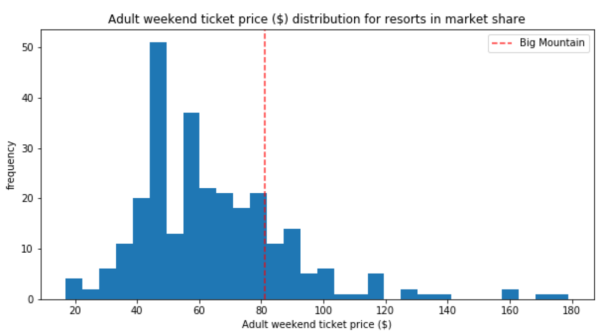
Summary

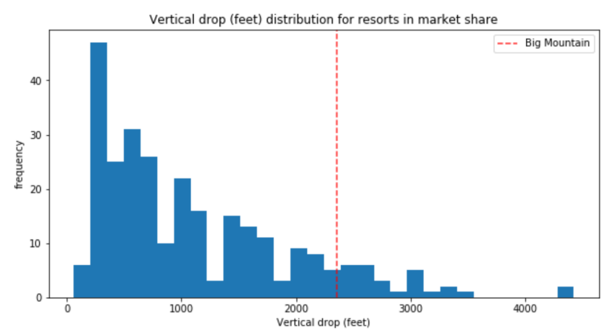
Big Mountain Resort, a ski resort located in Montana, offers spectacular views of Glacier National Park and Flathead National Forest, with access to 105 trails. The resort has recently installed an additional chair lift to help increase visitors' distribution across the mountain, which increases their operating costs by $1,540,000 this season. The business wants some guidance on how to select a better value for their ticket price. They are also considering several changes that they hope will either cut costs without undermining the ticket price or support an even higher ticket price. Our objective is to determine the reasonable ticket price that can help them increase the revenue by $1,540,000 this season.

We have built two models, a linear model and a random forest model. We have decided to use the random forest model as our final model to predict the ticket price because it exhibits less variability since it has a smaller mean absolute error by almost $1 compared to the linear regression model. After successfully building our model, we use it to gain insight into Big Mountain's ideal ticket price and how that might change under various scenarios by taking our model testing with different parameters/features. We can assume that a free market sets prices as our model relies on the implicit assumption that all other resorts are primarily setting prices based on certain facilities' value. Specifically, we first made the visualizations to compare Big Mountain with other resorts in different states using a variety of features:

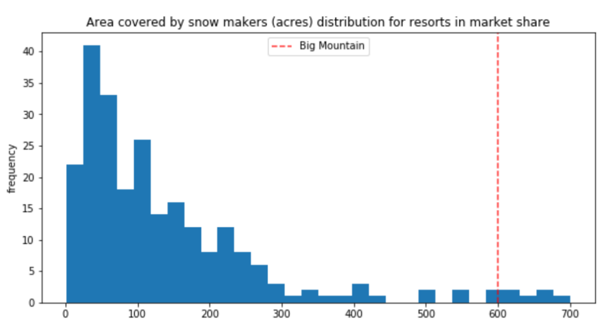
1. Ticket Price (AdultWeekend)



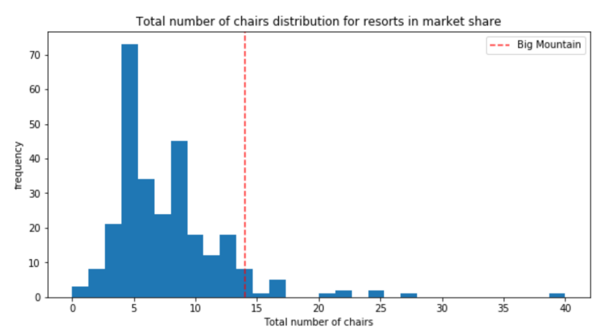
2. Vertical Drop (vertical_drop)



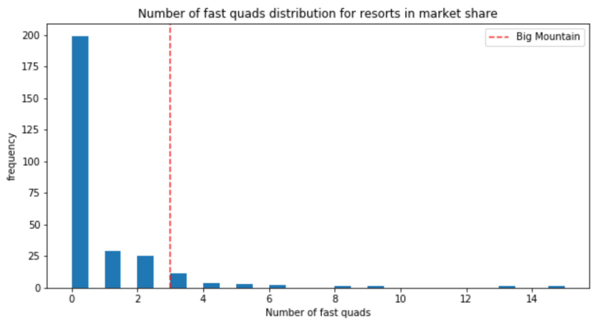
3. Snow Making Area (Snow Making_ac)



