

# Big Mountain Resort Price Analysis Report

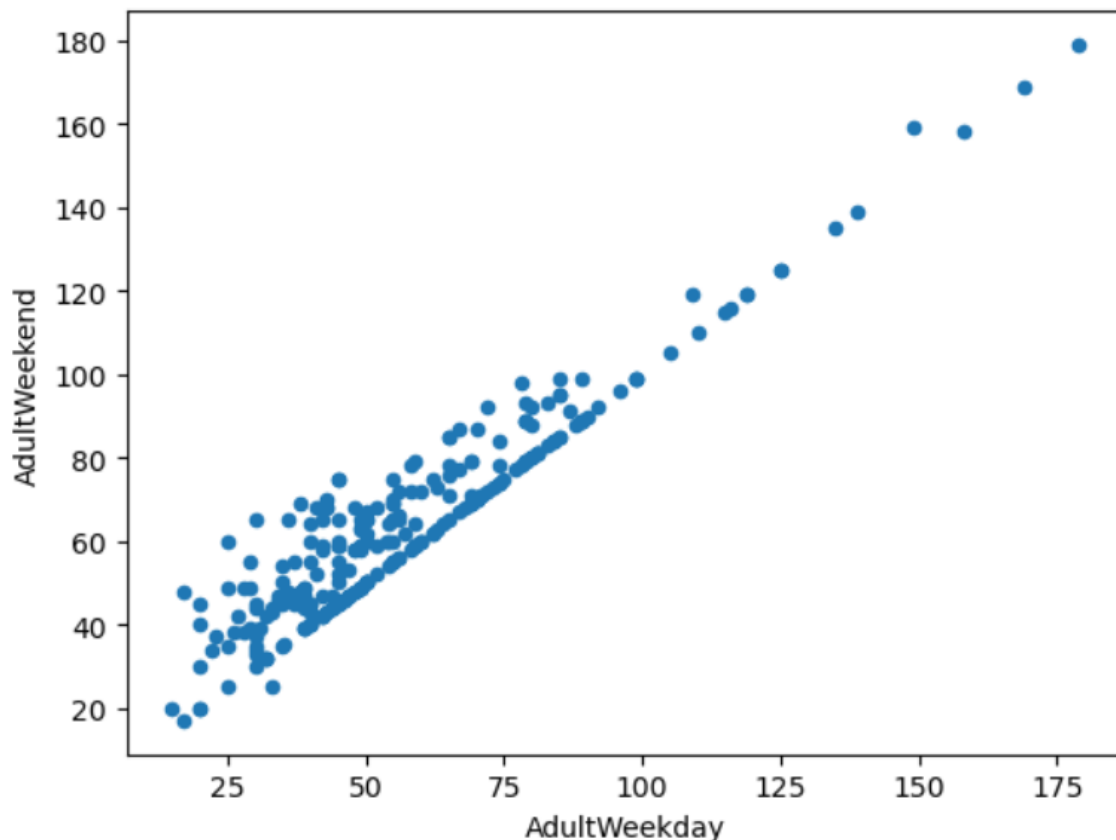
## Introduction:

Big Mountain Resort boasts breathtaking views of Glacier National Park and Flathead National Forest, offering access to a vast network of 105 trails. Annually, approximately 350,000 skiing and snowboarding enthusiasts visit Big Mountain. With accommodation suitable for all skill levels, the resort features 11 lifts, 2 T-bars, and 1 magic carpet designed for novice skiers. The premier run, named Hellfire, stretches an impressive 3.3 miles in length. Situated at a base elevation of 4,464 ft and summiting at 6,817 ft, the resort provides a vertical drop of 2,353 ft. To enhance visitor distribution across the mountain, Big Mountain Resort recently installed an additional chair lift, increasing operating costs by \$1,540,000 for the current season. This new operating cost has made business leaders rethink their pricing strategy.

## Problem:

Big Mountain Resort is in need of a new pricing strategy. How Big Mountain Resort can increase their net income (revenue minus costs) by 10% within a year by adjusting the ticket price and/or operating costs?

