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?

   With 1 carat of difference you are expected to pay 8413 more.
   Going by the regression equation
   Price = -5,269 + 8,413 x **Carat** + 158.1 x **Cut** + 454 x **Clarity**
   The price of the diamond varies by factor of 8413, keeping all other independent variables constant i.e. cut and clarity. So if a diamond is 1 carat heavier keeping other factor const.
   P1 = -5269 + 8413 x Ca + 158.1 x Cu + 454 x Cla
   P2 = -5269 + 8413 x (Ca+1) + 158.1 x Cu + 454 x Cla
   This diff between P2 & P1 would be equal to 8413

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 regression equation is

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

Carat = 1.5

Cut = 3

Clarity = 5

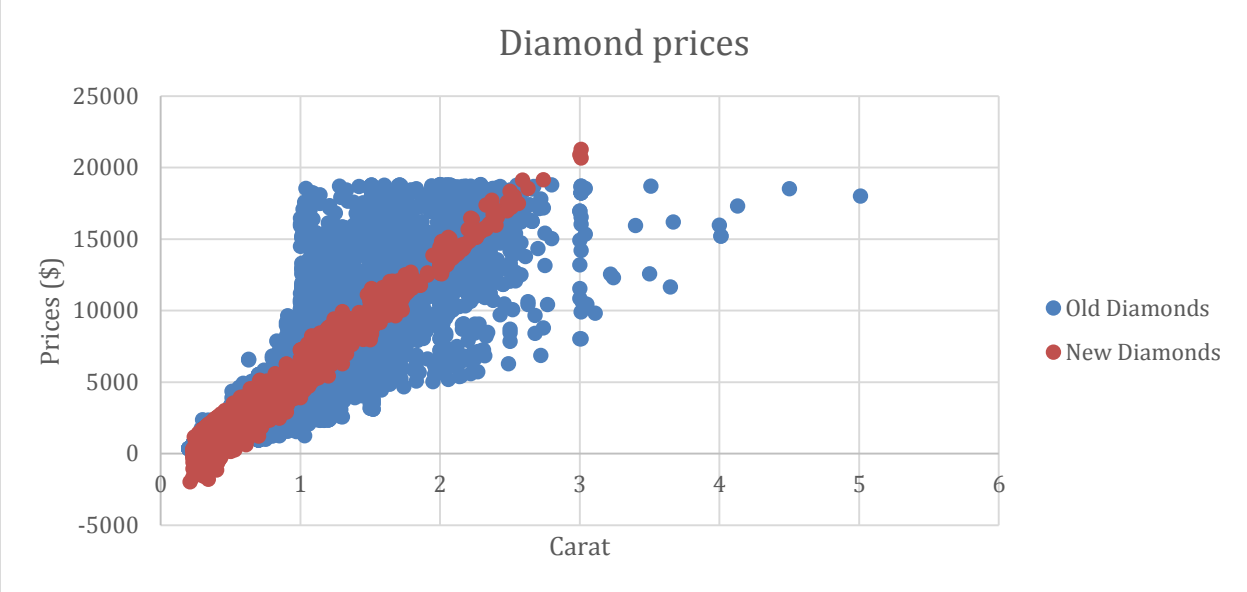
Price = -5,269 + 8,413 x **1.5** + 158.1 x **3** + 454 x **5** = 22714.3

According to the model I would have to pay $ 22,714.3 for 1.5 carat with a very good cut and a vs2 clarity rating.

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?



We can see diamond prices vary greatly for a particular carat. The regression model only accounts for carat, cut, clarity for a model. In real world there are more factors that dictate the price of diamonds. For example location from where the diamonds have been mined, or if a diamond has some historical significance. There can be n number of factors.

Our model is ok in predicting prices for less than 3 carat but it tends to predict higher prices for more than 3 carat diamonds.

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 price of $8,213,466.
Going by the prediction equation. The model predicts the total price to be $11733523. This value depicts the final retail price the consumer would pay.
The company would pay 70% of that price.(0.7 x $11,733,523 = $8,213,466)