Project Report 1 – Advanced Statistics

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Data Selection for Time Series Forecasting

The dataset which we are using is USCarrier_Traffic_20210326025348 data for year Jan 2000 to Feb 2019 with Geographic Area: System (domestic and international, Schedule Type: Total, Service Class: Passenger and Service Class: Passenger.
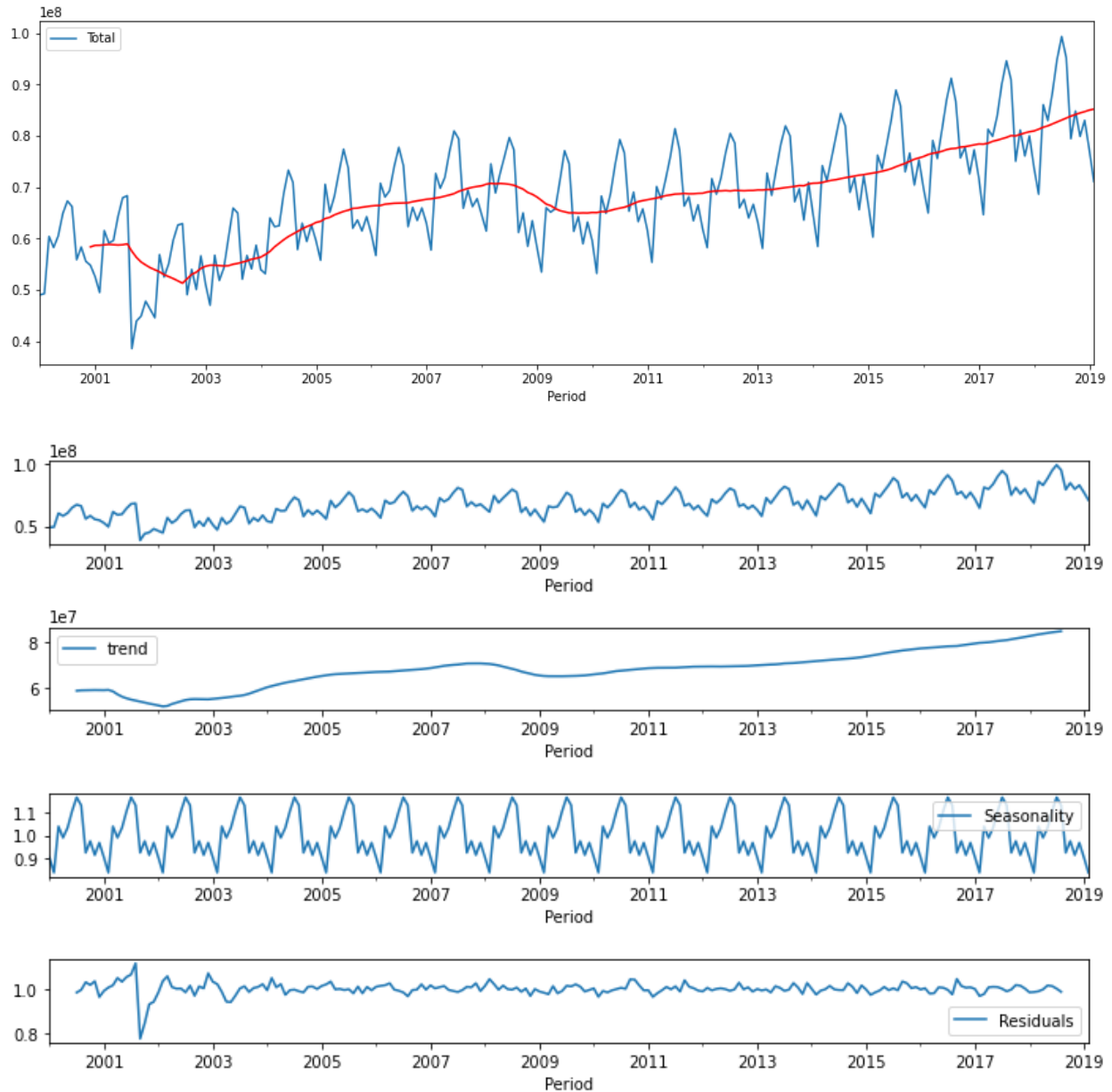
Intuition behind Time Series Forecasting

Time series forecasting is a technique for the prediction of events through a sequence of time.
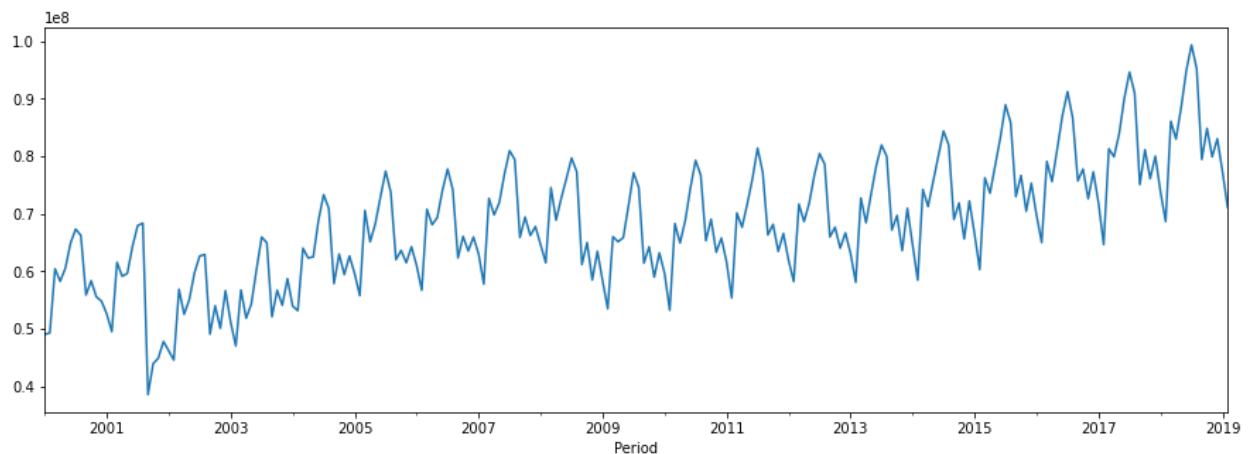
This is a time graph from year 2001 to 2019 and then the trend shows that gradually with time it is going upwards.

