Guided Capstone Project Report
Big Mountain Ski Resort
Naomi Lopez

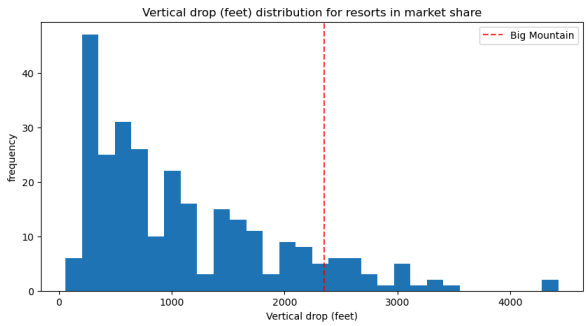
Introduction
Big Mountain Ski Resort is looking to restructure its pricing strategy. Currently the company charges a premium above the average price of resorts in its market segment. However, this approach does not gather a strong sense of how important some of its facilities (resort features) are compared to others. There is also a need to reevaluate pricing structure as the resort installed an additional chair lift which will increase operating costs by $1,540,000.

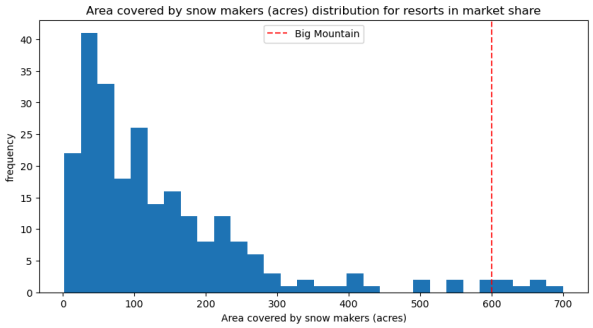
Objective
Big Mountain Resort would like guidance on how to select a better value for their ticket price. They would also like recommendations on how to implement change that will either cut costs or support a higher ticket price. A CSV file was provided which provides resort features from ski resorts across North America.

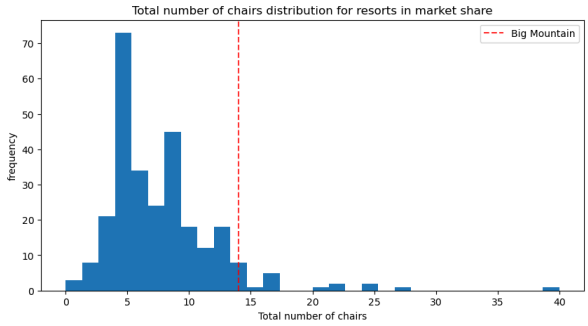
Findings
Big Mountain Resort is a leader in desirable features compared to the other resorts. It ranks among the top percentiles within the following categories: vertical drop, snow making area, number of chairs, number of fast quads, total number of runs, long run length, and skiable terrain. However, the resort is charging $81.00 per Adult Weekend ticket- slightly above the median price point. Given this information, the model states that Big Mountain can increase Adult Weekend Ticket prices to between $91.39- $95.87

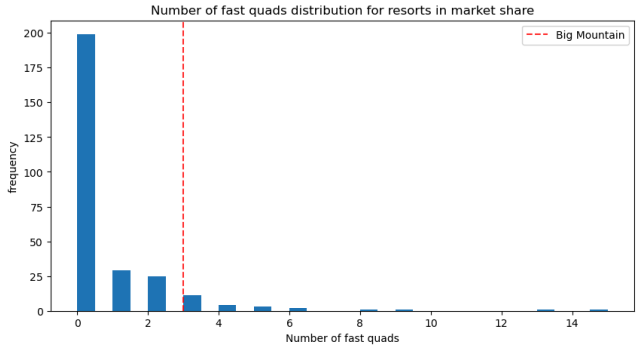
current pricing structure for Adult Weekend tickets

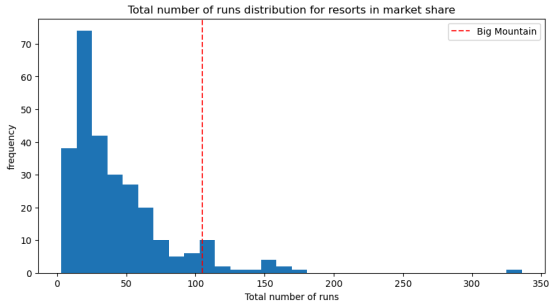
The figures below demonstrate where Big Mountain Resorts lies in regards to its top features.

