Big Mountain Resort Project Report

Background: Big Mountain Resort in Montana accommodates more than 350000 tourists every year. It is one of the most prominent resorts in Montana that offers spectacular views of Glacier National Park and Flathead National Forest, with access to 105 trails. They have 11 lifts, 2 T-bars, and 1 magic carpet. The longest run is 3.3 miles in length. The base elevation of the resort is 4,464 ft, and the summit is 6,817 ft with a vertical drop of 2,353 ft. This year they installed an additional chair which has increased operational costs by more than $1.5 million. The management has expressed a desire to optimize a data-driven ticket price for all its facilities in order to balance out the operational costs and maximize profit.

Problem Statement: What are some of the steps that can be taken to develop an optimum ticket price which will be at par with the other resorts and also reduce the operational costs by $1.5 million by the beginning of the peak tourist season (September)?

Stakeholders: Jimmy Blackburn – Director of Operations
Alesha Eisen – Database Manager
CFO of Big Mountain Resort
Data science team leader

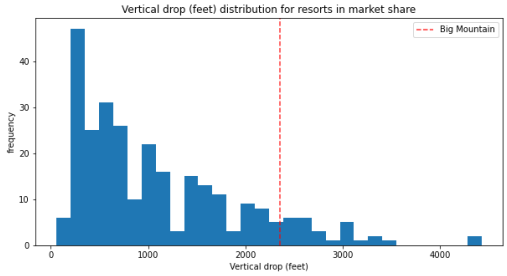
Report: The **current ticket price** of Big Mountain resort **is $81.** Using the facilities Big Mountain currently has, our modeling scenario suggests that the **current ticket price should be $95.12**. This suggests that **there is room for an increase even with an expected mean absolute error of $10.41**. All our trained models had shown that the vertical drop is severely correlated to the ticket price. **In the scenario of adding an additional chair, the average ticket price can be increased by $1.20 and this will also lead to an increase in revenue by $2105072.**

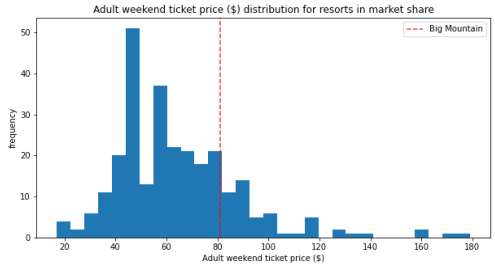
Modification Scenarios - The best model to fit in scenarios will be the Random Forest model and it should be used to test any additional scenarios by the management. This was modeled based on an average visitor buying 5-day tickets. Installation of an additional chair with the addition of a snow area does not affect this scenario and will lead to the same ticket price increase and revenue increase as the above-mentioned prices. So according to our final model and testing of all scenarios, the best scenario will be to increase the vertical drop by 150 meters and install an additional chair without additional snow-making coverage.

An additional scenario was also tested with closures of up to 10 of the least used runs. Our model shows that closing one run didn't have much of an effect. However, closing 2 or 3 successive runs will reduce support for ticket prices and revenue. Closing 4 and 5 successive runs will have the same effect as that of closing 3 runs. However, closing down 6 or more successive runs will severely affect both support for ticket price and revenue as well.

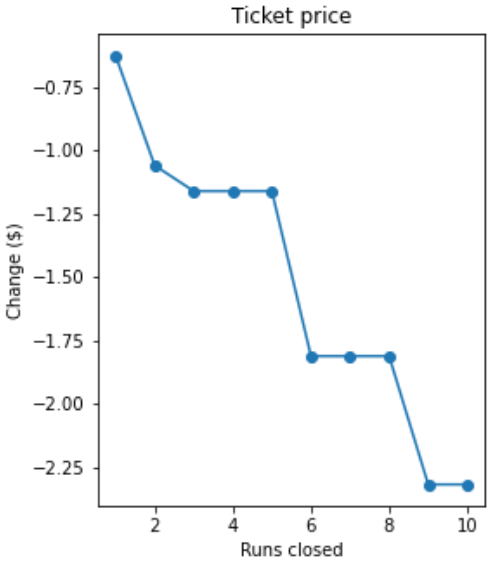
Important features according to our model that might affect the price: Vertical drop (top priority), Snow making_ac, Total chairs, Runs, and Skiable Terrain

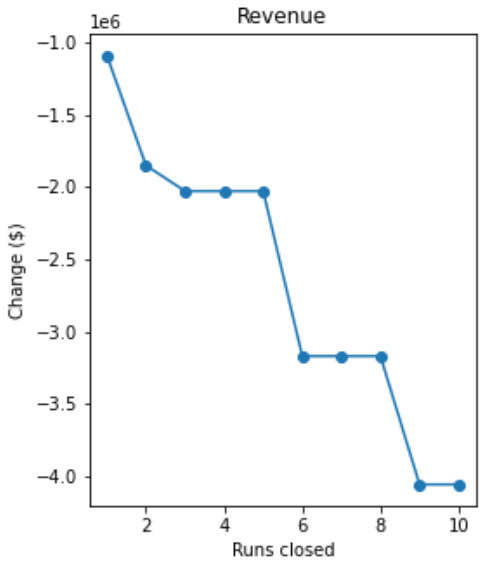
Current Status of Vertical drop and Adult ticket prices compared to other states





Ticket price and revenue drop if the number of runs is reduced





Constraints within the workspace: This price increase is solely based on the assumption that the other resorts in Montana and in other states are fairly priced. However, they may be overpriced or underpriced as well, in which case our ticket prices may be changed.

Final recommendation: After looking at all the models, Big Mountain compares favorably in terms of features with other resorts. The recommended adult ticket price should be $95. Even if we consider a mean absolute error of $10, the min ticket price can be increased to $85. Combining all the recommendations, the suggested ticket price should be between $86 and $96.

Future Work: This model works on the assumption that the other resorts in the datasets were all appropriately priced. This was a limitation in this work. It would be important to know if any of the other resorts assessed their ticket prices and how they viewed their prices. Other cost information that might have been helpful in this dataset was the cost of each chair, fast_quads, fast_eights, and the tram prices. The average revenue of each resort might have also helped in order to compare them based on their total skiable areas. I feel this might have trained our

model in a much better way and would have been more accurate in predicting the support for the increase in ticket prices.

This Random Forest model is trained to use all available data in the dataset provided. The "predict_increase" function can simply be used to input additional changes in scenarios or parameters and can be used to predict revenue difference. Just using this function, business analysts can analyze a plethora of other scenarios in the dataset.