Big Mountain Resort Guided Capstone Part 6

Analysis Report

Overview:

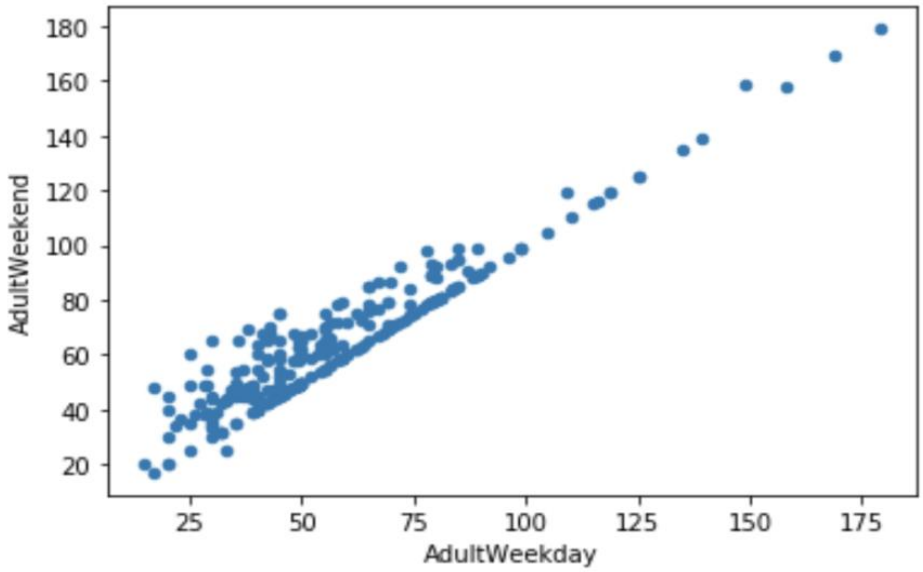
Big Mountain Ski resort in Montana, is a popular resort that offers unique views of the Flathead National Forest and Glacier National Park. Besides several ski runs, its services include 11 lifts, 2-T bars, and 1 magic carpet for novice skiers. Its longest run is 3.3 miles. Big Mountain Ski resort has recently installed a new chair lift to increase visitor's distribution across the mountain. This increased the operating cost by $1.54 million only this season. This increase has caused the business to rethink the pricing strategy, previously including a slight premium above the average price of resorts in its market segment.

Problem:

The need for a new pricing strategy is obvious to maintain profit. The approach is to develop a new pricing strategy based on data gathered from numerous ski resorts across the country. Create a pricing model that can determine a price that is competitive for customers and accurately reflects the significance of Big Mountain Resort's facilities.

Data Wrangling:

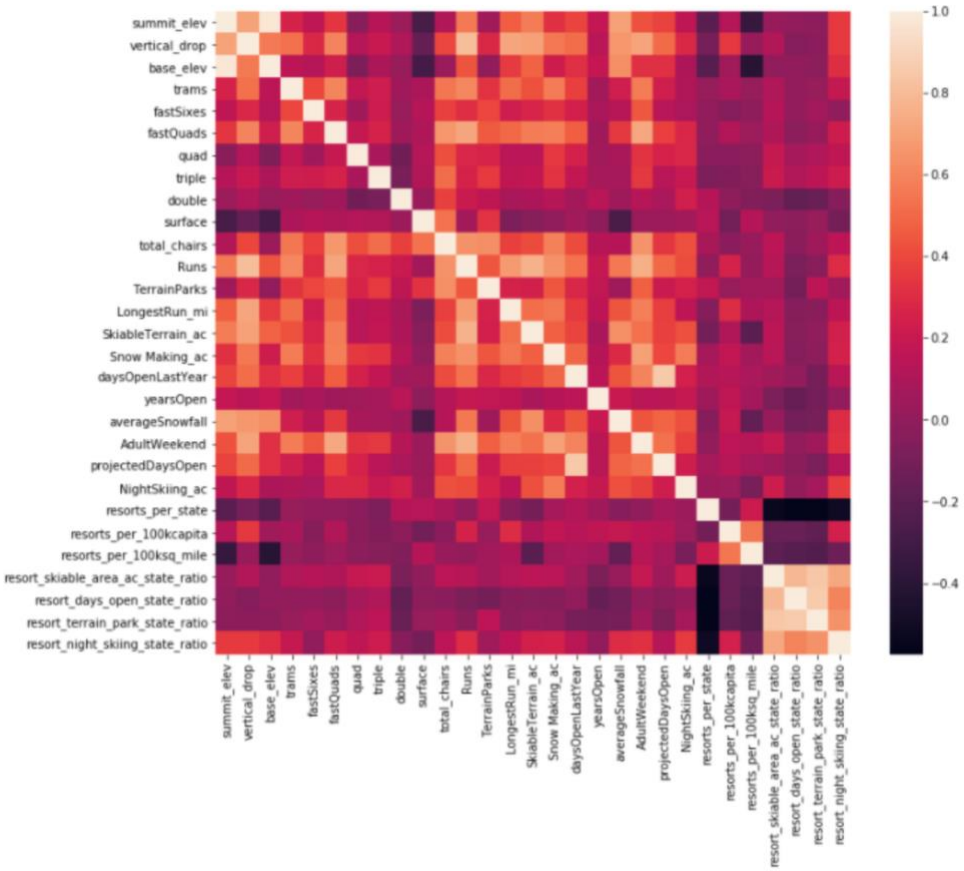
We first focused on the Adult Weekend and Adult Weekday prices to see if it was advantageous to have a different price for the weekend. Most states had the same price for each, seen in this graph:



