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?

   Answer.
   Lets consider an example from the dataset:

carat	cut	cut_ord	color	clarity	clarity_ord	predicted_price	bid_price
0.71	Very Good	3	I	VS2	5	3448.53	2413.971

   The predicted price is $3448.53 for a 0.71 carat diamond.
   Lets increase the value to 1.71 carat and calculate the price for it using the given formula:

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

   Price' = -5269 + 8413*1.71 + 158.1*3 + 454*5 = 11861.53
   Thus, actual Price is given by:
   Price = Price' - predicted_price = $11861.53 - $3448.53 = $8413

   Thus, a diamond is 1 carat heavier than another is **$8413 more,** with the same properties (cut and clarity).

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?

   Using the shown formula, we can predict the price:

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

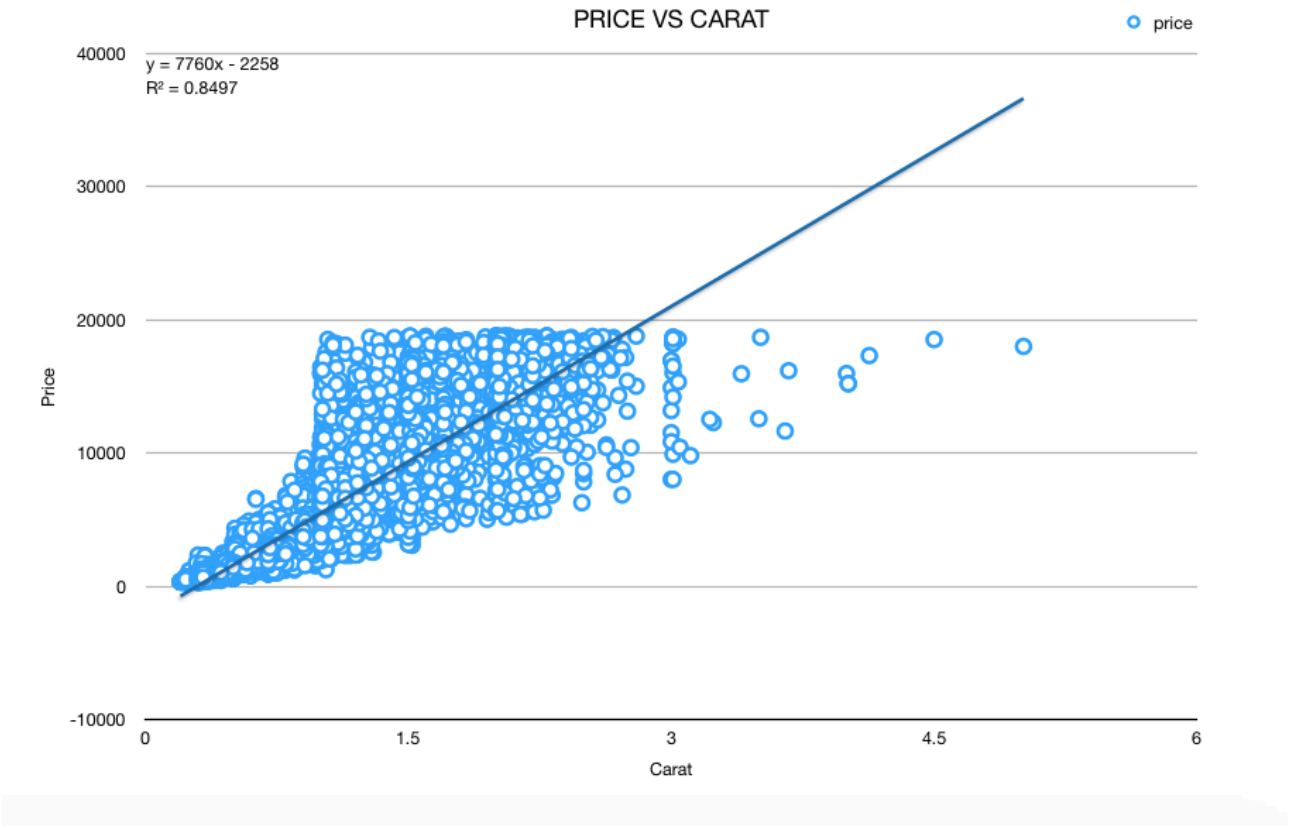
   Price = -5269 + 8413*1.5 + 158.1*3 + 454*5 = 10094.8

