

Project Scope and Analysis

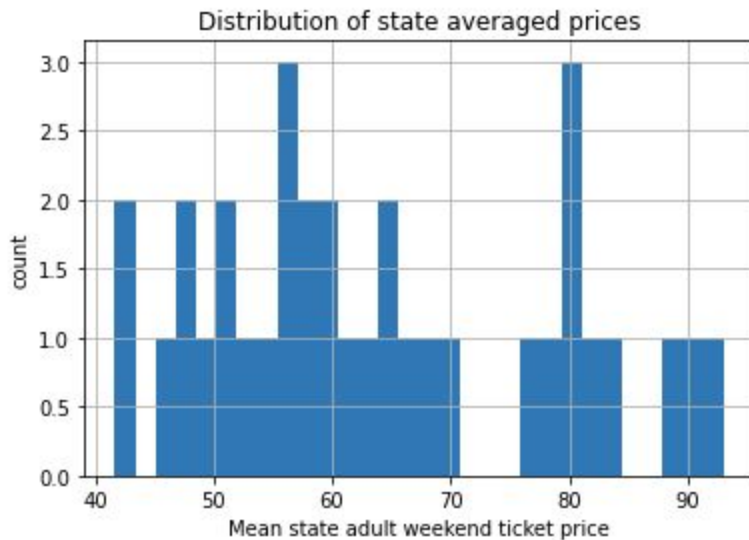
Big Mountain suspects it may not be maximizing its returns, relative to its position in the market. The purpose of this project is to build a predictive model for ticket price based on the number of facilities, or properties, boasted by especially the ski resort market.

The data acquired to conduct this project has 330 rows and 27 columns in ski_data data. Columns and rows with incorrect data, indeterminant data, missing values, and zero were dropped. For example, fastEight column was dropped because it had missing values and zeros. yearsOpen and year 2019 were removed as well because of incorrect data and indeterminant values respectively. Out of the 330 rows, 14% were dropped leaving just 277 rows. For more accurate data, SkiableTerrain_ac changed to 1819. AdultWeekday and AdultWeekend were removed due to their close resemblance. I also obtained some additional US state population and size data with which to augment the dataset, and hence required some cleaning.

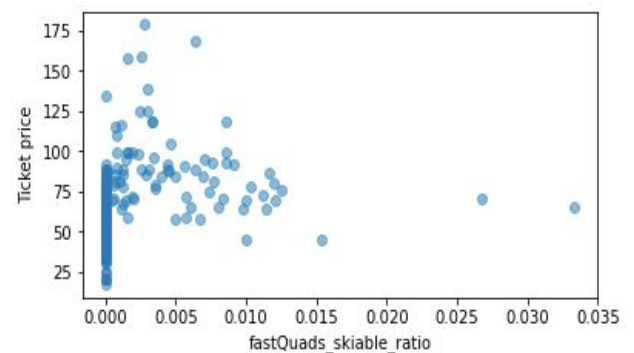
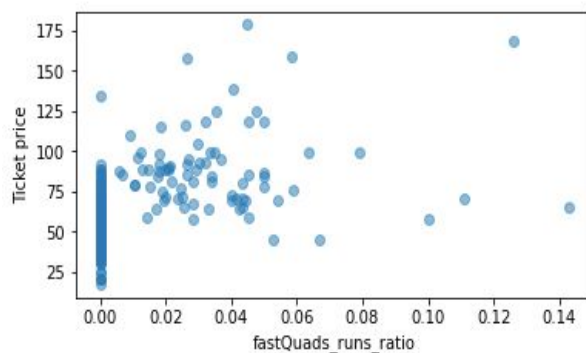
At this problem, I made the decision that it is better to predict the adult weekend ticket price for ski resorts. This led me to conduct an exploratory data analysis. I explored the categorical features in the data and figured some relationships between states and ticket prices. For example, here the average prices for the first 5 states in the data and a distribution plot for all states by count.

