

Big Mountain Resort Price Analysis Report

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Data Sourced from: Springboard Data Science Career Track

Introduction:

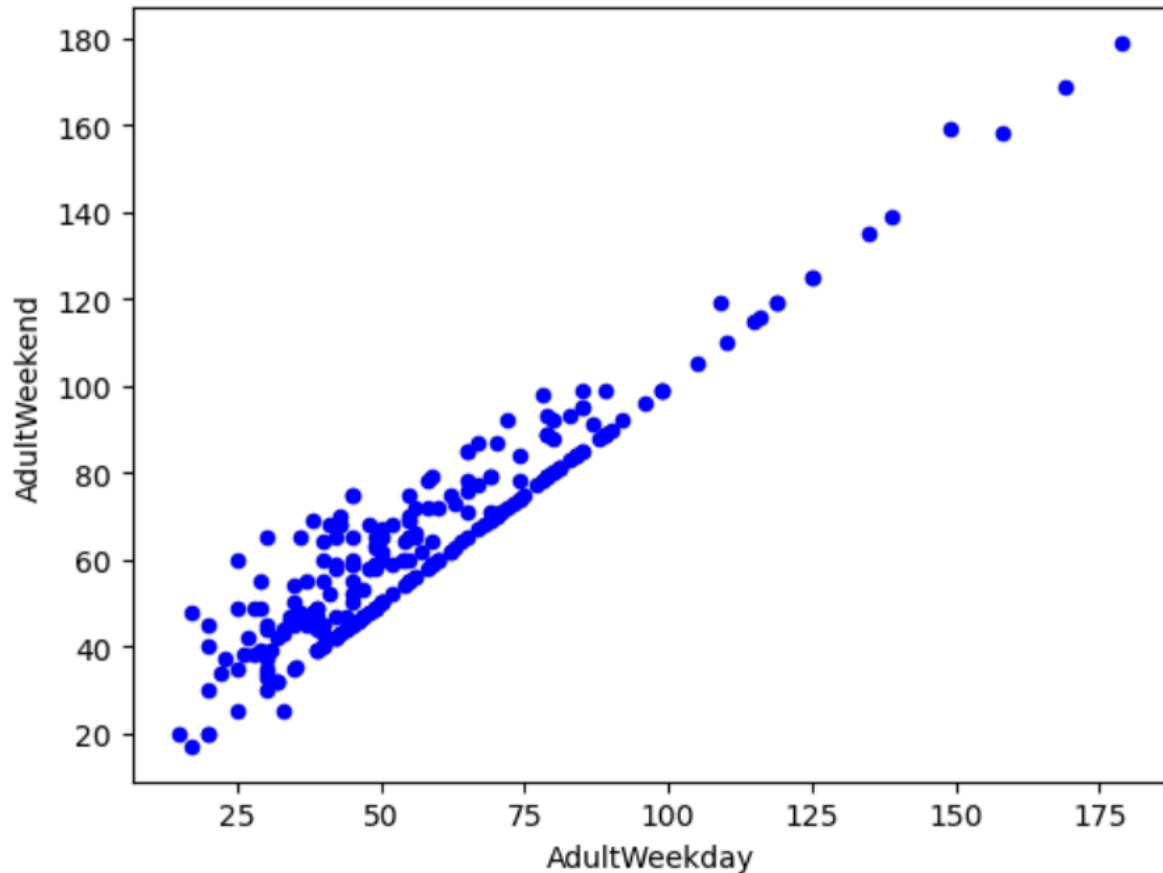
Big Mountain Resort is a ski resort located in Montana that offers spectacular views of Glacier National Park and Flathead National Forest. This resort can accommodate skiers and riders of all levels and abilities. To help increase the distribution of visitors across the mountain, Big Mountain Resort has installed an additional chair that has increased the operating costs by \$1.54 million. With a suspicion that the resort may not be capitalizing on its facilities, the business needs a more data-driven business strategy and requires guidance without undermining the ticket price or supporting an even higher ticket price.

Problem:

What opportunities exist for Big Mountain Resort to capitalize on its facilities to maintain a minimum profit margin without undermining the ticket price or hiking up the ticket price during the upcoming season and covering additional operating costs of \$1,540,000 for the new chair lifts?

