Recommendation for Big Mountain Resort

The initial step of making a ticket price recommendation (after ensuring the data was viable) was to compare the prices of all resorts across the country vs their features. This would result in finding out which features were best correlated with ticket price. The following charts demonstrate scatterplots of each feature vs the ticket price. The features that were most correlated with ticket price were fast quads, runs, total chairs, longest run in miles, acres of skiable terrain, snow making acres, trams, and vertical drops.
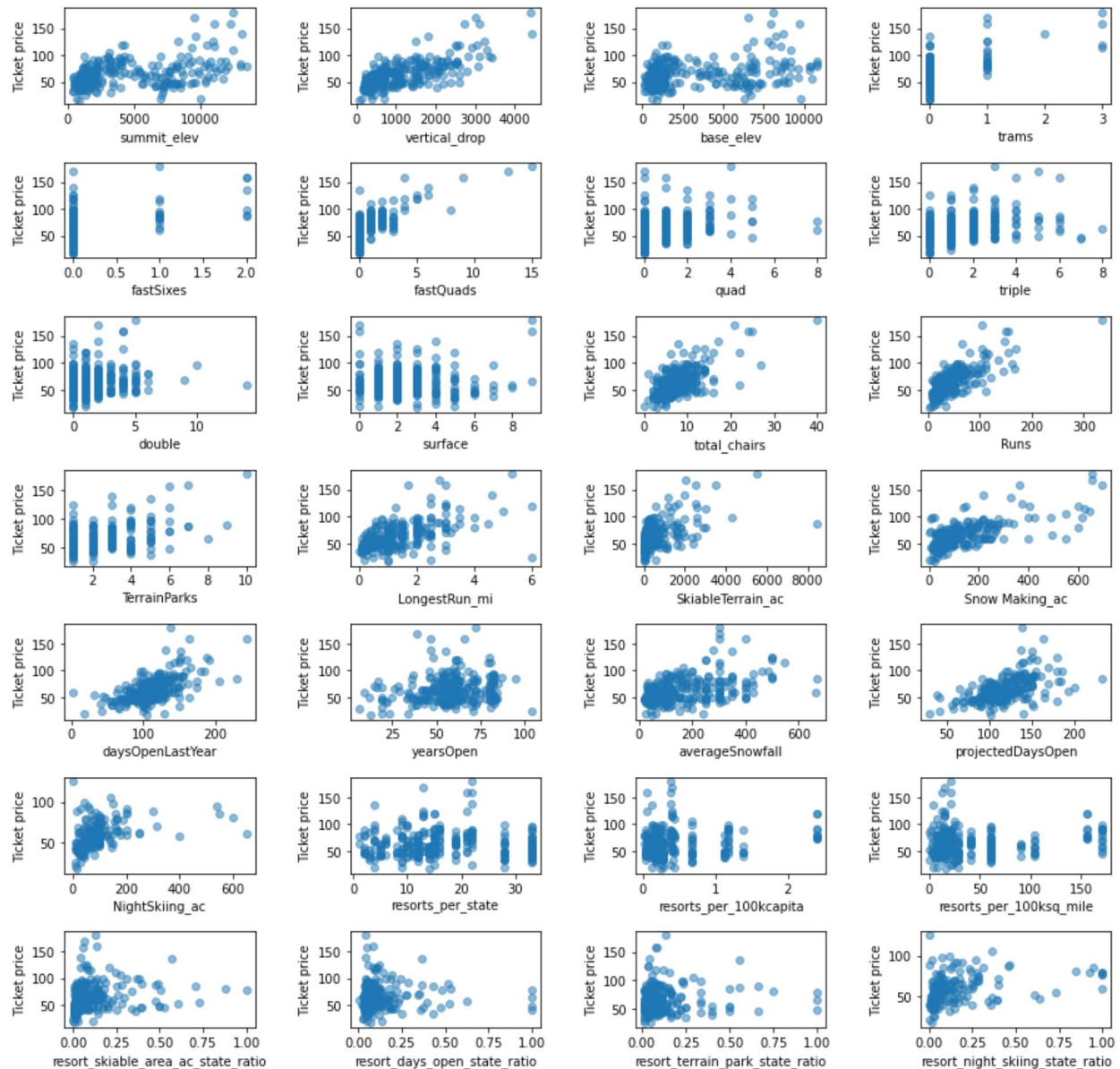
Determining the best model
Next various machine learning models were tested using a train/test split in order to determine the model with the lowest mean absolute error. A linear regression model, random forest model, and average ticket price model were compared. The random forest model worked well. After

