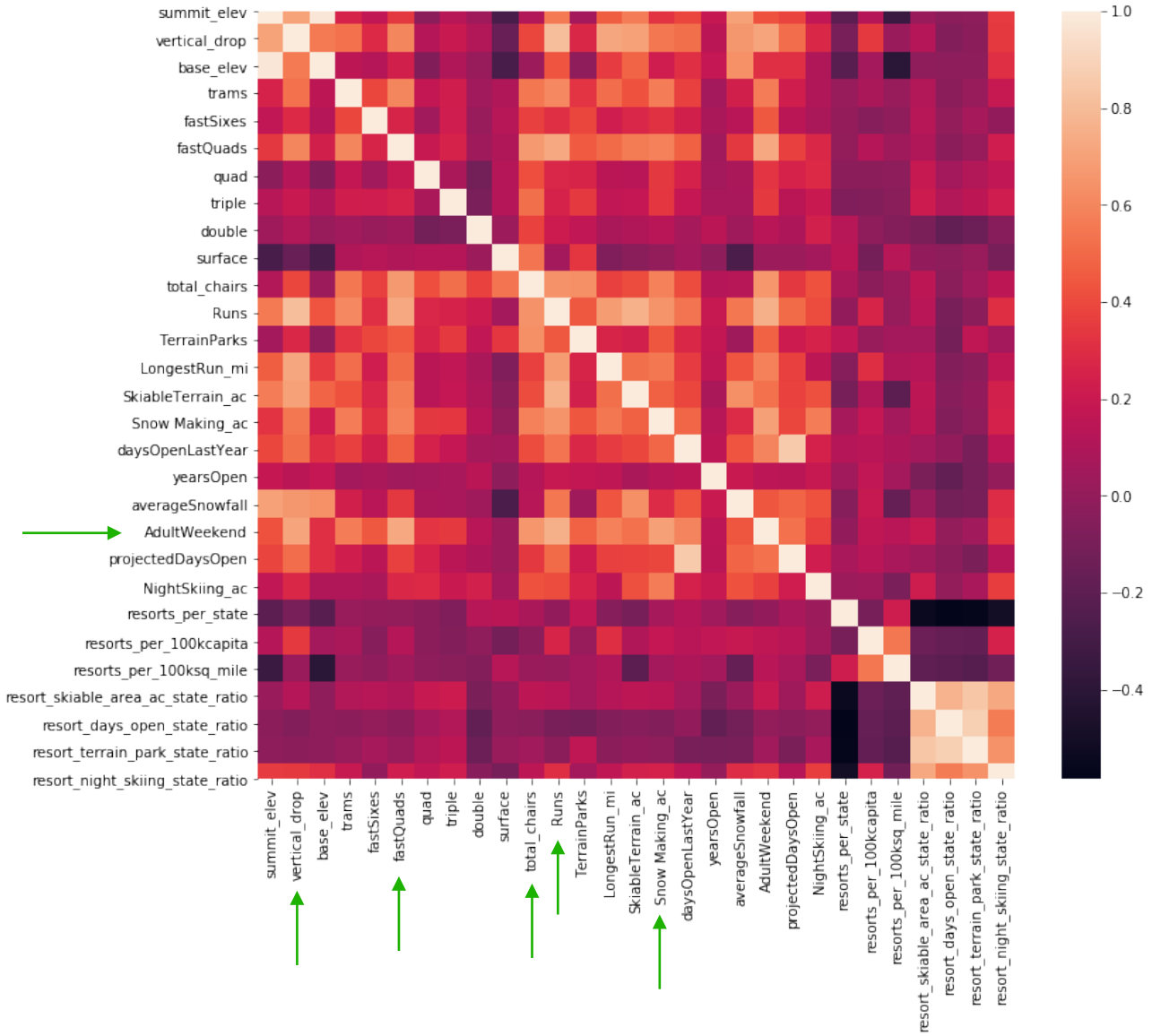
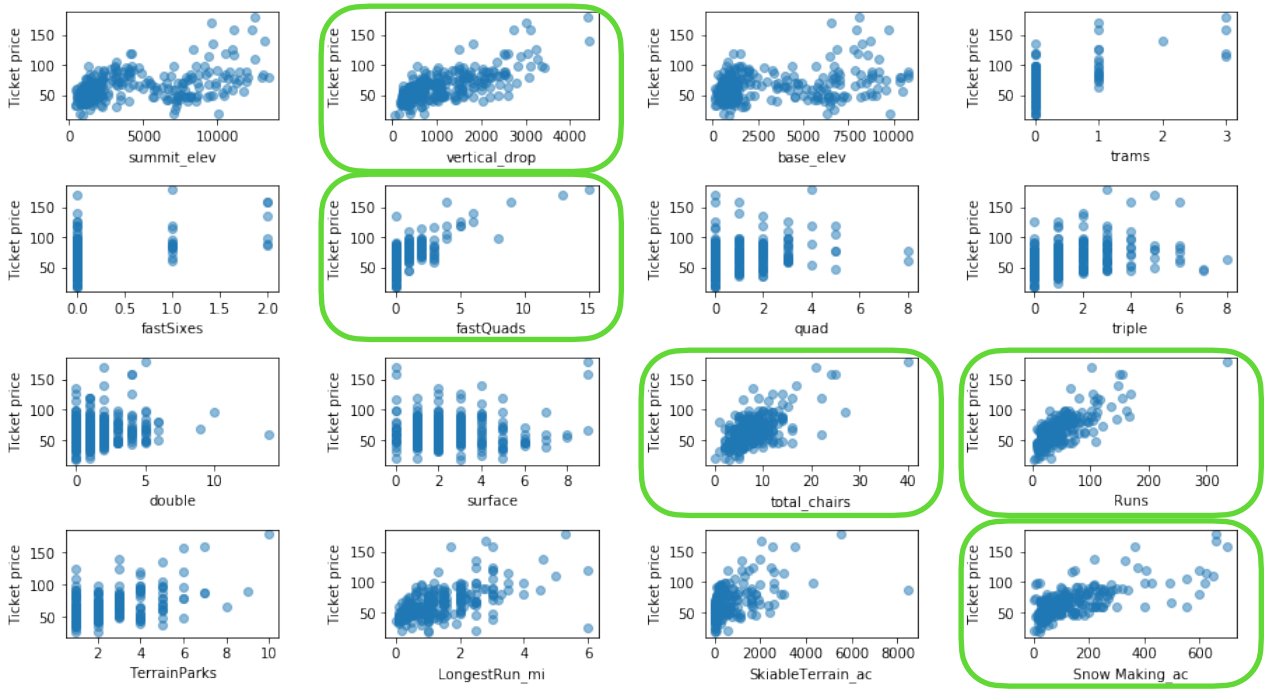
Guided Capstone Project Report

