Big Mountain Ticket Price Prediction System

An Exercise in Price Modeling for Ski Resort Tickets

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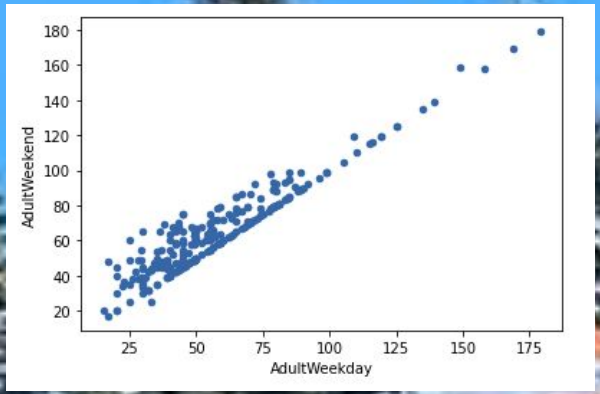
WHY

- Big Mountain Resort is a well-known ski resort that offers spectacular views of Glacier National Park and Flathead National Forest, with access to 105 trails.
- The resort has recently installed an additional chair lift that has increased there operating costs by $1,540,000.
- Big Mountain is suspicious it may not be maximizing its returns, related to its position in the market.

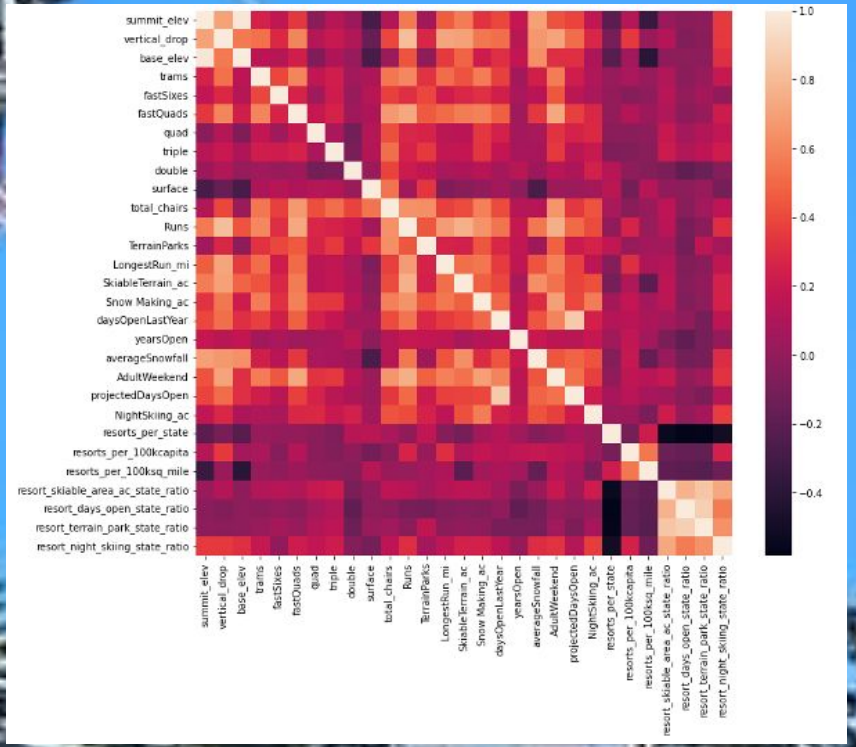
Data

- The number of columns in the data set is 27 and the number of rows is 330.
- Observing duplicate names, these names are unique records.
- Dropped columns fastEight and AdultWeekday to narrow down my search.
- Ended with the number of columns at 25 and the number of rows at 277.
- The target feature discovered was AdultWeekend price.