cross validation the mean absolute error of the random forest model was $9.64, which was better than the linear regression model of $10.50. Using the average price had the worst result of $19 for the mean absolute error.

Expected Big Mountain Ticket Price
Using the model the expected Big Mountain Ticket Price would be $95.87. The current price per ticket is $81.00, and even with an mean absolute error of $9.64 there is room to increase the price.

Justifications for price increase, how does Big Mountain compare to other resorts?
The list below are features that came up as important in the modeling, as well as a brief description where Big Mountain stands compared to other resorts and a graph representing the data.
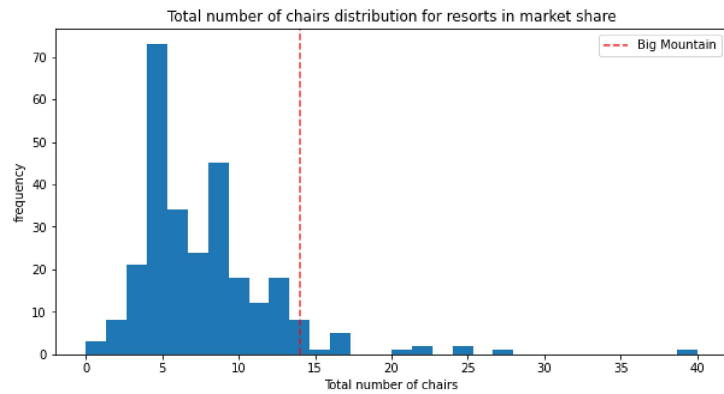
- **Vertical_drop**: big mountain has a greater vertical drop than more than 50% of resorts nationwide.
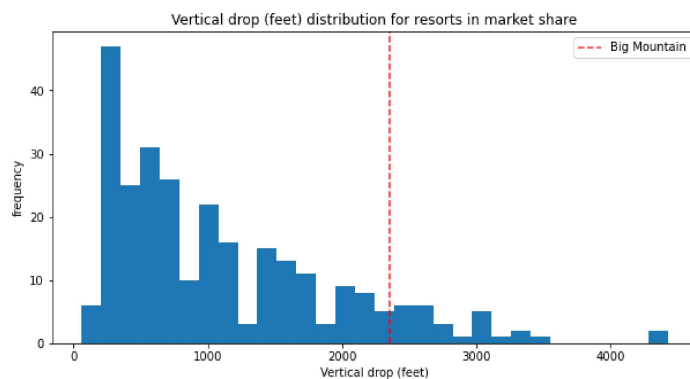