Big Mountain Resort is a ski resort that offers spectacular views and access to 105 trails. Each year, they service roughly 350,000 people for skiing and snowboarding of all skill levels and abilities. With the recent installment of an additional chair lift, operation costs have increased by $1,540,000 this season. With this in mind, our goal was to price the tickets at an appropriate price point for the resort. We observed resort data across the country and created a model for predicting ticket prices and revenue by adjusting resort features and facilities in different scenarios.

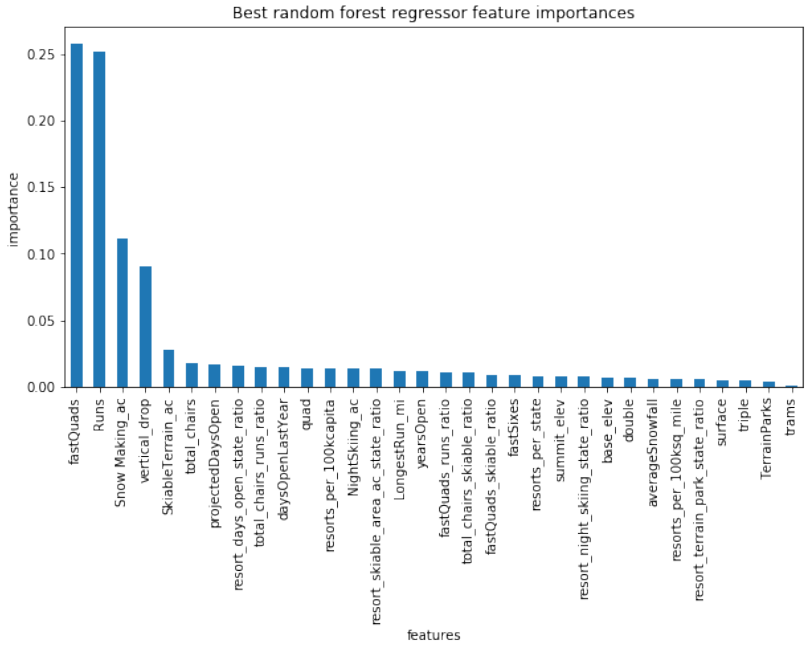
During preliminary assessments of our resort data and exploring patterns with state summary data, we've determined that predicting the adult weekend ticket price was going to be our focus. After merging our two data sets together, we then added 'state resort competition' features, and plotted a feature correlation heat map.



