Time Series Analysis

Introduction

"A time series is a series of data points indexed (or listed or graphed) in time order. Most commonly, a time series is a sequence taken at successive equally spaced points in time. Thus it is a sequence of discrete-time data."
Or, simply, "a data which is collected based on time at regular intervals is known as time series data".

Time series analysis comprises methods for analyzing time series data to extract meaningful statistics and other characteristics of time series data.
It focuses on comparing values of a single time series or multiple dependent time series at different points in time.

Requirements

- Installed R of version 3.4.3 or above
- Installed python of version 2.7.6 or above

Src

Each file in the source is named with the model that it is implementing.
"Holts_smoothing1.R" and "Holts_smoothing2.R" represents the Holts Smoothing algorithms when the seasonality is less than 24 and when the seasonality is greater than 24 respectively.

"Python_Implementation.py" represents the python file for implementing the forecasting algorithms.

Data

The data folder contains the csv files for the algorithm implementation. You can use the files "requairt.csv" for moving average,Weighted moving average and exponential smoothing. That is a very small data set which can be loaded very fast. Steps to implement the algorithm in R are included in the Google slides. You can use the "vine_data1.csv" for the same methods

mentioned above.

The "AirPassengers" data set in the R studio(We can Directly load the data in R) can be used to forecast using Holt Winters. We can observe that the forecast will be good and see the clear match with the actual data. Steps for using the Air Passengers data and plotting the forecast in R are included in the slides.

You can use the "Air_and_Waterquality.csv", "vine_data1", "sensordata1.csv" for Holt Winters and also for Arima. But due to high data frequency, the forecast in R won't be appropriate to see.

For ARIMA, we can use "Tractor-Sales.csv" or "AirPassengers" data which will result in good forecasting.