Guided Capstone Project Report

The purpose of this data science project is to come up with a pricing model for ski resort tickets in our market segment. This project aims to build a predictive model for ticket price based on several facilities, or properties, the resorts*.* This model will be used to provide guidance for Big Mountain's pricing and future facility investment plans. The final model that evaluated best was a random forest-based model.

Through gird search cross Validation found the optimal random forest regressor would use 33 features. The importance of the features was graphed by percentage to evaluate the major ones in the data set. The major features of “fastQuads”, “Runs”, “Snow Making\_ac” , “vertical\_drop” were common with the features used in the best linear model which helped verify their importance. For further addition of features the amount of tickets sold at each resort or amount of riders per park could still be added to see if better modeling results could be obtained for further testing. The random forest model had about a $1 better mean absolute error than the linear model and would be used for the next towards production. The price of a ticket at Big Mountain Resort is $ 81.00, our model predicts the price could be $ 95.97. If the assumption that resorts set their prices according to public demand then even with an expected mean absolute error of $10.50 the model suggest a price increase could occur.

Using the model to predict the effect of different scenarios one or two runs being removed causes a large decrease in ticket value but after those small decreases in values occurs until after 7 runs are closed. If 6 runs were closed, the max before the next large drop in ticket value. This scenario changes support for ticket price by $-2.27 Over the season, this could be expected to amount to $-3,977,273. As there is more than 5$ in discrepancy from the price charged now and the modeled price while keeping the mean absolute error in mind, 6 of the least used rides could be closed without expecting a change in revenue as the tickets as they are now having more value than the face value collected for each. To test the price elasticity of demand, one ride could be closed and change in revenue could be measured. If the change in revenue followed the model predictions up to 6 rides could be dropped with greater confidence that the max revenue drop would be less than the value of the ticket allowing for no loss in revenue.

In the second scenario, Big Mountain is adding a run, increasing the vertical drop by 150 feet, and installing an additional chair lift. The model projected that this scenario increases support for ticket price by $1.45. Over the season, this could be expected to amount to $2,545,455. These would be less than the operating cost of the new facilities and allow for a greater profit margin. I would suggest these changes to create more revenue. Between the discrepancy of the projected price, while taking into consideration, the mean absolute error, and the additions in scenario two a new ticket price of $87.50 could be used to increase profit.

To be able to generate greater confidence in the model, different features would be required to create a more comprehensive model. The two largest deficiencies in the data set are missing operating cost per facility and staff, and second ticket sales per resort. A key addition of Operating cost for all facilities would allow for changes in value in relation to cost to be modeled. The effect of changes in facilities to revenue would be modeled with greater confidence with this data. Having ticket sales per resort would allow for seasonal revenue to be calculated and added to the model. This value would also help accuracy of projected price allowing for relationships between facilities and ticket value to be strengthened. Big Mountain is on the higher end of the scale for volume in a lot of facilities that point towards a greater value in ticket price than what is being charged. To discover more about this discrepancy, looking at a smaller scale of in-state resorts and creating a model solely on direct competitors could allow for more information on price value to the tickets.