**Guided Capstone Project Report**

1. Problem Identification

Big Mountain Resort has recently installed an additional chair lift to help increase the distribution of visitors across the mountain. This in turn has increased the operating costs by $1,540,000. To ensure that the resort is bringing in more money than before to cover the operation expenses, we must focus on admission prices -- either for weekday passes, weekend end passes, or both.

In doing so, we must be careful that the resulting prices are “reasonable” as there are 11 other resorts in the region. Yet prices must remain competitive to resorts that have similar features. Whatever the price, we must guarantee investors that the profit margin is at least 9.2%.

***So how can we mitigate the additional $1,540,000 operation expense and keep investors happy by safeguarding the 9.2% annual profit margin by the end of the season?***

1. Method & The Process

To tackle this problem, I decided to use a linear regression model, a supervised machine learning algorithm, to identify if there exists a relationship between 26 the unique characteristics of a ski resort and our target variable -- ticket price. I chose this method because it allows the use of historical data to make predictions thus allowing us to make informed business decisions.

I was provided with incomplete data, so I had to fill in the holes and filter out any data that was too dissimilar from Big Mountain. Additionally, I created clusters to determine which features were highly correlated to price. Three models were made using adult weekend price as the target variable. Of the three, only 2 yielded intelligible results.

1. Results

The best model yielded a predicted price of $85.99 versus our actual price of $81. It also identified the amount of skiable terrain (in acres) and the number of days open for the season to be highly correlated to weekend ticket prices.

1. Recommendations

In conclusion, we should increase our weekend ticket price to $85.99. While this may seem small --only a 6% increase--we should be careful because it is well above the average price of our immediate competition in the region. However, if we kept the weekday and weekend prices equal and presuming we get our usual 350,000 visitors, we’d see $30,096,500 in annual revenue and a profit margin of approximately 14%, well exceeding the minimum 9.2%.

Additionally, I’ve learned that we have the 2nd largest resort by skiable terrain (in acres) in the region (see Fig 1) but remain average for the length of our season (see Fig 2).  Since we have the highest ability to make snow in the region (600 inches as seen in Fig 3), we should take advantage of that to lengthen our season to gain more revenue.

\*Note: Big Mountain Resort has black marker in the following figures.

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1. Next Steps

Due to this method’s reproducibility, if taken a step further, we could use it to predict the weekday price if we wanted to change it or even forecast the number of days of the season.