

# **BIG MOUNTAIN RESORT**

## **Ticket Pricing Strategy Recommendations**

### **Problem Statement:**

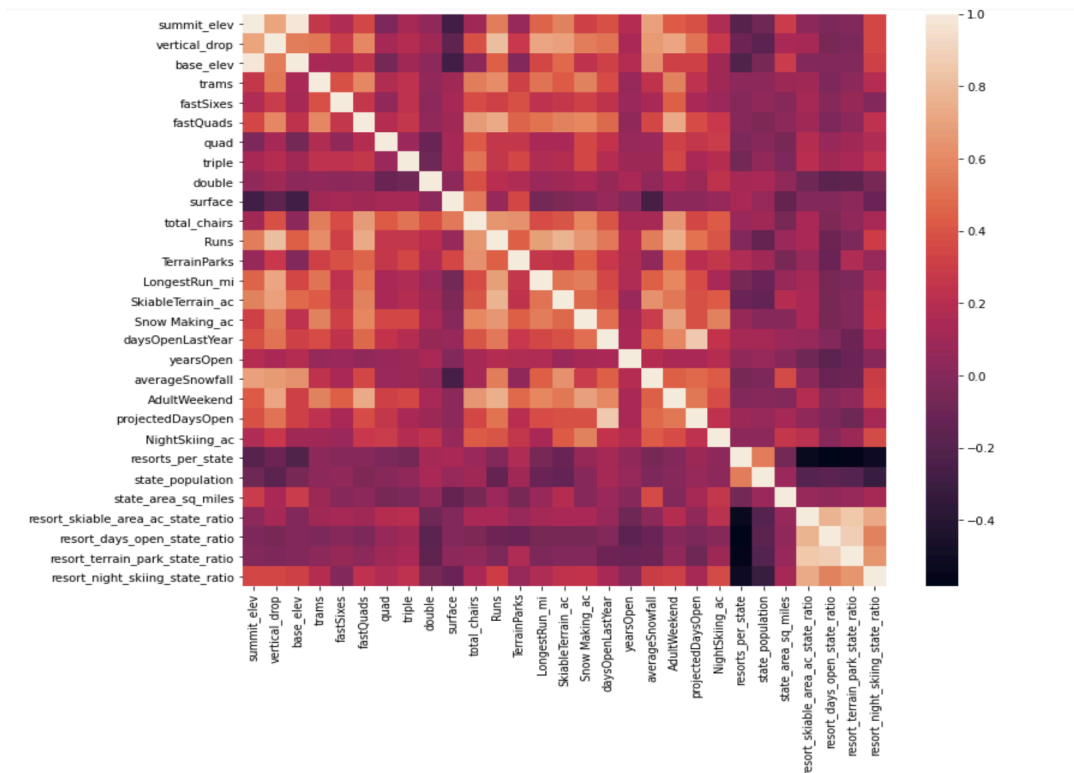
The changes needed to be made at the Big Mountain Resort to increase the revenue of Big Mountain Resort by 15%, increase ticket prices by 10%, increase the number of operational days by 10% and offer year-round activities like festivals to attract visitors, and 20% increase in revenue from non-ticket sources such as food & beverage, retail and rental equipment offerings. The project implementation strategy must be in place in the next 6-months, before the beginning of the upcoming opening season.

### **Data Wrangling:**

We start with the original dataset of 330 rows and 27 columns with two columns Adultweekend and Adultweekday being the only two features related to the prices we are looking at. Based on the first look at the information about the dataset there are several columns with missing values, which has to be investigated further. The target resort is part of the dataset with no missing values, which is good. We dropped two columns fastEight and Adultweekday. fastEight because 50% of its data was missing and most of the other rows were valued at 0. Adultweekday because the prices for weekends and weekdays were the same for our target state, Montana and Adultweekday was missing more data. The rows with missing values in the AdultWeekend column were removed as well. The target column of 'Price' was the AdultWeekend column from now on. Some categorical feature investigations were interesting. Looking at the resort distribution w.r.t state, New York has more than 30, and Montana our state of interest has 12. The ticket prices w.r.t stats vary broadly between 25 USD and 100 USD, which is huge. Montana shows no price difference between the weekend and weekday prices - maybe something to look at. The analysis got us two tables, one for the state summary and the other for the ski data, which are saved for further analysis.

