



Guided Capstone Project Report

BIG MOUNTAIN RESORT

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Problem Statement

What opportunities exist for Big Mountain Resort to maintain or increase the current profit margin to offset the newly incurred operational costs of \$1.54M by adjustment of ticket prices, or reduction of operational costs, or combination of both within the year?

Background

Big Mountain Resort entertains about 350,000 guests every year. Recently Big Mountain Resort invested in a new chair lift, increasing operational costs by \$1.54M this season. There's a suspicion that Big Mountain is not capitalizing on its facilities as much as it could. The resort's pricing strategy of using the average price of resorts in its market segment does not provide the business with a good sense of how important some facilities are compared to others.

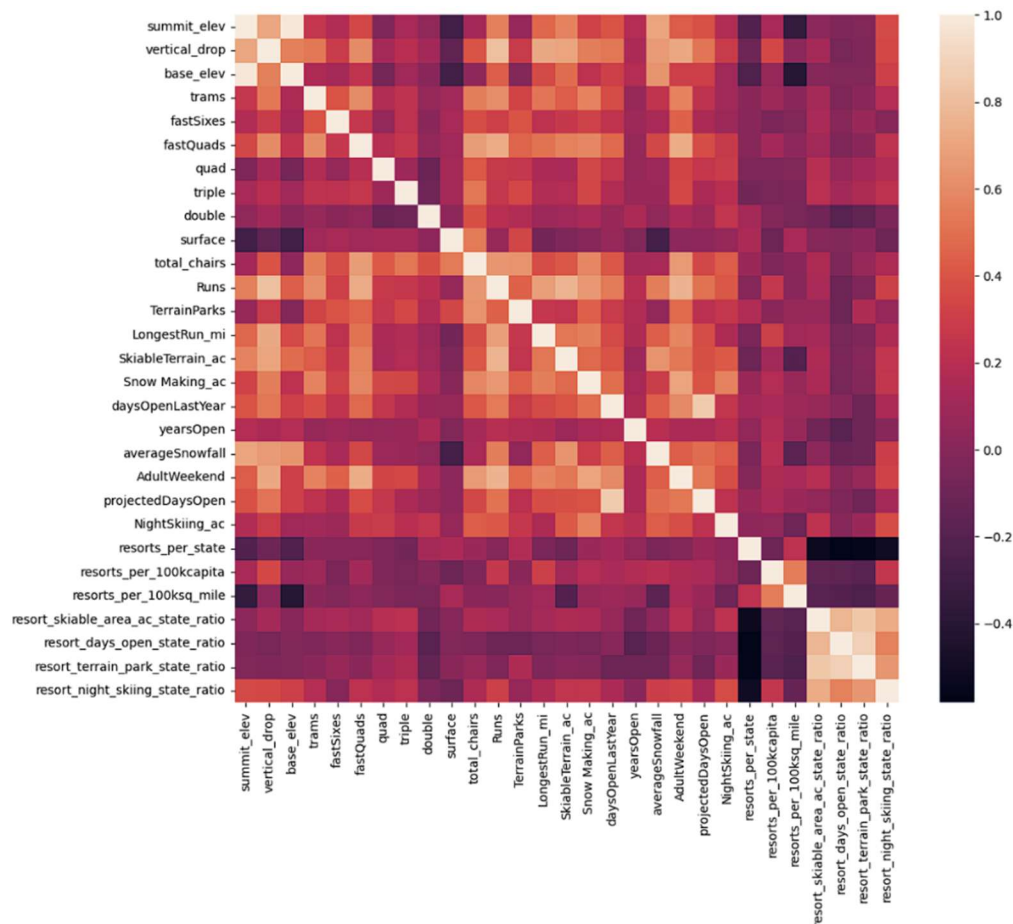
Summary of Findings

Our primary goal was building a predictive model for ticket price based on a number of facilities, or properties, boasted by resorts (*at the resorts*). This model will be used to provide guidance for Big Mountain's pricing and future facility investment plans.

DATA WRANGLING: we established a better understanding of distributions of the different features in the market. We also identified our target feature of an adult weekend ticket price.

EXPLORATORY DATA ANALYSIS: We uncovered correlation between adult weekend price and the following features:

- **fastQuads** – The number of fast four person chairs.
- **Runs** – Count of the number of runs on the resort.
- **Snow Making_ac** – Total area covered by snow making machines in acres.
- **total_chairs** – Sum of all chairlifts at the resort.
- **vertical_drop** – Vertical change in elevation from the summit to the base in feet.



PREPROCESSING AND TRAINING:

We evaluated our models using the following metrics:

- R^2 – Coefficient of determination
- Mean Absolute Error
- Mean Squared Error

We trained and tested the following algorithms:

- Linear Regression
- Random Forest Regression

MODEL SELECTION: After evaluating model performance, the Random Forest Model was selected. The random forest model had a lower cross-validation mean absolute error by almost \$1. It also exhibits less variability.