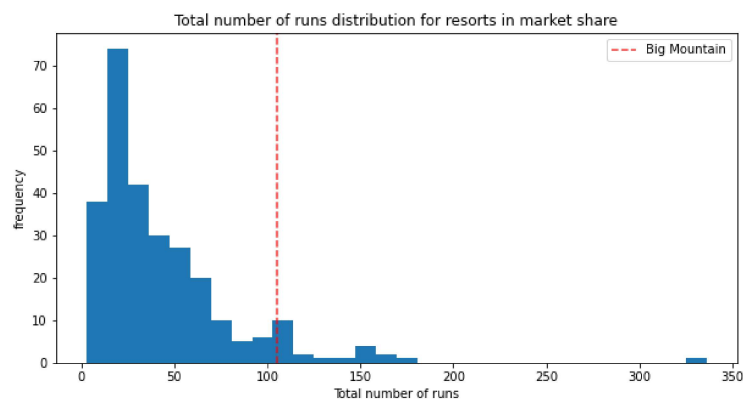- **Snow Making_ac**: very high up in the snow making area
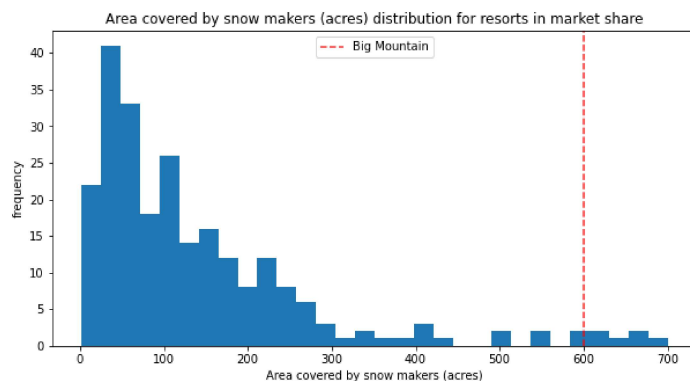
- **Total_chairs**: among the highest number of total chairs, resorts wit more appear to be outliers

Total number of chairs distribution for resorts in market share

- **fastQuads**: the majority of resorts have no fast quads, big mountain has 3, putting it high up in the table
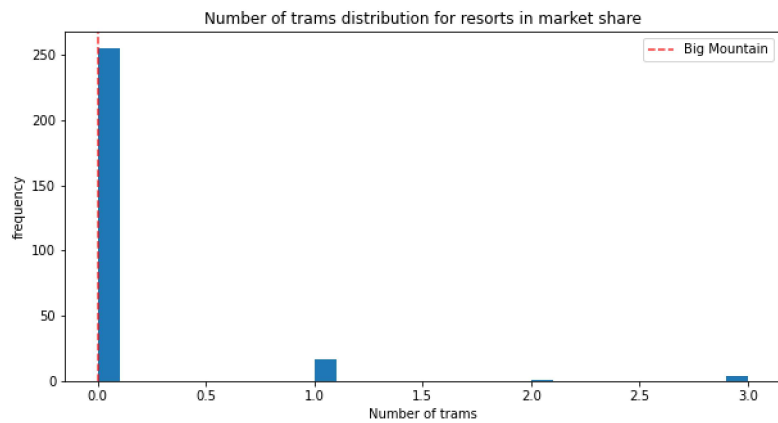
Number of fast quads distribution for resorts in market share
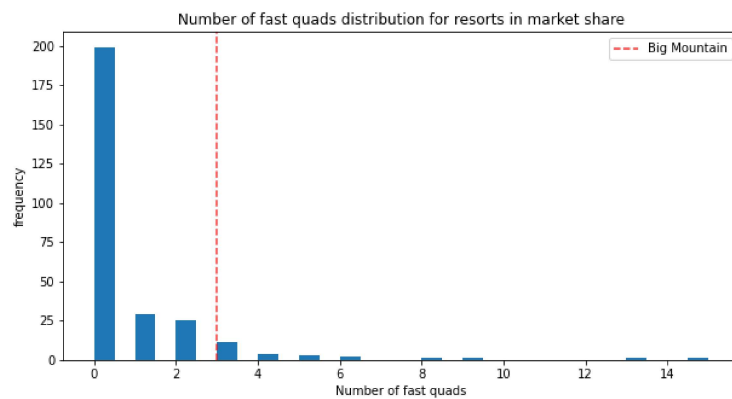
- **Runs**: big mountain has more runs than the majority of resorts

Total number of runs distribution for resorts in market share

- **LongestRun_mi**: again big mountain has one of the longest runs when compared to all resorts in the nation