### **Exploratory Data Analysis:**

The state summary data did not give us any solid correlations or patterns that could be studied. However, the ski data was more promising. Based on the heat map, for our target feature, AdultWeekend ticket price, we can see quite a few reasonable correlations. fastQuads, Runs, Snow Making\_ac total\_chairs and vertical\_drop stand out. Of the new features, resort night skiing state\_ratio seems the most correlated with the ticket prices.



### **Model Preprocessing with Feature Engineering:**

First we partition the data into training set and testing set to get a more accurate assessment of how the model might perform in the future. However, a common mistake is to use the test set repeatedly to evaluate and compare multiple models. Then we use R-squared, Mean Absolute Error (MAE) and Mean Squared Error (MSE) to check the model's goodness. Cross-validation helps avoid this issues of overfitting. It allows us to assess model performance more reliably, ensuring the model's expected future performance is based on a more independent evaluation. The test split is then used as a final check on the model's performance.

### **Algorithms used to build the model with evaluation metric:**

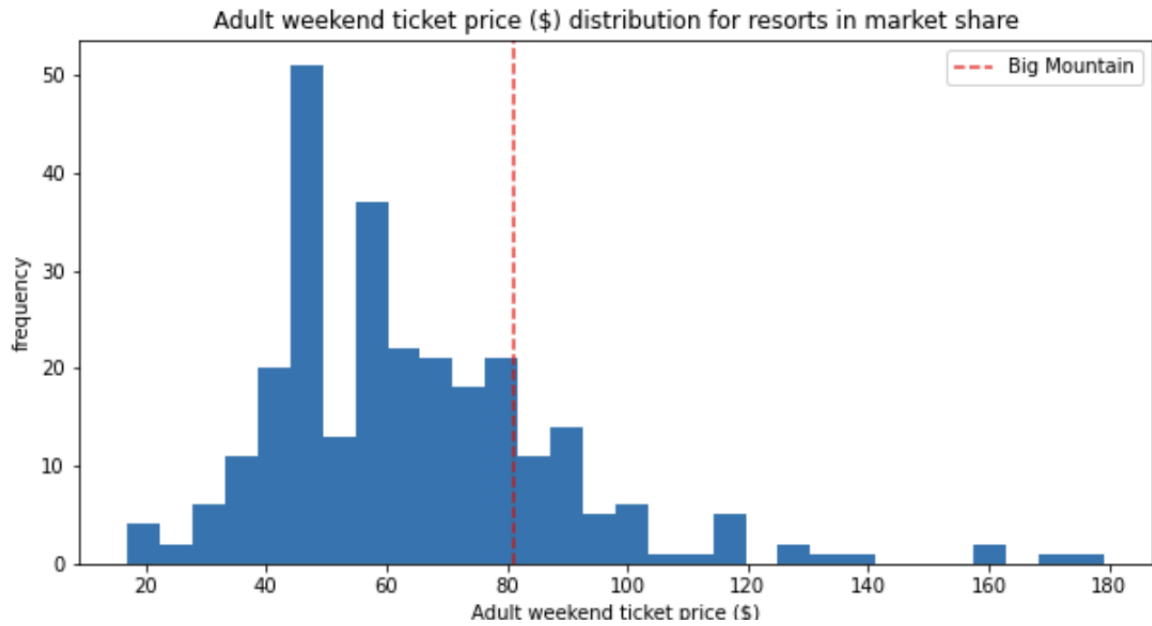
Two models were used and tested to see which one would better represent the data. The linear regression model and the Random Forest Model. The dominant top four features are in common with the linear model are fastQuads, Runs, Snow Making\_ac, and vertical\_drop.

