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Assignment 7 – Simple Linear Regression

This simple linear regression uses satisfaction (satis) as the dependent variable and likelihood of recommendation (recommend) as the metric independent variable. This metric variable is measured on a 10-point scale, 0 being poor and 10 being excellent, that is the likelihood that a customer would recommend HBAT to other firms. The goal is to predict satisfaction using recommended. I would expect that customers how would highly recommend HBAT to other firms will also be highly satisfied with their past purchases from HBAT.

From the scatter plot below, we can visually confirm that there exists a positively linear relationship between satisfaction and recommend.



Figure 1: Satis vs Recommend

In figure 2 there appears to be no apparent patter, meaning that the error terms are homoscedastic. In figure 3 the studentized residual (SAS’s name for standardized residual) versus ID (observation number) shows no apparent pattern which suggests that the error terms are independent.



Figure 2: Studentized Residual vs Predicted Value of Satis



Figure 3: Studentized Residual vs ID

The regression equation is, . They y-intercept is and the slope,indicates that for each additional unit increase in likelihood of recommendation average satisfaction increases by The regression model is highly significant,

Measures of fit include indicating that 58.41% of the variation in satisfaction is explained by recommendation; and means that estimates or predictions made with this equation have an error of roughly 0.77251. Appendix – The REG Procedureincludes all SAS information using the REG procedure.

In conclusion, this model meets the regression assumptions. Recommendation was initially chosen since recommend and satis are highly correlated with a Pearson’s Correlation coefficient of 0.76428; However, the model will be improved by adding additional independent variables in a future multiple linear regression model.

**Appendix – The REG Procedure**

|  |  |
| --- | --- |
| **Number of Observations Read** | 100 |
| **Number of Observations Used** | 100 |

| **Analysis of Variance** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **Source** | **DF** | **Sum of Squares** | **Mean Square** | **F Value** | **Pr > F** |
| **Model** | 1 | 82.14364 | 82.14364 | 137.65 | <.0001 |
| **Error** | 98 | 58.48396 | 0.59678 |  |  |
| **Corrected Total** | 99 | 140.62760 |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Root MSE** | 0.77251 | **R-Square** | 0.5841 |
| **Dependent Mean** | 6.91800 | **Adj R-Sq** | 0.5799 |
| **Coeff Var** | 11.16670 |  |  |

| **Parameter Estimates** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **DF** | **Parameter Estimate** | **Standard Error** | **t Value** | **Pr > |t|** |
| **Intercept** | 1 | 0.78892 | 0.52809 | 1.49 | 0.1384 |
| **Recommend** | 1 | 0.87309 | 0.07442 | 11.73 | <.0001 |

**Appendix – The REG Procedure (Plots)**

