Big Mountain ski resort recommendation

In order to understand how to price tickets, maximize return on business investments, and cut costs with minimal impact on ticket revenue, Big Mountain Resort sought to address the following problem: how can Big Mountain identify the dollar impact of controllable factors on ticket value, as soon as possible, to understand how to maximize return on business investments and cut costs. Our follow-up actions focused on providing a solution.

Based on the raw data provided by Big Mountain (330 resorts in the same market share), there were two types of ticket prices: weekend and weekday. Data for both price types were identical in Montana. The weekend prices had more complete data compared to the other one. Hence, weekend prices were selected as the target feature for modeling.

After my first initial exploration of the data, it wasn't easy to find a pattern or trend across features. Then I decided to treat all the states equally since I couldn't find any pattern associated with states/resorts per capita and resorts per land area. The exploratory analysis also identified fast quads, runs, vertical drop, snowmaking, and total chairs as potentially important features.

Later, I used the average ticket price among all resorts as the baseline model. Models that failed to make better predictions than the baseline were not considered. The linear model suggested the following features from most to least important: vertical drop, snowmaking, total chairs, fast quads, runs, longest run, trams, and skiable terrain. The random forest model suggested the following features from most to least important: fast quads, runs, snowmaking, and vertical drop. The random forest model made better predictions than the linear model based on mean absolute error. The random forest model also showed more consistency. Therefore, the random forest model was selected for further analysis.

The business proposed 4 scenarios that would validate the ticket cost. Based on modeling, Big Mountain could charge$94.22 per ticket with their current facilities. The mean absolute error was $10.39. Accounting for the error, I suggest Big Mountain could charge $83.83 per ticket (an increase over their current price of $81 per ticket). One approach could be initially charging $83.83 but gradually increasing the price to reach $94.22 eventually. This approach would allow Big Mountain to assess the impact of each price increase on ticket sales but ultimately maximize their ticket price.

Scenario 3 and scenario 4 can be excluded from analysis because scenario 3 is the same as scenario 2, but it comes with additional costs for snowmaking equipment. Scenario 4 is not adding any value to the ticket price, but it will incur the immediate cost of extending the longest run and the cost of snow-making equipment. Scenario 1 is worth considering. The model suggests that closing one run makes no difference. Closing 2 and 3 successively reduces support for ticket price and so revenue. If leadership from Big Mountain decides to close down 3 runs, it seems they may as well close down 4 or 5 as there's no further loss in the ticket price (see picture below). However, the cost/benefit analysis is required to make the decision. For scenario 2, the model suggests that the ticket price can be increased by $1.99 with an estimated 350,000 visitors and an average visit for 5 days. This model will give us a revenue of $347,4638. However, this model would require adding a run, increasing the vertical drop by 150 feet, and installing an additional chair lift. We need additional information such as the cost of adding an extra chair lift or increasing vertical drop by 150 feet, to proceed with this model.

Chart, line chart

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In conclusion, there were limitations to this work. The modeling accounted for ticket revenue but not profits. The data for the operation cost was not provided. It is also possible that more fine-grained data about customer visits or customer review/survey data would have allowed a better predictive model to consider and build. If this data can be collected, Big Mountain may want to revisit these areas in the future.