Introduction

The objective of this project is to develop a pricing model for The Big Mountain Resort. The executive team suspect that it may not be maximizing its returns relative to its market position on ticket sales to its patrons. The team knows that ticket prices are invariably related to what patrons value on their visit to the resort. However, they do not know what features matter most to visitors, particularly the ones that visitors are willing to pay more for. This project aims to build a model for ticket prices on several facilities offered by the resort. This predictive model will inform Big Mountain’s pricing strategy and future investment endeavors.

Exploratory Data Analysis and Feature Engineering

To get a sense how much ticket prices could be, the exploratory data analysis looks at picture of the ski resort market in general. Montana, home state of the big mountain resort has 11 other resorts. Montana is the third largest state in area per square miles, with only California and Alaska having more. California has the greatest state population despite coming in second in area per square feet to Alaska, which has more than three times the area of California. Montana, which is home to the big mountain resort, was in the top five for size; However, it is not as densely populated as states such as California. New York state has the most resorts of any state, while Montana comes in twelfth, with only twelve resorts available. Though New York has most resorts, these resorts do not account for a lot of skiable area. Montana has more than four times the number of skiable areas that New York has. Total days open appears to relate to the number of resorts available. Ski seasons run from late November to early April, however larger resorts in Colorado and California are known to run lifts as late as the 4th of July. The more resorts open through the skiing season, the more total open days we will see. The data shows that there are big states which are not the most populous. To get a better view of the competitive landscape of each state, resort density, the ratio of resorts serving a state population and state area, was calculated. These calculations translated the state data into something more useful that showed the density of resorts relative to the state population and size. Interestingly, Vermont has the most resorts per 100k capita, with Montana coming in fourth, despite Montana’s low population. The ratio tells us that Montana serves just about one resort per unit of 100,000 people. This is quite a lot when comparing this value to New York State’s resorts, which has more resorts. Another crucial part of the EDA was to look at features or columns that mattered the most in data. Analyzing the data was like having a double-edged sword. The data generates a lot of great questions rather than answering the question of what a better predictor of resort ticket prices is. To have a chance of building a great model that predicts ticket prices, we need features with variance. Features with high variance contain a lot of signals that is important in creating a great model. Principal component analysis was used uncover the set of features that mattered the most in predicting prices. PCA reduces the number of variables that do not help in prediction of prices, while preserving as much information as possible that does. The features that most drive prices in Montana, home state of the big mountain resort, are total skiable area and resorts per 100k capita, indicating that these features carry more weight when patrons consider ticket prices.

Ticket Price Modeling

Resort ticket price modeling relies on the assumption that other resorts in big mountain’s competitive market are setting prices based on what people value at certain facilities. A random forest regression model was used to fit and predict ticket prices. The big mountain resort modelled price was $95.06, while the actual price was $81. Even though expected mean absolute error was $10.32, the model suggests that there is room for a price increase on current ticket prices. Though the modeled pricing suggests that the big mountain resort is undercharging its visitors, it is not complete without knowing what the current operating costs are. The resort is looking at either cutting costs or increasing revenue from ticket sales to turn a reasonable profit. The resort is free to set ticket prices to what it chooses. However, the resort exists in a market where people pay more at certain facilities and less at others. Raising prices too high could alienate potential customers; conversely, making prices too cheap could put a strain on operating costs.

The model’s ability to determine ticket prices while considering operating costs is a very useful tool in addressing some uncertainty on ticket prices.

The resort wants to look at four scenarios for pricing strategies. The first scenario is to close up to 10 of the least used runs. The model recommends closing only one run if the resort wants ticket prices to remain the same. Closing 2 to 5 runs reduces support for tickets prices and therefore revenue increases. Closing 6 runs or higher will result in a significant drop in revenue and ticket sales. The second scenario involves adding one more run, increasing the vertical drop by 150 feet, and installing an additional chair lift. The model predicts a bump in ticket prices by $0.99 and a revenue increase of $1,724,638. The model also predicts a similar rise in prices and revenue for scenario three, which involves adding two acres of snow making area and the same steps as scenario two. Finally, the model does not recommend using scenario four in the pricing strategy. The fourth scenario was to increase the longest run by 0.2 miles and adding 4 acres of snow.