In [ ]:

```
import pandas as pd
import statsmodels.api as sm
from poisson_utils import preprocess, evaluate_error, r_squared
import matplotlib.pyplot as plt
import datetime
```

In [ ]:

```
df = pd.read_csv('nyc_taxi_data/train.csv')
df = preprocess(df)
```

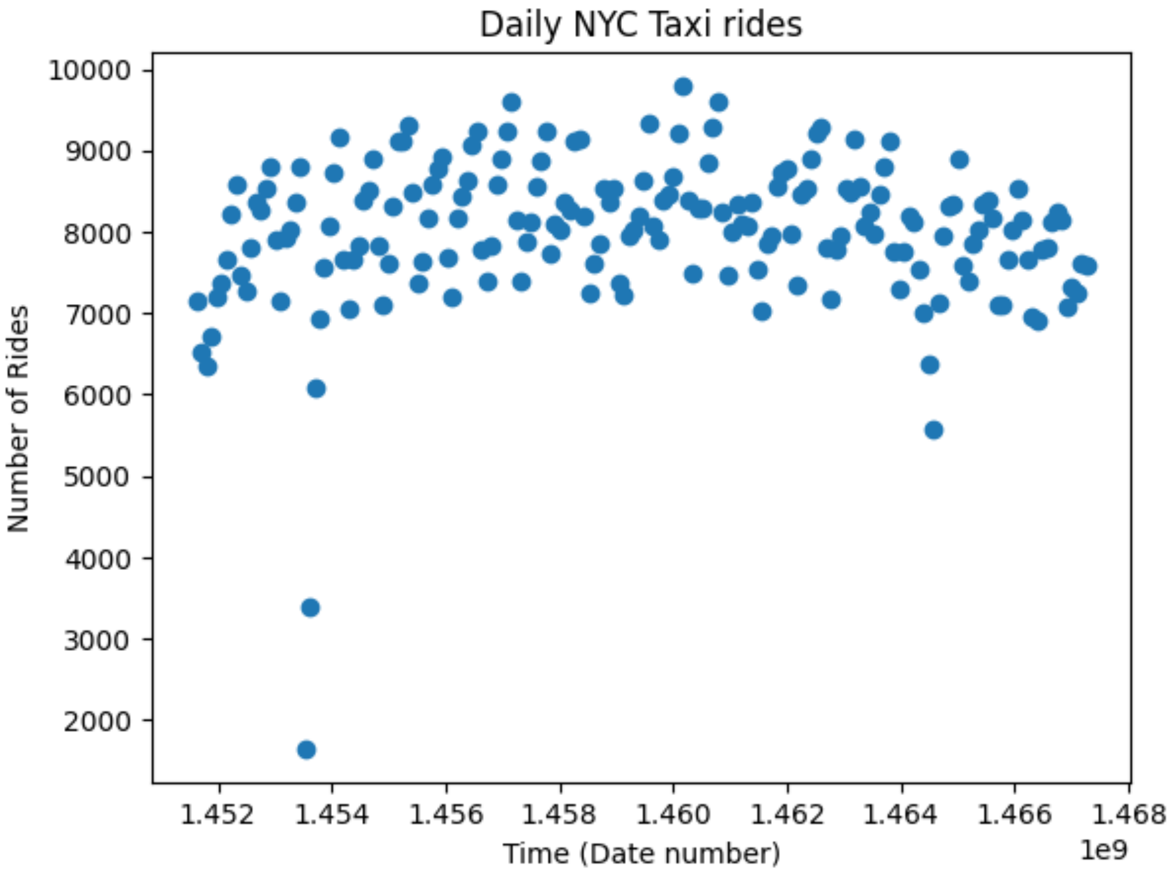
```
/home/kor/Desktop/ravindu/poisson_utils.py:18: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs
/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  df['pickup_datetime'] = pd.to_datetime(df['pickup_datetime']).dt.date
/home/kor/Desktop/ravindu/poisson_utils.py:21: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs
/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  df.sort_values(by=['pickup_datetime'], inplace=True)
```

In [ ]:

```
plt.scatter(df['timestamp'],df['count'])
plt.title('Daily NYC Taxi rides')
plt.xlabel('Time (Date number)')
plt.ylabel('Number of Rides')
```

Out[ ]:

```
Text(0, 0.5, 'Number of Rides')
```



In [ ]:

```
#drop rows that have less than 6800 rides
df = df[df['count'] > 6800]
```

In [ ]:

```
#find the stats of the df
df.describe()
```

Out[ ]:

