We have reviewed and analyzed the data provided to me by Big Mountain Resort to solve their pricing problem. Using the data, we were able to build a model to calculate ticket price based on various scenarios. The data had many different features, some were useful and some were not. We dropped whatever features we didn't need and entries that had insufficient data. This still left us with a lot of data to analyze. We first took a look at the data by grouping it by state to see if being in a different state was a significant factor. There was no pattern found between the features of the states and the ticket price as shown in figure 1.

We built two different models for the data, first using linear regression, and then using random forest. The linear regression model was okay, but didn't give us the best results. It showed us that vertical drop and snow making area covered were the most important features to increasing ticket price. The random forest model gave us a more accurate model for our data, having a mean absolute error of 9.53 versus the 11.79 that the linear regression model had. As shown on figure 2, the most important features according to the random forest model are number of fast quads and number of runs.

Now we create different scenarios to enter into our model. The first scenario is closing up to 10 of the least used runs. We find that closing one run makes no difference, but after that we see a drop in ticket price. There is no loss in ticket price from 3 to 5 so they want to close 3, they might as well close 4 or 5. This is shown on figure 3, which shows the ticket price drop as well as the revenue drop. The second scenario we experimented with was adding a run, increasing vertical drop by 150 feet, and installing an additional chair lift. This scenario resulted in a ticket price increase of $1.99, which leads to an increase in revenue of $3,474,638 over the season. In the third scenario, we did the same thing but added 2 acres of snow making. This gave us the same result as in scenario two, which means a small increase in snow making area makes no difference. For the fourth scenario, we increase the longest run by .2 miles and increase snow making by 4 acres. This resulted in no difference in the ticket price, which makes sense because we can see on figure 2 longest run is not one of the more important features.

Finally, using our model to calculate Big Mountain Resort's price based on their current features, we find that their modelled price is $95.87. This is an increase of $14.87. With an expected absolute mean error of $10.39, that means they can increase their ticket price by at least $4.48. We can see from scenario two, a ticket price increase of $1.99 leads to a revenue increase of $3,474,638, which would be more than enough to cover the operating cost of $1,540,000 for the new chair lift. My recommendation for Big Mountain Resort for the upcoming season is to increase their ticket price by at least $4.48, which will be enough to increase their profit.

Figure 1.

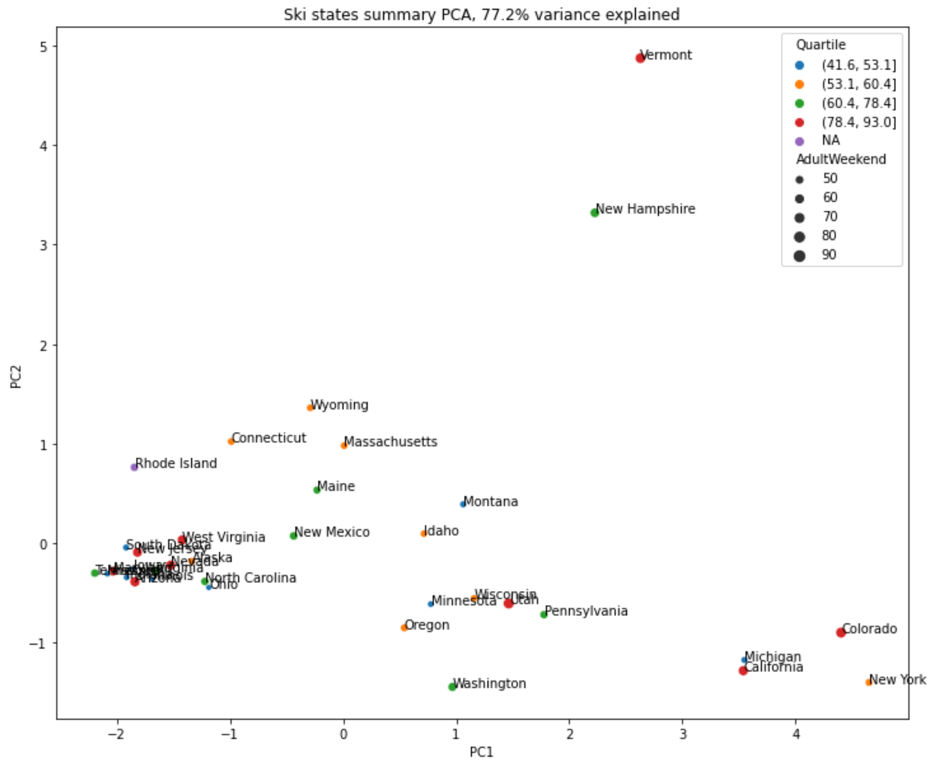



Figure 2.

