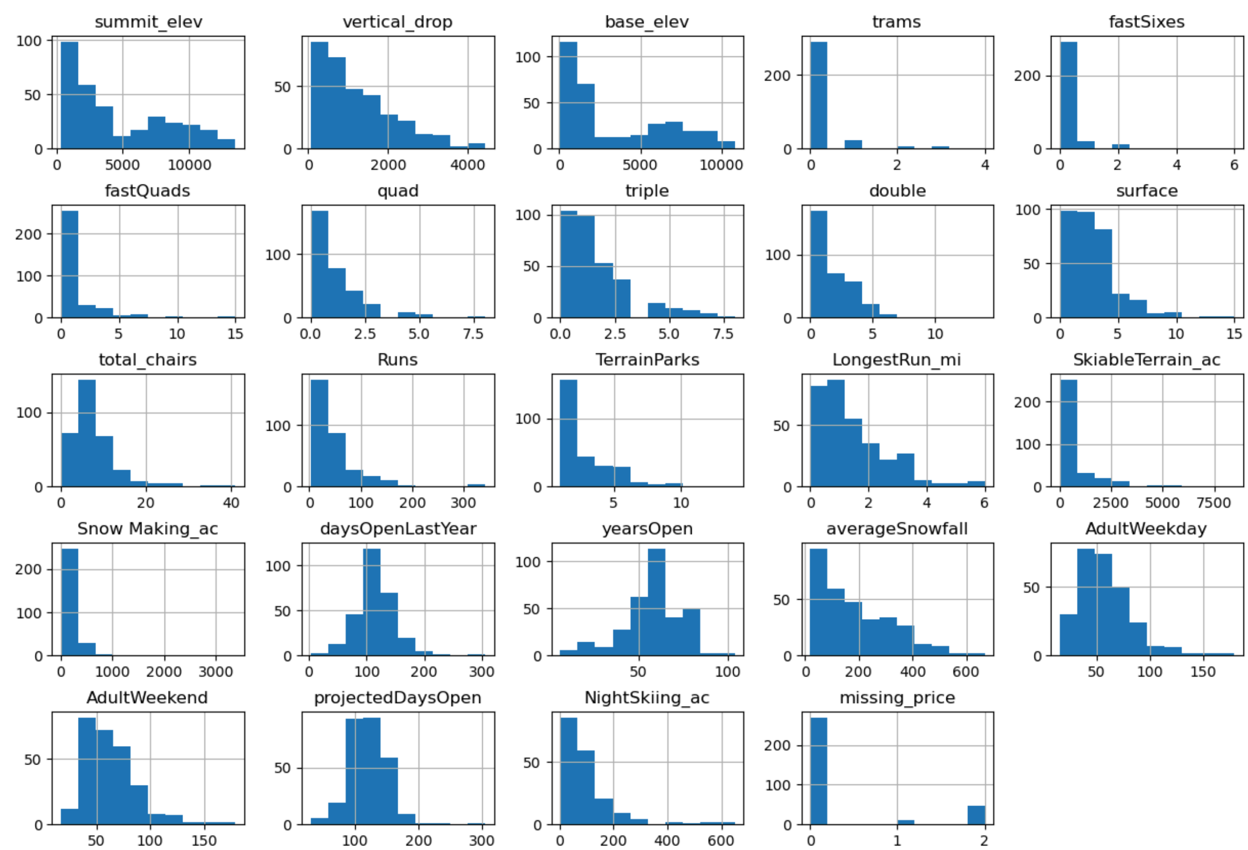
Guided Capstone Project Report

Problem statement

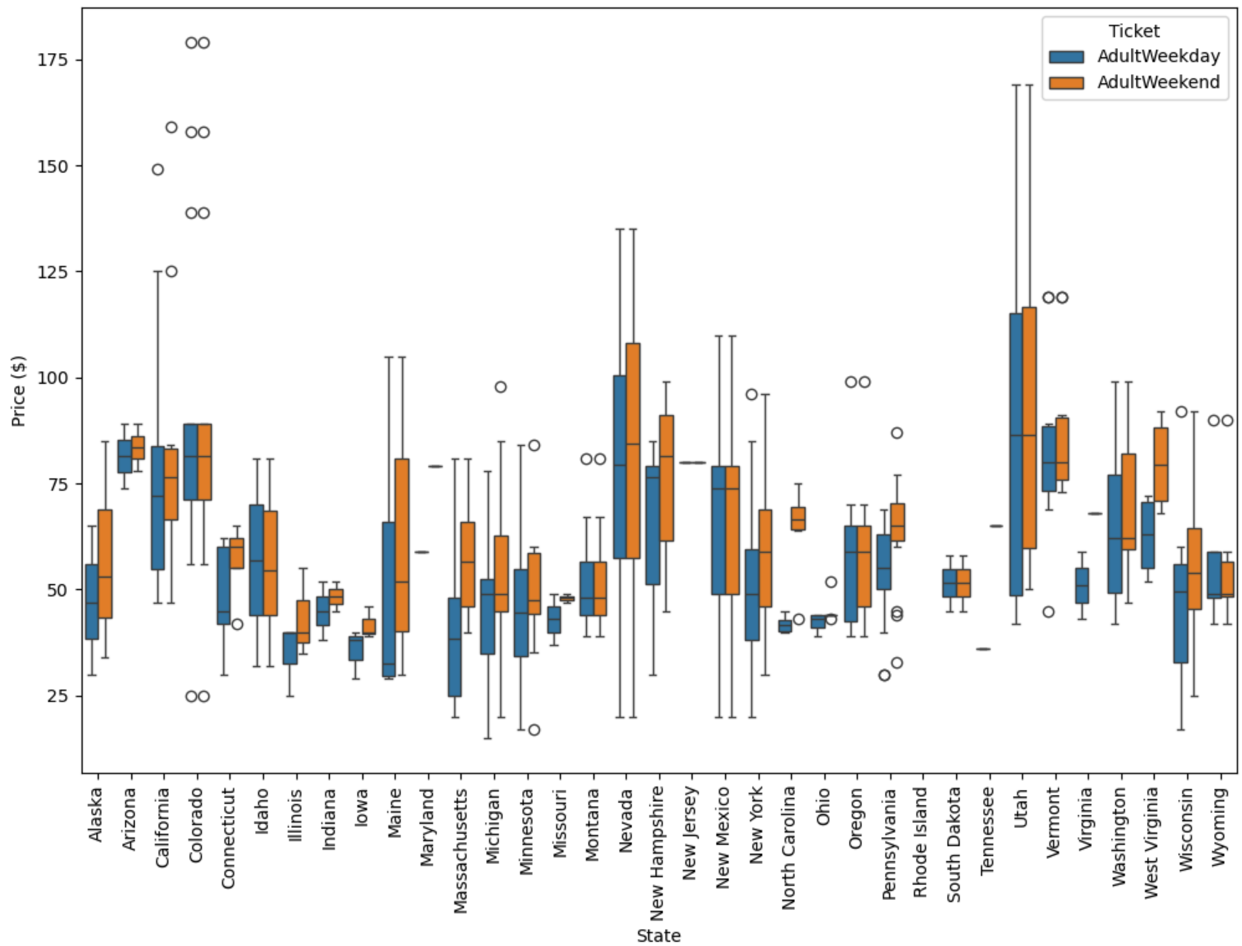
Big Mountain Ski Resort, located in Montana, has many features that make it a popular resort to visit. Ticket prices for Big Mountain are in the top 25% of resorts in our dataset. This analysis is to determine key features that drive Big Mountain's current pricing and explore how to maximize profits in future ski seasons.

Data Wrangling

Below are the features for each resort and their relative frequency. This is after removing rows and columns that are missing data entries. Those columns were 'FastEight' and 'AdultWeekDay'. 23 rows, or 23 resorts, were removed as well. That is equal to 14% of the resorts being unusable. That's okay, we have plenty of resorts to compare Big Mountain to after the cleaning.



