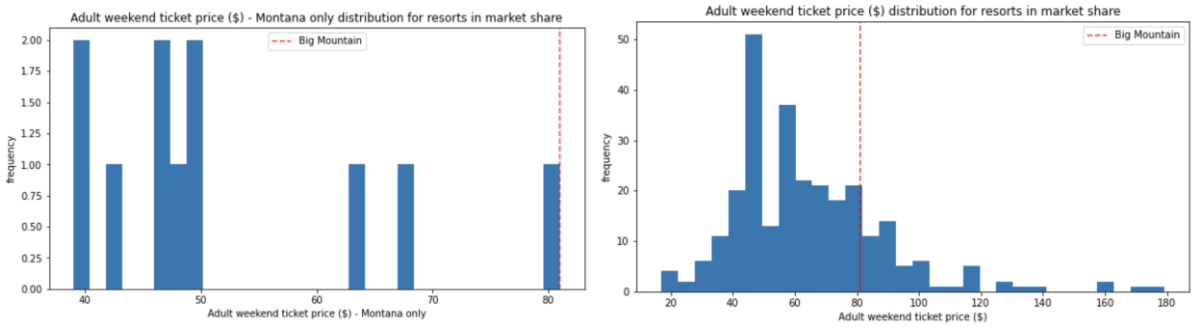
[Guided Capstone Project Report]

Olivia (Hyunyoung) Shin

Goal: Build a predictive model for Big Mountian resort's ticket price based on their facilities and properties, compared to other resorts in the market segment. Big Mountain will be able to find out better pricing methods and future facility investment plans, including the ways to make up for the operating cost for the new chair lift.



Montana's average ticket price is about $50 and Big Mountain's is $81. But does this mean we set a legitimate ticket price? Regardless of what Montana's average ticket price is, Big Mountain may have better facilities, which could lead to a higher price. In fact, although Big Mountain is currently somewhat highly located in the price distribution, we don't know if it's reasonable or not yet.

With the data including all the information about facilities in other resorts, we've built a model that shows us important features for setting a ticket price and a new modelled price.

<Random forest regression model performance>

```
mean_absolute_error(y_test, rf_grid_cv.best_estimator_.predict(X_test))
```

```
9.992426850258175
```

```
bm_pred = model.predict(X_bm).item()
bm_pred
```

```
99.78571428571429
```

```
y_bm = y_bm.values.item()
y_bm
```

```
81.0
```

```
print(f'Big Mountain Resort modelled price is ${bm_pred:.2f}, actual price is ${y_bm:.2f}.')
print(f'Even with the expected mean absolute error of ${mae_mean:.2f}, this suggests there is room for an increase.')
```

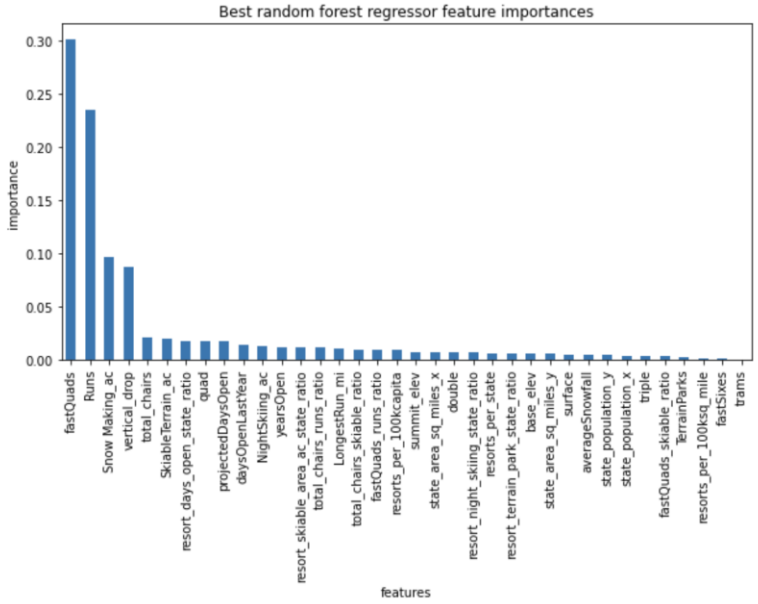
```
Big Mountain Resort modelled price is $99.79, actual price is $81.00.
Even with the expected mean absolute error of $10.59, this suggests there is room for an increase.
```

Model result (including all variables): We've built our model including all the features in all the competitor resorts. The result suggests that Big Mountain's ticket price should have been $ 99.79, where our current price is $81.

