Project: Diamond Prices

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Step 1: Understanding the Model

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 model, created by the regression, shows the following coefficients:

   Price = -5,269 + 8,413 x **Carat** + 158.1 x **Cut** + 454 x **Clarity**

   Which means that for each additional carat the price will increase another $8,413 in value. For every increase in the unit of carats the price will increase by the amount of that 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?

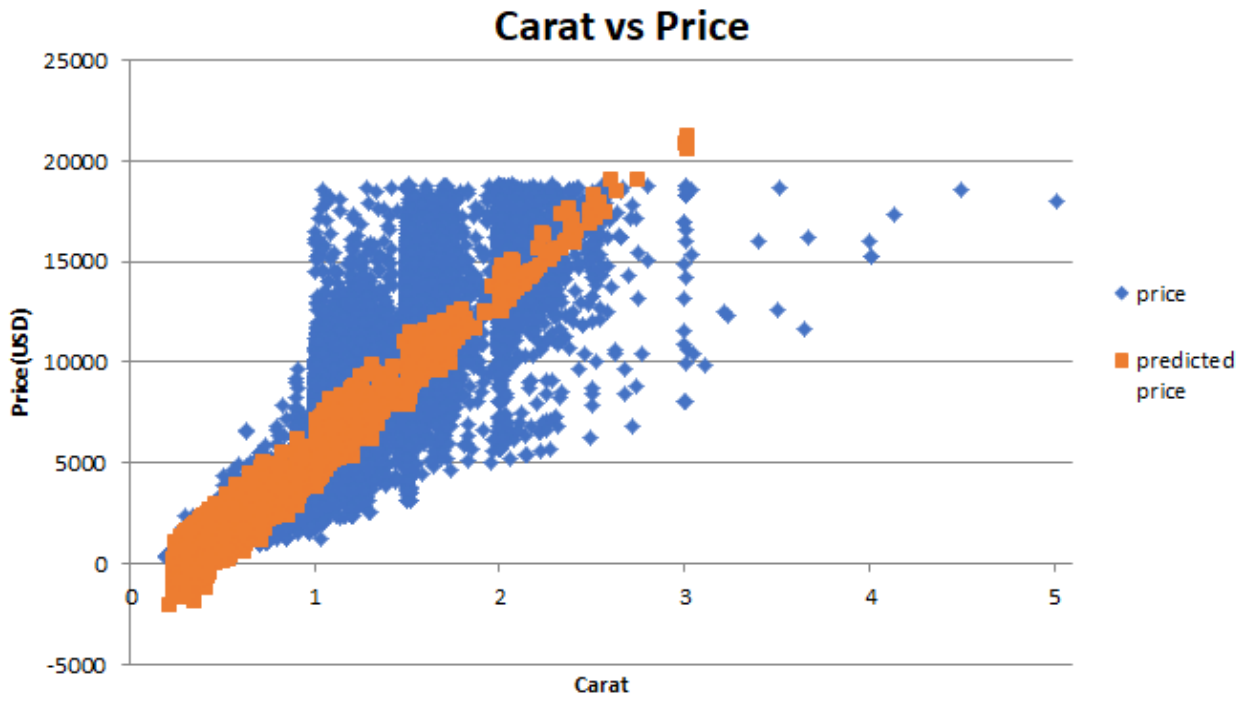
   After replacing the variables with the desired values, we evaluate the expression:

   Price = -5,269 + 8,413 x **1.5** + 158.1 x **3** + 454 x **5**

   Which results in a price of $10,094.8.

Step 2: Visualize the Data

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.
   - **Note**: You can also plot both sets of data on the same chart in different colors.
3. What strikes you about this comparison? After seeing this plot, do you feel confident in the model's ability to predict prices?



At first glance it seems like the model is doing a good job, however there are some diamonds whose price results in negative numbers. Looking at the points at the right, it also appears that the predicted price line has a steeper slope, so for diamonds with higher carats the model would return a much higher price than the blue data shows. Also, the diamond color variable wasn't taken into account for the linear model and it could have helped. In conclusion, it seems to work fine for diamonds with carat values between 0.5 and 2.

Step 3: Make a Recommendation

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

I recommend a bid of $8,213,465.932. I arrived at this number by using a formula from the regression model provided that was based on previous diamond prices and applied it to the diamonds that were up for bid, then obtained the sum of the predicted prices of the whole set which resulted in $11,733,522.76. As the company generally purchases diamonds from distributors at 70% of that price, I multiplied the sum of the predicted prices by 0.70 to get the final predicted bid of $8,213,465.932.