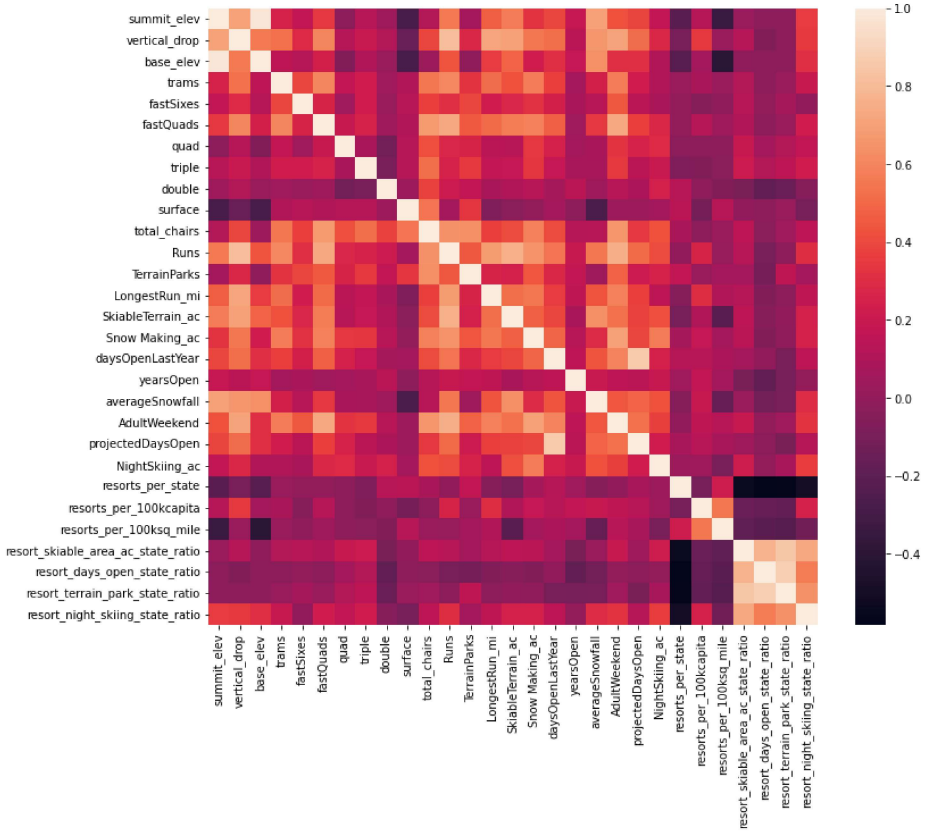
Guided Capstone Project Report

Meskerem Goshime

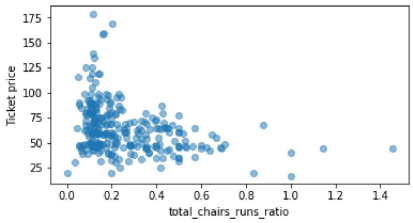
Big Mountain Resort offers spectacular views of Glacier National Park and Flathead National Forest, with access to 105 trails, 11 lifts, 2 T-bars and 1 magic carpet. Its longest run is 3.3 miles with a vertical drop of 2,353 ft. The Resort has recently installed an additional chair lift to help increase the distribution of visitors across the mountain. This additional chair increases its operating cost by $1,540,000 this season. Therefore, the management team is looking to increase ticket pricing, take measures to cut costs or both to make up for this increased expense.

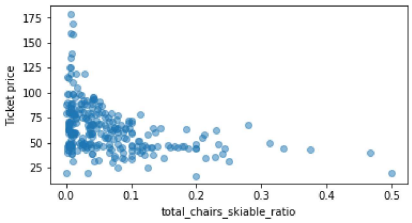
Data on 330 resorts was provided, which includes Big Mountain Resort. In the data wrangling stage, the data was cleaned. Outliers, errors, missing values and duplicates were identified and handled. In addition, external data on population and total area of the states was incorporated in order to calculate and add resorts per capita and resorts per 100K sq mile to the data.

