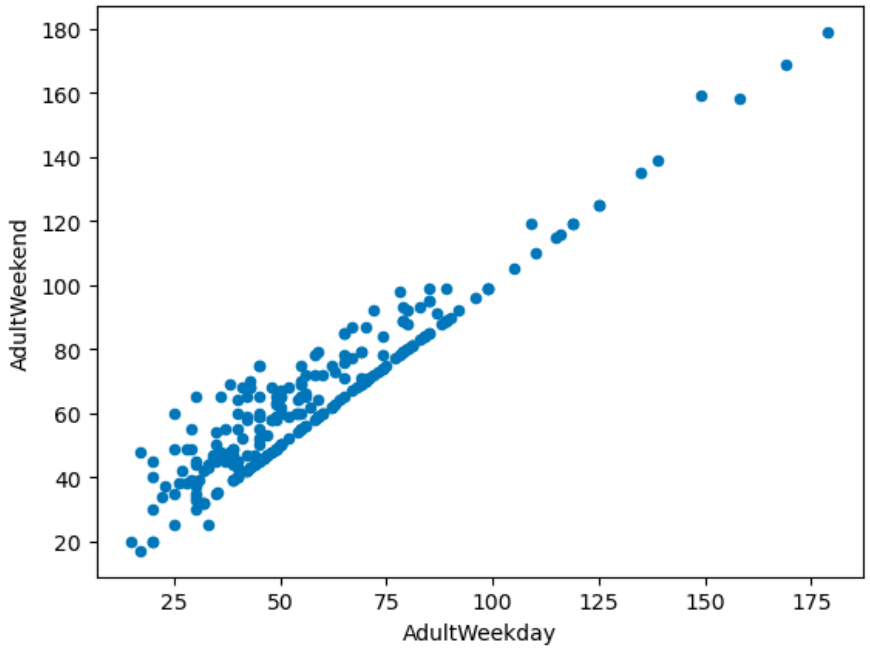
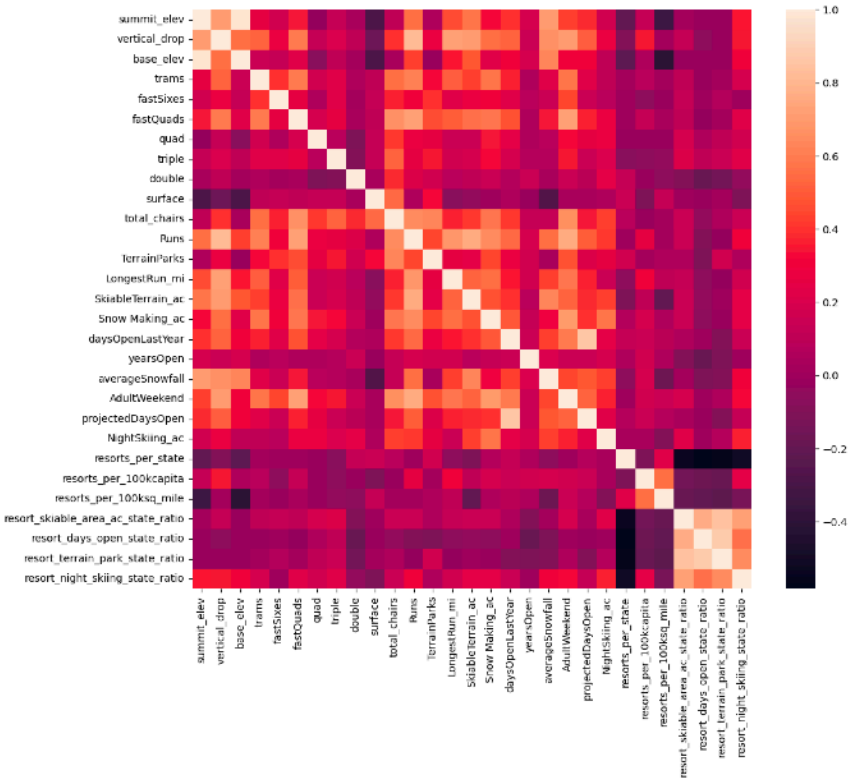
Report

Big Mountain Resort, which serves around 350,000 people every year, has the goal of optimizing its pricing strategy to make better use of its facilities. By applying data science and machine learning, we found where to add value in order to justify higher ticket prices as well as where to cut costs, which will in turn increase revenue and maximize profits.