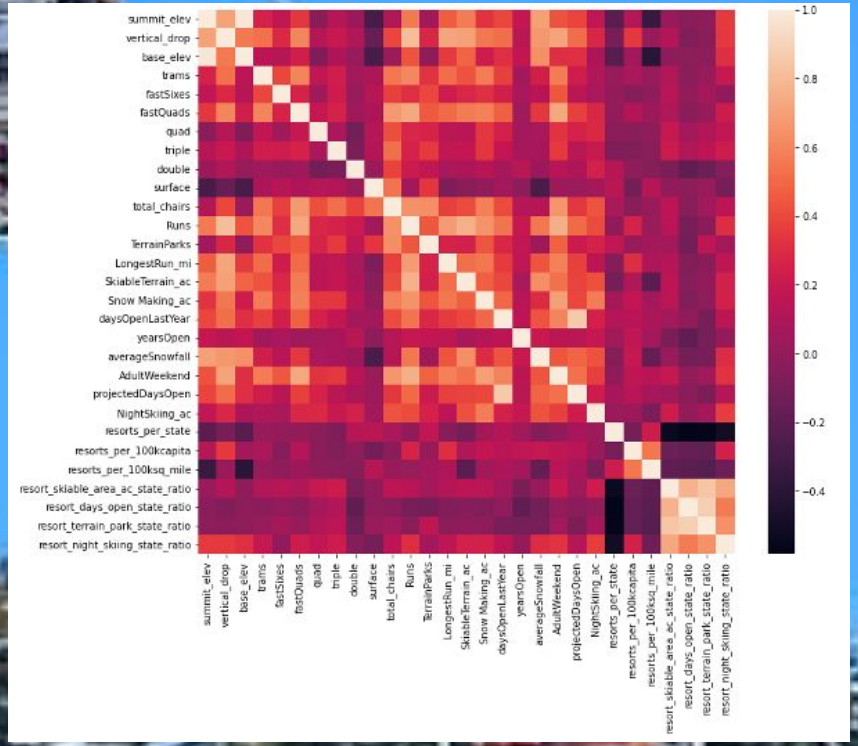
EDA

- I considered all states together when building a pricing model.
- There was potentially relevant state data in features relevant to the business use case.
- There is a positive correlation between the ratio of night skiing areas and the number of resorts per capita.
- Resorts that are more densely located with population tend to provide more night skiing.



More EDA

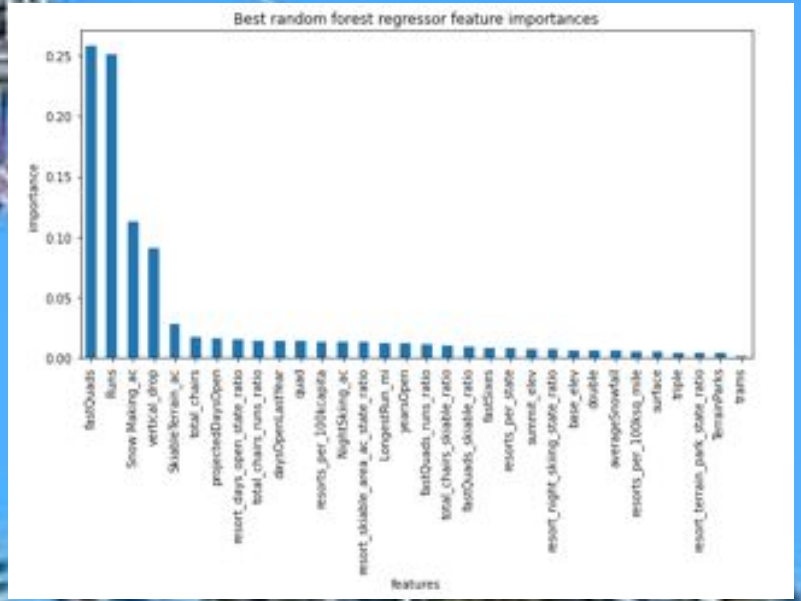
- Three columns stand out with our target feature. fastQuads, Runs, and Snow Making_ac.
- Runs and total_chairs are correlated with ticket price.
- The more runs you have the more chairs you'd need to ferry people to them.
- The vertical drop seems to be a selling point that raises ticket prices as well.



Algorithms

- Finding the linear model coefficients and matching the feature names provide enough evidence that the vertical_drop is the biggest positive feature.

- Random forest was used, the regressor provided a lower cross-validation mean absolute error by almost 1 dollar. It had less variability and the performance on the test set produced consistent results with cross-validation therefore I'm choosing to use the random forest model.



Executive Choices

- The model created suggests four different scenarios the business can consider.
    - First scenario, closing 1 run will make no difference. Closing 2 to 3 runs can successively reduce support for ticket price therefore revenue.
    - Second scenario, adding a run, increasing the vertical drop by 150 feet, and installing an additional chair lift. Increases support for ticket price to 8 dollars and 61 cents and over the season 15,065,471 dollars.
    - Third scenario, repeat the second scenario and add 2 acres of snow. Increases support for ticket price to around 9 dollars and 90 cents and over the season 17,322,717 dollars.
    - Fourth scenario, increase the longest run by .2 miles and guarantee its snow coverage by adding 4 acres of snow making capability. No difference to this scenario. However, the longest run feature was used in the linear model.

Recommendations

- Based on the model performance and the ticket price predictor. Scenario 2 would be the best business strategy to take due to installing the additional chair lift and the expected amount over the season being 15,065,471 dollars.

- In scenario 3, further consideration would be suggested as an increase of two million over the season can be made depending on the cost of making 2 acres of snow throughout the season.

Summary and Future Improvements

- I believe there could have been more done to explore possible hyperparameters. Possibly removing least useful features. Calculating and storing features adds cost and dependencies.
- Building a simpler model using the four features would have worked and would be easier to explain.
- The cost to make snow per acre over a season could have been useful for considering scenario 3.
- The big reason the modeled ticket prices were high was mostly due to the addition on the run, the increase of a vertical drop, and the install of an additional chair lift. These new resort features bring the model to increase the ticket per adult.