Data Wrangling

During the data wrangling phase, we were able to identify several important data. One of the many values we first analyzed were the AdultWeekend vs AdultWeekday prices which can be seen with the dot plot below:

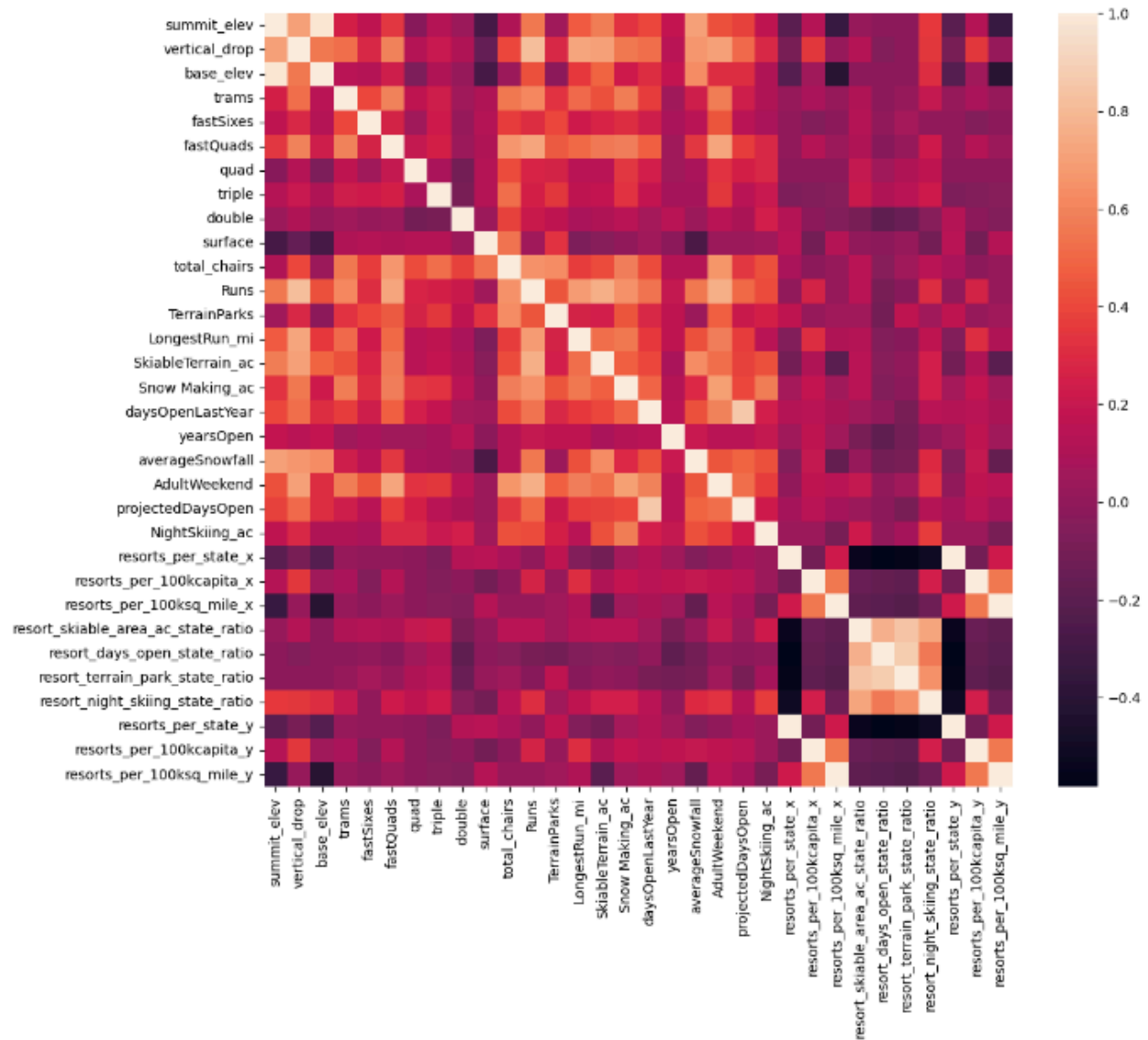


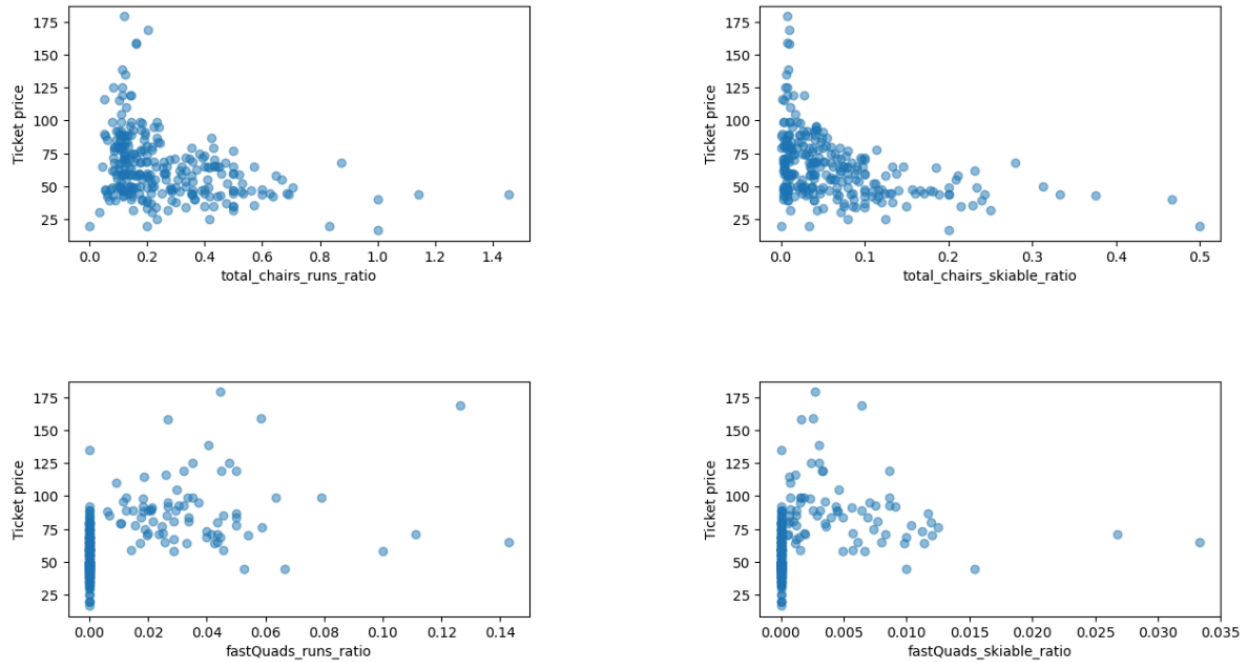
In the state of Montana where Big Mountain is located, the ticket prices for both AdultWeekday and AdultWeekend are sold at the same price which are relatively less expensive compared to other states. Many states have price variations between AdultWeekday and AdultWeekend, in which most of the Weekend prices cost more compared to the Weekday prices. However, there were some discrepancies with the given data. Just over 82% of resorts have no missing ticket price, 3% are missing at least one value, while 14% are missing both values. Under column 'yearsOpen', Pine Knob Ski Resort is valued at 2019 years which is incorrect. There are about 14% of rows without any price data. Under column 'SkiableTerrain', one resort was found to have an extremely high skiable area which was later corrected from 26819 to 1819. The final data index is 277 entries and 25 columns.

One ticket pricing strategy we can gather from the data is that most resorts have increased the price during the weekends compared to the ticket prices during the weekdays.

Exploratory Data Analysis

During the exploratory data analysis, we used several types of data in order to identify correlations, patterns, and relationships between two variables to really dive into how the ticket price varies with other numeric features.