After we had collected, organized, and cleaned our dataset, we began to gain some valuable insights. The most relevant at this early stage was finding that weekend prices are higher than weekday prices for most sub $100 (ticket price) resorts. This was a key finding because currently, Big Mountain Resort is charging $81 for both weekend and weekdays, so there is definitely room to charge a bit more for weekend tickets.



In the exploratory data analysis phase, we were able to identify which features were most correlated with adult weekend ticket prices. By using a heat map, we found that: Vertical drop, fastQuads, total_chairs, Runs, and Snow_Making_ac, were the most correlated. (See below):



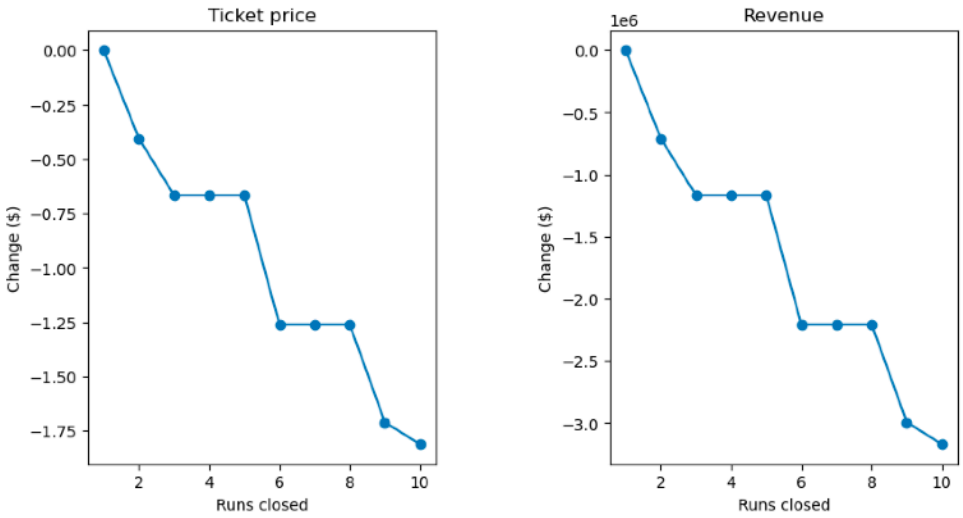
In the model preprocessing phase, we first created a baseline of performance by just taking the average price and using that for predictions. Our goal was then to create a model that could do better predictions than the baseline. We built both a linear regression and random forest model which selected only the k amount of features that would lead to the best model performance. We then used cross-validation to find out the scores, and based on the results, the random forest model worked best.

While using our model to compare prices in the marketplace, we found that Big Mountain Resort could potentially charge $95.87 dollars per weekend ticket, with an expected mean absolute error of $10.39. If we apply the mean absolute error, the range would be between $85.48 – $106.26. This means that even the lower bound of our estimate is above the current ticket price, so this gives us optimism to increase the price. However, we must also be aware that we are assuming other resorts are accurately pricing their tickets in a free market.

We also used our model to generate different facility upgrade scenarios to see which one created the greatest amount of increase in ticket price. We found that if Big Mountain Resort

were to increase its vertical drop by adding a run to a point 150 feet below its current lowest run (but requiring the installation of an additional chair lift to bring skiers back up), this would increases support for ticket prices by $1.99 – which would translate to a $3,474,638 increase in revenue over the season. Since we know that the operational cost for a new chair lift would be $1,540,000, then it would make sense to make this investment as it has a good ROI.

Finally, our model also found that Big Mountain Resort should consider permanently closing its least used run, as it won't affect ticket price but will reduce costs. Closing the second and third least used runs would adversely impact ticket prices, but then they stay constant if closing four or five runs. This can be seen in the following plots:



In conclusion, we have already identified several ways to improve Big Mountain Resort's bottom line. Going forward, adding qualitative features to our analysis may also help uncover more insights. Some of these features might include: the quality of views (how nice the landscape looks), quality of snow (naturally there are places where powder is more common and others where ice is more common), and if there are any high-end luxury hotels in the region, all of which could affect how tickets are priced.