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 formula created by the regression determined that the coefficient for a carat is 8,413; thus, if a diamond is 1 carat heavier than another with the same cut, you should expect to pay 8,413 USD more.

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?

According to the module, the following is the formula used to predict the price:

$$Price = -5{,}269 + 8{,}413 * carat + 158.1 * cut + 454 * clarity$$

Plugging the given values in our formula, we would get the following result:

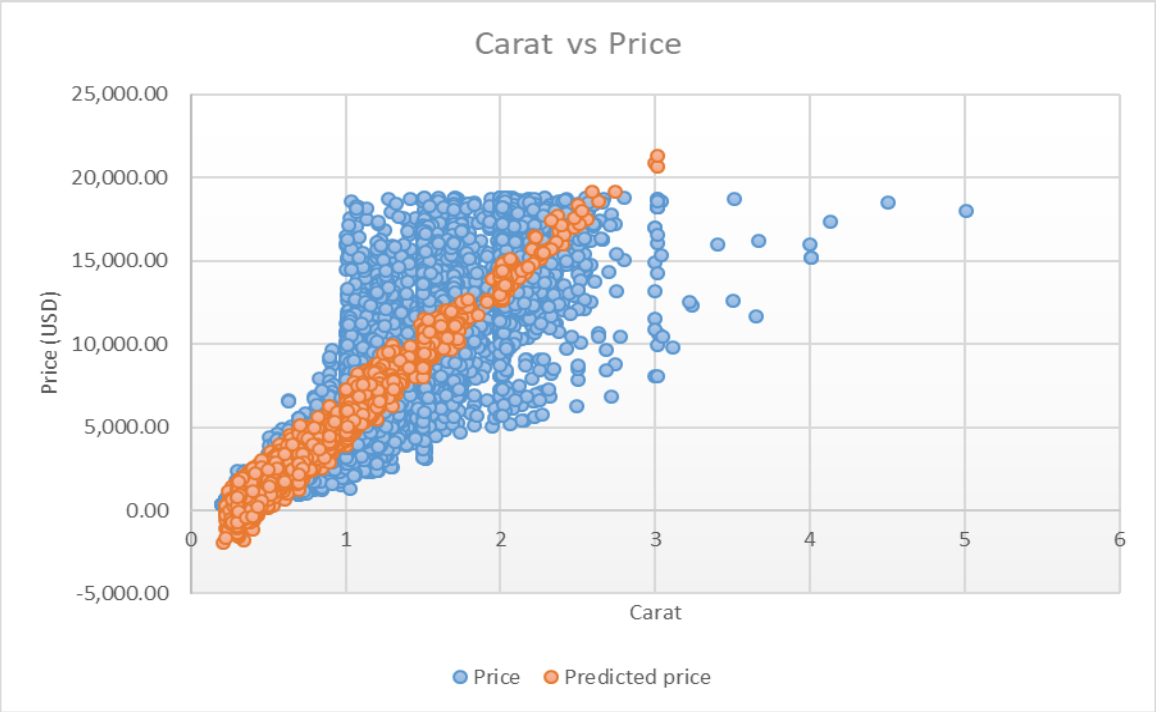
$$-5{,}269 + 8{,}413 * 1.5 + 158.1 * 3 + 454 * 5 = 10{,}094.8$$

Thus, for a 1.5 carat diamond, with a Very Good cut and a VS2 clarity rating, the model predicts you should pay 10,094.8 USD.

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 having a perfect positive correlation. By visualizing this plot, the model appears, on average, to predict the prices ok, but it can be off for diamonds that have more than 3 carats due to outliers.

I would have added to the model also data referring to the shape of the diamonds as this has an impact over the price tag, were a round diamond is more expensive than other shapes, such as: emerald, heard, oval, etc..[1]

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 the jewelry company to bid 8,213,465.93 USD.

I arrived to this number by using the formula from the model, which I then applied to the diamonds the company would like to purchase.

I then factored that the company generally purchases diamonds from distributors at 70% of that price, so I multiplied the predicted amount for the set (11,733,522.76 USD) by 0.7 to get the final predicted bid of 8,213,465.93 USD.

[1] IGS – International Gem Society: Addison Rice - Different Diamond Shapes: Ultimate Guide with Size & Price Chart, available at: https://www.gemsociety.org/article/diamond-shapes-price-size/