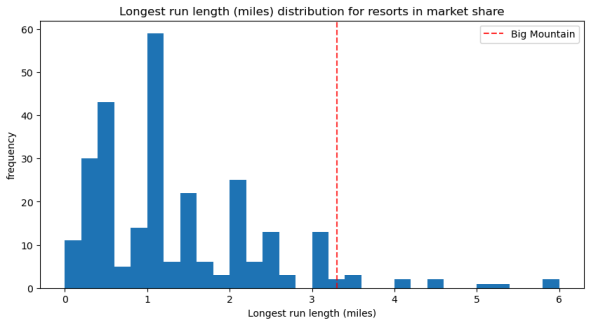


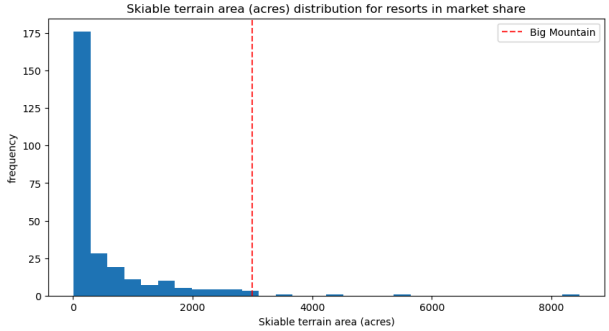






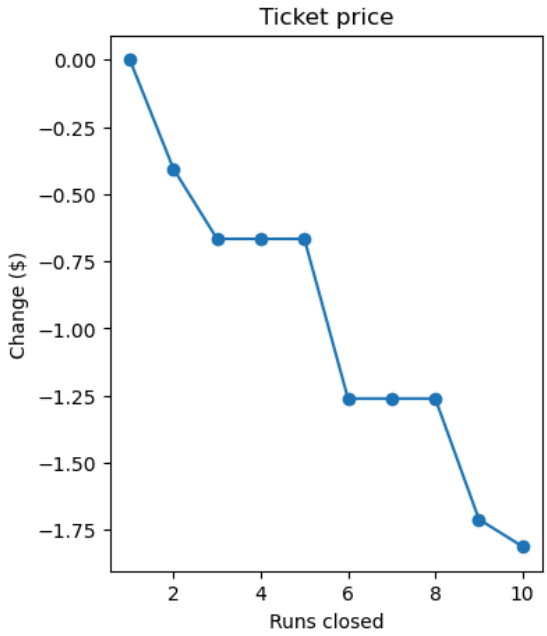


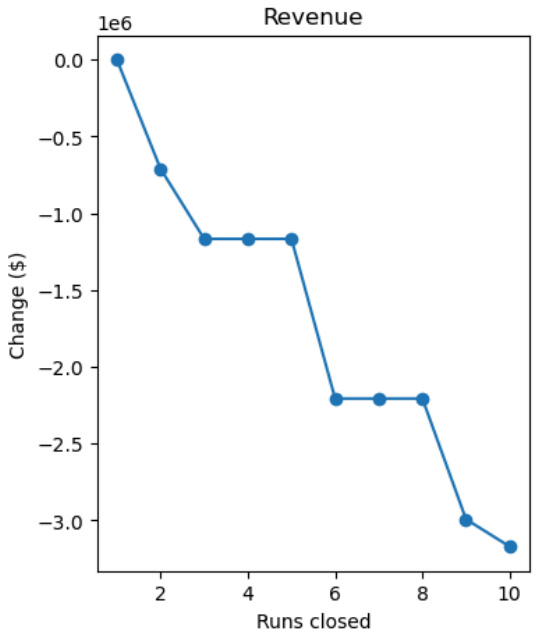




The model created introduces four scenarios that can cut costs or support an increase in ticket price.

