Project: Diamond Prices

Complete each section. When you are ready, save your file as a PDF document and submit it here: https://classroom.udacity.com/nanodegrees/nd008/parts/235a5408-0604-4871-8433-a6d670e37bbf/project#

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?

   Each additional carat would result in an increase of $8,413 in price. The formula created by the regression determined that the coefficient for a carat is $ 8,413, so for every increase in the number of carats 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?

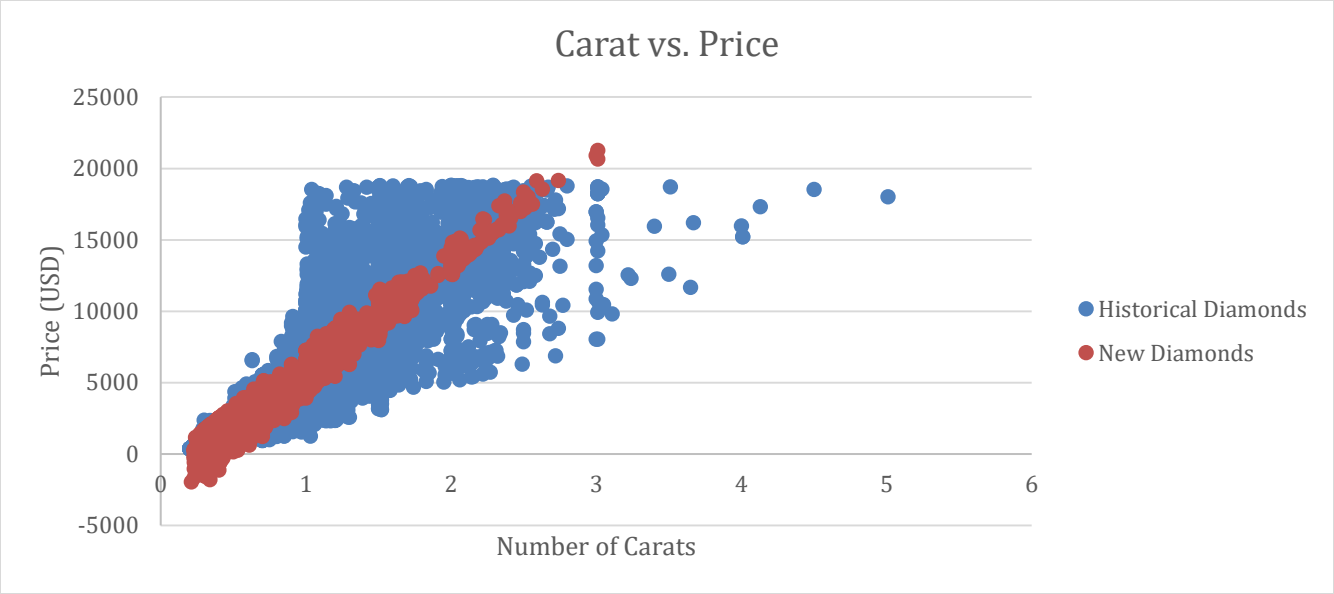
   Regression formula: **Price** = -5,269 + 8,413 x **Carat** + 158.1 x **Cut** + 454 x **Clarity**

   Price = -5269 + (8,413*1.5) + (158.1*3) + (454*5)
   Price = $10,094.80

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.
   - **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?



The predicted prices are more compact than the actual data is. This is because we are not accounting for everything that effects prices. There are many more factors besides carats that effect price. We used carat, cut, clarity in to our formula but there are other factors that account for price variance. For instance, other factors that might affect price are color and shape.

After looking at this plot the model appears on average to predict the prices ok, but it can be very off for certain diamonds. There appears to be a few outliers with only 3 carats but is predicted to have the highest sales price. Overall the model does a decent job at predicting the price we should pay for several diamonds at once since it on average looks representative.

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 recommend a bid of $8,213,465.93 I arrived at this number by using a formula from the regression model provided that was based on previous diamond sales and applied it to the new_diamonds data that were up for bid. I then factored in that the company generally purchases diamonds from distributors at 70% of that price, so I multiplied the total predicted amount of $11,733,522.7 by 0.7 to get the final predicted bid of $8,213,465.93.