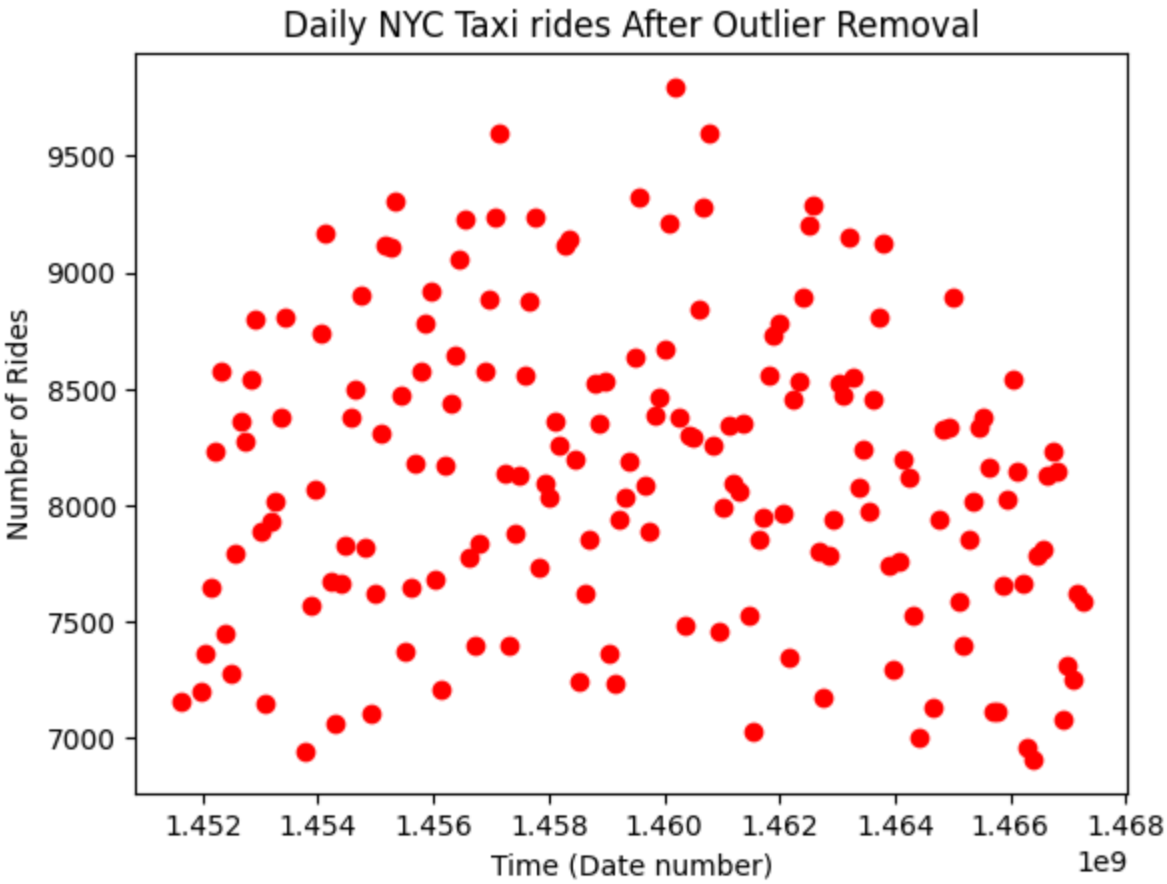
	count	timestamp
count	174.000000	1.740000e+02
mean	8137.913793	1.459615e+09
std	642.478374	4.441770e+06
min	6910.000000	1.451624e+09
25%	7663.500000	1.455880e+09
50%	8132.500000	1.459613e+09
75%	8542.750000	1.463350e+09
max	9796.000000	1.467259e+09

In [ ]:

```
plt.scatter(df['timestamp'],df['count'], color='red')
plt.title('Daily NYC Taxi rides After Outlier Removal')
plt.xlabel('Time (Date number)')
plt.ylabel('Number of Rides')
```

Out[ ]:

```
Text(0, 0.5, 'Number of Rides')
```



In [ ]:

```
# Calculate the number of rows for the training set (80% of the data)
train_size = int(len(df) * 0.8)

# Split the dataset into training and testing sets
df_train = df[:train_size]
df_test = df[train_size:]
```

In [ ]:

```
# Fit a Poisson regression model to the data
model = sm.GLM(df_train['count'], sm.add_constant(df_train[['timestamp']]),


model.summary()
```

Out[ ]:

Generalized Linear Model Regression Results

Dep. Variable:	count	**No. Observations:**	139
Model:	GLM	**Df Residuals:**	137
Model Family:	Poisson	**Df Model:**	1
Link Function:	Log	**Scale:**	1.0000
Method:	IRLS	**Log-Likelihood:**	-4122.7
Date:	Sun, 07 May 2023	**Deviance:**	6737.2
Time:	18:00:42	**Pearson chi2:**	6.74e+03
No. Iterations:	4	**Pseudo R-squ. (CS):**	0.7105
Covariance Type:	nonrobust		

	coef	**std err**	**z**	**P>|z|**	**[0.025**	**0.975]**
const	3.9335	0.387	10.159	0.000	3.175	4.692
timestamp	3.485e-09	2.66e-10	13.124	0.000	2.96e-09	4.01e-09

In [ ]:

```
# Make predictions for the future dates using the Poisson regression model
future_counts = model.predict(sm.add_constant(df_test[['timestamp']]))
```

In [ ]:

```
error = evaluate_error(df_test['count'], future_counts, metric='mae')
print('The Mean Squared Error of the model on the test set is:', error)
```

```
The Mean Squared Error of the model on the test set is: 702.6682053719423
```

In [ ]:

```
r2 = r_squared(df_test['count'], future_counts)
print('The R-squared value of the model on the test set is:', r2)
```

```
The R-squared value of the model on the test set is: -1.7924853605282225
```