Guided Capstone Project Report

Is Big Mountain maximizing their profits? Business executives are questioning whether their lift ticket prices are sufficiently reflective to its position in the ski resort market. We also ask: What features of a ski resort facility are most important to the consumer? Are their certain aspects of a ski mountain, such as overall skiing area or number of runs for example, that lead to higher ticket prices? Does Big Mountain's location near Glacier National Park and the Flathead National Forest have an affect on its ticket price relative to other resorts in the area? In this data analysis, we propose a more accurate pricing model that Big Mountain can use to compare their facilities to other resorts in the market and highlight what facilities may or may not be important to the consumer for future investment plans.

The data we were provided with contains information from 330 different resorts through 35 states in the U.S. However, some resorts had missing lift ticket price data and were removed, so our final dataset only contains 277 different resorts. In addition to the original data, we added more information on the states themselves including the population and the square mileage. This additional data could be used to gain insights on the market of each ski resort to see the affect it may have on the ticket prices. Our analysis of the state data showed that Montana is ranked 12th in most number of ski resorts and is the 13th cheapest state to ski on average. However, if we analyzed Montana in terms of resort density per capita, we found the state to be ranked 4th on the list.

In our exploratory data analysis we achieved several tasks, including adding additional features that described resort density per state, generated additional columns on a resort-by-resort basis instead of state-by-state, and identified features that are the most correlated with lift ticket prices. Our analysis of the state data gave us insights on how Montana ranked in certain

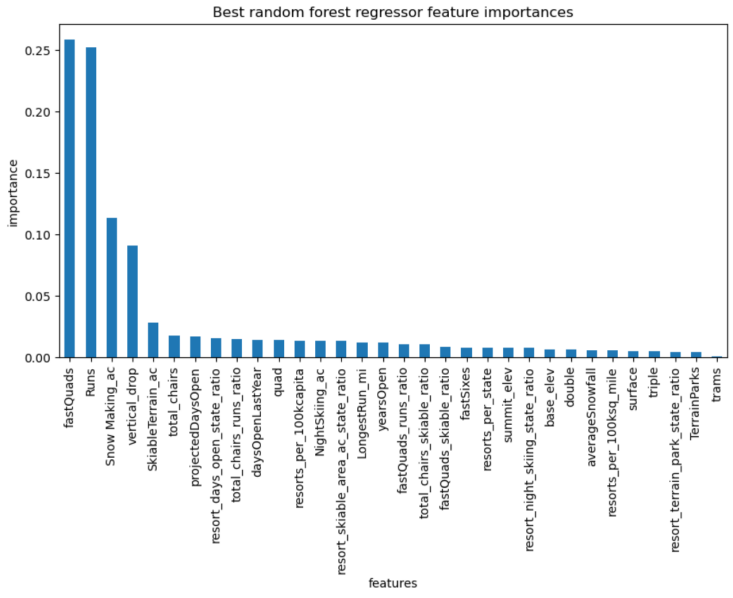

Figure 1

categories and also to attempt to identify a market for Big Mountain. However, in our final analysis, we included all 276 other resorts in our data for multiple reasons. One being to have sufficient data to train our models with and two being that we were unable to draw many distinctions between the markets from only the data without having business input. The features we found to have the highest correlation with the lift ticket prices are number of fast quads, total number of runs, snow making acreage, and vertical drop.

In our preprocessing and modeling steps, we trained different models to optimize our testing error rates and find the best model to predict lift ticket prices. We found the best model for this scenario was using a random forest regressor. This model found that the features most important to ticket prices are number of fast quads, total runs, snow making acreage, and vertical drop. A full list of these features in their order of importance can be found in Figure 1. For Big Mountain, they rank in 93rd percentile for number of fast quads, the 93rd percentile for total runs, the 97th percentile for snow making acreage, and the 89th percentile in vertical drop nationally. However, despite these rankings and their overall importance in the pricing model, Big Mountain ranks in the 81st percentile nationally in ticket price. A full distribution of resort prices can be found in Figure 2.

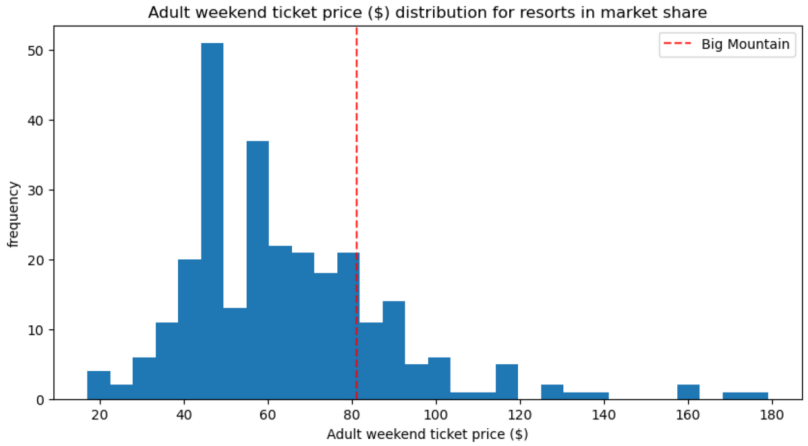

Figure 2

Currently, Big Mountain charges $81 per day per guest. Our model suggests that Big Mountain could charge $95.87 per day per guest. This prediction carries an expected mean absolute error value of $10.39 meaning that at worst, Big Mountain could raise their ticket price to $85.48. Our model is suggesting that Big Mountain is undercharging and overachieving in terms of mountain facilities. Also, we modeled several scenarios that involved some of the most important features and found that increasing the vertical drop by 150ft by adding an additional run and chair lift could increase lift ticket price by $1.99 or by $3474638 annually when using the provided expected visitors.

This model uses all U.S. ski resorts for the data population. These results need to be viewed with a doubtful eye as there may be other underlying features that need to be included in the analysis. Perhaps a different market needs to be used or adding other features such as number

of lodges, population of mountain village, amount of fine dining, and distance from large metro areas. Nonetheless, this analysis provides insights on where Big Mountain is now in terms of pricing and how they can move forward in adjusting facilities and lift ticket prices.