There were some high correlations that were clear when using the scatterplots. With the data provided through the scatterplots, there's a strong positive correlation with vertical_drop, fastQuads, runs, and total_chairs which are very useful. There is a variability when it comes to ticket prices as it can value low or quite high depending on many factors. When the number of resorts per capita increases, the ticket price may drop right before it climbs upwards. When there is plenty of demand, ticket prices could climb. When it comes to a less popular state for skiing, the ticket price may be lower as there is less demand. As we focus more on total_chairs_runs_ratio, total_chairs_skiable_ratio, fastQuads_runs_ratio, and fastQuads_skiable_ratio, we are able to determine more factors into our data. If the resort does not have many chairs, the resort can charge more for the tickets, but the effect of that is there will be less visitors. Another factor to take into consideration is that not having fast quads may limit the ticket price. What can be beneficial to the ticket price is if the resort can cover a wide area and have a small number of fast quad.

Preprocessing and Training

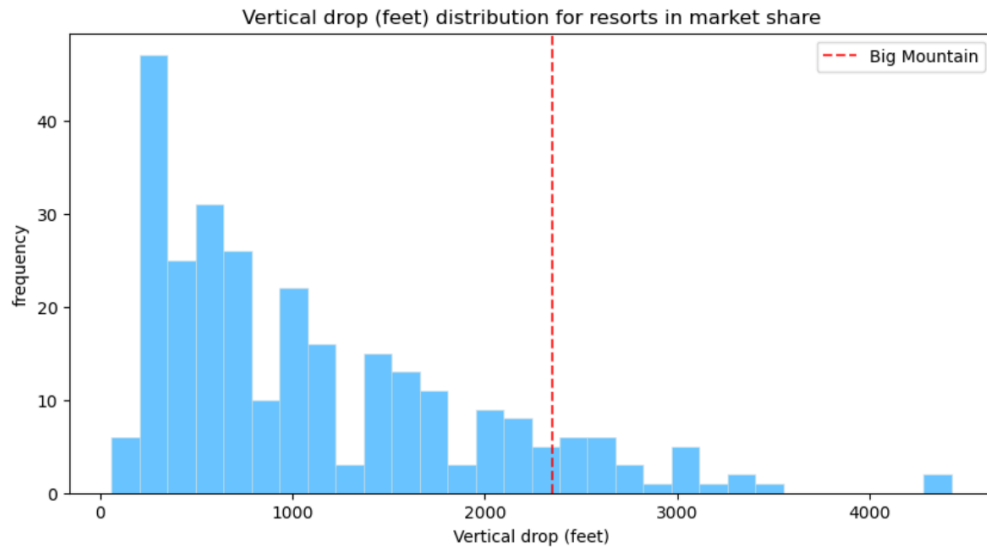
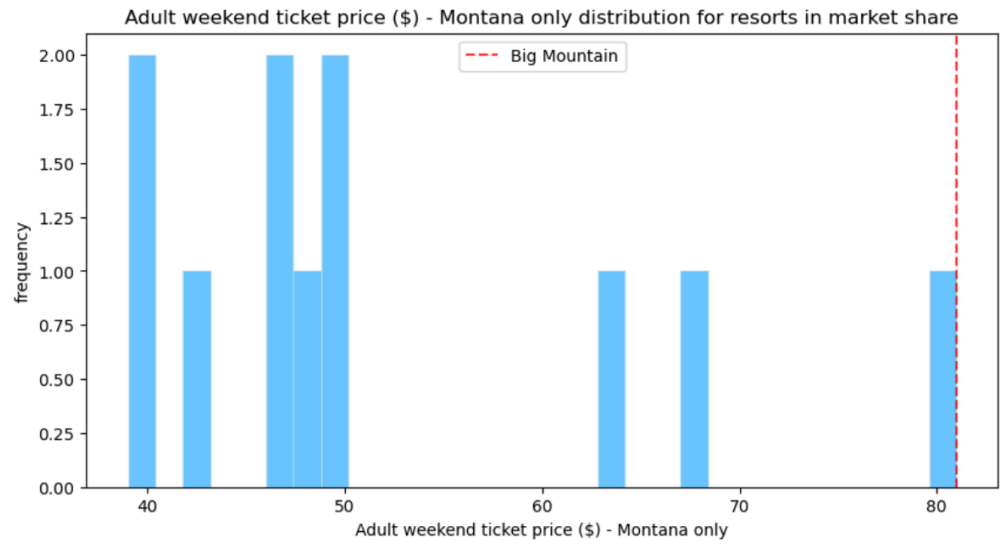
After the exploration of the data, we first created a model as a baseline performance comparator for any subsequent model to ensure that the machine learning pipelines will work as expected. To gain a baseline, we used sklearn's RandomForestRegressor. By doing so, we were able to see the dominant top four features that were found in the linear model which were: fastQuads, Runs, Snow Making_ac, and vertical drop. The random forest model has a lower cross-validation mean absolute error by almost \$1 and has less variability. By using the learning_curve function, we were able to gather significant data. There was an initial rapid improvement in model scores, however, it eventually leveled off by around a sample size of 40-50, indicating that we have sufficient quantity of data.



