**Guided Capstone Project Report**

Our client, Big Mountain Resort, a ski resort located in Montana offers spectacular views of Glacier National Park and Flathead National Forest, with access to 105 trails. Every year about 350,000 people ski or snowboard at Big Mountain. There's a suspicion that Big Mountain is not capitalizing on its facilities as much as it could. Basing their pricing on just the market average does not provide the business with a good sense of how important some facilities are compared to others. Hence, the business has now approached our data science team to give some guidance on how to select a better value for their ticket price and implement a more data-driven business strategy.

Big Mountain resort is serviced by 11 lifts, 2 T-bars, and 1 magic carpet for novice skiers. The longest run is 3.3 miles in length. The base elevation is 4,464 ft, and the summit is 6,817 ft with a vertical drop of 2,353 ft. Big Mountain Resort has recently installed an additional chair lift to help increase the distribution of visitors across the mountain. This additional chair increases their operating costs by $1,540,000 this season. We also obtained data about 330 ski resorts across the United States, in our (ski\_resort\_data file).We compared this data to our client- Big Mountain’s data and came up with the best value for ticket price and proposed the most desirable features in a resort.

Now we will go through more details on what are the different procedures we followed to arrive at our proposed solution – First we performed ‘Data Wrangling’ , i.e. we cleaned our data and removed erroneous information and removed some irrelevant information from the ski\_resort\_data file. Our resultant file now has data for about 276 resorts across the US. Once we got a clean file in hand, we explored the data. In our analysis using heatmap we found a positive correlation between vertical drop and ticket prices. FastQuads, runs, snowmaking\_ac were also quite reasonably correlated. resort\_night\_skiing\_state\_ratio was the most correlated to ticket price. Since heatmaps can mask some of the correlation between features, we visualized our data again using scatterplots. In our analysis using scatterplots we found that there is a strong correlation between vertical drops and ticket price, and fastQuads and ticket price.

Our task now is to predict the best value for ticket price. In order to predict the ticket price, we need to know which resort facilities are most desired by customers. So, we mainly used 2 types of models, Linear model and Random Forest model to do this. Linear model predicted vertical drop as our biggest positive value followed by snowmaking\_ac, total\_chairs, fastQuads and Runs. According to Random Forest model, fastQuads, Runs, snowmaking\_ac and vertical\_drop were found to be the best features which is almost consistent with our linear model. These results are also somewhat consistent to the results obtained by scatterplots earlier.

Now that we know vertical\_drop, fastQuads, Runs, snowmaking\_ac, total\_chairs are among the most desired facilities, we need to know where Big Mountain stands with respect to these facilities. We analyzed all these facilities for Big Mountain and found that Big Mountain has most of these desirable facilities. The numbers are as follows-

It was found that Big Mountain is very high up the league table of snow making area with around 600 acres.

Big Mountain is amongst the resorts with the largest amount of skiable terrain of 3000 acres.

Big Mountain is doing well for vertical drop at 2353 ft, but there are still quite a few resorts with a greater drop.

Big Mountain has 3 fastQuads, there are some resorts with higher number, but they are rare.

Big Mountain has 105 runs, it compares well for the number of runs. There are some resorts with more.

Big Mountain has 14 total chairs, which is quite high.

After refitting the model on all available data and comparing the feature of Big Mountain with

desirable features of all other resorts, the business team provided us with some possible scenarios that could be implemented. Based on those scenarios and by comparing Big Mountain’s features with it’s competitors, we predicted that it would be beneficial to increase vertical drop by 150 feet, increase 1 run and add one additional chair. This scenario increases support for ticket price by $9.26 which puts our newly predicted ticket price at $90.26 per adult. Over the season, this could be expected to amount to $16,208,333 on the basis that each visitor buys 5 tickets. Although, an additional chair lift increases operating costs by $1,540,000 the resort can still have a seasonal turnover of around $14,668,333. This is a rough estimate since we do not have information regarding other operating costs. Nevertheless, this seems to be beneficial for the resort.