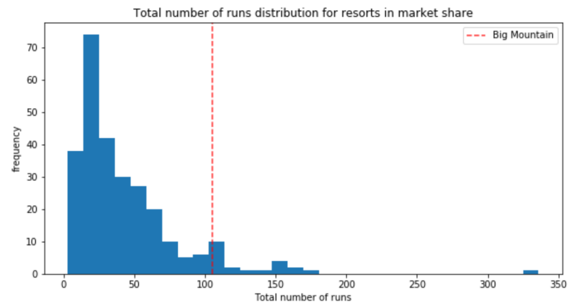
4. Total Number of Chairs (total_chairs)



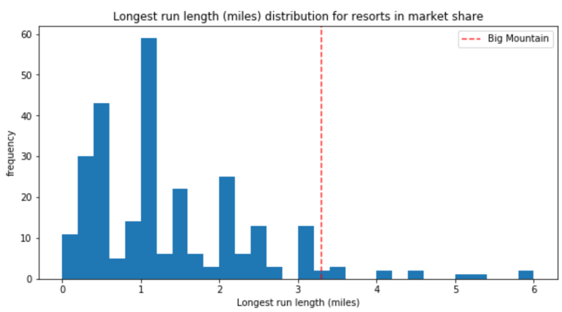
5. Fast Quads (fastQuads)



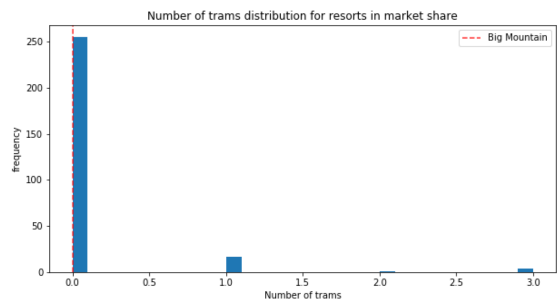
6. Total Number of Runs (Runs)



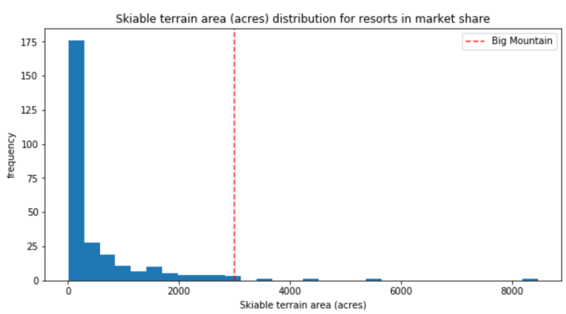
7. The Longest Run (LongestRun_mi)



8. Number of Trams (trams)



9. Skiable Terrain Area (SkiableTerrain_ac)



After calculating the expected ticket price for Big Mountain from our model, we noticed that Big Mountain currently charges $81.00 and our model suggests $94.22 for a ticket price that could support Big Mountain's facilities in the marketplace. We then also made four scenarios to test our model and gained some interesting insights:

1. The more runs Big Mountain closes down, the more drops it will see in the ticket price and revenue. Therefore, they should not close down any runs.
2. If Big Mountain adds a run, increases the vertical drop by 150 feet, and installs an additional chair lift, it will see increased support for ticket price by $8.46, which could be expected to amount to $14,811,594 over the season. If it further adds 2 acres of snow-making cover, it will see the increased support for ticket price by $9.75, which

could be expected to amount to $17,068,841. Even though it is a slight increase, it will help the business increase the revenue over the season.

3. There is no difference in the ticket price if Big Mountain increases the longest run by 0.2 miles and guarantees its snow coverage by adding 4 acres of snow-making capability.

Based on the above insights, we can recommend Big Mountain to add two runs, increase the vertical drop by 150 feet, install an additional chair lift, and add 2 acres of snow-making cover for one season to see the revenue changes. Suppose they see the benefits in supporting the ticket price by doing so, and more importantly, the revenue is still performing well. In that case, they should consider adding four runs, increasing the vertical drop by 300 feet, installing two additional lifts, and adding 4 acres of snow-making cover for the following season.