## Data Wrangling:

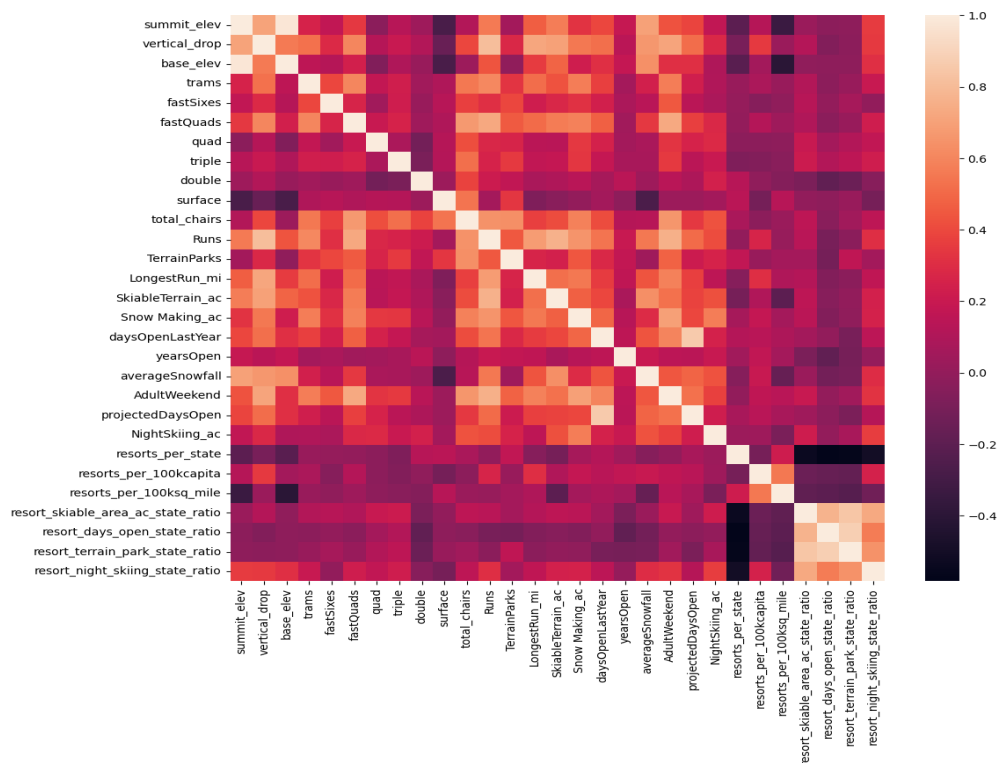


From the dataset AdultWeekend and AdultWeekday prices were analyzed to check if there is any difference in ticket prices for weekend. As shown in the graph above most states had the same prices for both.

AdultWeekend and AdultWeekday prices matched for Montana. Addition to that AdultWeekday had more missing values than AdultWeekend. Therefore, AdultWeekday was dropped from dataset. FastEight column had more than 50% null value which was dropped. Addition to that some other columns were dropped as well due to missing values. At that point we were left with 277 of the original 330 rows.

