**Big Mountain Resort Ticket Price Analysis**

**Jan 2024**

Big Mountain Resort 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. This mountain can accommodate skiers and riders of all levels and abilities. These are serviced by 11 lifts, 2 T-bars, and 1 magic carpet for novice skiers. The longest run is named Hellfire and 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 $1.54M this season. The resort's pricing strategy has been to charge a premium above the average price of resorts in its market segment.

**Problem Statement:**

Big Mountain resort is rethinking finding a ticket price that will offset the cost of operations and keep its customers at the same time. How can we create a model that will help us determine the ticket price that is reasonable for the customers and reflects the importance of Big Mountain Resort’s facilities?

**Data Wrangling:**

For this step I focused on collecting data, organizing it, and making sure it's well defined. I then explored the data to see if there are any missing values that I need to take care of. After dropping the columns that has a value of 0 and dropping a row that has no ticket price, I then ran an analysis between AdultWeekend and AdultWeekday prices and based on the scatter plot below I observed that there is and equal prices for the weekend and weekdays in most states.A graph of blue dots

Description automatically generated

Finishing off this step with 277 rows out of 330.

**Exploratory Data Analysis:**

For this step, I used a technique called Principle Components Analysis (PCA) . This technique will find linear combinations of the original features that are uncorrelated with one another and order them by the amount of variance they explain. A great way to visualize this technique is by using the heatmap to identify patterns:

A screenshot of a graph

Description automatically generated

We can tell that Runs, and total chairs is quite correlated with ticket price meaning that the more runs we have, the more chairs we’d need to ferry people to them.

**Pre-Processing and Training Data:**

The random forest model has a lower cross-validation mean absolute error by almost $1. It also exhibits less variability. Verifying performance on the test set produces performance consistent with the cross-validation results.

A graph with blue and white text

Description automatically generated

**Modeling:**

The model says closing one run makes no difference. Closing 2 and 3 successively reduces support for ticket price and so revenue. If Big Mountain closes down 3 runs, it seems they may as well close down 4 or 5 as there's no further loss in ticket price. Increasing the closures down to 6 or more leads to a large drop. The plots below show us where Big Mountain sits overall amongst all resorts for price and for just other resorts in Montana:

A graph of a number of blue bars

Description automatically generated with medium confidence

A graph with blue lines

Description automatically generated

A graph of a vertical drop

Description automatically generated

A graph of a graph

Description automatically generated with medium confidence

A graph of blue and red bars

Description automatically generated

A graph with numbers and lines

Description automatically generated

A graph of a number of runs

Description automatically generated

A graph of a running graph

Description automatically generated

A graph with numbers and lines

Description automatically generated

A graph of a terrain area

Description automatically generated with medium confidence

**Conclusion:**

Based on the analysis below:

A graph of a price

Description automatically generated with medium confidence

Big mountain can close up to 10 of the least used runs. This doesn't impact any other resort statistics. Increase the vertical drop by adding a run to a point 150 feet lower down but requiring the installation of an additional chair lift to bring skiers back up, without additional snow making coverage, adding 2 acres of snow making cover and increase the longest run by 0.2 mile to boast 3.5 miles length, requiring an additional snow making coverage of 4 acres.