With AdultWeekend ticket price as our target feature, here we can see a few reasonable correlations with other features such as, fastQuads, total_chairs, Runs, Snow Making_ac, and vertical_drop. This is also supported by scatterplots of ticket prices against these features, with a strong positive correlation.



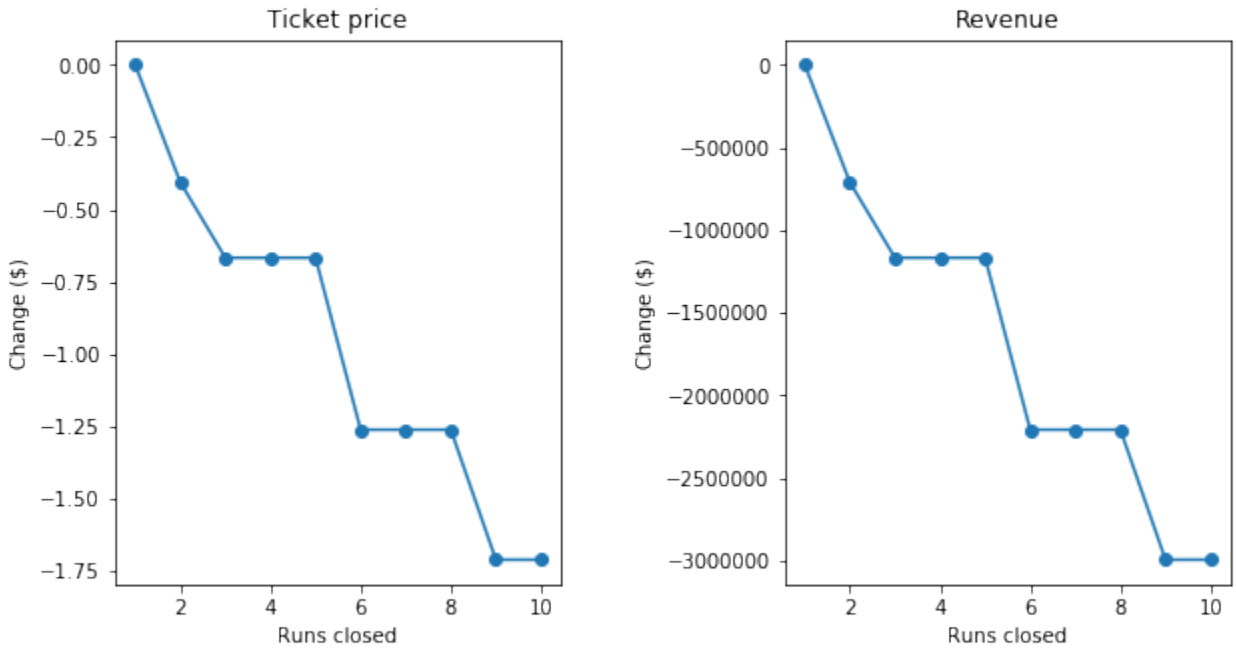
Our next steps involved testing our data using both the mean and median as predictors for any missing values, and as a result, did not see much difference between the two when assessing model performance. We then worked on refining our linear model using a couple different regression features along with cross-validation to tune our model for a better fitting. While looking at Random Forest Regression, we were also able to see our dominant features that are in common with the linear model.



In our final model selection, we chose the Random Forest Regression model after seeing that it showed lower cross-validation absolute error and also exhibits less variability in performance. Once we chose our model, we then used it to gain insight what Big Mountain's ideal ticket price could/ should be, and looked at how the price changes based on various scenarios and adjustments of our dominant features.

Currently, Big Mountain charges $81 per ticket. The modeled price is $94.22, with an error of $10.39, suggesting that there is room for an increase.

In one scenario, we predicted ticket price change (with its associate revenue change) in the case Big Mountain closes down 10 of its least used runs. Here are the plots side by side:



The model says closing one run won't make a difference, but closing 2 and 3 reduces support for ticket price and revenue. If Big Mountain choose to close down 3 runs, they might as well close 4 or 5, as there is no further loss in ticket price.

In another scenario, we saw that adding a run, increasing a vertical drop by 150ft, and installing an additional chair lift increases support for ticket price by $1.99, with a revenue increase of $3,474,638.

While Big Mountain was already fairly high on some of the league charts of facilities offered, the reason why the modeled price came out to be much higher than the current price could be because our model assumes that other resorts also accurately set their prices according to the market. So this suggest Big Mountain may be undercharging. It's possible other resorts are overpriced or underpriced as well.