Scenario 1
Closing up to ten of the least used runs can decrease operational costs but will warrant a a decrease in ticket price. Closing 1-5 runs will result in the least drastic response to dropped ticket rates and revenue.





Scenario 2
Adding a run to increase the vertical drop by 150 ft and installing an additional chair lift will support increasing the rate of Adult Weekend ticket prices by $1.99 which could amount to $3,474,638 over the season.

Scenario 3
Similar to Scenario 2, this scenario calls for adding a run to increase the vertical drop by 150 ft, installing an additional chair lift, *and* adding 2 acres of snow making coverage. This scenario supports Adult Weekend ticket prices to increase by $1.99 and could amount to $3,474,638 over the season.

Scenario 4
Increase the longest run by 0.2 miles and guarantee snow coverage by adding 4 acres of snow making. This scenario does not support increasing or decreasing ticket prices.

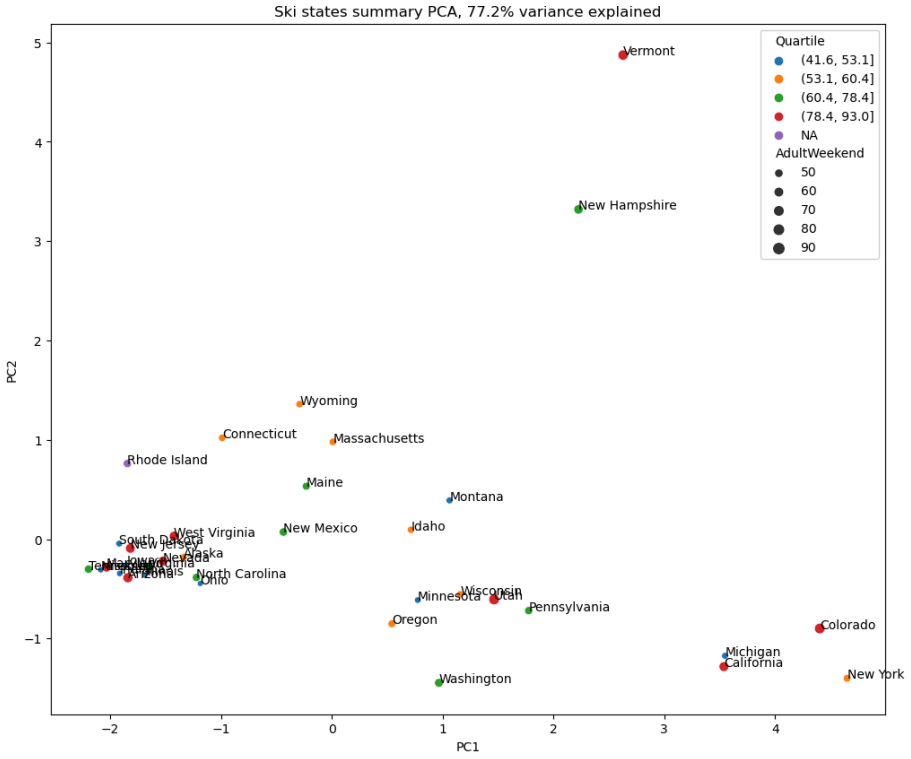
Methods

Data Wrangling

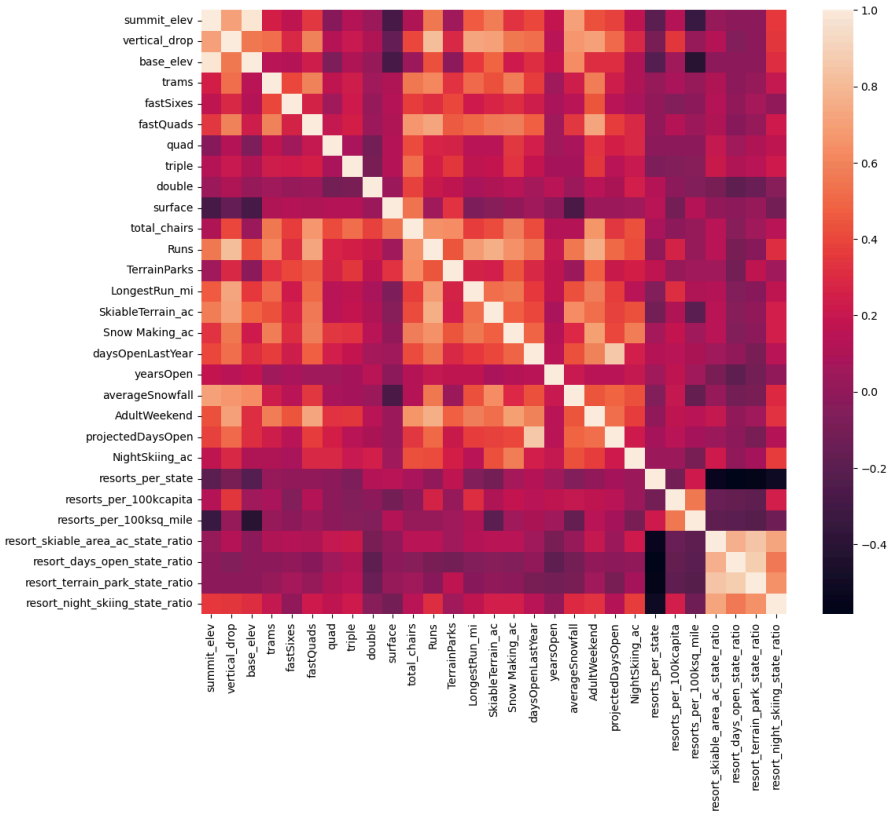
The CSV provided was transformed into a more readable file that demonstrated there was less missing data for Adult Weekend prices vs Adult Weekday prices. State population data from wikipedia was gathered to perform a better analysis of resorts' features per state demographics.

Exploratory Data Analysis

I analyzed size, number of resorts, population, days open, and night skiing among states. This helped generate more questions about the data. The ratio of number of resorts per state-to-state population was generated and the "absolute population" and "state size" columns were dropped. This made the data more applicable to finding the ideal ticket price. PCA was used to identify correlations in the data. The "Quartile" column was added to separate ticket prices by their quartile range. Seaborn was used to assess the PCA values from the ski/state data. A heat map was created using seaborn to visualize correlations between resort features. The number of chairs, fast quads, runs, and vertical drops all had a notable correlation to Adult Weekend ticket prices.



This graph utilizes PCA to demonstrate how resorts per state charge within the interquartile range.



The heat map was used to identify correlations between features. AdultWeekend was strongly correlated with: vertical drop, fast quads, and number of chairs

