Price Predictions Project

Overview and Rationale

This assignment is designed to give you hands-on experience in performing both regression and time series forecasting. You will be given a particular real-life time series, and are asked to perform regression for predictions and to perform a time series forecasting. In addition, you are asked to perform a sensitivity analysis by using different parameter values and calculating measures of error for each of those values.

Course Outcomes

This assignment is directly linked to the following key learning outcomes from the course syllabus:

CO1: Use descriptive, Heuristic and prescriptive analysis to drive business strategies and actions

CO3: Analyze the role of analytics in supporting decision making for various other stakeholder groups within and outside of your organization

CO5: Utilize applied analytics and definitions of measures of success to provide a strategic analytic roadmap for an organization

Assignment Summary

The Excel workbook **Honeywell.xlsx** contains the historical stock prices of the Honeywell International Incorporated, an American multinational company that produces a variety of commercial and consumer products, engineering services and aerospace systems for a wide variety of customers, from private consumers to major corporations and governments from 10/15/2017 to 4/15/2018 (courtesy of **Yahoo Finance**). This project consists of three parts. Each part should be completed in a separate worksheet as designated in the workbook.

Project Instructions:

1. Perform exponential smoothing forecasts on the Honeywell stock prices to forecast the price for 4/16/2018. Use successive values of 0.15, 0.35, 0.55, and 0.75 for the smoothing parameter α. Calculate the MSE of each forecast, Use the MSEs of your forecasts to determine the value of α that has provided the most accurate forecast.

Describe qualitatively as to why such a value of α has yielded the most accurate forecast.

2. Use your exponential smoothing forecast with **α=0**.75, and perform adjusted exponential smoothing forecasts on the Honeywell stock prices to forecast the price for 4/16/2018. Use successive values of 0.15, 0.25, 0.45, and 0.85 for the trend parameter β. Use the MSEs of your forecasts to determine the value of β that has provided the most accurate forecast. Describe qualitatively as to why such a value of β has yielded the most accurate forecast.

3. Perform a simple regression analysis of Honeywell stock prices versus periods (i.e., 1, 2, 3,…) to forecast the Honeywell stock value for 4/16/2018. Calculate the MSE of this forecast and compare its value with those obtained from parts (1) and (2) above. The regression analysis should consist of the following additional details:

    a. Coefficients of correlation and determination, and the interpretations of their values

    b. A histogram of the regression residuals, and the interpretation of its shape

    c. A Chi-squared normality test of the residuals, and the interpretation of its outputs

    d. A Normal probability plot of the residuals

    e. A scatter plot of residuals versus time to study their independency, and the interpretation of the shape of the scatter plot

    f. A scatter plot of residuals versus the predicted stock values to study their homoscedasticity, and the interpretation of the shape of the scatter plot

4. Perform a research to find out the actual Honeywell stock value on 4/16/2018, and compare this true value with your forecasts in this project. Among the forecasting methods that you have used in this project, what method has shown to be actually the most accurate method in predicting the Honeywell stock price for 4/16/2018?

Format & Guidelines

The report should follow the following format:

(i) Introduction

(ii) Analysis

    (iii) Conclusion

And be 1000 - 1200 words in length, not including the title page, and presented in the APA format.

Rubric

Category	Above Standard	Meets Standards	Approaching Standards	Below Standards
R: Problem Modeling & Set-up ALY6050-CO1	Completely and concisely modeled the problem in Excel (or R) for each method	Accurately modeled the problem in Excel (or R) for each method	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.	Modeled the problem in Excel (or R) for each method, but there are some gaps in the problem modeling and setup
R: Problem Solution & Accuracy ALY6050-CO1	Efficiently obtained correct and accurate solutions in Excel (or R) by using the appropriate analytic tools of the software	Obtained complete and accurate solutions in Excel (or R) by using the appropriate analytic tools of the software	Obtained correct solutions in Excel (or R) using the appropriate analytic tools of the software, but the application of the tool is awkward.	Obtained a solutions in Excel (or R) by using the appropriate analytic tools of the software, but the solution is not complete.
Word/Report: Problem Description & Introduction ALY6050-CO3	Provides a thorough and concise summary of the problem descriptions and introduced the problem using rich and significant ideas	Provides an accurate and succinct summary of the problem descriptions and problem introduction	Provides an accurate summary of the problem descriptions and problem introduction, but the description is too wordy or not succinct	Provided a summary of the problem descriptions and problem introduction, but it is inaccurate or incomplete
Word/Report: Description of Problem Analysis ALY6050-CO3 ALY6050-CO5	Provides a thorough and precise description of the analytic concepts and theories used in analyzing the problem	Accurately describes the analytic concepts and theories used in analyzing the problem	Describes the analytic concepts and theories used in analyzing the problem, but description lacks appropriate detail or precision	Describes the analytical concepts and theories used in analyzing the problem, but descriptions are incorrect or the analytical concepts and theories are incorrect
Word/Report: Description of Conclusions ALY6050-CO5	Provides conclusions and results obtained in the project using a high level of critical thinking and reasoning	Provides relevant conclusions and results obtained in the project that reflect critical thinking and reasoning	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	Provides conclusions and results obtained in the project, but they are irrelevant and reflect a lack of critical thinking

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Word/Report: Writing Mechanics, Title Page, & References	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	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	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	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