Time Series Analysis

For Moving Average Modelx we can say that the –

Here, we can say that for our data, the data from 2001 to 2019 shows no seasonality effect and is constant.

In the year between 2001 and 2002 though the value falls and we can see the unusual years/months which has significantly small value.

For ACF and PCF plots we get –

Auto Correlation Function (ACF)

The correlation between the observations at the current point in time and the observations at all previous points in time. We can use ACF to determine the optimal number of MA terms. The number of terms determines the order of the model.

Partial Auto Correlation Function (PACF)

As the name implies, PACF is a subset of ACF. PACF expresses the correlation between observations made at two points in time while accounting for any influence from other data points. We can use PACF to determine the optimal number of terms to use in the AR model. The number of terms determines the order of the model.
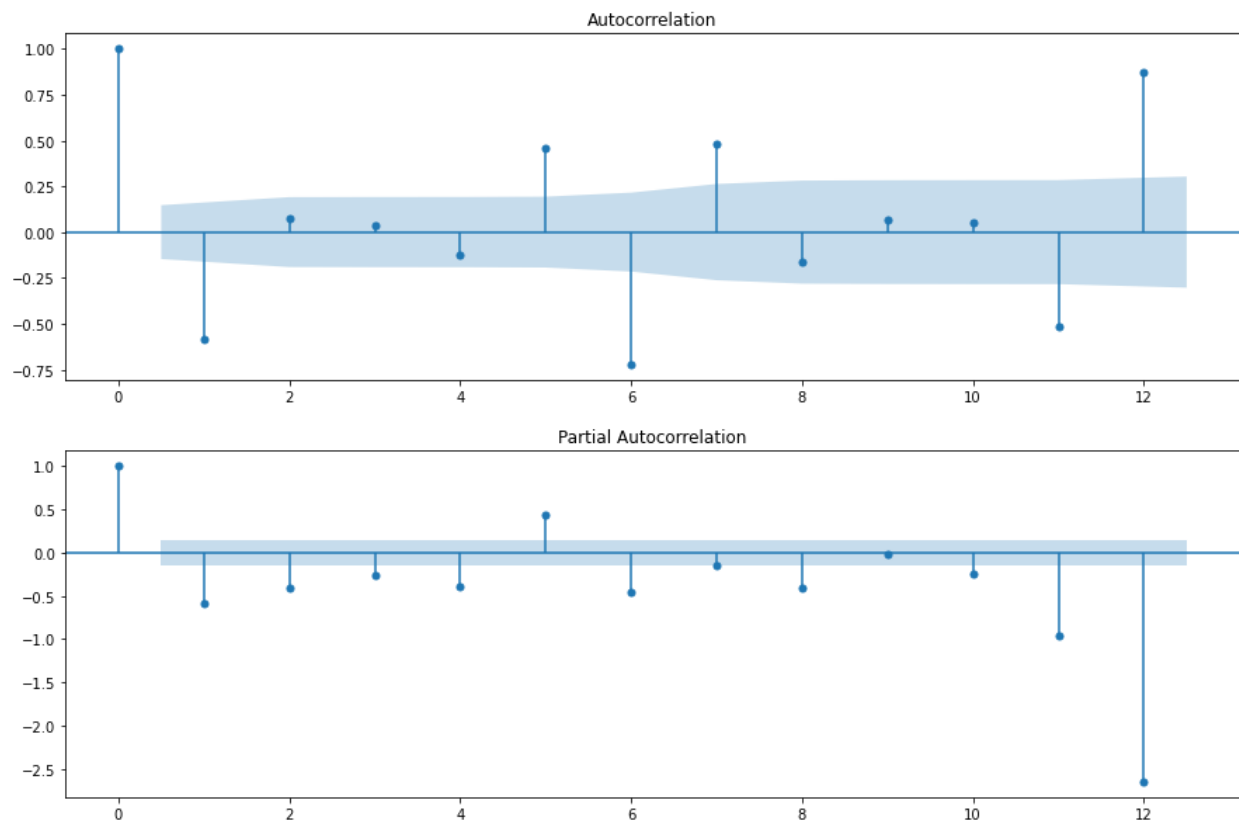
The forecasted Data for the 12 Months are as follows –

```
1  forecast = model_fit.forecast(steps=50)
2  #print(forecast)
3
4  #plot the predictions for validation set
5  plt.plot(train, label='Train')
6  plt.plot(test, label='Test')
7  plt.plot(forecast, label='Prediction', color='black')
8  plt.show()
```