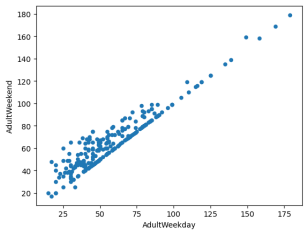
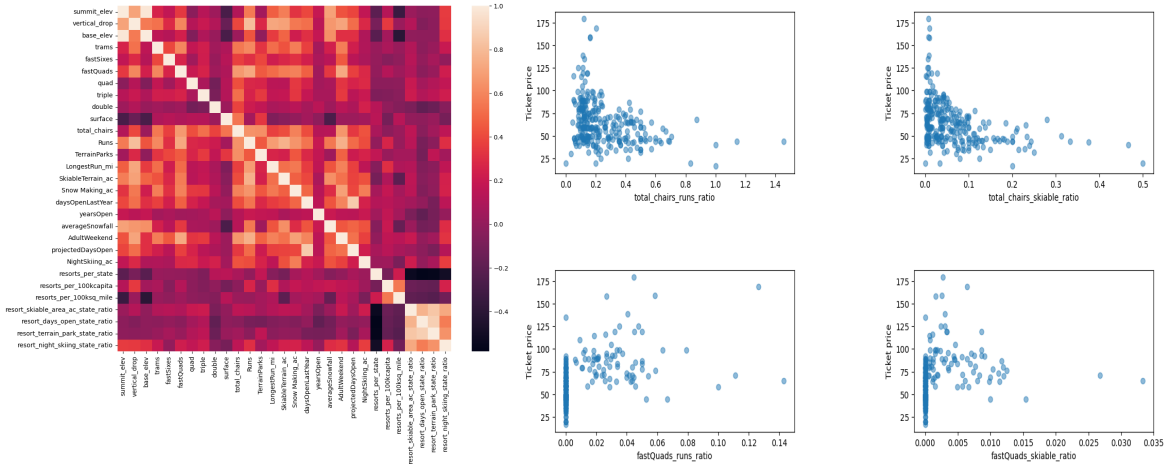
Guided Capstone Project Report:

The project began with the following problem: *Can Big Mountain Resort determine what business assets drive customer spending/investment in order to calculate real market value and what sets them apart from the competition so as to balance ticket and service pricing?* Big Mountain Resort has recently invested **$1,540,000** in their current operating budget by adding a new chair lift and we set out to explore ticket pricing options to accommodate that increase in budget.

We began wrangling the data from the dataset provided by the Database manager after determining that we could plausibly find a solution with this dataset. We removed unverifiable data and columns which didn't supply enough data to be of use and elected to use only the weekend pricing as our measure for ticket price as we found a strong linear correlation between weekend and weekday prices with variation mostly occurring in the smaller/lower priced resorts, which Big Mountain is not. Correlation shown below:



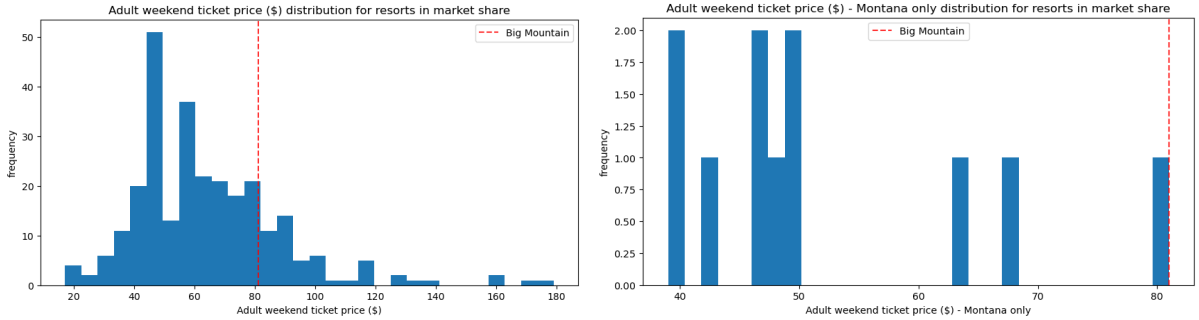
We examined several numerical features, namely: price, skiable area, night skiable area, # of Fast 4s, (a kind of chairlift), state population, number of resorts per state, and number of resorts per sq kilometer to name a few. We also examined data by comparing these numerical features across states in the hopes that a pattern would emerge. From there we further generated scatter plots and heat maps to view multiple correlations more precisely:



The relationship between state and ticket price is a jumbled mess by itself without finer analysis including other resorts details as previously stated. Ergo, there shouldn't be any issue in analyzing the data further by state as it won't bias our attempts to model ticket prices
'total_chairs_runs_ratio', 'total_chairs_skiable_ratio', 'fastQuads_runs_ratio', 'fastQuads_skiable_ratio' and possibly 'vertical_drop' were demonstrated to be our strongest indicators for ticket price value with the possibility of a few others EX: 'skiable_terrain'.
We recalculated the mean as a baseline with the generated dataset.

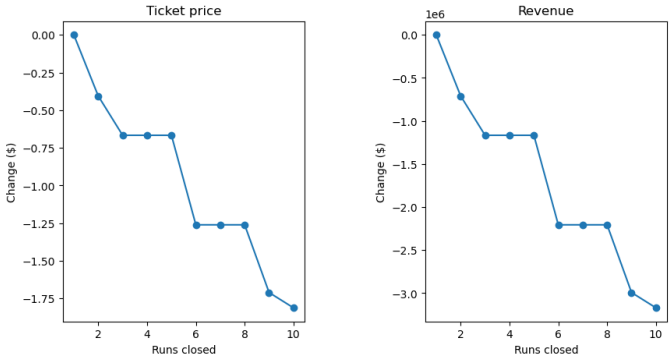
After attempting a number of modeling techniques we selected the Random Forest Model as our final pre-processing model to train going forward due to its reasonable accuracy and better generality. Also there wouldn't be much use in adding more data to this model as its variability and accuracy stabilize between 40-50 inputs.

Currently: Big Mountain Charges $81 for its services while its level of service per our key indicators are all in the upper percentile of ski resorts And is the most expensive in Montana as shown here:



Our model predicts a potential price point of $95.87 give or take $10.39. I would recommend a price increase based on this model's predictions, however I cannot confidently recommend raising the price to its potential maximum value given that in the state of Montana we are already in the highest percentile, and it wouldn't do to price out potential local skiers.

In the scope of cutting costs, We could potentially drop 1 run without a predicted loss in value to our tickets however it begins to drop from there. Potentially 3-5 runs dropped would remain stable at a lower price point but any more than that drastically decreases the value of your ticket in a free market according to this model.



Of the 4 Scenarios proposed by this body, there would be no measurable ticket price value to be considered.

Based on the results of this project I would recommend a **$1.99** price increase on the ticket which would result in a **$3,474,638** increase in revenue (assuming 5 day tickets.) This price point would be further justified if the chairlift were used to increase the vertical drop which was one of the strongest key factors in ticket pricing.