## Exploratory Data Analysis:

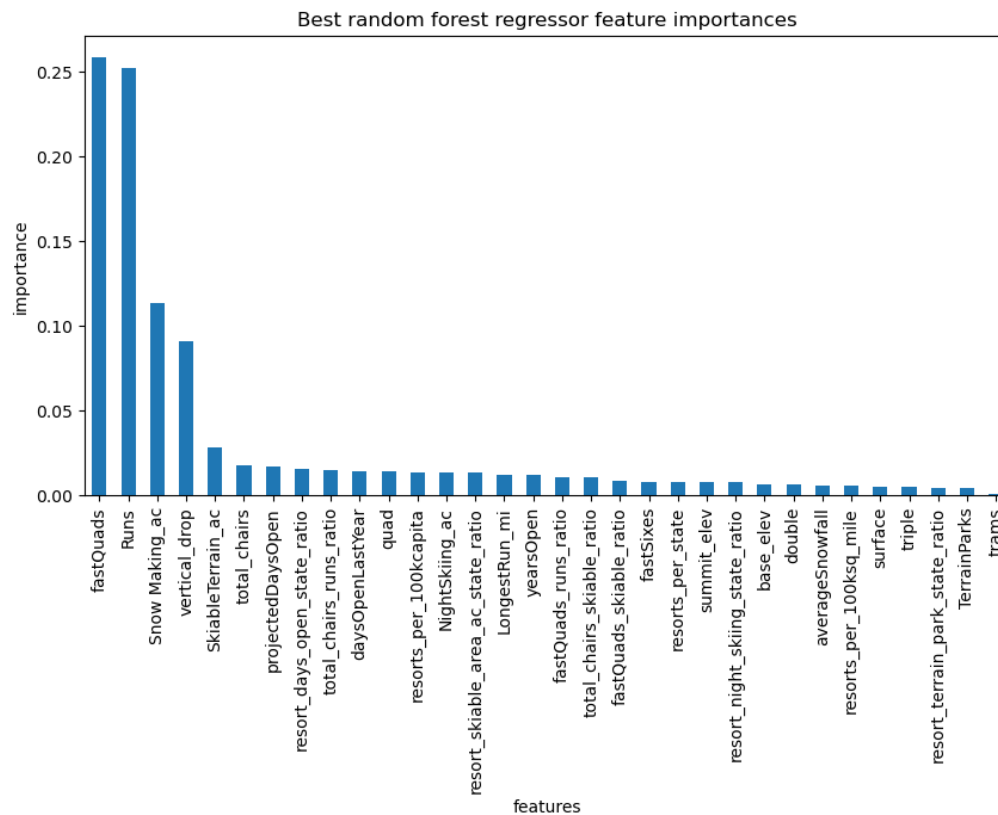
In order to find patterns and trends in the data, we need to explore and analyze the data. Firstly, we analyzed the relationship between the number of resorts per 100k population and numbers of resorts per 100k area. For further analysis we scaled numeric data and calculated Principal Cumulative Analysis (PCA) which showed that the first two components seem to account for over 75% of the variance, and the first four for over 95%. Then I plotted the average ticket price. For further analysis I created a heatmap to better visualize the relationships between datasets.



Based on the results shown above we can predict that there is a positive correlation between AdultWeekend and fastQuads, Runs, Snow Making\_ac and resort\_night\_skiing\_state\_ratio. Additionally, Runs and total\_chairs are quite well correlated with ticket price. Using these features, we can construct a model capable of predicting a new data-driven ticaret price.

## Model Preprocessing with feature engineering:

After identifying the four categories with the strongest correlation to price, the first step was to identify best price. Based on the calculations of mean absolute error, it can be concluded that the initial estimate was off by \$19, indicating a significant discrepancy in price prediction. Imputed missing values by median and the Mean Absolute Error was only off by \$9 this time. In order to get a better result, we created a data pipeline, and we suspected that model was overfitting. The next regression was based on Random Forest Model. Imputing medians helped with the MAE of our four components. Then, calculated mean absolute error using cross-validation to choose between linear model and a random forest model. The mean absolute error of random forest model was down almost by \$1 and it also exhibits less variability.



## Modeling

I used datasets and random forest model to get a ticket price that would be affordable to Big Mountain Resort. We analyzed final model using 8 features which includes vertical\_drop, Snow Making\_ac, total\_chairs, fastQuads, Runs, LongestRun\_mi, trams and SkiableTerrain\_ac. Further, we analyzed where Big Mountain Resort is ranked in the categories mentioned above.

Based on the analysis we concluded that Big Mountain Resort either ranks high or is well above average in each category. Big Mountain Resort has many facilities

which would help increase the price strategy. Model predicted the price of \$95.87 per ticket.

## Conclusion

Based on analysis we can conclude that Big Mountain is charging little less compared to their facilities. They should raise their ticket price by \$10. In addition to that Big Mountain can close their 2-5 runs to save operation costs. According to predictive analysis using the Random Forest Model, Big Mountain Resort can afford to keep up to 5 runs closed without experiencing a significant decrease in revenue as shown below:

