Big Mountain Ski Resort Capstone Project

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Problem Identification

Problem Identification Statement:
How can Big Mountain Resort change its ticket pricing strategy to optimize its capitalization on the facilities, as well as cut costs by 10% by the end of the coming season, possibly by introducing ticket tiers for guests using some of the infrastructure, without losing existing business?

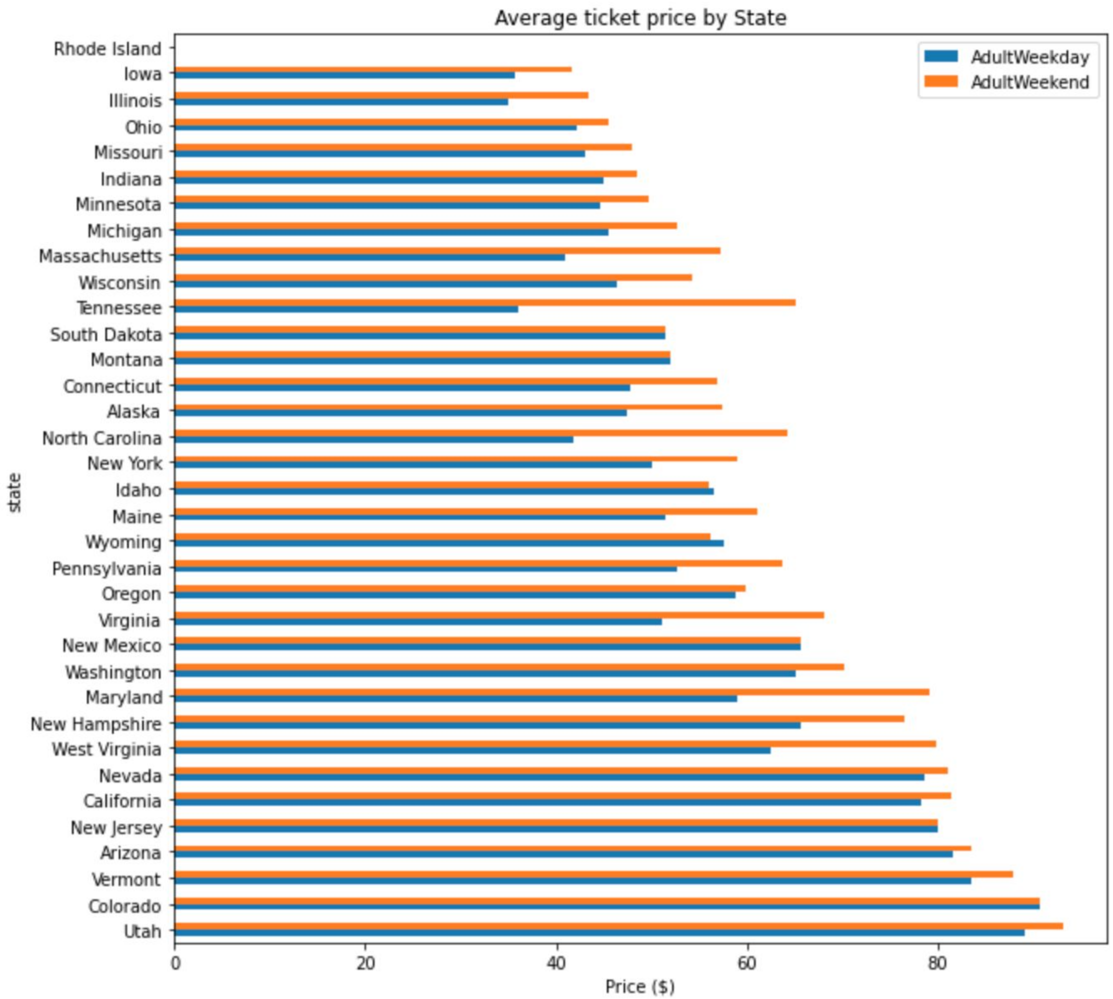
- Our client, Big Mountain Ski Resort located in Montana, currently bases its ticket pricing strategy on the market average
- We can better optimize a model to give a better ticket price based on Big Mountain's facilities and features, improving profitability
- Big Mountain is also considering changes that can cut costs, or support a higher ticket price, also for better profitability
- We set out to use market data from ski resorts all over the country. We aimed to build a predictive model using the ski resort data set in a CSV file, as well as other sources of data like the internet, for the client
- The CSV file contains information from 330 resorts in the US that can be considered part of the same market share. Columns of this data include the name of the ski resort, the region, how many trams, how many chairlifts, average snowfall, and more
- Scope of solution space: Changing the ticket pricing strategy is the main place we're looking for new ideas, but other ways to cut costs or use the facilities differently are valid