Modeling

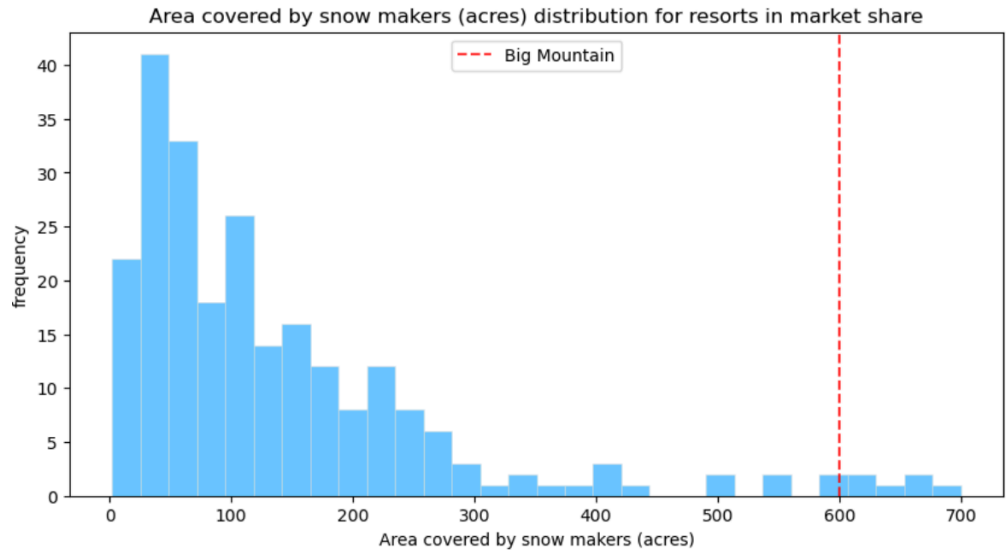
To determine a fair price, let's take a look at where Big Mountain sits overall amongst all resorts in Montana. The following red dotted lines represent Big Mountain.