Preprocessing & Training

Initially, a linear model was built and the features that should be emphasized in the business model included: fast quads, runs, snow making, and vertical drop. Cross validation and test splitting performed similarly but cross validation proved to perform better overall. In addition to a linear regression, a random forest regressor was tested. The optimal preprocessing steps were to impute the median values for each feature without using a standard scale. I moved forward with using the random forest model instead of the linear regression because the Random Forest had a smaller mean absolute error which would provide a more precise final value for optimal Adult Weekend ticket price.

Modeling

A model was built to create an optimal price point for Big Mountain's Adult Weekend tickets. I then used the model to learn how the top features for Big Mountain compared to the rest of the resorts. The model was built to describe how ticket prices would be affected given four different scenarios.

Recommendations

Given Big Mountain's top features I would recommend the implementation of Scenario 3. Not only would adding an additional run heighten the resort's appeal, but this scenario also supports an increase in ticket price, and could yield high profits. Scenario 3 would require a $1.99 dollar increase in Adult Weekend ticket prices; however, per the model's recommendation, the resort

could theoretically surpass the estimated amount of $3,474,638 by increasing prices by $10.39-$14.87. Scenario 3 was chosen over Scenario 2 because it guarantees there will be enough snow coverage on the new run which would result in happier customers.

Limitations & Scope

In the future, data that shows the number of visitors per season that are buying single day passes vs season passes, rates of tickets (and ticket type) sold per season, and current/ projected operational costs would yield a more comprehensive conclusion for implementing a ticket pricing strategy and may even be useful to predict future trends.

The finance team is responsible for assessing the operational costs associated with implementing scenario 3. Considering that a new chair lift was recently built, further analysis is needed to determine the feasibility of scenario 3.