A picture containing calendar

Description automatically generatedThe goal of this data science project is to come up with a pricing model for Big Mountain Resort which will increase revenue by adjusting ticket pricing that will capitalize on key identified facilities. Management has provided a csv data set containing 330 resorts, including Big Mountain Resort, and 27 features to evaluate, including ticket pricing. After cleaning up the data set and scaling the values to make features comparable, initial investigations show that there were multiple features directly correlated to ticket price shown in the collective scatter graphs.

By spliting up the data set into a training set and a testing set, using a 70/30 split respectively, and piping it through a linear regression model with varying levels of k features, 8 features were identified to contribute the most to affecting ticket pricing. Through the use of cross validation, my linear regression model identified these features to be vertical\_drop, snow Making\_ac, total\_chairs, fastQuads, Runs, longestRun\_mi, trams, and skiableTerrain\_ac. These are consistent with the correlations shown in the collective scatter graphs, with vertical\_drop being the major contributer for ticket pricing. Evaluating my best linear regression model against my best random forest regressor model, they both identified the same top 4 features of fastQuds, Runs, Snow Making\_ac and vertical\_drop, but the random forest regressor model has a lowewr cross-validation mean abosulte error by almost $1 and with less variability. But to provide a model with more identified and workable features, the linear regression model is used to continue with further final investigation.

Applying my linear regression model to Big Mountaint Resort data set, it generated a modeled price of $95.87, compared to the current price of $81. Although there is an expected mean absolute error of $10.39, this still shows there is room for increase in ticket price. The model does makes assumptions about other resorts and how accurately they have set their prices, but Big Mountain Resort ranks near the top in all identified contributing features to ticket pricing, giving confidence that a price increaes is justifiable and have a highly likely chance be accepted by consumers.

The model is also applicable to give predictions about business decisions for certain options to cut down cost. The four listed business decisions are:

1. Permanently closing up to 10 of the least used runs. This doesn't impact any other resort statistics.
2. Increase the vertical drop by adding a run to a point 150 feet lower down, but requiring the installation of an additional chair lift to bring skiers back up, without additional snow making coverage.
3. Same as number 2, but adding 2 acres of snow making cover.
4. Increase the longest run by 0.2 mile to boast 3.5 miles length, but requiring an additional snow making coverage of 4 acre.

Chart, line chart

Description automatically generatedFor scenario 1, the model describes closing no more than 5 runs. As shown in the graph below, closing 1 run shows no change, but 2 and 3 have a significant drop price and revenue. But if deciding to close 3 runs, there is no negative consequence to closing 2 more for a total of 5 runs. Closing 6 runs will have too significant of an impact to be justifiable. For scenario 2-4, the models show little to no impact to ticket pricing and total revenue compared to before making the adjustments. This means that the business should focus on closing runs based on the predicted graph. The business may decide to continue cutting the runs past 6 if the actual impact of the ticket price and revenue is smaller than predicted and the operational cost of the new lift is covered.