Adult Weekend Ticket Price

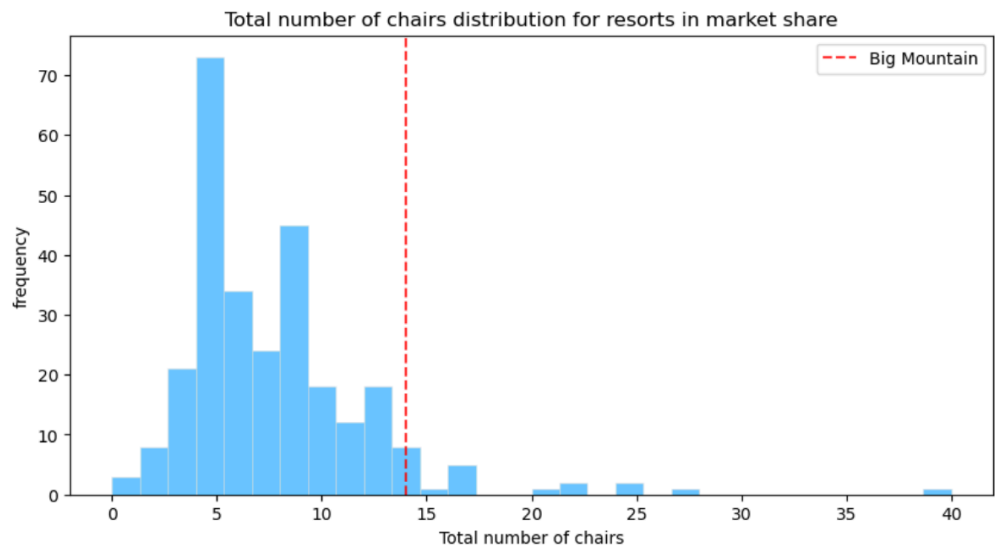


Vertical Drop

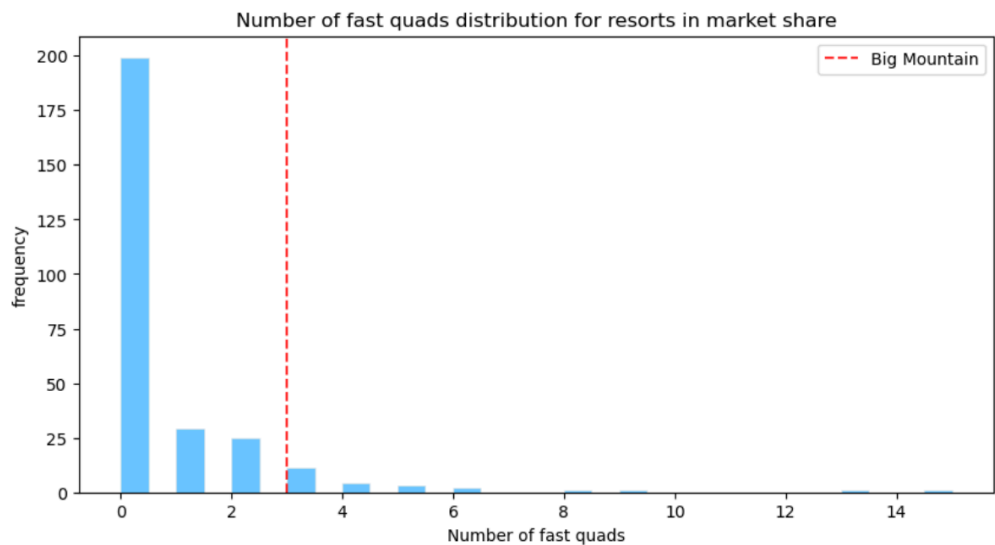
Snow Making Area

