Big Mountain Resort Project: Report

A random forest regression model is built using the data provided to predict the ticket price and identify essential facilities that have a higher impact on ticket prices. In order to avoid biasing the model by the current pricing scheme, the Big Mountain resort's information is not included in the training model. Our model predicts a price of $95.87 with an error of +/- $10.39. The predicted price is relatively higher than the current price of $81. So looking at the most critical variables that have a high impact on ticket pricing, Big Mountain values are at the top of the competition, suggesting the resort has facilities that customers widely appreciate. Thus, increasing ticket prices could be justified.

The figure below shows the impact of each variable on ticket pricing sorted according to their importance—for example, fastQuads, Runs, Snow_making_ac, vertical_drop, skiableTerrain_ac, and total_chairs.

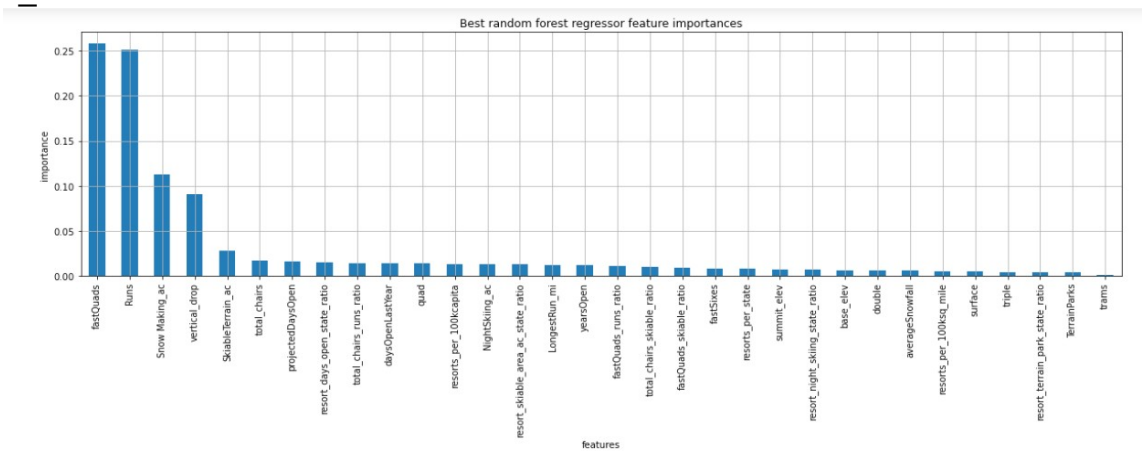

Figure 1. Distribution of important features sorted by their importance.

Comparing Big Mountain's values of these important variables with the rest of the competition shows that the resort is in the top in almost all of these features (see figure below)

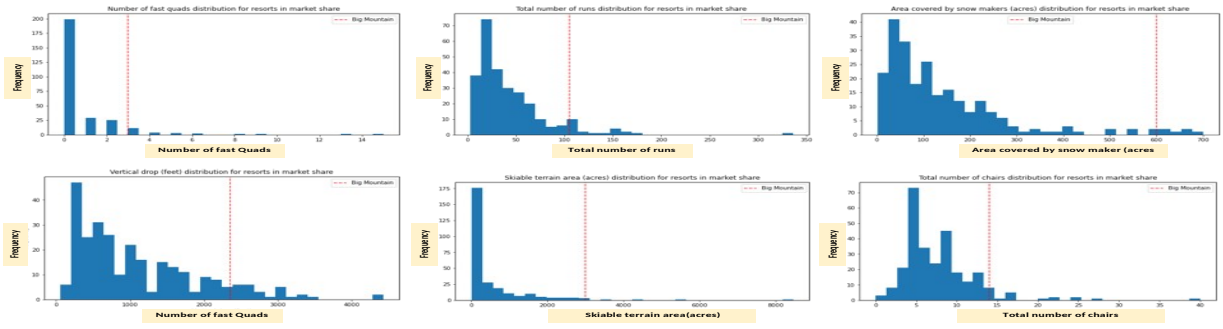

Figure 2. Important Distribution features

We used the model to run some scenarios to see the impact of adding or reducing some facilities on ticket prices. The simulations were conducted with the assumptions of 350,000 visitors per season and five days of skiing on average per visitor.
One of the scenarios tested was to see the impact of closing up to 10 least used runs. Reading from

the graphs below, closing one run does not impact prices. However, closing 2 and 3 runs will reduce the ticket price and thus the revenue. The figure also shows that completing five runs and three runs have the same impact on pricing, and hence Big Mountain may close five runs instead of 3 if this is the management's route. Completing more than five will reduce ticket prices further.

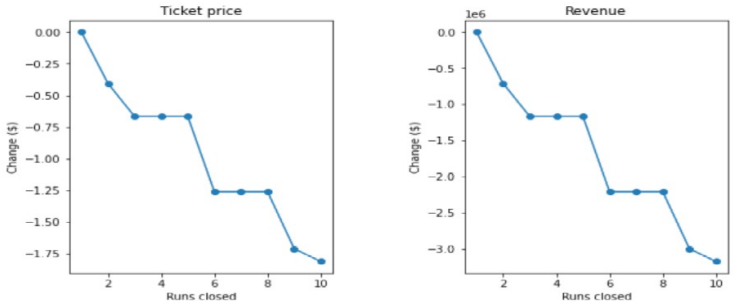

Figure 3. The effect of closing least used runs on prices and revenue

Another plan is to increase the vertical drop by 150 feet by adding a run and installing an additional chair lift. This scenario can increase the ticket price by $1.99, which resulted in an increase in revenue by $3.5M (with the assumptions mentioned above). However, this increase in revenue comes with additional operating costs for the newly added 1 run and 1 chairlift. Assuming the operational cost of adding a chairlift is the same as the recently added ($1.54M operating cost). Subtracting this operating cost from the revenue will increase $1.96M in income within one season.

Based on our model prediction and scenario tests, we recommend the following measures for the Big Mountain management to consider to increase the revenue:

- Increase the ticket prices. The current average ticket pricing scheme is too low. Big Mountain resort possesses highly valued facilities by consumers and should take advantage of that.
- Invest in increasing the vertical drop. This has the highest potential to support higher ticket prices.
- Close at least one least used run; it has zero impact on ticket pricing and thus will save the resort the operational cost for that particular run.
- There is a potential to close up to 5 runs. This will depend on the operation cost of each run (the information we don't have currently). Suppose the total operational cost of these 5 runs is greater than the reduction of revenue caused by their closure (estimated to be ~ 1.2M by our model). In that case, there is room to increase profit by closing these facilities.

One crucial variable missing from our data was the operational cost of each facility. This would have helped us immensely in our scenario testing. However, Big Mountain management can use the model generated in this project to run a different combination of scenario tests and compute the adjusted revenue for adding or removing any facility. This would allow the management to strategically target which facilities to close or increase investment on.