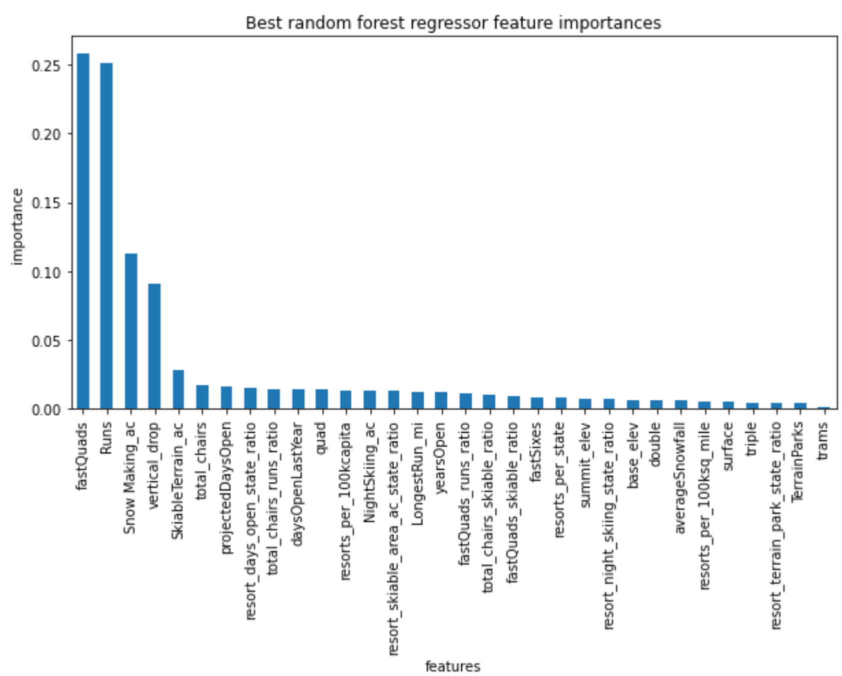
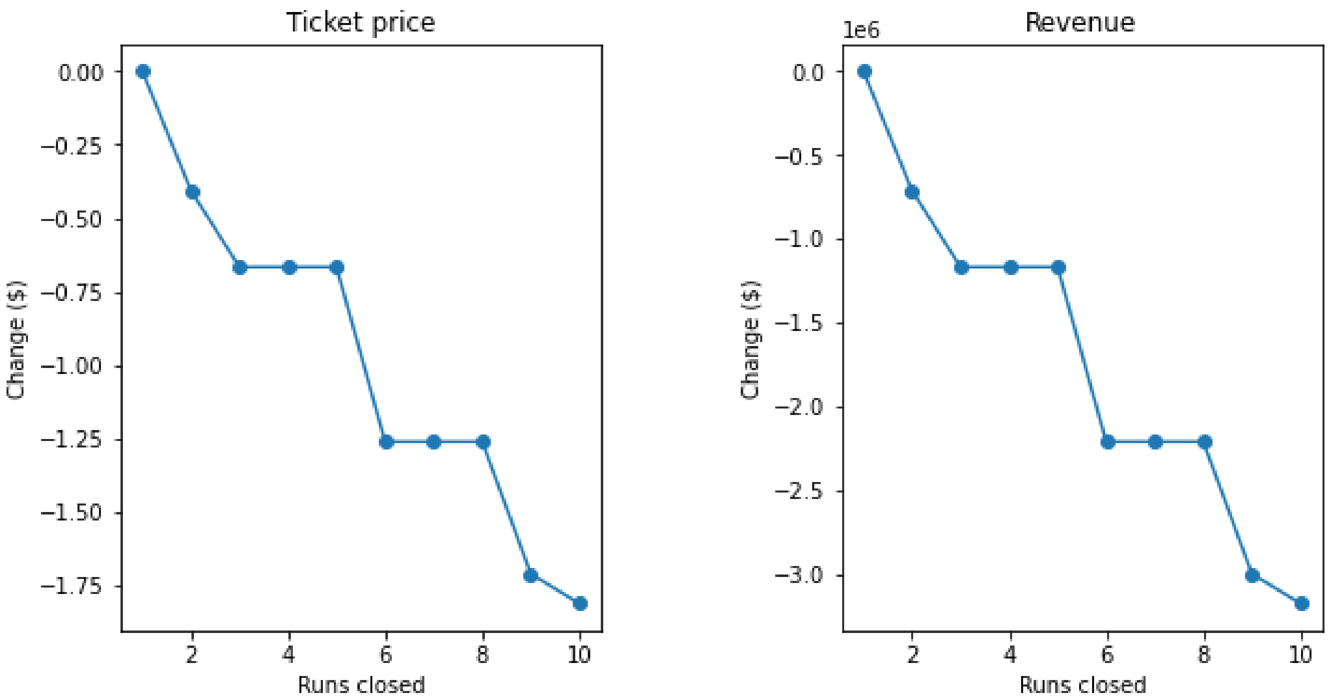


Figure 3


Ticket price
0.00
−0.25
−0.50
−0.75
−1.00
−1.25
−1.50
−1.75
Change ($)
2
4
6
8
10
Runs closed
Revenue
1e6
0.0
−0.5
−1.0
−1.5
−2.0
−2.5
−3.0
Change ($)
2
4
6
8
10
Runs closed