After dropping missing values and we were left with 277 of the original 330 rows.

Exploratory Data Analysis:

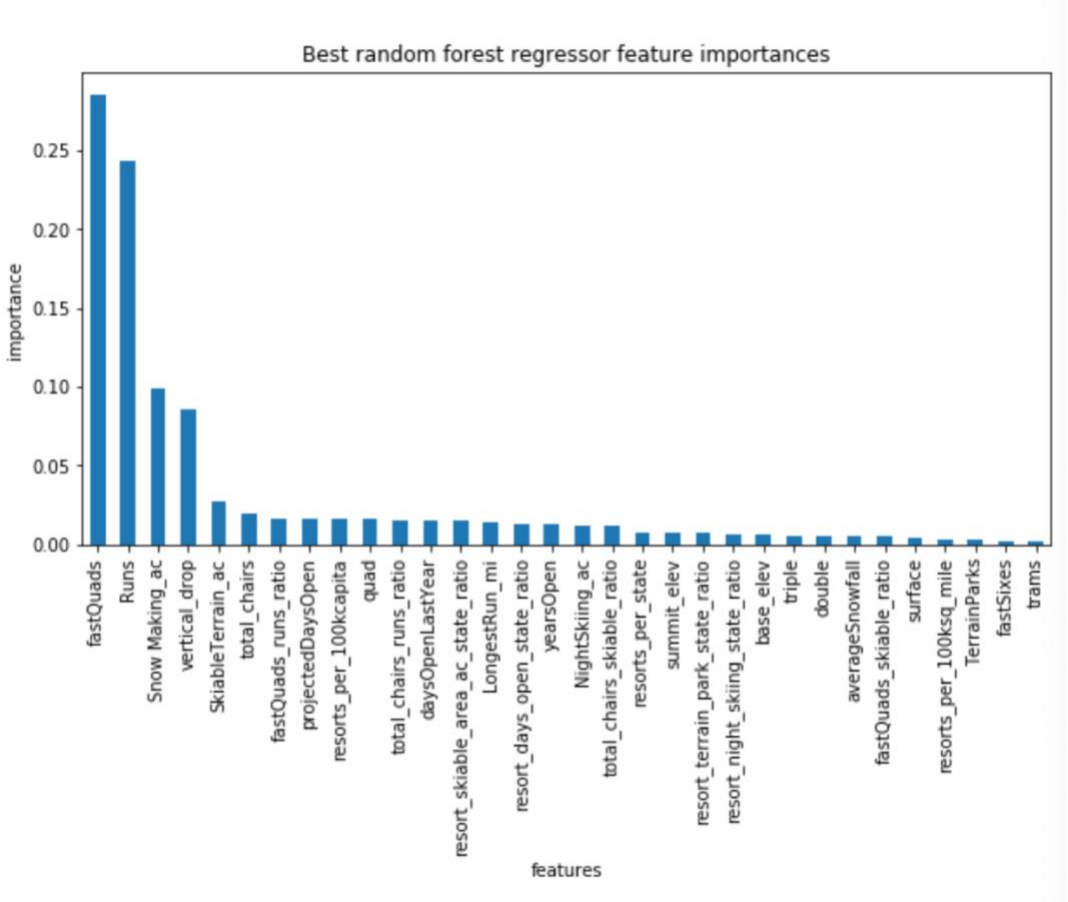
To find patterns, trends, and actionable insights in the data, we need to explore the set further to. First, we explored the relationship between the total number of resorts by population vs the total number of resorts by area. This didn't yield much as usable information for Big Mountain Resort, but it cleared up some initial thoughts. Next, I investigated the components like vertical drop or skiable areas versus the price in each state. This required a PCA (Principal Cumulative Analysis), revealing that the first two components account for 75 % of the variance, and the first four account for 95%. Focusing on only 2 components, we scaled the data and added average ticket price to the scatter plot. To see a clearer relationship between price and components, a heatmap was created to better visualize the relationship between each feature.