Longest run length (miles) distribution for resorts in market share
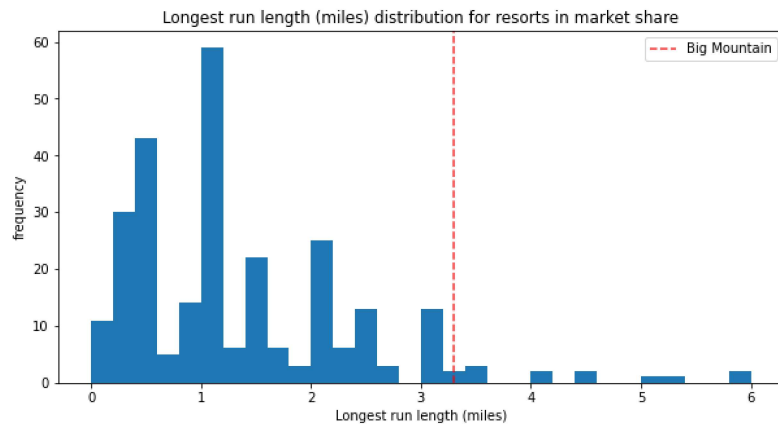
- **Trams**: the vast majority of resorts, including big mountain, have no trams

Number of trams distribution for resorts in market share

- **SkiableTerrain_ac**: Big Mountain is amongst the resorts with the largest amount of skiable terrain.

Skiable terrain area (acres) distribution for resorts in market share
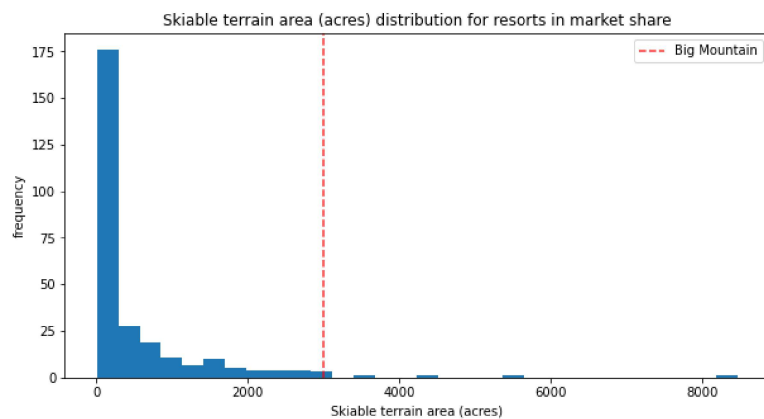
Modeling Scenarios

- **Scenario 1: Close up to 10 of the least used runs**

  Closing 1 run makes no difference, but closing 2 and 3 runs reduces support for ticket price, so that reduces revenue. If Big Mountain closes 2, 3, 4, or 5 runs then the drop in ticket price is the same. So if Big Mountain wanted to experiment and see if closing runs would decrease operating costs, then closing 5 runs would decrease operating cost without any further decrease in ticket price. Closing more than 6 or more runs results in a significant decrease in ticket price and it is not advised.

- **Scenario 2: Increasing vertical drop by 150 feet and adding another lift**

  Increasing the vertical drop by 150 feet and installing an additional chair lift would support the ticket price to be increased by $8.61, with an average increase in revenue equalling $15,065,471. There would be an increase in operating cost, therefore justifying the price increase.

- **Scenario 3: Same as above but adding 2 acres of snow making.**

  Repeat above but adding snow making acres by 2 results in an average price increase to $9.90 and a yearly revenue of $17,322,717

- **Scenario 4: Increasing the longest run by 0.2 miles**

  This will have zero impact on the price, but instead it will only increase operating costs.

My recommendations

At this time I recommend increasing the premium of the ticket to $90-$95 dollars. This will result in a total revenue increase of $15,750,000-$24,500,000. Big Mountain offers more than enough features to justify this price. The lower figure of my recommendation would better take into consideration the mean absolute error and the higher figure was the amount the model recommended. I would leave this decision up to the executives. Both prices are justifiable in my opinion. Overall this is quite a significant increase in revenue and completely mitigates the operating cost of the installation of a new chairlift.