   Thus, you will have to pay **$10094.8**

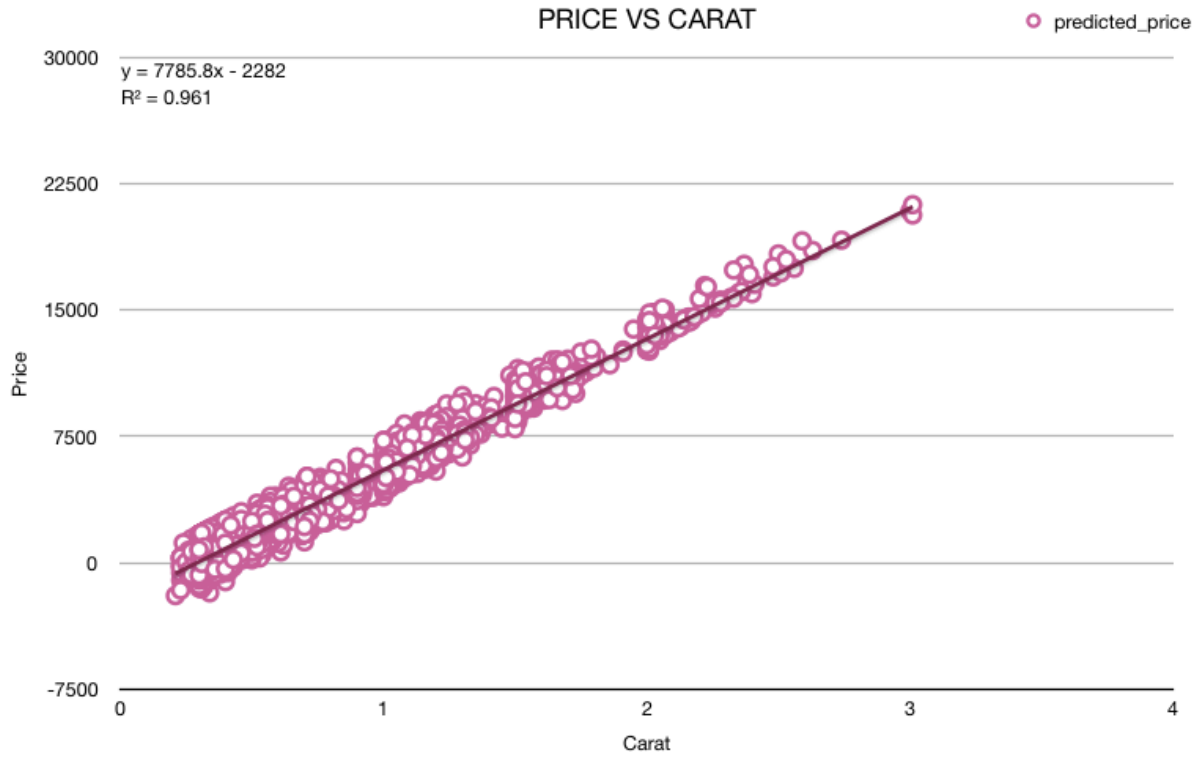
Step 2: Visualize the Data

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.



3. What strikes you about this comparison? After seeing this plot, do you feel confident in the model's ability to predict prices?

Answer:

- The graph shows ambiguous prices for diamonds with carat less than 0.5.
- The predicted prices sometimes are going into negative i.e. below $0 (for carat value less than 0.5), which is not possible.
- The prices for diamonds with carat value 3 or greater is quite high.
- The price of the diamond varies largely when the carat value is between 0.5 and 2.

Step 3: Make a Recommendation

Answer the following questions:

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

Answer:

If we sum up all the values in the bidding price column (given by 70% of predicted price), we get a value of **$8,213,465.932** which should the bidding amount.