Exploratory Data Analysis

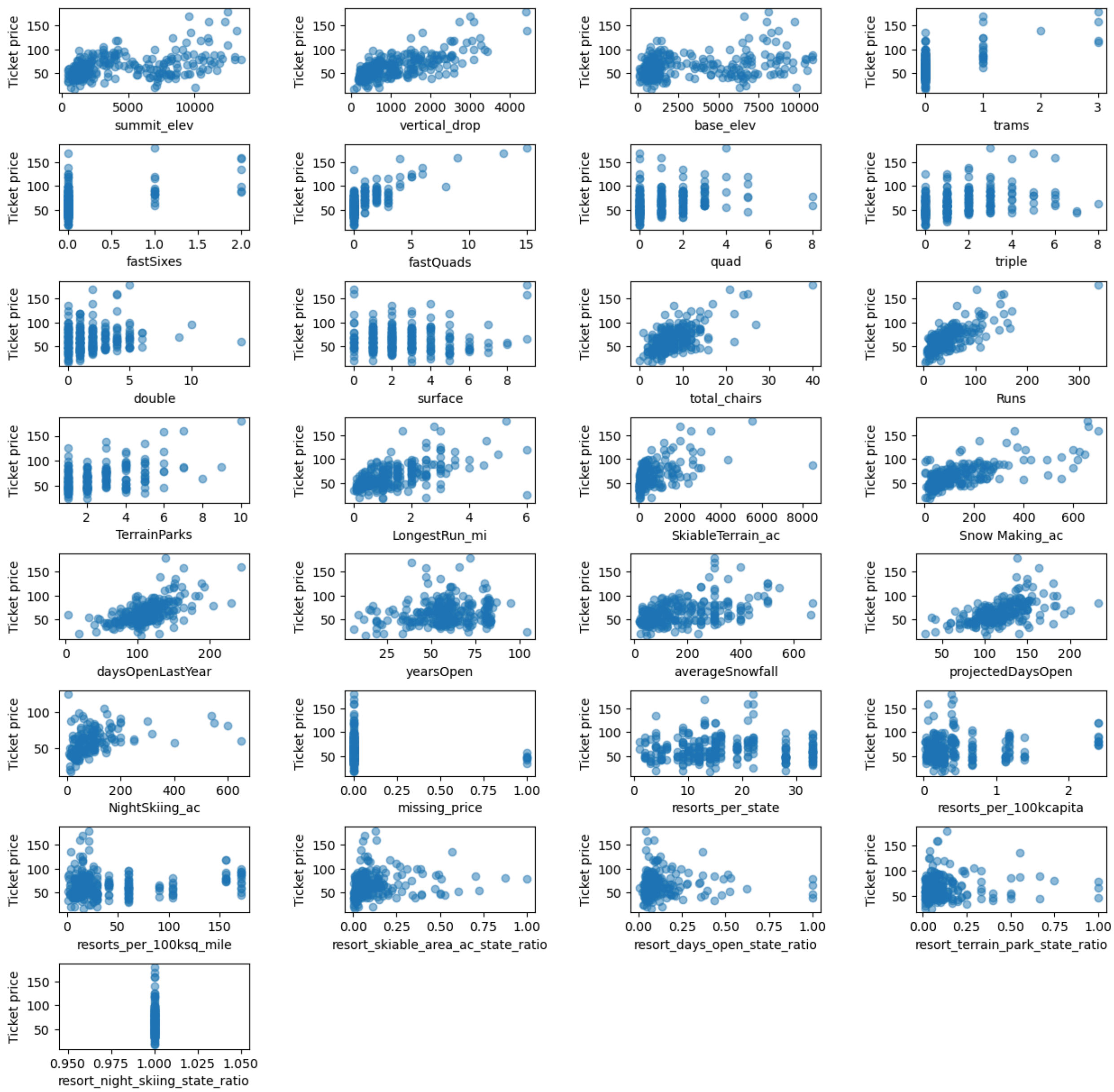


This table above gives us a visual representation of adult weekday and weekend prices for each state. There are a few outliers, but most the weekend and the weekday, ticket prices are almost the same. They also typically range from $30-$115. Big Mountain has the highest ticket prices for Montana at $81.