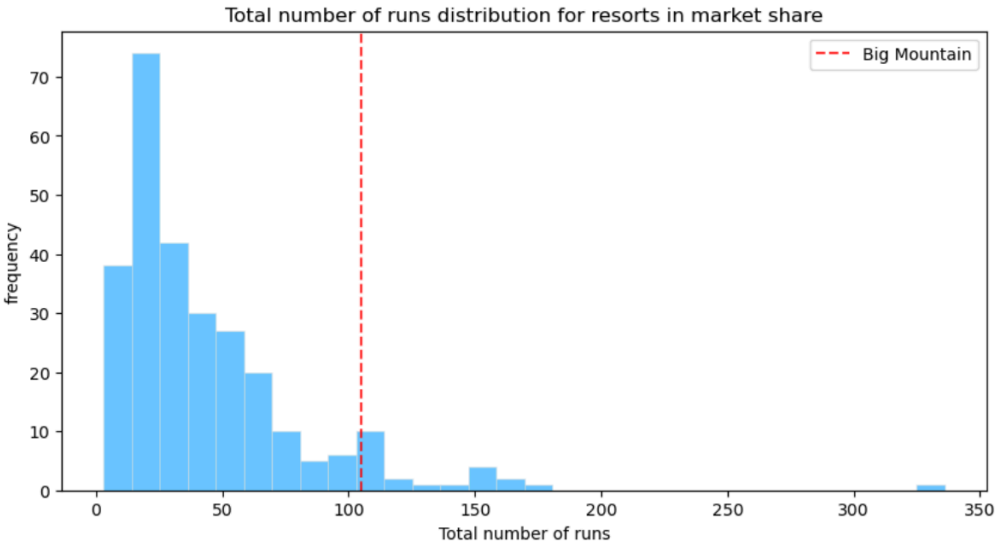


Number of Chairs



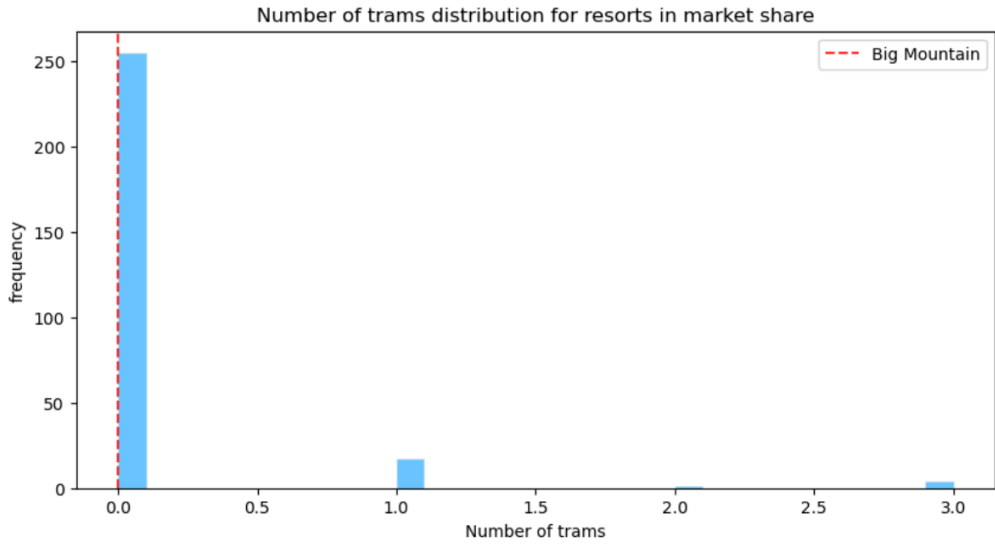
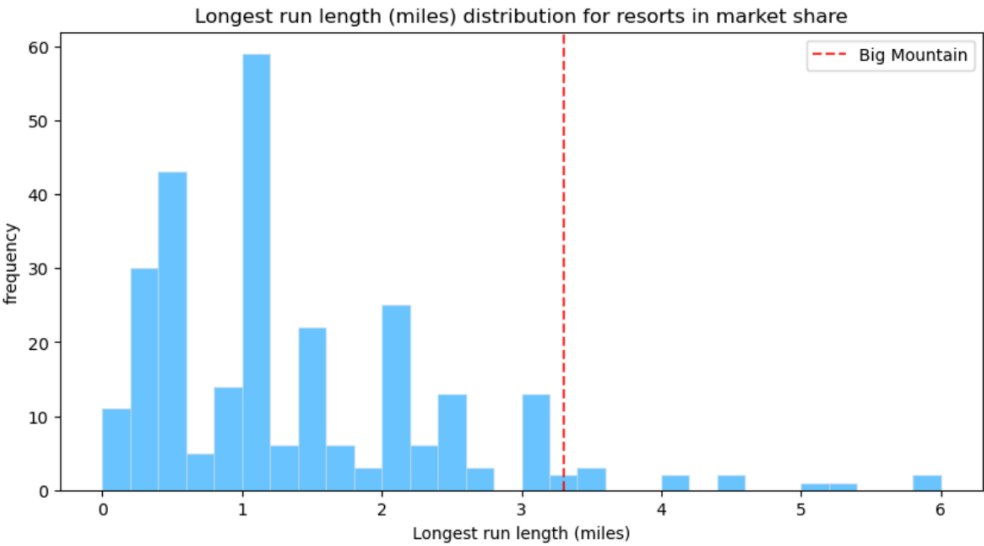
Fast Quads