The relationship in the "AdultWeekend" row shows that there is a positive correlation associated with fastQuads, Runs SnowMaking_Ac and resort_night_skiing_state_ratio. Now we can use these features to build a model to determine the new data-based ticket price.

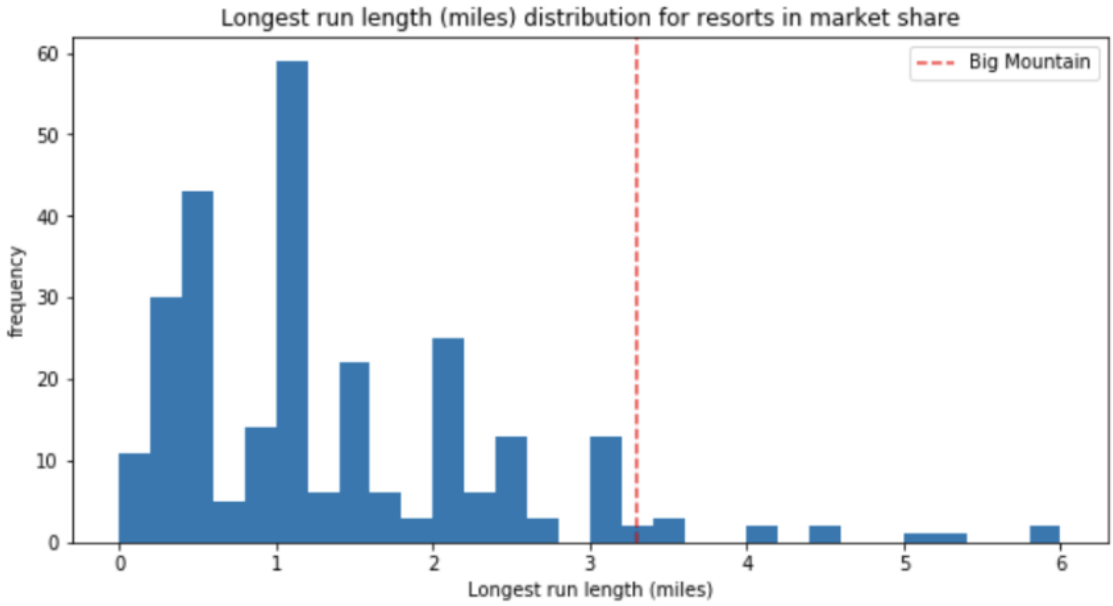
Pre-Processing and Training Data:

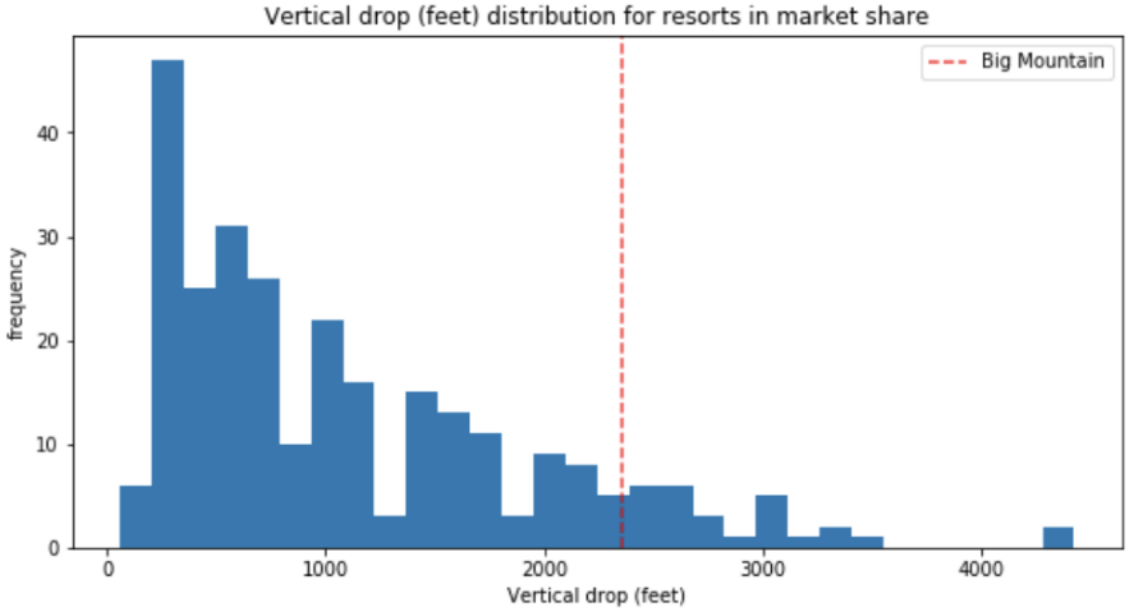
Now that the four categories with the strongest correlation to price were identified, an initial average as 'best guess' for pricing was taken. The result., $83.81, is the baseline we use to compare prices moving forward. Regression was performed using the median after the mean showed that the absolute error was off by almost $19. This got the Mean Absolute Error down to only $9. To further improve this a data pipeline was created to efficiently produce identical results to make comparison easier. The next regression was based on a Random Forest Model which helped identify that imputing the median value helps with the MAE of our four components. In addition to our four components, the vertical drop seemed to also play a big role in determining the ticket price. Once this new component was added, the Random Forest Model, the Mean Absolute error was down to around $1 which was an acceptable amount of variability.



