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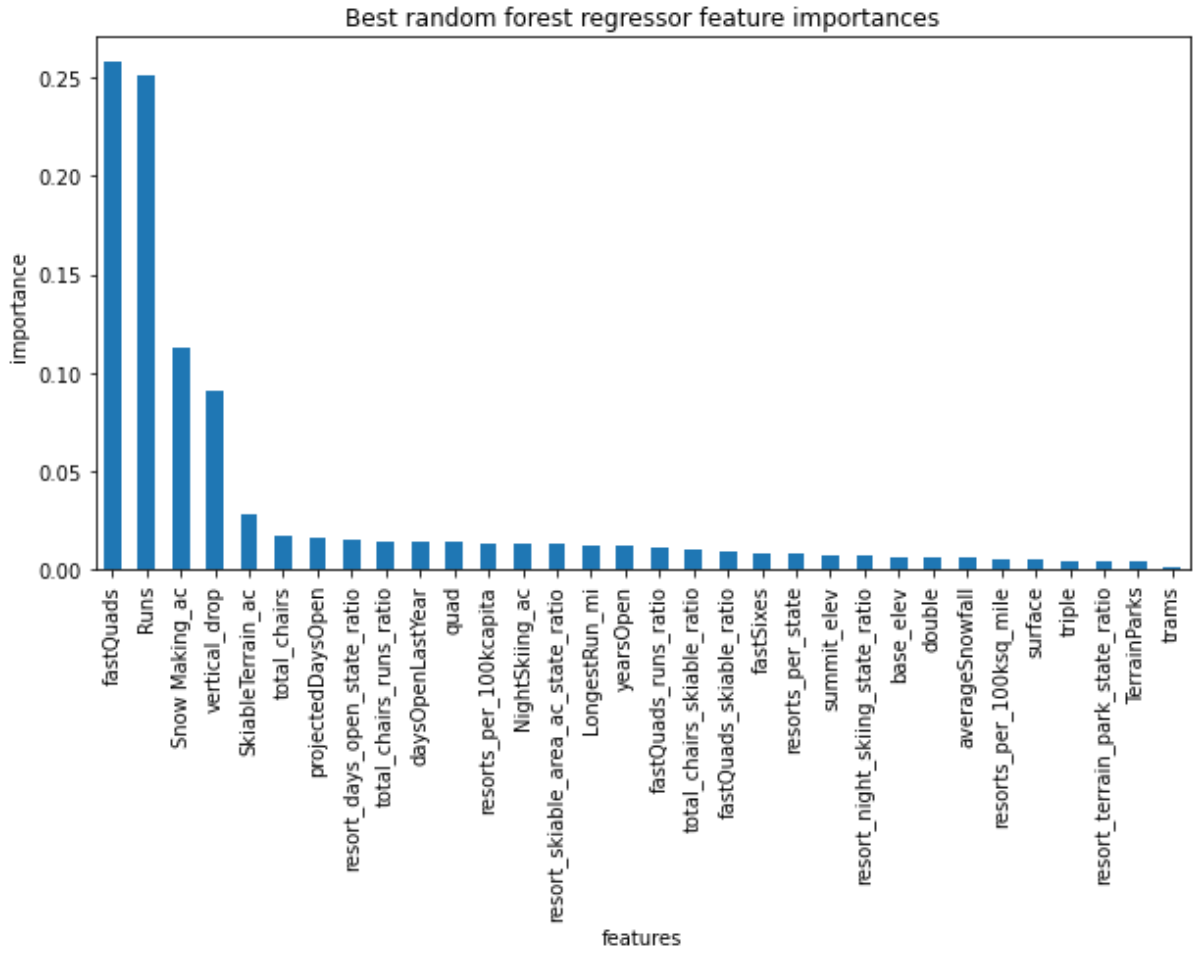
Big Mountain Project Report

Introduction

Big Mountain Resort, a ski resort in Montana, sought to determine a better value for their ticket price instead of just using the market average. They hired me to figure out their ticket value using data science methods to determine the most important resort features and those that can be eliminated to reduce costs. They have recently installed a new chairlift which will increase operating costs by $1.54M this year and are therefore looking to increase revenue by at least $2M this year to offset this cost and have some increased profits.