### **Winning model and scenario modelling:**

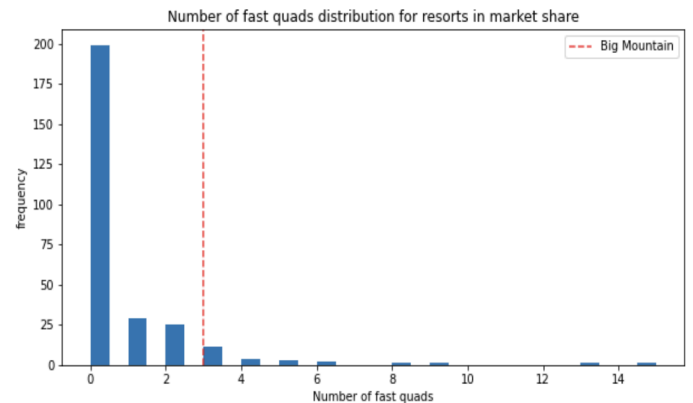
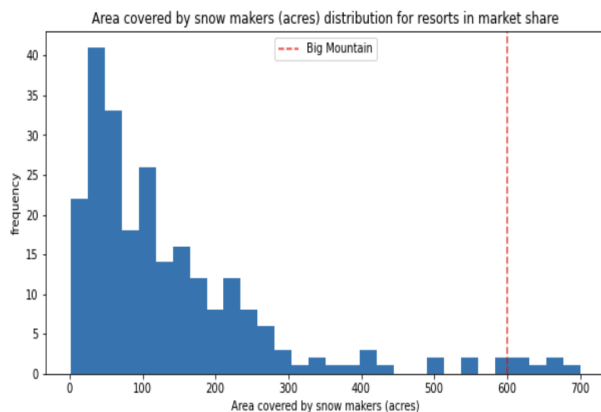
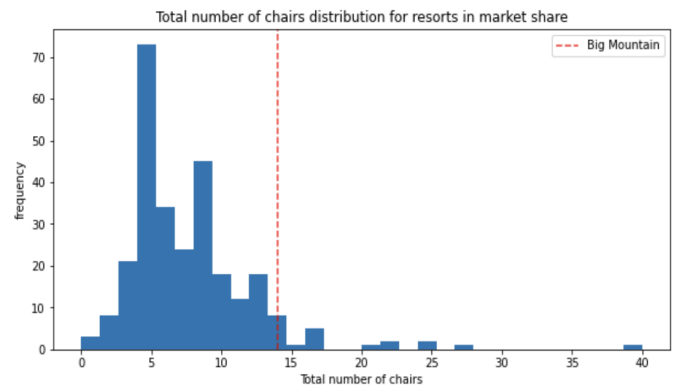
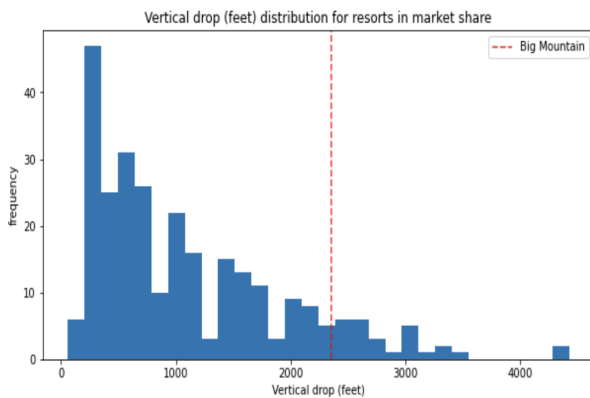
Based on the performance matrices (Rsquared, MAE and MSE) and crossvalidation, Random Forest Model better. The random forest model has a lower cross-validation mean absolute error by almost \$1. It also exhibits less variability. Verifying performance on the test set produces performance consistent with the cross-validation results.

### **Price Recommendation:**

Here is where Big Mountain sits overall amongst all resorts for price and for just other resorts in Montana.



The original price for the ticket for Big Mountain resort is 81.0 USD and the price suggested by the model is 95.97 USD. With the expected Mean Absolute Error is \$10.5, there is definitely a room for increase in the ticket price. In the model, the important features that showed maximum effect were vertical drop, snow making, total chairs, and fast quads. In all of these 4 features Big Mountain is near the top compared to other ski resorts. If the ticket prices are increased to the suggested amount, the cost of adding the chair lift would be covered over the season as the revenue seems to increase by nearly the same amount. For future improvements in would like to take a more closer look at the senario 2, i.e. on Runs, vertical drop, and total chairs features to see at what point would increasing those features maximize the ticket prices. The distributions for these features are below:



**Conclusion:**

The Big Mountain Resort has an option to increase the ticket prices by upto 15% in order to increase the revenue for the next season and compensate for the operational costs incurred by installing the additional chair lift. Also, the resort is placed at high places in almost all the ammenities given by the resorts in montana, this cost increase is justifiable.

**Future Scope:**

It would be helpful to look at a number of things. We can look to increase the number of operational days and look whether that would help in increasing the overall revenue if we are able to offer any year round activities like festivals to attract visitors. We can also look at the non-ticket sources of revenue like the food & beverage, retail and rental equipmnet offerings and what charges can be put in place to boost it. Additionally we could look at the maintenance costs and how much is the resort spending on that and are there any equipments whos maintenance is costing more than it would to replace them completely. Based on the additional data we can try and predict the effect of these parameters on the model or create a new model so that the resort can make the maximum profits out of all the facilities that they offer, which is in many cases better than the other resorts.