Project: Diamond Prices

Step 1: Understanding the Model

Answer the following questions:

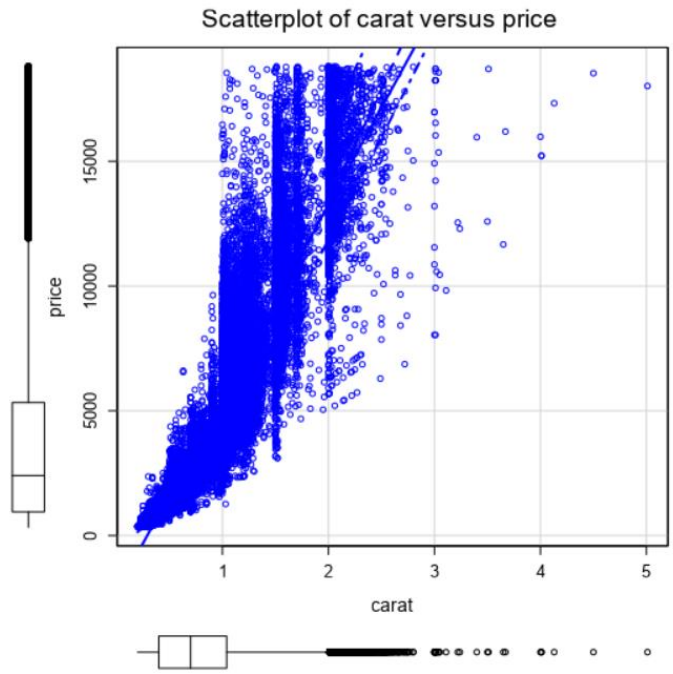
1. According to the model, if a diamond is 1 carat heavier than another with the same cut, how much more should I expect to pay? Why?
   The model is **Price** = -5,269 + 8,413 x **Carat** + 158.1 x **Cut** + 454 x **Clarity.**
   If a diamond is 1 carat heavier, the diamond will be $8,413 more expensive which is carat's multiplier.

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 equation would be **Price** = -5,269 + 8,413 x **1.5** + 158.1 x **3** + 454 x **5**
   The price for this diamond would be **$10,094.80.**

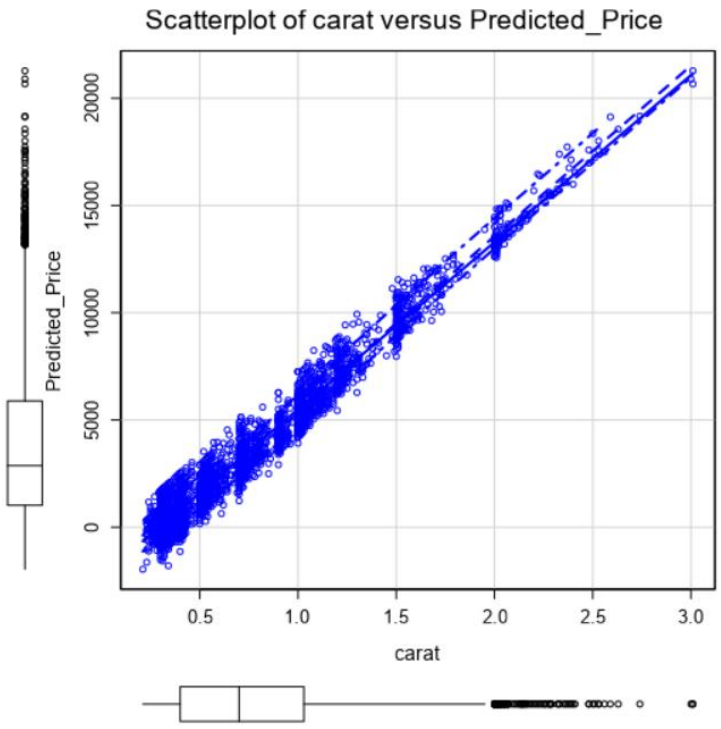
Step 2: Visualize the Data

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?

In the first graph, the carat data is highly correlated with the price data. Since the first graph was drawn from the initial data to produce the regression model, it is normal to see some outliers. In the second graph, the correlation between predicted price and carat looks much higher than the first graph. However, the size difference between y axis of two plots are different which can mislead the decision makers.

If we compare specific points such as the intersection of 15,000 (price) and 2.0 (carat), both graphs illustrate the same results. This is also same for the intersection of 10,000 and 1.5. Therefore, I feel confident in the model's ability to predict prices.

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.

The total price of the predicted values is $11,733,522.76. However, it is indicated that the company generally purchases diamonds from distributors at 70% of the price, so my recommended bid price is $8,213,465.932.