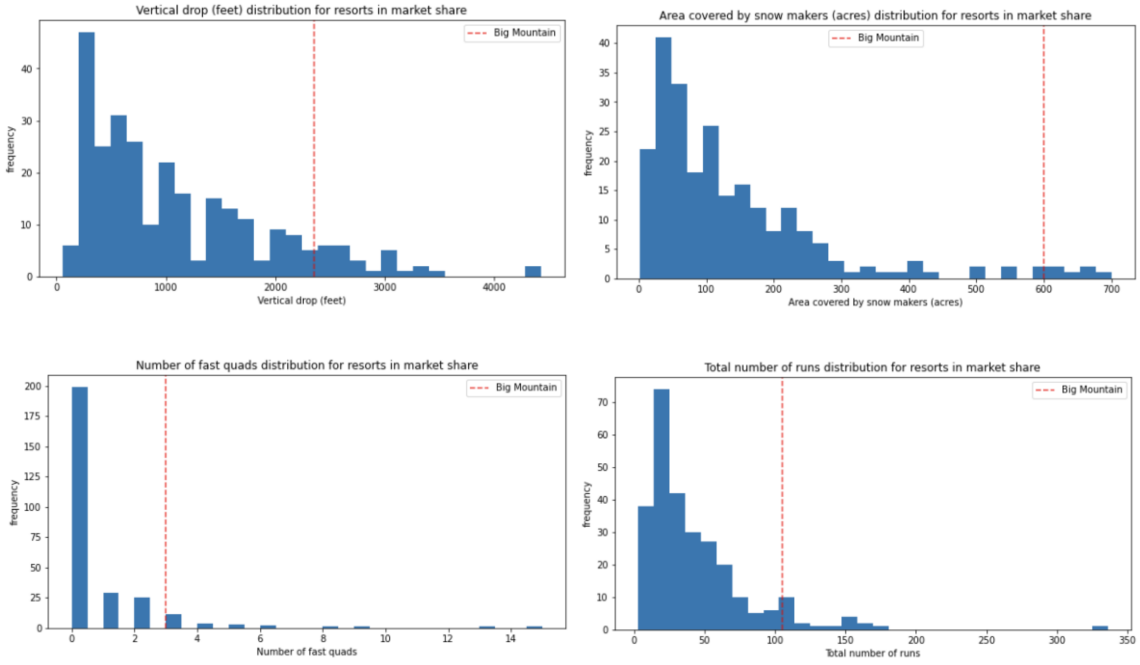
Recommendation: We would like to recommend raising the ticket price to $ 99.79.

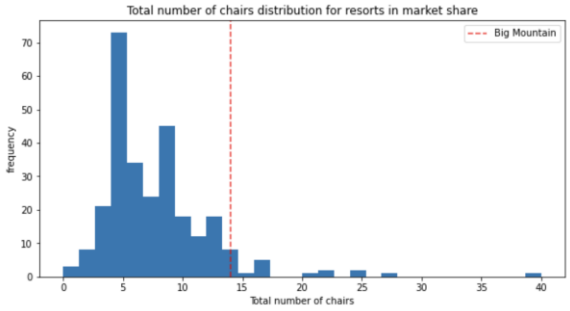
<Other comparison graphs that support our recommendation>

While the dominant top 4 features contributing to setting the ticket price are fastQuads, Runs, Snow Making_ac, and vertical_drop…



Here are the graphs that shows where Big Mountain is located in terms of the top contributing features.





Big Mountain is ranked high in all the most important features! This proves that it is reasonable to set a higher price at Big Mountain.

<Example Senario for Future Investment Plan>

```
ticket2_increase = predict_increase(['Runs', 'vertical_drop', 'total_chairs'], [1, 150, 1])
revenue2_increase = 5 * expected_visitors * ticket2_increase
```

```
print(f'This scenario increases support for ticket price by ${ticket2_increase:.2f}')
print(f'Over the season, this could be expected to amount to ${revenue2_increase:.0f}')
```

```
This scenario increases support for ticket price by $0.50
Over the season, this could be expected to amount to $875000
```

Moreover, if we increase the number of runs and total_chairs by 1 and the length of vertical_drop by 150ft, supposing that the expected numer of visitors over the season is 350,000 and the visitors ski for five days, we can expect $875000 revenue increase.

Likewise, if we continue adjusting the features we should be able to find the point where we can cover the operating cost for newly added chair, $1540000.

Therefore, we should make more scenarios with the knowledge of other facilities' operating cost, measure its impact on our revenue, and find out the best scenario for our business.