Christopher W. Hong

Project: Diamond Prices

Step 1: Understanding the Model

Answer the following questions:

1. According to the model, if a diamond is 1 carat heavier than another with the same cut, how much more should I expect to pay? Why?

   The additional 1 carat would result in an additional $8,413 in price. The regression model determined that the coefficient for 1 carat is $8,413, so for every increase in the weight of carat the price will increase by the amount of the coefficient.

2. If you were interested in a 1.5 carat diamond with a **Very Good** cut (represented by a 3 in the model) and a **VS2** clarity rating (represented by a 5 in the model), how much would the model predict you should pay for it?

   The formula is price = -5,269 + 8,413 * Carat + 158.1 * Cut + 454 * Clarity
   Price = -5,269 + 8,413 * 1.5 + 158.1 * 3 + 454 * 5
   Price = 10094.8

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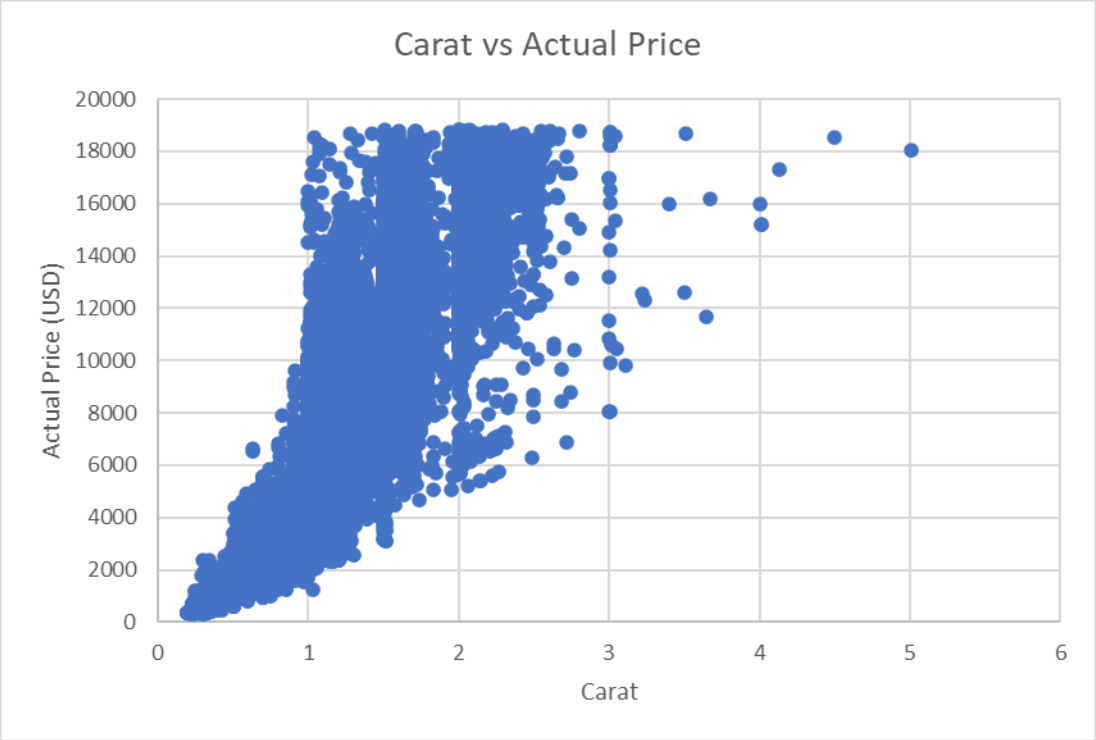
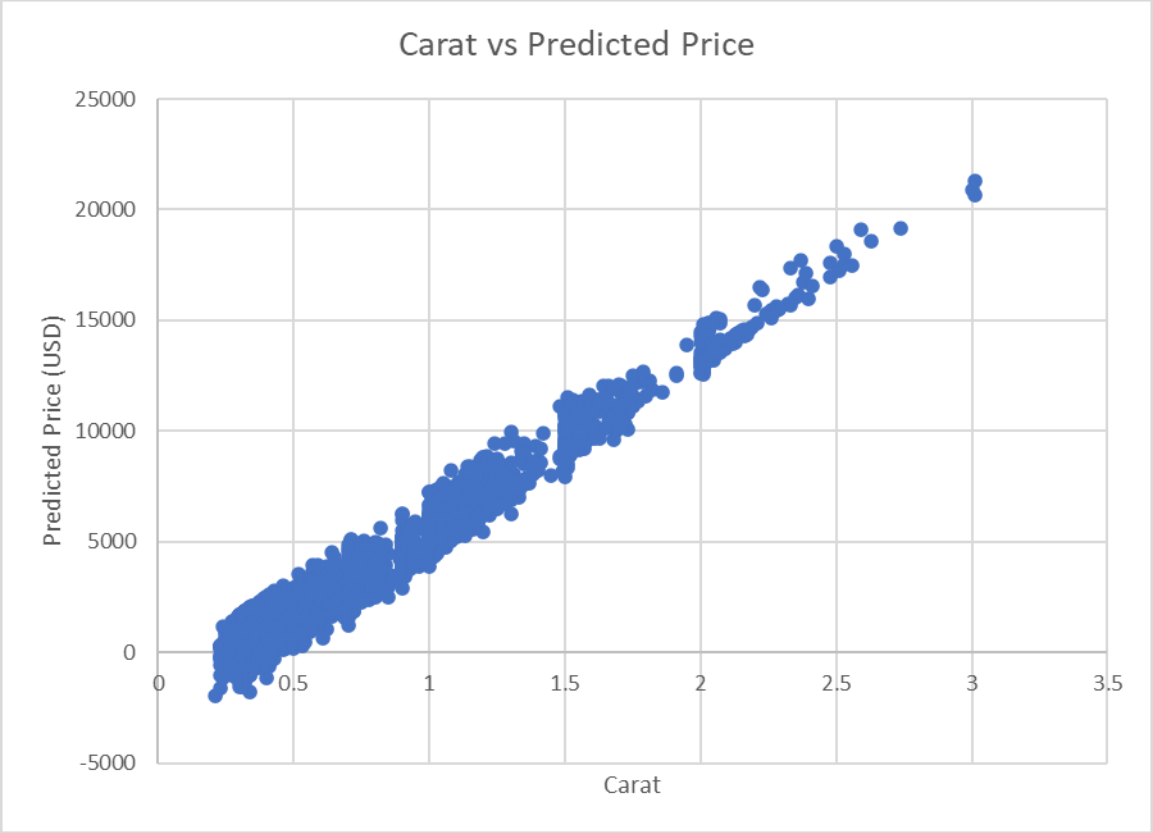
Step 2: Visualize the Data

Make sure to plot and include the visualizations in this report. For example, you can create graphs in Excel and copy and paste the graphs into this Word document.

1. Plot 1 - Plot the data for the diamonds in the database, with carat on the x-axis and price on the y-axis.



2. Plot 2 - Plot the data for the diamonds for which you are predicting prices with carat on the x-axis and predicted price on the y-axis.



3. What strikes you about this comparison? After seeing this plot, do you feel confident in the model's ability to predict prices?

   There is a strong linear relationship between predicted prices and carat simply because we are using a linear regression model to predict the price based on features of a diamond. Yet, there seems to be an exponential relationship other than the linear one between the actual prices and carat.

   After seeing this plot, the model seems to predict the prices of the minority of diamonds, but it can be very off for the majority. Thus, we should try a more complex model other than the naïve linear one.

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Step 3: Make a Recommendation

Answer the following questions:

1. What price do you recommend the jewelry company to bid? Please explain how you arrived at that number.

   I would recommend a bid of $8,213,466. I used the regression model that was built on the data for the diamond in the database to predict the price of every diamond for bid. Then, I factored in the margin (30%) the company was looking for, multiplied the total predicted amount $11,733,523 by 0.70 to get the final predicted bid of $8,213,466.