Big Mountain Resort Report

Recently, Big Mounting Resort has added an additional chair lift, which has increased operational costs. I have been tasked with looking into the solutions to make up for this cost. This brought up the question, how can Big Mountain Resort increase their revenue for the resort over the next season to make up for the $1.54 million operating costs for the additional chair through seasonal availability and operational cost changes? It had been decided that the primary source of revenue increase for this project will be the ticket price and one of the key points of data would be the ticket prices of competitors. There were certain constraints to keep in mind, such as availability due to weather and seasons. We used data from a CSV file from Database Manager to look at information from up to 330 resorts within the US with help from Jimmy Blackburn and Alesha Eisen.

When wrangling the data we used data from 277 resorts as the others were missing essential data such as missing weekend ticket prices for adults. We also removed the data related to ticket prices on weekdays as it was primarily repetitive to the data for weekends along with a few other data points. The state column ended up being a primarily used datapoint as it had more reliable information that the region column.

In the exploratory data analysis section, the data related to the states was the primary focus. We explored the data related to per capita and per square mile for each state and the primary numerical features included ticket price, the total number of runs and chairs, the number of resorts per state and the total skiable area per state. Number of quad cars, the amount of snow making used plus the amount of night skiing per resort were also researched. With this information we found some recognizable patterns between state and ticket but nothing seemed to be more than just correlation. We did, however, discover that it would be good to use vertical drop, fast quads, runs and total chairs as featured data in further modeling.

Afterwards, in the preprocessing stage we split the data into a test group and a training and then gathered information about the coefficient of determination (R2), mean absolute error and mean squared error for the ticket prices. The training group was 70% of the data while the test group was the remaining 30%. We removed any categorical data to keep it as data driven as possible.

We calculated the error using multiple algorithms. The first was just calculating the error based off the average ticket price which resulted in a roughly $19 error per ticket. Then we calculated the error through an initial model and got a ticket price estimated to be about $9 or so different from the real price. This model explained over 80% of the variance of the training set and 70% of the test set which means we could have been overfitting the data a bit. Finally we tested with a linear model and a random forest model. With the linear model we got an error of roughly $10.50

per ticket and with the random forest model the error was about $9.65, a nearly $1 improvement. Going forward, we chose to use the random forest model as it seemed to have the smallest margin of error with a lower chance of overfitting that seemed to be a problem with the initial model.

Finally we modeled the data to find the recommended ticket price and what options are available to our disposal. Currently the Big Mountain Resort ticket price is $81 but should have a price of $95.87 with a mean absolute error of $10.39. This could be done in accordance with a few modeling scenarios. The best scenario as a result was to increase the vertical drop by adding a run to a point 150 feet lower down and installing an additional chair lift and adding 2 acres of snow making cover. This scenario would support increasing the ticket price by $1.99 which over the season would lead to an expected amount of $3,474,638.

In conclusion, the expected ticket price for Big Mountain Resort seems to be greater than the current price and it is recommended to increase this value and add another new chair lift and increase the length of the vertical drop by 150 with 2 acres of snow making cover. There seems to be more data that can be researched in future works, regarding other price points related to the resort as we only focused on the ski lift ticket price for an adult, and other costs related to the resort that weren't mentioned. We should implement a program with our current model that would use the data we gathered for the executives to use. By doing this, the executives would have a more direct way of plugging in desired numbers to get the outputs needed in future scenarios.