Key Findings and Recommendation

- Based on best model selection, we found that one type of model, Random Forest, with the optimum amount of features, 8 variables, could model ticket pricing the best
- Big Mountain currently charges $81.00. This model predicts that a price consistent with the market, based on Big Mountain's features, can be **$95.87**. Even with the expected **mean absolute error of $10.39**, this suggests there is room for a price increase
- Additionally, the model can predict ticket prices in scenarios such as adding infrastructure, which the Big Mountain execs may want to use

Modeling Results and Analysis

- One initial finding from the dataset was that weekend adult tickets were more expensive than weekday. However, the state Big Mountain is in, Montana, has equal ticket prices, so we used only weekend prices in our model, as there was less missing data for weekend
- There was no obvious pattern or correlation between state and ticket price. So, we treated all states as the same dataset

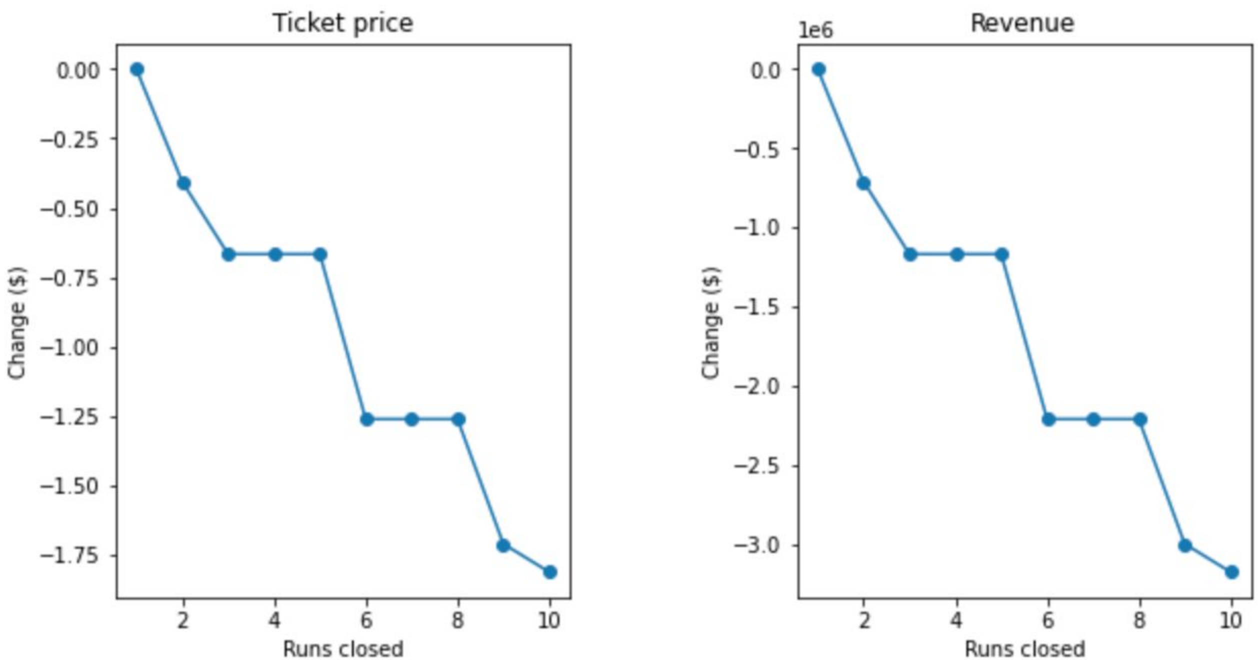


Modeling Results and Analysis

- Throughout the model selection process we used cross validation - cycling through test sets as many times as how many partitions we had, so that our models were tested all throughout the data instead of just on one test set
- The linear model found that vertical drop and snow making area covered were the most important estimators
- We tried a random forest regressor, too. The important features for RF were also vertical drop, snow making area covered, as well as fastQuads and Runs
- The RF model performed better in CV mean absolute error, so we used that!
- k features = 8 was optimal. The 8 best features we fit our model to were vertical drop, snow making area covered (artificial snow), total chairs, fast quads, runs, longest run, trams number, and skiable terrain area covered
- We then trained the final model on all of the available data, and that model predicted the $95.87 ticket price, with mean absolute error $10.39

Modeling Results and Analysis

- The model can be used to estimate how much revenue is gained or lost if new runs and chairs and numbers of features would be put in, as seen below



The model says closing one run makes no difference. Closing 2 and 3 successively reduces support for ticket price and so revenue. If Big Mountain closes down 3 runs, it seems they may as well close down 4 or 5 as there's no further loss in ticket price. Increasing the closures down to 6 or more leads to a large drop.

Summary and Conclusion

- Overall, our model selection and final model offer evidence-based predictions about what pricing is appropriate for Big Mountain
- Certain assumptions were made, but not without looking into it and finding justification, for example our reasons for using the weekend price data only
- Big Mountain has justification for increasing prices based on its infrastructure, and also now has a tool to know how much some infrastructure contributes to the ticket price and revenue
- We did use the optimization of the capitalization on the facilities in the process, and we can still explore tiered ticketing in the future. Furthermore, we might want to gather data about visitor numbers in the future