Data Analytics: UE18CS312

Unit 3: Instructor Notes

Text Book:

1. **"Business Analytics, The Science of Data-Driven Decision Making", U. Dinesh Kumar, Wiley 2017**

Chapter 13: page no: 427- 430, 431-439, 440-443, 444-450, 452-457, 457-463, 464-465, 466-469, 470-471.

Reference Books:
1: "Data Mining: Concepts and Techniques" by Jiawei Han, Micheline Kamber and Jian Pei, The Morgan Kaufmann Series in Data Management Systems, 3rd Edition.

Lecture 1: Introduction and Section. Time series data and components, Types of time series and decomposition.
https://www.abs.gov.au/websitedbs/D3310114.nsf/home/Time+Series+Analysis:+The+Basics

Lecture 2: Forecasting techniques and accuracy (Exponential SmoothingHolt's and Holt Winter'smodel)
https://app.box.com/s/763xaouvxbwkw1noje78obpglkrct8md
https://online.stat.psu.edu/stat510/lesson/5/5.2

Lecture 3: Case studyhttps://www.kdnuggets.com/2020/04/forecasting-stories-power-seasonality-index.html) Text (+ additional case study https://otexts.com/fpp2/counts.html)

Lecture 4: In text (measures of accuracy of time series models) + selecting window shape and size for moving average methods (feature engineering for time series:
https://www.analyticsvidhya.com/blog/2019/12/6-powerful-feature-engineering-techniques-time-series/)

Lecture 5: In text - Regression model for forecasting text.

Lecture 6: IConcept of ACF and PACF and Correlogram.
(https://app.box.com/s/wr50f11slghr4vnvnqqrbjabnetehfyf +)

Lecture 7: Forecasting using AR, MA ARMA and ARIMA13.10, 13.12, 13.13 in text - AR, MA and ARMA models (AR̤ https://otexts.com/fpp2/AR.html) + MA (https://otexts.com/fpp2/MA.html) + ARMA (Venkat Reddy's slides on ARIMA (https://app.box.com/s/nizsfr6pza79nef6gfxkw45ppgp6shcj), model selection case studies - https://people.duke.edu/~rnau/411arim3.htm)

Lecture 8: Concept of stationarity, DF and ADF test and transforming non stationary process to a stationary one. (https://otexts.com/fpp2/stationarity.html

Lecture 9: ARIMA and SARIMA. https://people.duke.edu/~rnau/411arim3.htm), SARIMA (https://machinelearningmastery.com/sarima-for-time-series-forecasting-in-python/

Lecture 10: Ljung Box and Theil's coefficient (https://365datascience.com/)

Lecture 11: ARIMAX and Box-Jenkins (https://365datascience.com/arimax/) and Box-Jenkins (https://machinelearningmastery.com/gentle-introduction-box-jenkins-method-time-series-forecasting/, https://math.unice.fr/~frapetti/CorsoP/Chapitre_5_IMEA_1.pdf

Lecture 12: Spectral Analysis of time series data. Time series feature extraction using Fourier and wavelets, using filters, ML for prediction+ using filters+ ML for prediction. https://bookdown.org/rdpeng/timeseriesbook/spectral-analysis.html and https://www.stat.berkeley.edu/~bartlett/courses/153-fall2010/lectures/15.pdf (for examples) and slides (https://astrostatistics.psu.edu/su07/fricks_2timeseries07.pdf) Wavelets: https://blog.octo.com/en/time-series-features-extraction-using-fourier-and-wavelet-transforms-on-ecg-data/ + using filters + ML for prediction https://jmread.github.io/talks/Time_Series_AI.pdf