# Highline case study

Business

For this problem we look to try and gather an estimate of what the best forecasting method will be for he demand of services A, B, and C. The methods of analysis used to attain the figures Include; linear regression, regression model, and forecast error analysis.

Plan the Treatment: In order to apply all of the demand forecasting methods properly and acquire the most accurate demand forecast, we must do the following… Graph historical demand – define the key data elements. Define the time horizon – forecast must Include a time Interval.

Clean the Historical data – there usually exist problems with the quality and completeness of data, “ clean” (remove) all data that is found unnecessary to the forecast. Select a forecasting technique or multiple forecasting methods. Make the forecast. Execute: In order to make the best forecast possible, It Is Imperative to understand the past demand In order to better see what type of data and trends to look for. Linear Regression attempts to model a relationship between two variables; the dependent variable (y) and an explanatory variable (x).

Linear Regression allows for a visual look Into the linear trend of a forecast. It formulates the best-fluting straight line for the plotted data. Linear Regression allows for a visual view In determining whether the trend is ascending (positive) or descending (negative). Figure 1. 1 (Service A), Figure 1. 2 (Service B), and Figure 1.

3 (Service C) are shown below. Figure 1. 1 Figure 1. 3 Figure 1. 2 Figures 1. 1 and 1.

3 both have a positive correlation, while figure 1. 2 is descending making It a negative correlation.

In addition, figures 1. 1 and 1. 2 both have averagely steep slopes, while figure 1. 3 has a minimal slope making it a less drastic increase compared to the other two liner regressions.

Overall, from the figures above we see that the demand is very cyclical and seems to follow some kind of trend. Thus, we are already given clues that adjustments for trends may be necessary. Now that the demand data has been analyzed, I will begin to explain the three methods of forecast mentioned in the section (define the problem).

Static Regression Forecasting: We 1 OFF now preterm a static Treats AT ten mean data to give us a model wanly NAS level and trend as constants. These parameters are based off historical data provided, and held constant for the forecasting of new demand. The static forecasts for services A, B, and C are shown below.

The steps necessary to obtain their values are used with he regression tool in excel. First you plot the x and y coordinates into an excel spreadsheet.

Afterwards, you would select the demand data, click on the Data tab – Data Analysis Tab – Search for Regression – Input the y and x range – Click k. Once these forecasts have been made, we can stack the forecasting method against the actual demand to observe its effectiveness. Service A: Service B: Service C: Desalinating: Seasonal variations are “ regularly repeating movements in series values that can be tied to recurring events”

(Stevenson). However, our demand data sacks the information used to develop seasonal relatives.

Thus, in order the remove the seasonal component from a set of data, one would dissocialize the data. Desalinating data allows for a clearer representation of the non-seasonal (trend) components. In order to obtain disillusioned demand for the forecast one must divide the demand data by the seasonal relative. The resulting values from this equation were calculated in excel and are shown below. The tables descend from Service A Dissocialized demand for quarter three in the table above was obtained by taking 100 and dividing it by 1. 0056.

100/1. 0056 -+ Del= 71. 5. Now Tanat ten regression results are totaled, we nave ten equators to get ten dissocialized regressed demand equations. The equations are: Service A: 64.

2 + 2. XX service s: 90. 2875 + (-2. Mm service c: 98. 3875 + (-0. Mm To find the average seasonal factor for each quarter we simply take the same quarter of every year and average all of them together.

Once the average seasonal factors are obtained, you can obtain the re-seasonality data forecasts by multiplying the regressed demand against the average seasonal factor for each period.

This acquired demand data is now used as your forecast demand. Forecast Error Calculation: Error analysis can provide a helpful look at the effectiveness of a forecast as it tells us how our forecasting method statistically stacks up against the actual demand data that we have been

given. If the error analysis comes back with low errors, we know we have created a good forecast. The methods for finding these error values are shown below: Error: is found by simply subtracting the forecasted demand against the actual demand. Absolute Error: Absolute value of the error.

Mean Squared Error (MS): States the variance (square root) of the forecast error, and is calculated with the following equation, MS= E(Actual – Forecasts)2 / n-l Mean Absolute Deviation (MAD): is the average absolute forecast error ?+ solved with the following equation, MAD Actual – Forecastle / n Mean Absolute Percentage Error (MAPLE): determines whether a forecast is consistently over-estimating or under- estimating the demand. The equation is as follows, MAPLE= (21 Actual – Forecastle / Actual) *100)) / (n) % Error: Measures the percent difference between the absolute error and the actual demand.

Solved by the following equation: %E= 100*(Absolute Error/ Demand) Conclusion: Overall, Service A appears to be increasing and should continue to increase over the next year (four quarters). According to the Adjusted R Square, the model is an A model with a score of . 996104.

Service B appears to be decreasing annually and the data demonstrates that it will most likely follow a decreasing pattern. However, although Service B has a negative slope it is also the best rated model with and Adjusted R Square of . 99666. Service C shows an inconsistent demand pattern. Service C was also rated as an F model with an Adjusted R Square of . 29114.

In addition, Service C is very scattered and has a high mean absolute deviation. Concern: In general all three services follow a trend. However,

according to the forecasted data, Service B poses the greatest risk of concern. Service B continues to follow a downward linear trend in both the historical data and the forecasted data. Thus signifying that demand for Service B will continue to decrease.

Simply, Service B has little opportunity for growth and anticipates a decline in profit. In addition, even though Service C follows an inconsistent pattern, verbal it continues to follow a minimal increase in its linear trend.

As mentioned earlier, Service C was rated as an F model, thus suggesting that there is room for improvement. If improvements are made the model will increase to a level closer to 1. 00 or 100% thus making it a better model. Eventually, there might still appear a scatter In data never ten mean will continue to Increase Walt a positive slope.

Forecasting: Forecasted data is only an estimate, can and is subject to change. Works Cited: Stevenson, William J. Operations Management. 1 lath De. New York: McGraw-Hill/learn, 2012.

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