INDIAN INSTITUTE OF TECHNOLOGY PATNA

Applied Time Series Analysis (CS575)

Mini Project

This mini project is mandatory work as an essential learning activity. You may choose either Option 1 OR Option 2 OR Option 3

Option 1: Analysis of financial time series
Consider a time series stock values of various companies for a given duration (download using the script below). Your task is to find an appropriate model for the stock prediction and estimated relation between stocks.
Estimate the parameters of the chosen time series model. Compare at least with three different models (use different metrics, RSME, MAE. Elaborate on difficulties and alternative approaches.

Option 2 :
Choose time series data that you would like to analyze. Present the time series and explain your interest in the data. Analyze the time series using appropriate techniques (eg for prediction, anomaly detection, missing value prediction etc), and any other techniques that seem relevant for the specific time series dataset. Present your analysis and describe your findings. Elaborate on difficulties and alternative approaches.

Option 3: Define your own project.

You may use whatever software you like (e.g., Python, R, ...), use available functions for time series analysis, or write your own functions. Whatever you choose, you are required to state precisely what you are using and what the specific function does; it is not enough to only provide the name of a function and its output. First, explore the basic properties of the entries in the dataset in order to begin to refine your analysis. Once we understand how our data is formatted and what the data range is for each variable, then investigate. The relationship between stocks at a deeper level would be interesting analysis to investigate.

Report should contain (maximum of 15 Pages)

Objectives
Methodology and Mathematical Background
Results and Analysis
Conclusion

Submission:

Report (also should include Plots of data analysis design and comparison). Implementation files (python, R).

- Zip files(report, presentation ppt, dataset). File name is your role number.

Mini-Project submission through:

https://u.pcloud.com/#page=puplink&code=owLkZwYG3mW5Pn15wElf9e9fUo8uI4w9V

This work is due 2nd December 11.30 PM.

```
################################################
#download data from yahoo! finance
################################################
##data source: http://finance.yahoo.com/ """
#https://pypi.org/project/yfinance/
-----------------------------------------------------------------------------------------------
from pandas_datareader import data as pdr
from datetime import datetime

#download data
ibm = pdr.DataReader('IBM', 'yahoo', start=datetime(2014, 8, 1),
```

```
                    end=datetime(2016, 11, 30))
aapl = pdr.DataReader('AAPL', 'yahoo', start=datetime(2014, 8, 1),
                      end=datetime(2016, 11, 30))
fb = pdr.DataReader('FB', 'yahoo', start=datetime(2014, 8, 1),
                    end=datetime(2016, 11, 30))
googl = pdr.DataReader('GOOGL', 'yahoo', start=datetime(2014, 8, 1),
                       end=datetime(2016, 11, 30))

#print first few lines of data
print(ibm.head())
print(aapl.head())
print(fb.head())
print(googl.head())

#export and save as csv files
ibm.to_csv('IBM_stock.csv', sep=',')
aapl.to_csv('Apple_stock.csv', sep=',')
fb.to_csv('Facebook_stock.csv', sep=',')
googl.to_csv('Google_stock.csv', sep=',')
```