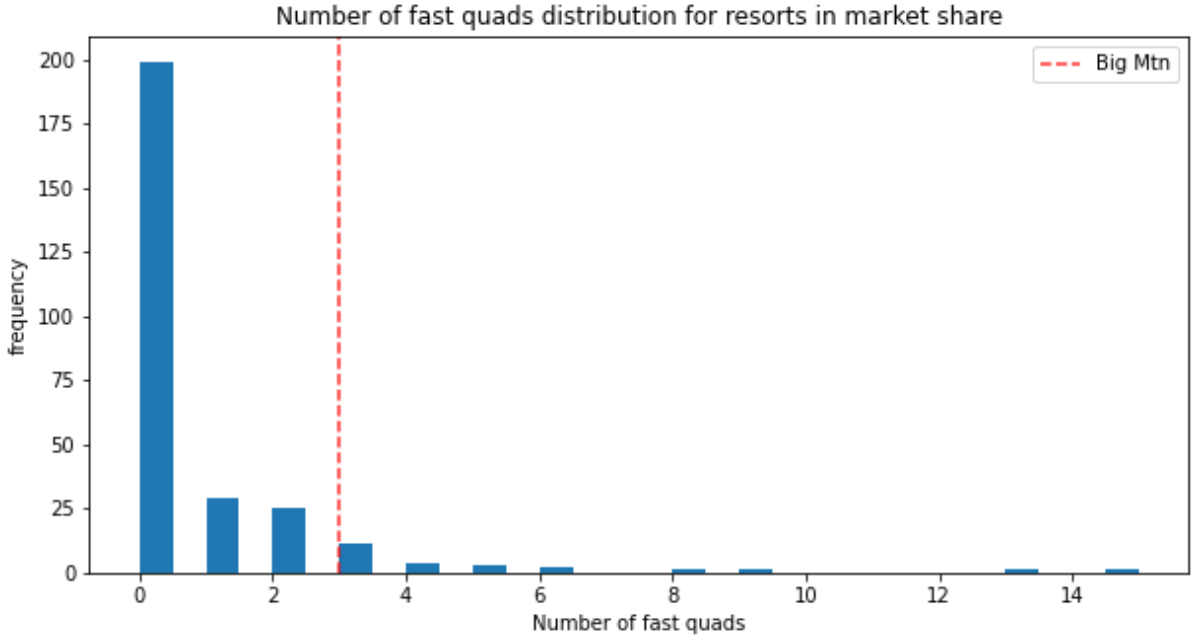
Analysis

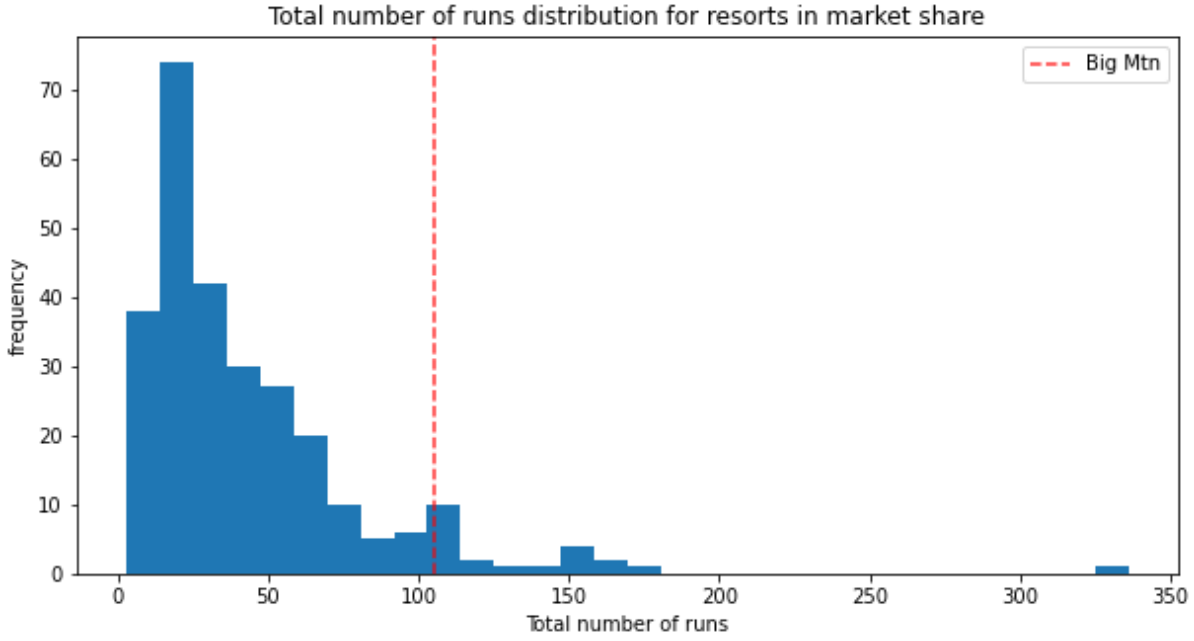
After comparing the results from both a linear regression and random forest model, the random forest model was deemed more accurate. After optimizing the model the most important features were determined to be the following:



As seen in the graph above, the most important features for a ski resort in order to increase ticket value are fast quads, runs, snow making coverage and vertical drop.

When looking at where Big Mountain stands in comparison to other ski resorts in terms of runs and fast quads, it is clear that they are among some of the highest in the U.S.





The graphs above suggest Big Mountain should definitely be able to charge an above average ticket price. When the data for Big Mountain is fed into the model, the ticket price returned is $95.87, significantly higher than the $81.00 being charged right now. Even with the model's mean absolute error of $10.39, there is still room for the ticket price to be increased.

The business executives at Big Mountain resort asked the following 4 scenarios to be modelled as well:

Scenario 1 - Close up to 10 of the least used runs

Modelling scenario 1 showed that there would be no predicted decrease in ticket value if 1 run were to be closed and value drops for 2-10 runs closed. Further analysis could be done to determine operating costs per run and if the shutting down of runs would be worth looking into based on the amount of savings from not having to maintain the additional runs.

Scenario 2 - Add 1 run, increase vertical drop by 150 ft., install additional chairlift

Adding a run, a 150 ft vertical drop and a chairlift would allow the ticket price to be increased by $1.99 which leads to nearly $3.5M increased revenue per year. The construction and operating costs for the additional chairlift would need to be evaluated to determine if this would be a profitable scenario.

Scenario 3 - Same as scenario 2 + add 2 acres of snowmaking

The model does not indicate any ticket value increase for this scenario compared to scenario 2. Therefore it would not be a better option than scenario 2 because increased snow making would mean increased operating cost and consequently less profit.

Scenario 4 - Increase longest run length by 0.2 miles, add 4 acres of snowmaking coverage

The changes in scenario 4 do not lead to any ticket value increase in the model and would therefore not be a good scenario to move forward with. The changes would incur starting costs and increased operating costs with no increase in revenue.

Conclusion

My suggestion to the Big Mountain Resort team is to increase the ticket price to $85.00 for the season and close 1 run if there are significant maintenance costs per run. This way the price is not increased into the error range of the modelled price and assuming the same number of visitors to Big Mountain this year (350 000) a $7M increase in revenue would be observed, far surpassing the initial goal.