# Guided Capstone Project Report

### Problem:

What are the prices of Big Mountain Resort’s tickets to cover the extra operation cost of the additional chair lift and achieve $200,000 profit from this new chair lift in next ski season? The operational cost of this new chair lift is about $1,540,000 per season. One way to answer the above question is to see how much Adult Weekend price can be adjusted to increase revenue in the upcoming season more than $1,740,000. Therefore, this project will focus on predicting the expected Adult Weekend price from the data set.

### Data:

Database manager, Alesha Eisen, has provided the CSV file that contains characteristics and price information for 330 resorts including Big Mountain Resort.

### Model:

Random Forest Regression model was employed for the cleaned data set. GridSearchCV was used to explore the hyperparameters of the model.

### Findings:

Four top features are listed in Figure 1 to show the importance to the Adult Weekend ticket price. Those are: number of fast Quads, number of runs, acres of snow making and vertical drop. For this project, Big Mountain Resort adds a new chair lift, and the findings are:

1. As shown in Figure 2, closing one run makes no difference for the Adult Weekend ticket price but closing 2 and 3 runs successively reduces the support of ticket prices.
2. The new lift support for the ticket price by $8.61 and about $15 millions revenue based on the visitors and stays of last season. This is substantially to achieve the financial goal
3. Adding extra 2 acres of snow making can support $1.3 per Adult Weekend ticket, but the operational cost of snow making shall be accessed
4. Extending the longest run by 0.2 mile makes no difference of the ticket price.

### Recommendations:

1. The model suggests increasing the ticket price by $8.61 due to the new chair lift. The data of visitors of Big Mountain Resort and other resorts nearby shall be collected and analyzed to confirm if the ticket price jump is feasible.
2. Closing one run will not impact the ticket price based on the model. The least popular run could be closed gradually to save the operational cost.

Chart

Description automatically generated

Figure 1. Importance of Features to Adult Weekend Ticket

Chart, line chart

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Figure 2. Ticket price and revenue with the number of runs closed