    14.6611
297    71.5568
298    44.7904
299    89.0764
Name: Trip_Price, Length: 300, dtype: float64
```

In [35]:
```
clf = RandomForestRegressor()
model = clf.fit(x_train, y_train)
pred = model.predict(x_test)
```

In [36]:
```
print(mean_squared_error(y_test, pred))
```

```
38.176461019176024
```

In [37]:
```
for i in range(len(pred)) :
    print(f"{y_test[i]:0.2f}  and  {pred[i]:0.2f}    = {(pred[i] - y_test[i]):0.
```

40.17 and 50.57 = 10.39
44.89 and 48.14 = 3.25
66.54 and 68.74 = 2.20
45.29 and 40.35 = -4.93
67.25 and 63.27 = -3.97
62.80 and 60.67 = -2.12
17.17 and 17.60 = 0.43
101.03 and 97.75 = -3.28
77.57 and 75.71 = -1.86
78.19 and 81.27 = 3.08
42.87 and 44.60 = 1.73
76.10 and 75.63 = -0.47
2.22 and 22.27 = 20.04
46.59 and 55.63 = 9.04
8.67 and 11.40 = 2.73
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31.83 and 42.06 = 10.23
46.15 and 45.95 = -0.21
66.58 and 70.56 = 3.98
84.16 and 89.73 = 5.57
57.05 and 60.12 = 3.07
83.63 and 90.56 = 6.93
33.34 and 34.68 = 1.34
75.93 and 79.34 = 3.41
80.32 and 55.56 = -24.76
19.94 and 23.16 = 3.22
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61.56 and 61.93 = 0.38
112.71 and 101.81 = -10.90
45.53 and 50.01 = 4.48
29.98 and 38.19 = 8.21
96.55 and 96.76 = 0.22
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30.80 and 34.67 = 3.87
13.37 and 16.84 = 3.47
25.44 and 30.54 = 5.10
16.93 and 17.82 = 0.89
52.78 and 57.78 = 5.00
46.64 and 44.02 = -2.62
82.37 and 72.92 = -9.44
96.35 and 96.98 = 0.64
73.86 and 81.88 = 8.01
37.77 and 46.67 = 8.90
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54.49 and 54.05 = -0.44
63.04 and 61.57 = -1.47
27.44 and 21.26 = -6.19
26.20 and 27.74 = 1.55
68.65 and 62.99 = -5.67
24.48 and 25.47 = 1.00
31.69 and 34.02 = 2.32
46.63 and 39.81 = -6.82
63.62 and 58.93 = -4.69
23.96 and 37.32 = 13.36
62.95 and 59.67 = -3.27
72.97 and 70.73 = -2.24
39.91 and 39.13 = -0.78
28.77 and 32.09 = 3.31
43.01 and 44.37 = 1.36
29.56 and 31.24 = 1.69

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34.40 and 30.48 = -3.93
97.21 and 92.25 = -4.96
96.73 and 106.25 = 9.52
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28.59 and 27.16 = -1.43
65.08 and 64.35 = -0.73
19.14 and 24.62 = 5.48
81.85 and 80.40 = -1.45
59.88 and 61.28 = 1.40
58.96 and 58.63 = -0.33
34.26 and 36.01 = 1.75
44.53 and 49.18 = 4.65
86.55 and 76.39 = -10.17
33.27 and 40.22 = 6.94
59.48 and 65.99 = 6.52
31.23 and 33.94 = 2.71
57.15 and 60.87 = 3.71
22.30 and 27.86 = 5.57
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41.43 and 41.77 = 0.34
115.12 and 96.02 = -19.10
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37.12 and 39.31 = 2.19
90.99 and 93.65 = 2.66
123.77 and 120.42 = -3.36
20.28 and 29.16 = 8.88
65.21 and 72.26 = 7.05
57.55 and 58.67 = 1.12
70.83 and 72.20 = 1.37
123.77 and 118.11 = -5.67
26.12 and 30.66 = 4.54
23.98 and 21.05 = -2.93
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123.77 and 118.05 = -5.72
69.00 and 68.17 = -0.84
32.74 and 36.22 = 3.48
64.73 and 66.28 = 1.54
40.28 and 46.61 = 6.33

48.02 and 38.11 = -9.91
27.17 and 34.09 = 6.92
71.09 and 69.62 = -1.47
46.32 and 44.19 = -2.13
78.78 and 87.58 = 8.80
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85.62 and 80.73 = -4.89
19.11 and 18.03 = -1.07
45.78 and 48.61 = 2.83
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123.77 and 119.99 = -3.78
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72.92 and 70.68 = -2.24
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76.58 and 72.86 = -3.72
71.21 and 78.15 = 6.93
48.28 and 42.04 = -6.24
15.10 and 18.14 = 3.04
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110.25 and 105.99 = -4.26

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46.61 and 52.70 = 6.09
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76.62 and 76.52 = -0.10
46.14 and 45.03 = -1.12
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47.38 and 62.00 = 14.62
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66.63 and 67.12 = 0.49
90.90 and 88.43 = -2.46
26.30 and 24.52 = -1.78
14.66 and 22.19 = 7.52
71.56 and 72.90 = 1.34
44.79 and 43.28 = -1.51
89.08 and 85.04 = -4.03

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