SCENARIO MODELING: After refitting the model, we calculated the expected ticket price for Big Mountain Resort. The modeled price was \$96.71 and the actual price was \$81.00. Even with the expected mean absolute error of \$10.33, this suggests there is room for an increase.

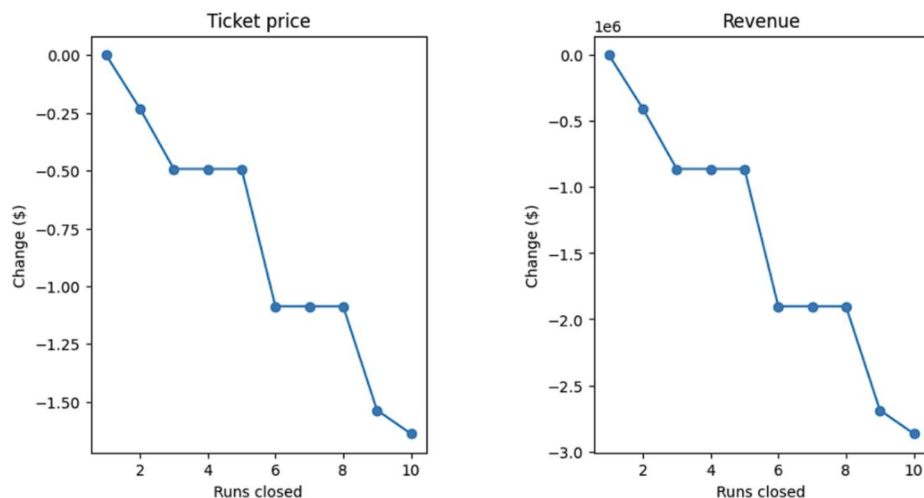
Next, we looked at how Big Mountain Resort compared to other resorts in the market for all the key features we identified. Big Mountain Resort was fairly high on many of the features we investigated. With this information, we investigated the following scenarios to sense how facilities support a given tick price:

1. Permanently closing down up to 10 of the least used runs. This doesn't impact any other resort statistics.
2. 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
3. Same as above but adding 2 acres of snow making cover
4. Increase the longest run by 0.2 mile to boast 3.5 miles length, requiring an additional snow making coverage of 4 acre

RESULTS AND RECOMMENDATIONS

1. CLOSING RUNS

RESULTS: When analyzing how closing runs will affect ticket price and revenue, it was found that closing up to 5 runs will only reduce ticket price marginally. However, closing 6 or more runs will see a large drop in ticket price.



RECOMMENDATIONS: Closing runs can result in a reduction in operating costs, it is recommended that Big Mountain Resort explore closing from 1 to 5 of the least popular runs.

2. MODIFYING AND ADDING RESORT FEATURES

RESULTS: When analyzing scenarios 2 through 4 it was found that modifying and adding features can support an increase in the ticket price which will in turn create additional revenue. For example, by increasing the vertical drop by 150 feet and adding an additional chair lift will increase support for ticket price by \$1.99. Over the season, this could be expected to amount to a revenue increase of \$3,474,638.00.

However, not all modifications or additional facilities will result in support for increasing ticket price. For example, in scenario 3, the additional 2 acres of snow making made no difference from scenario 2. And scenario 4 shows no support for ticket price increase.

RECOMMENDATIONS: Through our analysis we have identified some key features and the data suggests that guests value certain features more than others and thus, the ticket price should be determined based on the features that Big Mountain Resorts offers compared to other resorts in the market.

PRICING: The modeled ticket price is \$96.71 and is a little off from the current price of \$81.00. However, there is an expected mean absolute error of \$10.33, this suggests there is room for an increase. Therefore, it is recommended that Big Mountain Resort explore raising ticket prices based on the facilities offered at Big Mountain compared to the market. The model has shown that even a \$1.99 increase in ticket price has the potential to cover the recently acquired operational costs of \$1,540,000 for the newly installed lift.

FUTURE SCOPE OF WORK

Currently our model includes price information for only ticket prices. We have not factored in additional costs that would need to be considered to help improve the model. Other cost information that would be useful would be:

- Operational costs of all the facilities not just the operational cost to operate a new chairlift. (i.e. payroll, maintenance costs, utilities, ect.)
- Annual visitor information from all resorts in the market.
- Construction costs for any facility modification if the resort were to add the additional skiable acreage, additional lifts, additional snow making capacity or adding/extending trails.

After improving the model with the information listed above, a cross-functional team of business experts should test different business assumptions similar to the 4 scenarios we initially explored. This will provide the business with a good sense of how important some facilities are compared to others and provide guidance on future facility investment plans.