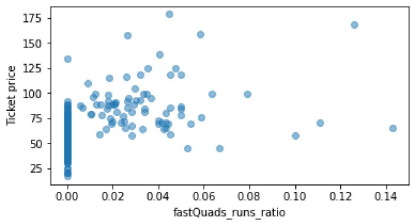
The data was then thoroughly explored using various tools. Scaling and PCA transformation was used to analyze the multi-dimensional data and explore possible correlations. This revealed that some of the features have more impact on ticket price than others. Among the top features that seem to have higher correlation with ticket price were Snow Making AC, Runs, Fast Quads, Total Chairs and Vertical Drop.

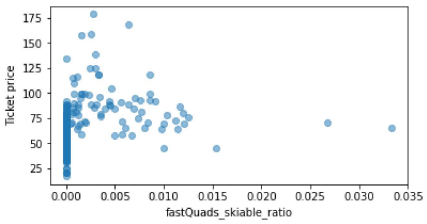


Interestingly, the total number of chairs seems to have a negative correlation with price. It may be because more chairs will enable a resort to serve more customers and benefit from the higher number of visitors. An exception to this was Fast Quads which seem to have a positive correlation with ticket price.



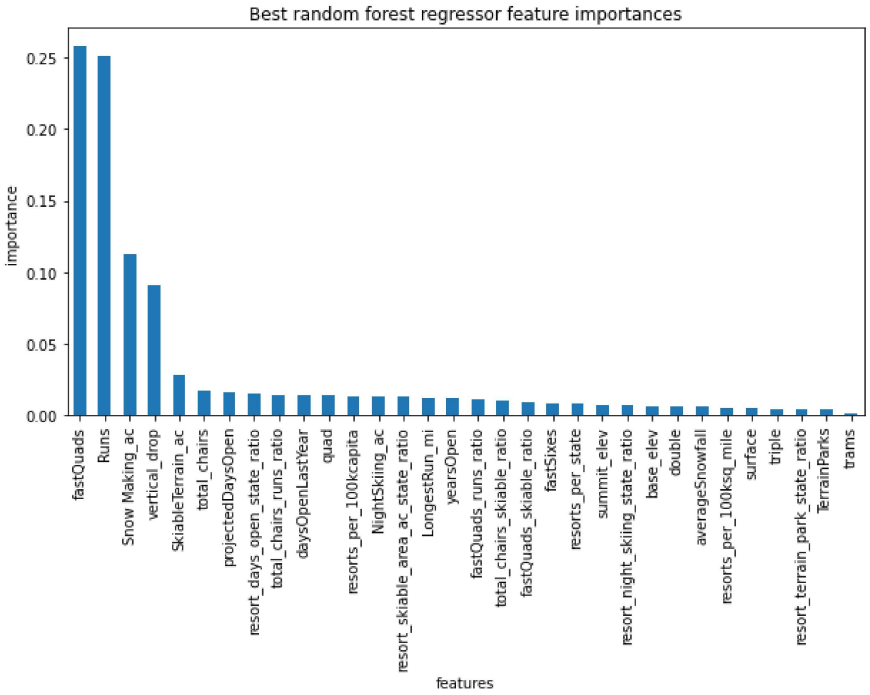






In the pre-processing and training stage, linear regression and random forest regression models were built and their performance was assessed with cross-validation. The random forest model was chosen because it had the least mean absolute error and variance.

The random forest regression model revealed the features that were most important to our dependent variable, ticket price.



In the end, the chosen model was used to predict Big Mountain ticket price. It calculated Big Mountain's price to be $95.87 with an expected mean absolute error of $10.39. The current ticket price is $81.00

Limitation: This model assumes that the market correctly determined other resorts' prices. It is possible that some resorts are 'overpriced' or 'underpriced'.

Proposed Scenarios Tested with the Model

1. Permanently closing down up to 10 of the least used runs. This doesn't impact any other resort statistics.

According to the model, 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.

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.

This scenario increases support for ticket price by $8.61. Over the season, this could be expected to amount to $15,065,471

3. Same as number 2, but adding 2 acres of snow making cover

This scenario increases support for ticket price by $9.90. Over the season, this could be expected to amount to $17,322,717

4. Increase the longest run by 0.2 mile to boast 3.5 miles length, requiring an additional snow making coverage of 4 acres

This measure will not result in any change in revenue.

This model can be provided as an application that the management team can use to test any combination of ideas for future changes.