Since Big Mountain is already the most expensive resort in its state, state averages won't help much in determining how we can raise ticket prices. In the EDA we removed these columns as they were irrelevant in determining ticket pricing:

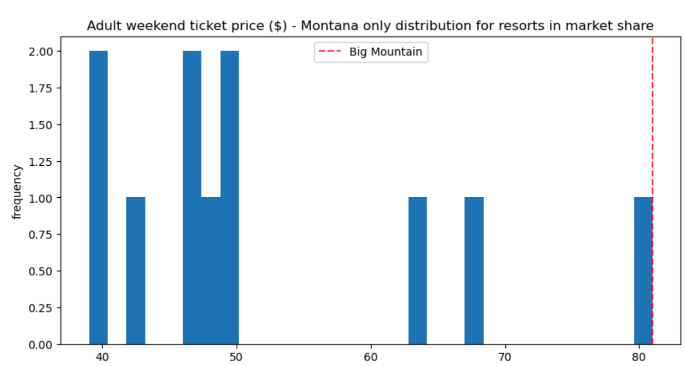
- 'state_total_skiable_area_ac'
- 'State_total_days_open'
- 'State_total_terrain_parks'
- 'state_total_nightstiing_ac'

Below are the features plotted against their frequency along the x-axis and the ticket price associated with that resort on the y-axis. We can see that vertical drop, number of chair lifts, snow making, and runs are key features in resorts with higher ticket prices. There is also a positive correlation between revenue and nearby parks.

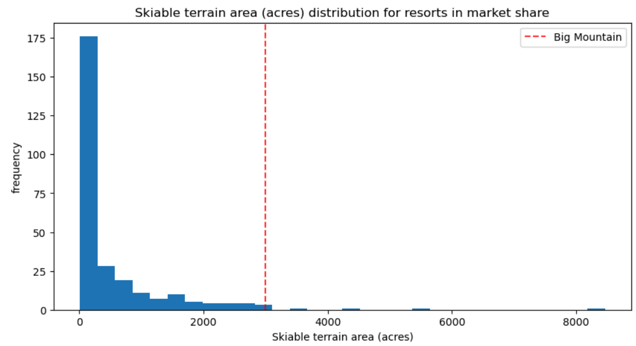


Modeling

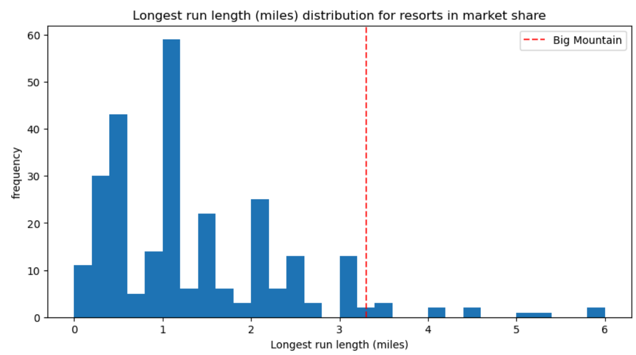
We tried using a linear regression model, but the R-squared value was negative, showing the model was performing worse than initially estimated. The forest regression model was chosen for this reason.



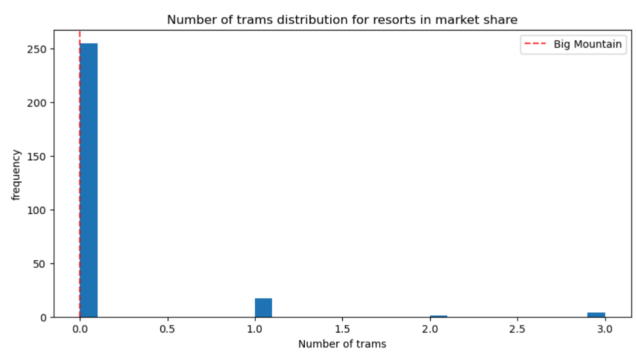
The histogram shows the average ticket prices in Montana. The red dashed line represents Big Mountain. We can see that most resorts in Montana charge $40-$50 for an adult ticket. Big Mountain charges double. In the graphs below, we highlight the features that make this premium pricing reasonable.



