

Project: Diamond Prices

Step 1: Understanding the Model

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?**

If a diamond is 1 carat heavier than another then we would expect to pay \$ 8,413 more if the cut quality and clarity stay the same. This is because the weight used for the carat variable is 8,413 and if everything else stays the same then the only change would be the carat value.

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?**

Price is determined by the equation below:

$$\text{Price} = -5,269 + 8,413 \times \text{Carat} + 158.1 \times \text{Cut} + 454 \times \text{Clarity}$$

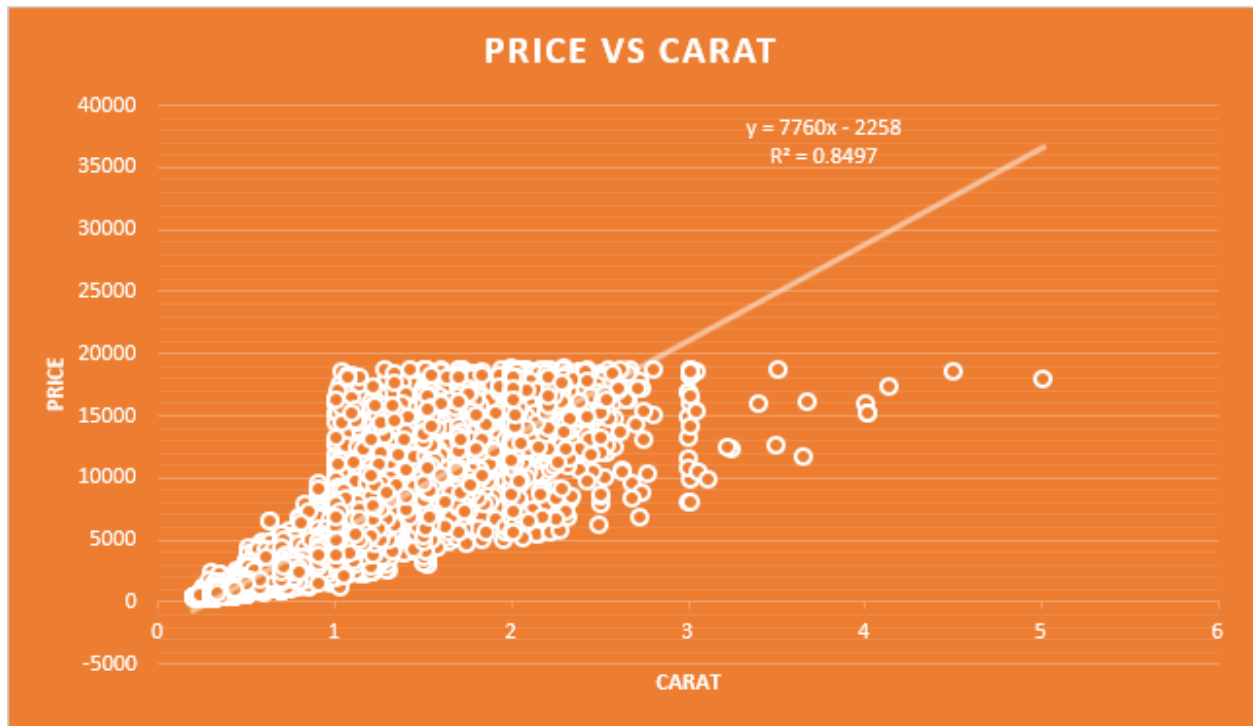
Substituting the values in this equation we get,

$$\begin{aligned}\text{Price} &= -5,269 + 8,413 \times \text{Carat} + 158.1 \times \text{Cut} + 454 \times \text{Clarity} \\ &= -5,269 + 8,413 \times 1.5 + 158.1 \times 3 + 454 \times 5 \\ &= \$ 10094.8\end{aligned}$$

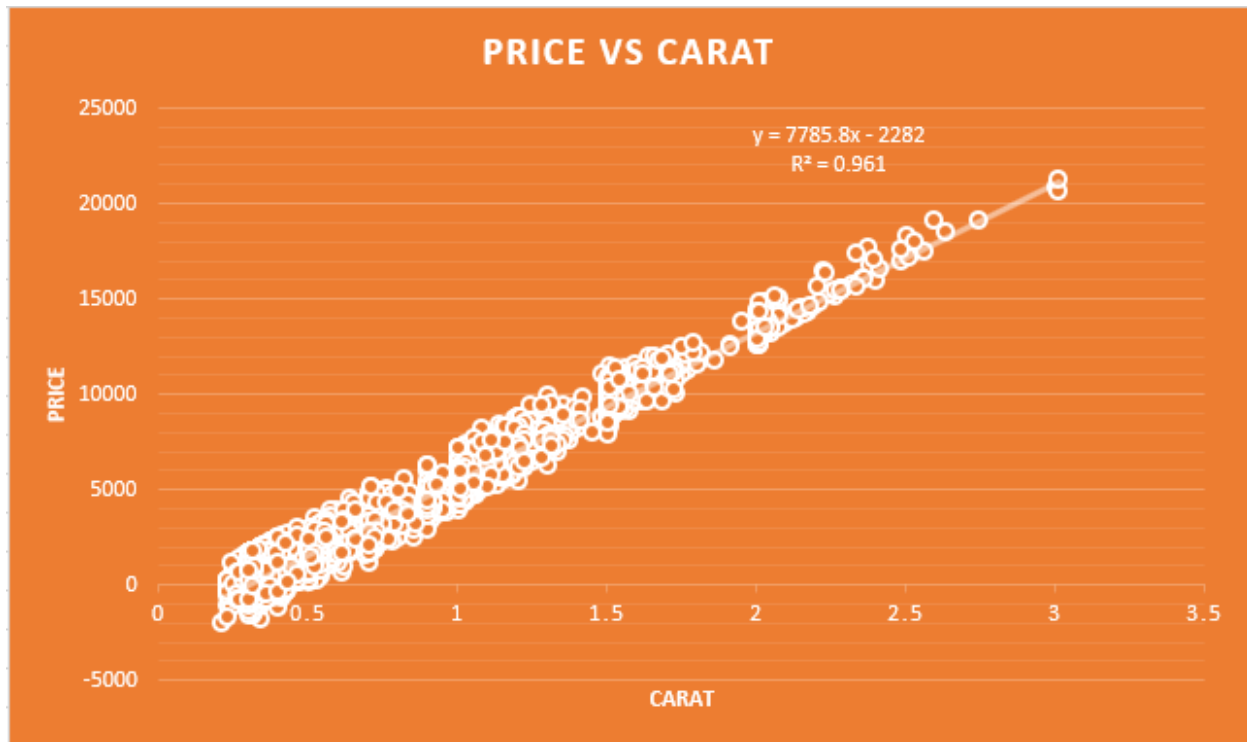
So we would have to pay \$ 10094.8

Step 2: Visualize the Data

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?

- The price predicted when the value of carat falls below 0.5 does not look correct. It dips below 0\$ for carats less than 0.3 which is not possible.
- More variables need to be considered to make our model generalize better to new data.
- It predicts a higher price for diamonds greater than 3 carats.

Step 3: Make a Recommendation

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

The recommended bid price is **\$ 8,213,466**. We arrived at this number by summing up the predicted price (\$ 11,733,523) and calculating 70% of it which is our recommendation amount \$ 8,213,466.