Big Mountain Ski Resort Summary Report

Problem

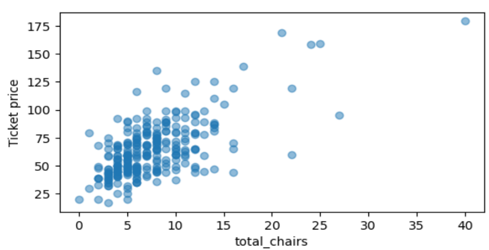
Big Mountain wants an updated lift ticket pricing model to better reflect the actual facilities and quantify how the various future facility investment scenarios affect pricing and revenue. The current model of adding a fixed premium to the average price in the industry lacks the refinement necessary to make predictions about the five scenarios under contemplation.

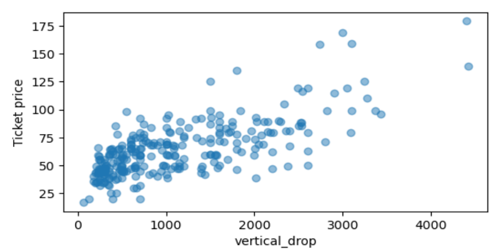
1. Permanently closing down up to 10 of the least used runs
2. Increase the vertical drop by adding a run to a point 150 feet lower down but requiring the installation of an additional chair lift to bring skiers back up
3. Same as number 2, but adding 2 acres of snow making cover
4. Increase the longest run by 0.2 mile requiring an additional snow making of 4 acres
5. Close the two T-bars

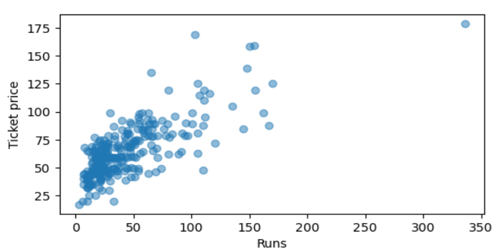
Data

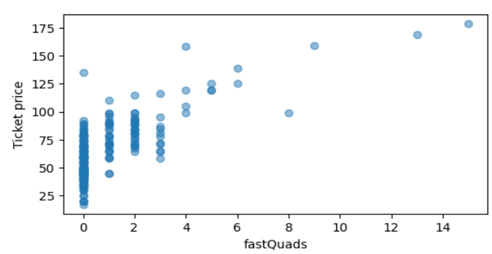
The data was almost entirely the data provided by Big Mountain on 330 resorts around the US. The only supplementation was gathering state area and population data to generate some statewide statistics. After aggregating statewide statistics and examining the data, unfortunately, the `state` label did not appear affect price. So we will only use it to help describe the competitive landscape and leave it out of the model.

These scatterplots of ticket price against `*total_chairs*`, `*vertical_drop*`, `*Runs*` and `*fastQuads*` highlight some important facilities.









Model

Both linear regression and random forest models were cross-validated and tested with a variety of hyperparameters with **MAE**, the mean absolute error, as our chosen metric. For reference, the current strategy of the mean plus a premium was tested and resulted in **MAE** = $19. The data was automatically processed and scaled in the model pipelines to find the optimal settings. The final model was chosen by this parameter search to be a random forest regressor, with median imputation and 69 estimators. In testing, the **MAE** of this model was $9.64 which rose slightly to $10.39 using the full dataset. The cross-validation confirmed we had more than sufficient data and that we could use less if needed. Since the data set was small, the additional computing time needed for the random forest was inconsequential.

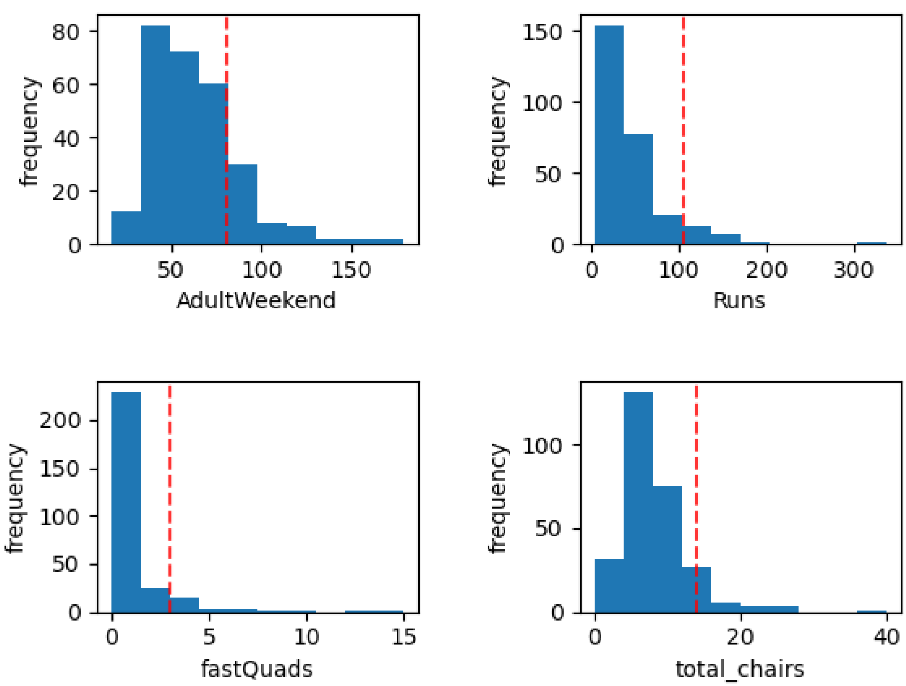
Predictions

The model predicted a lift ticket price of $95.87 and the following impacts from the future improvement scenarios.

1. Closing 1 run has no effect, 2 runs a $0.40 drop in price support, 3 to 5 runs a drop of $0.67, 6 to 8 runs a drop of $1.27, while 9 and 10 runs cause drops of $1.71 and $1.81
2. Adding the chair and run increase support by $2
3. Adding snowmaking to #2 has no effect.
4. Lengthening the run and adding snowmaking has no effect.
5. Closing the T-bars reduces price support by $0.35

Recommendations

I advise Big Mountain's lift ticket price be raised $4 to $85 this season with a potential raise to $89 the following season. With each $1 increase projected to increase revenue by $1.75M the additional operating costs are more than covered. This season would also be a good opportunity to close the outmoded T-bars and between 3 and 5 underutilized runs. Even factoring in the associated drop with these actions, lift tickets will still be nearly $10 underpriced. These graphs show Big Mountain's market position in red. Highlighting the fact that far more resorts have higher lift ticket prices than have superior facilities.



Conclusions

The missing gap of white in the first graph represents the current underpricing. By combining the lift price increase and closures this season, adjustments can be made if attendance does not meet expectations. This will give additional information on a potential second increase next season. These graphs also indicate Big Mountain's position in the top tier of ski resorts, so a more detailed analysis of all the features and pricing among the top 50 or 100 resorts would provide insight into enhancement and development of additional revenue streams.