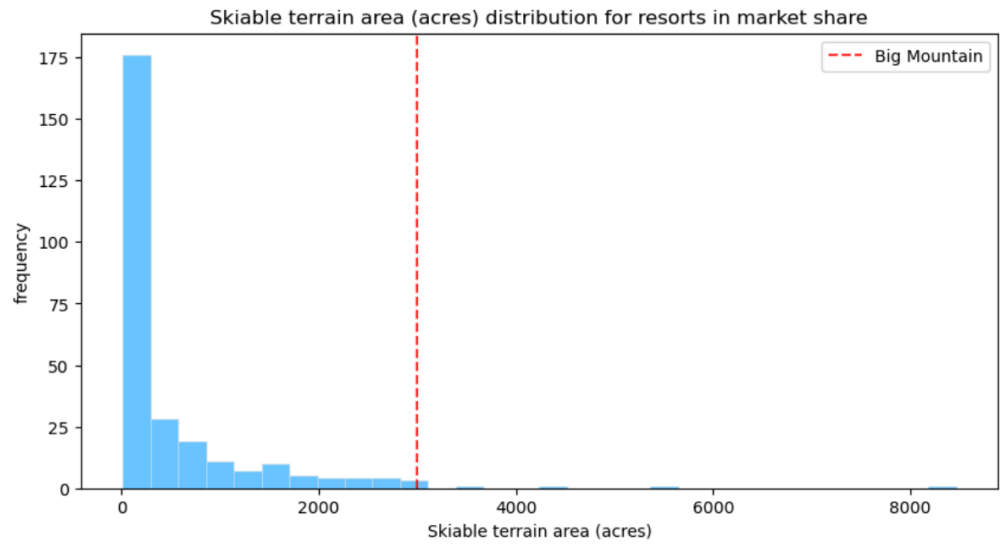
Total Number of
Runs

Longest Run Length



Number of Trams

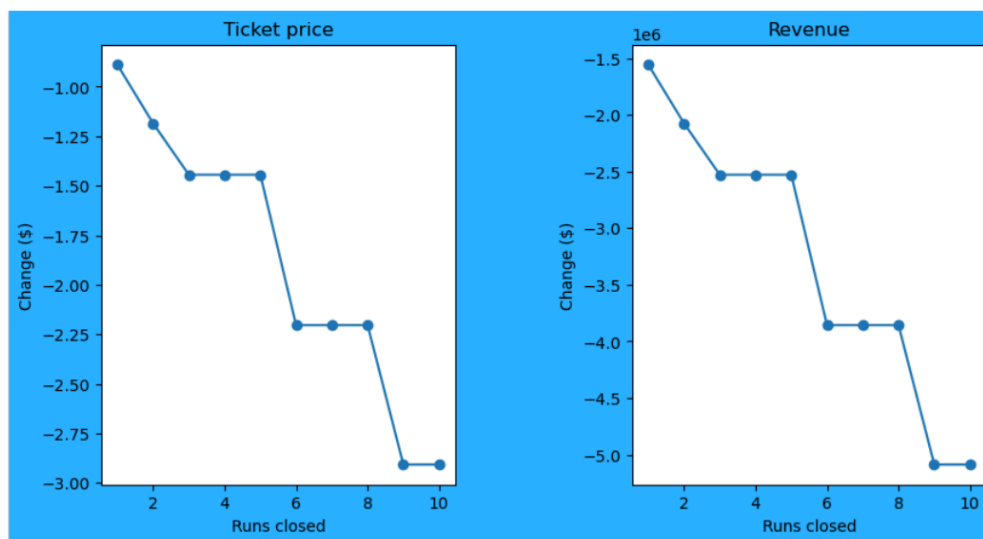
Skiable Terrain Area



Big Mountain Resort ranks high or well above the average in every category, excluding trams as most resorts. Big Mountain Resort has amazing amenities and the prices should reflect its greatness.

Conclusion

With all the greatness Big Mountain Resort has to offer, the resort is charging less than it should. By closing up to 10 of the least used runs, it showed no significant changes in the ticket prices. By adding a run, increasing the vertical drop by 150 feet, and installing an additional chair lift, there is an increased support for ticket price by \$7.00 which could lead to an expected amount of \$12,250,324 over the season. If the resort were to add a run, increase the vertical drop by 150 feet, installing an additional chair lift, and with an addition of 2 acres of snow making, this can cause an increase in support for ticket price by \$8.26 leading to an expected amount of \$14,454,028 over the season.



There are a few deficiencies that occurred through the modeling process in which we were using data that assumed the other resorts to be accurately priced. We are uncertain of the distribution on how other resorts priced various parts of their amenities based on the data we have. Based on the model, Big Mountain has plenty to offer in which we were not aware of at the beginning. The model gives a fair price that will benefit both the business and the guests.