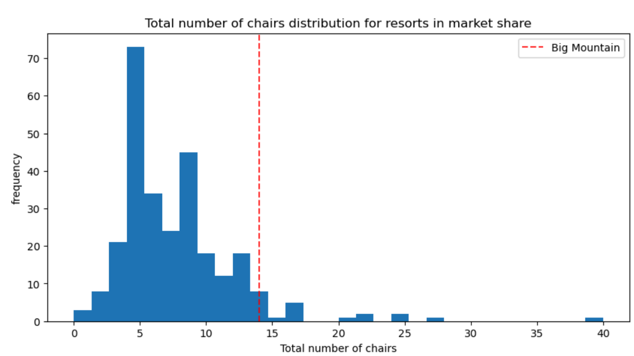
Skiable terrain is a key feature in determining ticket price. Interestingly, most resorts in our dataset seem to have a low amount of skiable terrain. Big Mountain has a lot compared to competitors, justifying its higher ticket prices.



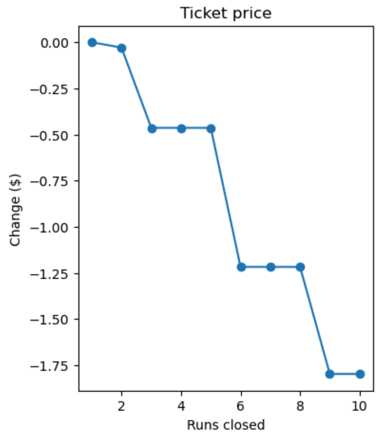
There isn't too much variability in run lengths. The average is 1 mile, with Big Mountain's being a little over 3 miles. Not many resorts have runs exceeding the average length.

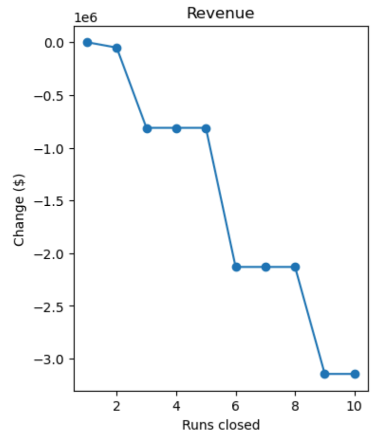


Here is an example where Big Mountain is average! Most resorts don't have any trams. Some have 1 and there is an outlier of 3 trams. Since most resorts don't have any trams, it isn't a feature that influences ticket price.



Big Mountain has more chairs than most, but here we see more of normal distribution than the previous histogram.





These two plots show how closing runs will impact ticket price and overall resort revenue. Taking off one run won’t make a big difference, but closing 5 or more runs would lead to a large decrease in ticket price.

Recommendations

In this phase of analysis, we simulated a few scenarios.These scenarios supported ticket prices increasing by at least $1.68, bringing in over $2 million more each season. The most profitable scenario involved increasing the vertical drop by 150 feet. Being more adventurous by increasing it to 300 feet would double this estimate, but may not be possible because of physical and safety constraints.

To decrease operational costs without cutting ticket prices, I would close 1 to 4 of the least popular runs. This reduction in runs can be offset by adding 1 or 2 chair lifts and increase vertical drop height by at least 150 feet. While snowmaking capability is an important feature amongst highly profitable resorts, increasing snowmaking by 2 acres did not yield a significant revenue increase. The same is observed for increasing the longest run length by 0.2 miles.

Future Analysis

I would like to see more data on costs regarding employees, maintenance, and additional chairlifts. Increasing vertical height and number of chairlifts would likely result in needing to hire more employees, leading to costs associated with recruitment, training, benefits, and wages. The additional amenities would likely lead to more guests staying at the resort, so there would need to be more lodging and employees as to not lower the quality of their visit. The extra revenue might be limited from these added operational costs. It would also be beneficial to our analysis to include guest demographics (in state visitors versus out of state visitors).