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D213 Advanced Data Analytics

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D213 Performance Assessment Task 1

**1 Introduction**

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**1.1 Research Question**

**1. Summarize one research question that is relevant to a real-world organizational situation captured in the selected data set and that you will answer using time series modeling techniques.**

**1.2 Objective and Goals**

**2. Define the objectives or goals of the data analysis. Ensure that your objectives or goals are reasonable within the scope of the scenario and are represented in the available data.**

**2 Method Justification**

**2.1 Summary of Assumptions**

**B. Summarize the assumptions of a time series model including stationarity and autocorrelated data.**

**3 Data Preparation**

**3.1 Line Graph Visualization**

**1. Provide a line graph visualizing the realization of the time series.**

**3.2 Time Step Formatting**

**2. Describe the time step formatting of the realization, including any gaps in measurement and the length of the sequence.**

**3.3 Stationarity**

**3. Evaluate the stationarity of the time series.**

**3.4 Steps to Prepare the Data**

**4. Explain the steps used to prepare the data for analysis, including the training and test set split.**

**3.5 Prepared Dataset**

**5. Provide a copy of the cleaned dataset.**

**4 Model Identification and Analysis**

**4.1 Report Findings and Visualizations**

**Report the annotated findings with visualizations of your data analysis, including the following elements:**

**• the presence or lack of a seasonal component**

**• trends**

**• auto correlation function**

**• spectral density**

**• the decomposed time series**

**• confirmation of the lack of trends in the residuals of the decomposed series**

**4.2 Arima Model**

**2. Identify an autoregressive integrated moving average (ARIMA) model that takes into account the observed trend and seasonality of the time series data.**

**4.3 Forecasting Using Arima Model**

**3.  Perform a forecast using the derived ARIMA model.**

**4.4 Output and Calculations**

**4.  Provide the output and calculations of the analysis you performed.**

**4.5 Code**

**5.  Provide the code used to support the implementation of the time series model.**

**5 Data Summary and Implications**

**5.1 Results**

**1.  Discuss the results of your data analysis, including the following:**

**•   the selection of an ARIMA model**

**•   the prediction interval of the forecast**

**•   a justification of the forecast length**

**•   the model evaluation procedure and error metric**

**5.2 Annotated Visualization**

**2. Provide an annotated visualization of the forecast of the final model compared to the test set.**

**5.3 Recommendations**

**3. Recommend a course of action based on your results.**

**6 Reporting**

**6.1 Reporting**

**F.  Create your report from part E using an industry-relevant interactive development environment (e.g., a Jupyter Notebook). Include a PDF or HTML document of your executed notebook presentation.**

**7 Supporting Documentation**

**7.1 Video**

This can be found within the attached file ‘Panopto Recording’.

**4.2 Sources**

Western Governors University. (n.d.). D213 Advanced Data Analytics. Salt Lake City.