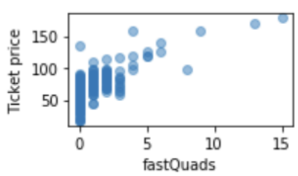
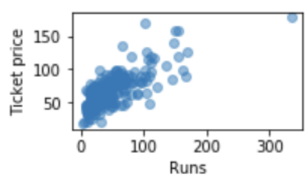
Big Mountain Pricing Strategy Recommendations

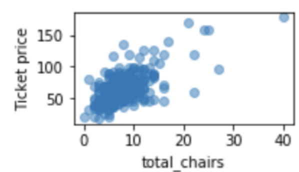
The Big Mountain Ski Resort in Montana is one of the largest ski resorts in the nation in terms of area and different facilities offered to skiers. Big Mountain anticipates constructing a new chair lift this year that would increase operating budgets by $1.5 million. The goal of this project was to identify the true value of Big Mountain's ticket prices in relation to other resorts in the state and nationwide. Additionally this report also includes a model that Big Mountain can use to change multiple different variables to predict revenue increases or losses.

For this project the data included 277 separate ski resorts with 25 different features that described the resorts. These features included information including chair lifts, ticket prices, and skiable terrain. Given ticket prices were the feature I was trying to model and predict, resorts with neither weekday and weekend prices were removed from the dataset. Additionally, weekday and weekend prices shared a very strong correlation so Adult Weekend prices was picked as the feature due to it missing the least values.

While exploring the data for correlations in ticket prices and different features of mountains I noticed several different features that had a strong correlation with ticket prices.







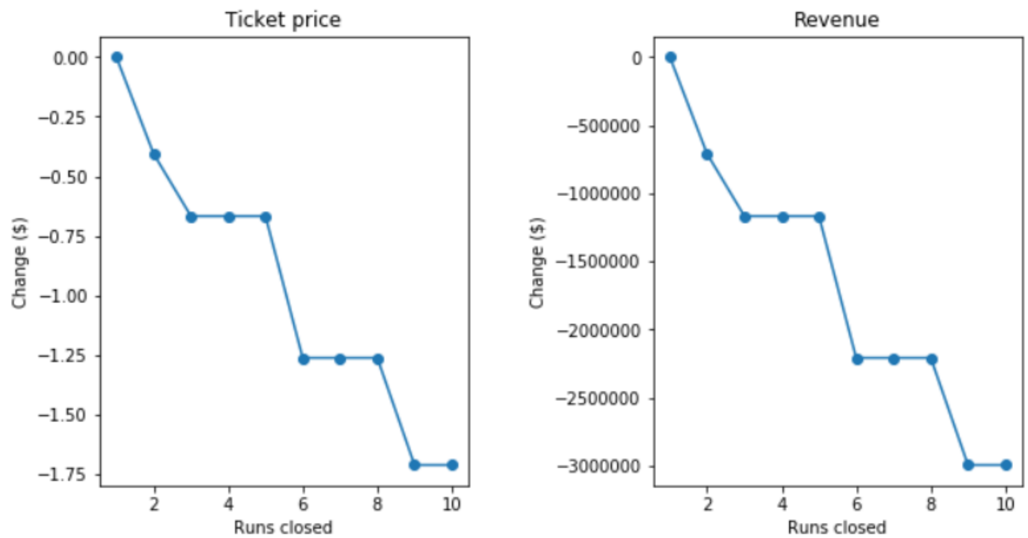
As we can see in these three graphs, all three features of runs, total_chairs, and fastQuads demonstrate a positive correlation to ticket prices. Features such as these and others indicate a pattern that allows us to find the best combination of features to improve ticket prices and therefore revenue.

For the model selection, there were two models built: a linear regression system and a Random Forest model. These two models each improved the Mean Average Error from around $19 to $11.79 for linear regression and $9.49 for the random forest model. The lower MAE provides a better predictor for the true value of the Big Mountain adult weekend ticket. Given that the random forest model has a lower MAE and variance than the linear regression, I will use the random forest model to predict the ticket value as well as implement new features to the mountain.

The current price for the Adult Weekend is $81. Given the current facilities Big Mountain offers, our model which takes into account all the factors given from the dataset concludes that the current ticket price could be $94.22. This increase in ticket price could be justified with the new chair lift being installed. This increase in ticket price alone could net the resort up $4.6 million in additional revenue.

Additional use of the model analyzed four potential changes to the mountain in order to justify increases in ticket prices or increase profit margins. The four scenarios proposed were closing runs, increasing vertical drop and adding a chairlift, the second scenario but also adding snow making area, and increasing the longest run by .2 miles.

In the first scenario, ten of the least used runs were closed in order to decrease operating costs. The model indicated that the closing of these runs would diminish the value of the park and therefore cause the ticket value and revenue to decrease.



These graphs from the model demonstrate that closing one run makes no difference in losing revenue in ticket prices. Depending on the operating costs of maintaining these runs, the decrease in revenue from closing three and five runs would be the same therefore I would recommend closing one, five, or eight runs depending on which provided the better value for the mountain.

The second scenario which includes adding a run, increasing the vertical drop of the mountain by 150 feet, and installing a new chair lift, increased the support for the ticket price by $8.46. Given an expected visitor count of 350,000 customers yearly, this would result in an increase in revenue by just under $15 million. The third scenario is the same as the second scenario but adds two more acres of snow making. This addition to the park would justify a ticket price increase of $9.75 for the adult weekend passes which would increase revenue by just over $17 million. Finally the fourth scenario modeled called for the increasing of the longest run by 0.2 miles and adding four acres of snow making. These changes actually did not justify an increase in ticket price and therefore no revenue increase.

Based on the given scenarios and without knowing the intricacies of operating costs for all of the potential changes to the facilities, I would recommend using the second model of adding a run, increasing vertical drop by 150 feet, and installing a new chair lift. This model could also potentially be paired with a decrease of the least used runs on the mountain. A decrease in runs could help alleviate the increase in operating costs due to the presence of the new chair lift. Given that Big Mountain already undercharges for their ticket prices, increasing ticket prices could be justified with the expansion of the mountain without grossly increasing operating costs for Big Mountain.

Overall this model performed fairly well. For future improvements I would cut back on some of the lesser important features that did not contribute much to the model performance. This would potentially improve results as well as improving efficiency of the model itself. I could also spend more time finding the proper hyperparameters for each model which could also improve model performance.