Alaska	\$57.333333
Arizona	\$ 83.500000
California	\$81.416667
Colorado	\$90.714286
Connecticut	\$56.800000

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After exploring these relationships, I decided to focus on eliminating more irrelevant columns. Columns with empty data were removed, these columns were mostly enriched with state info only and hence not useful to the analysis. Merge was used to join the summary data for each fastQuad and skiing data as seen below.

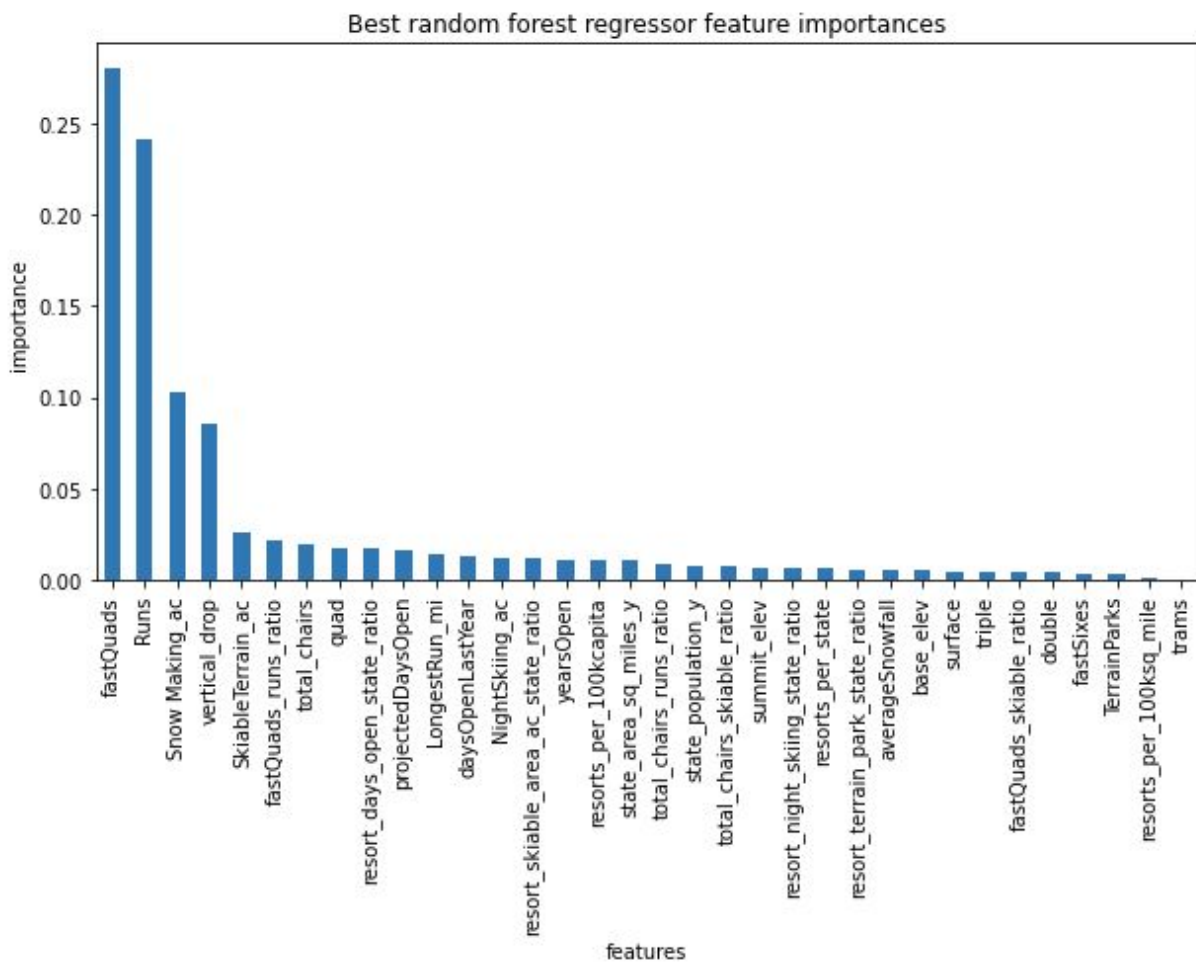


This combo made sure I have more meaningful information to carry on with the analysis. The exploration indicates there is some correlation between the total number of chairs, vertical drop, and quads.