Modeling:

Picking the top components and a method of regression, a model to give us data-based ticket prices was created. To make the model accurate as possible I boosted the number of components. To determine a fair price, the model showed how Big Mountain Resort (Red Line) ranked in all those categories compared to other Resorts. For example the vertical drop, or longest run:

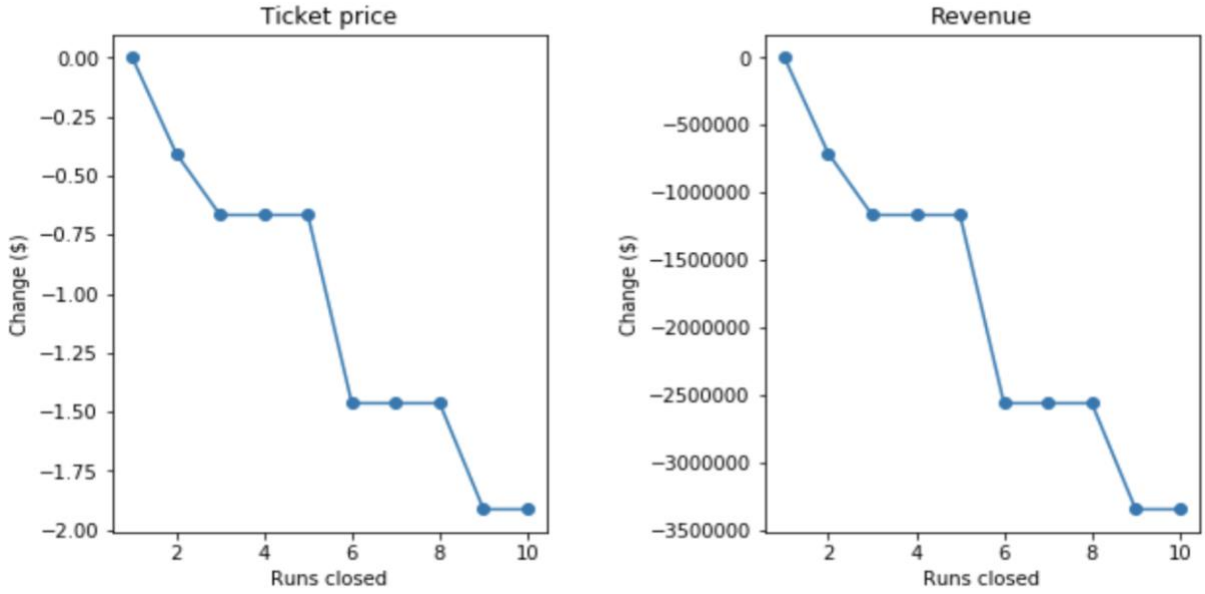




These results showed that Big Mountain Resort ranks high or well above average in each category. All this emphasizes that Big Mountain Ski Resort has an exceptioal stand in the market and their price should reflect that. The price the model predicted: $96.62, well above the current price, $81.00

Conclusion:

Compared to the outstanding features when compared to other resorts, it becomes clear that Big Mountain Resort is not capitalizing on it's market domination with its low ticket pricing strategy. They excel in 7 out of 8 price-determening features and should raise their prices by 10- 15 dollars. In addition, Big Mountain can save a lot of money on operating costs by not having all of their runs open at once. Based on the Random Forest Model (see below) Big Mountain can keep up to 5 runs closed without a huge drop in revenue.



We see a lot of opportunity for growth for Big Mountain Ski Resort and hope that the result of this analysis can be implemented to help keep this Resort open for decades to come.