ALY-6050   Module Three Project

Project: *Forecasting Financial Time Series*

The project consists of three parts. The submission of this project will consist of two attachments:

1. A Word document that is prepared according to the APA standards of formatting. In the Word document, explain the experiments and their respective conclusions, and additional information as indicated in each problem. Save your word document in the format: ALY6050_MOD3Project_ LastNameFirstInitial.docx

2. Either an Excel workbook or an R script file (.R file) that contains all the work and the calculations indicated in parts 1-3 of the project. Please save your Excel workbook or R script file in the following format: ALY6050_MOD3Project_ LastnameFirstinitial; for example, ALY6050_MOD3Project_ DowJ.

Project:

The Excel workbook **ALY6050_MOD3Project_Data.xlsx** contains the historical stock prices for Apple Inc (AAPL) and Honeywell International Inc (HON) for a total time period of one year, consisting of 252 market days.

Assignment Project Exam Help

Part 1: Short-term Forecasting:

(i)   Use a simple line plot of both time series to detect seasonal, irregular, or trend behaviors if any. Write a summary of your observations of both time series in your report.

(ii) Perform exponential smoothing to forecast both prices for period 253. Use successive values of 0.15, 0,35, 0.55, and 0.75 for the smoothing parameter α. Next, calculate the MAPD (Mean Absolute Percentage Deviation) of each forecast; and based on the MAPDs, determine the value of α that has yielded the most accurate forecast for each stock. In your report, describe your results; and explain why in your opinion such values of α have yielded the most accurate forecasts for the two stocks.

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(iii) Use your exponential smoothing forecast of part (ii) with $\alpha=0.55$ and perform an adjusted exponential smoothing to forecast both prices for period 253. Use successive values of 0.15, 0.25, 0.45, and 0.85 for the trend parameters β for both stocks. Next, calculate the MAPEs (Mean Absolute Percentage Error) of your forecasts and determine the values of β that have provided the most accurate forecasts for both stocks. In your report, describe your results and explain why, in your opinion, such values of β have yielded the most accurate forecasts.

Part 2: Long-term Forecasting

(i)   For each stock, use a 3-period weighted moving averages to forecast its value during periods 1 through 100. Use the weights 0.5 (for the most recent period), 0.3 (for the period before the most recent), and 0.2 (for two periods ago). Next, use the observed value for period 101 as the base of a linear trend, and use that linear trend to forecast the values of both stocks for periods 101 through 257. Write a summary of your results in your report. Describe how accurate this method of forecasting has been by comparing the forecasted values for periods 253-257 with their actual "Close" values on those specific days (Hint: check the actual values on https://finance.yahoo.com).

(ii)   Calculate the MAPEs (Mean Absolute Percentage Error) of your forecasts in question (i) above and compare them with the values obtained for your forecasts in Part 1. For each stock, describe which method has yielded a most accurate forecast.

Part 3: **Regression:**

  (i)   For each stock, use simple regression of stock values versus the time periods to predict its values for periods 1 through 257. In your report, describe how the accuracy of this prediction has been compared to the methods used in Parts 1 and 2 of this project.

  (ii)   Perform a residual analysis of your simple regression to verify whether regression is appropriate to use for each of the given data. In particular, determine:

  - Whether the residuals are independent
  - Whether the residuals are homoscedastic.
  - Whether the residuals are normally distributed by plotting a Normal probability plot of the residuals
  - Whether the residuals are normally distributed by performing a Chi-squared test for Normality of the residuals.

After completing parts 1-3 and in your report, respond to the following question. Note this question is subjective, and it does not necessarily have only one correct answer at this stage of the course.

Question: Suppose that you have decided to form a portfolio Π (Pi) consisting of the above two stock types (denote a share value of AAPL by X and that of HON by Y). You are however undecided as to what percentage of your investment should be allocated to the AAPL shares and what percentage should be allocated to HON shares. Let these percentages be denoted by P and Q respectively (Obviously, P + Q=100%). In your opinion, what are good values to select for P and Q?

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Project Rubric

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Criteria	**Ratings**				**Pts**
R (or Excel): Problem Modeling & Set-up	20.0 pts — Completely and concisely modeled the problem in Excel (or R) for each method	16.0 pts — Accurately modeled the problem in Excel (or R) for each method	10.0 pts — Correctly modeled the problem in Excel (or R) for each method, but the model lacks detailed insight into the problem or the set-up is awkward.	5.0 pts — Modeled the problem in Excel (or R) for each method, but there are some gaps in the problem modeling and setup	20.0 pts
R (or Excel): Problem Solution & Accuracy	40.0 pts — Efficiently obtained correct and accurate solutions in Excel (or R) by using the appropriate analytic tools of the software	32.0 pts — Obtained complete and accurate solutions in Excel (or R) by using the appropriate analytic tools of the software	20.0 pts — Obtained correct solutions in Excel (or R) using the appropriate analytic tools of the software, but the application of the tool is awkward.	10.0 pts — Obtained a solutions in Excel (or R) by using the appropriate analytic tools of the software, but the solution is not complete.	40.0 pts
Word/Report: Problem Description & Introduction	10.0 pts — Provides a thorough and concise summary of the problem descriptions and ... rich and significant ideas	8.0 pts — Provides an accurate and succinct summary of the problem descriptions and problem introduction ...	5.0 pts — Provides an accurate summary of the problem descriptions and problem introduction, but the description is too wordy, not succinct	2.5 pts — Provided a summary of the problem descriptions and problem introduction, but it is inaccurate or incomplete	10.0 pts
Word/Report: Description of Problem Analysis	10.0 pts — Provides a thorough and precise description of the analytic concepts and theories used in analyzing the problem	8.0 pts — Accurately describes the analytic concepts and theories used in analyzing the problem	5.0 pts — Describes the analytic concepts and theories used in analyzing the problem, but description lacks appropriate detail or precision	2.5 pts — Describes the analytical concepts and theories used in analyzing the problem, but descriptions are incorrect or the analytical concepts and theories are incorrect	10.0 pts
Word/Report: Description of Conclusions	10.0 pts — Provides conclusions and results obtained in the project using a high level of critical thinking and reasoning	8.0 pts — Provides relevant conclusions and results obtained in the project that reflect critical thinking and reasoning	5.0 pts — Provides conclusions and results obtained in the project, but not all conclusions or results are relevant to the problem or not all conclusions reflect good reasoning	2.5 pts — Provides conclusions and results obtained in the project, but they are irrelevant and reflect a lack of critical thinking	10.0 pts
Word/Report: Writing Mechanics, Title Page, & References	10.0 pts — Completely free of errors in grammar, spelling, and punctuation; and completely correct usage of title page, citations, and references. The report contains a minimum of 1000 words	8.0 pts — There are no noticeable errors in grammar, spelling, and punctuation; and completely correct usage of title page, citations, and references. The report contains a minimum of 1000 words	5.0 pts — There are very few errors in grammar, spelling, and punctuation; and completely correct usage of title page, citations, and references. The report contains a minimum of 1000 words	2.5 pts — There are more than five errors in grammar, spelling, and punctuation; or the usage of title page, citations, and references are incomplete; or the report contains less than 1000 words	10.0 pts
				Total Points: 100.0	