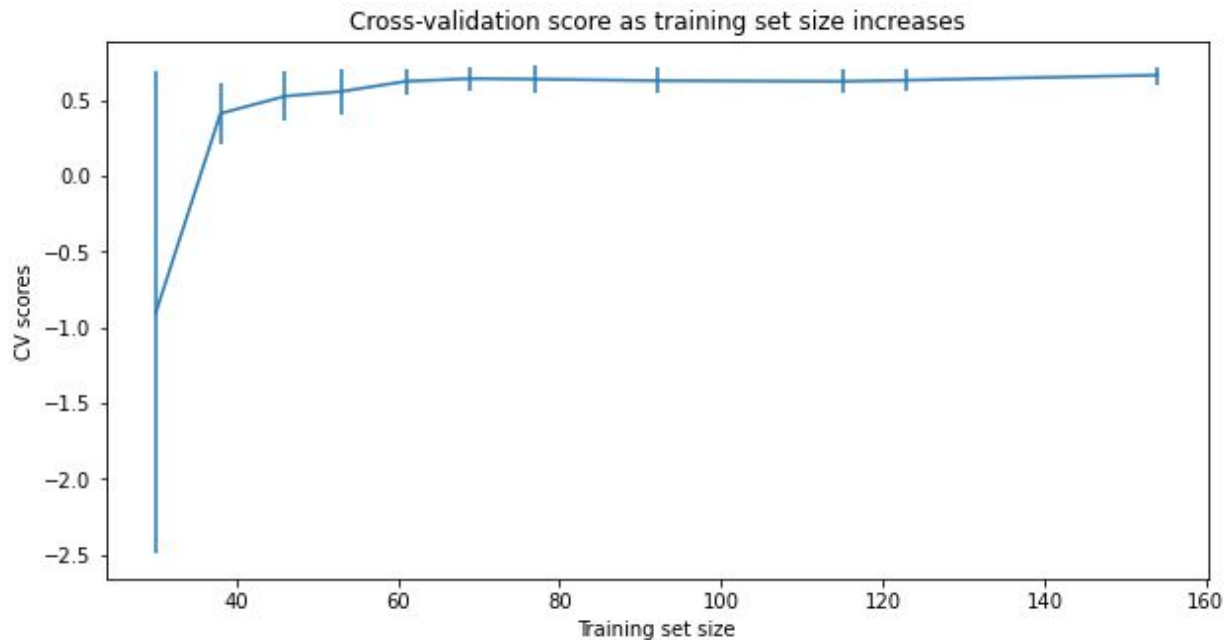
I performed preliminary assessments of data quality and refined the question to be answered. I found a small number of data values that gave clear choices about whether to replace

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values or drop a whole row. I determined that predicting the adult weekend ticket price was your primary aim. Hence, I eliminate records with missing price data because I didn't see any significant co-relation between states, and decided to treat all states equally. Also, the state label didn't seem to be particularly useful. I built a linear model and compare it with the following models.



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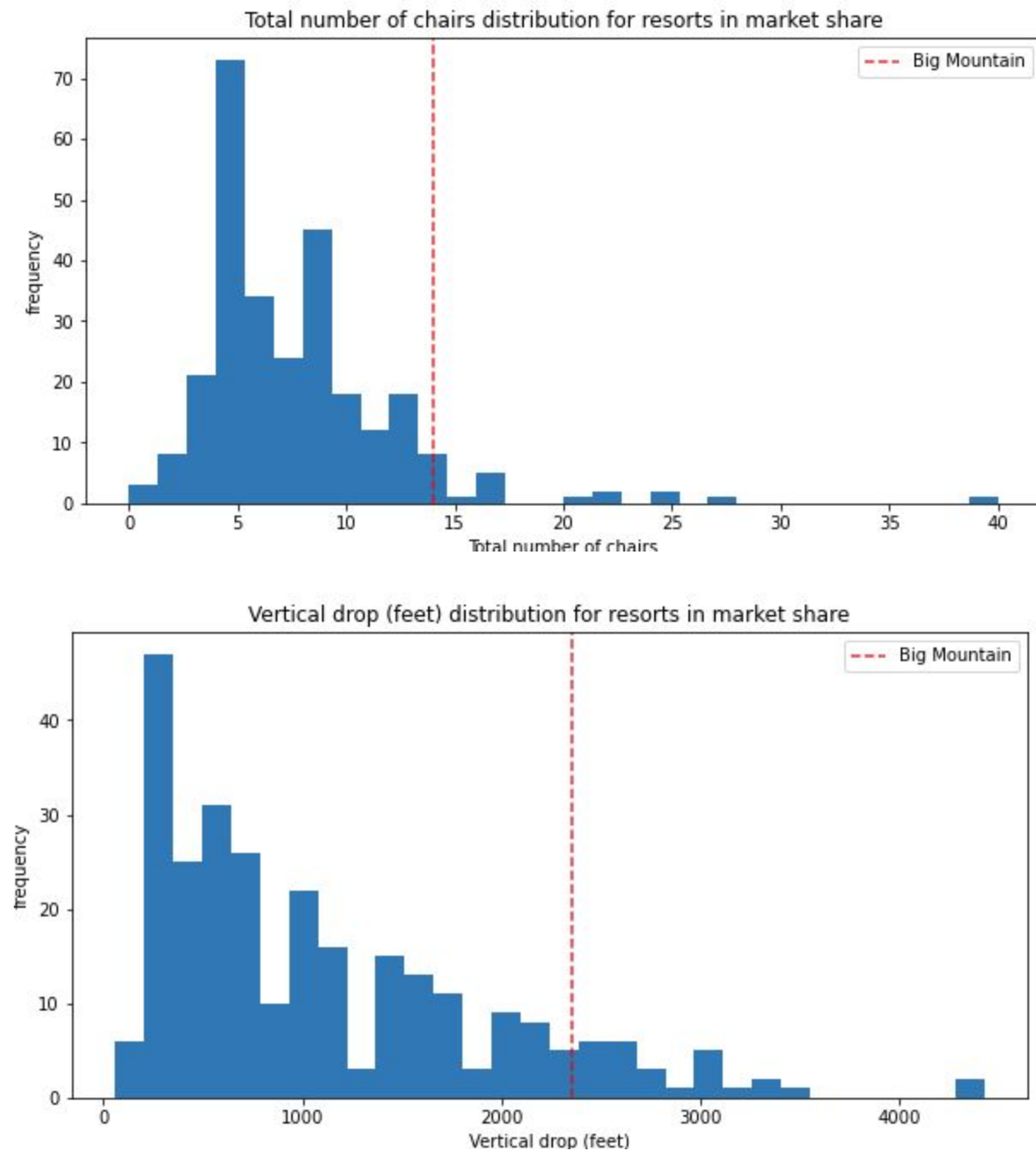


The dominant top four features of fastQuads, Runs, Snow Making_ac, vertical_drop are in common with my linear model. With the model that found the average prices for each category of customers. The random forest regression model shows that fastQuad is valued the most. The random forest model has lower cross-validation mean absolute error by almost \$1. The cross-validation model shows that the scores level off by around a sample size of 40-50. From, I made the decision to use the random forest model.

Summary

If we make an implicit assumption that all other resorts are largely setting prices based on how much people value certain facilities and the free market, then Big Mountain should not be shy to increase the adult tickets from \$81 up to \$90. With this price increase and other little changes as shown in the plots below such as increasing vertical drop to 150ft, and adding new chairlifts, Big Mountain can expect up to a \$3.2 million increase in revenue.

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It is important to remember that this analysis is limited to adult tickets only. So it might be helpful if info about how additional snow impacts the cost of operation. Although the recommendation to raise the price to \$90 may seem alarming, it is important to understand that Ski resort is in a strategic location and has facilities that make will the customers relatively

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inelastic to the ticket prices increase. This model recommendation can be implemented using a structured dashboard.