A DATA-DRIVEN APPROACH TO TICKET PRICING

BIG MOUNTAIN RESORT

HISTORICAL PRICING

- Big Mountain Resort has been charging an arbitrary premium above the average price of resorts in its market segment. This approach has many limitations:

Big Mountain Resort may not be capitalizing on its facilities as much as it should

Does not provide Big Mountain Resort with a good sense of how important one feature is compared to another

This prevents adding more important features of the resort to support higher ticket prices

Big Mountain Resort will also be unable to confidently implement changes that can cut costs without undermining the ticket price

PROBLEM BREAKDOWN

- Compare Big Mountain Resort to other resorts to determine the importance of features across the market segment
- Determine if the current features at Big Mountain Resort justify a ticket price increase
- Do these proposed changes cut costs without undermining the ticket price or support an even higher ticket price:

1. Permanently closing down 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, requiring an additional snow making coverage of 4 acres

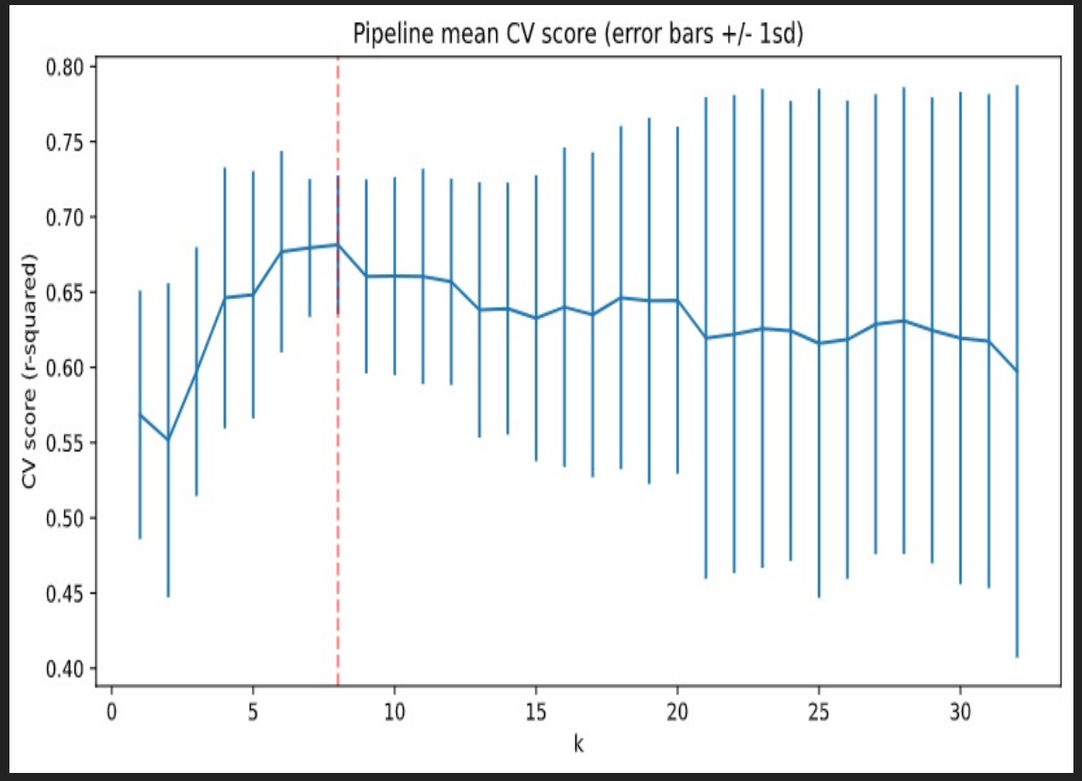
KEY FINDINGS

- Key features of ski resorts, regardless of state:
  - Fast Quads Chair Lifts
  - Number of Runs
  - Snow Making Acreage
  - Vertical Drop
- The modeled price for Big Mountain Resort is $95.87
  - This is an increase of 14.87 over the current price of $81.00
  - Even with an expected mean absolute error of $10.39, these results suggest there is still room for a price increase
- Of the proposed changes, only Scenario 1 and Scenario 2 are worth considering:
  - Closing one run makes no difference to ticket price. Closing 2 and 3 successively reduces support for ticket price and so revenue. If Big Mountain closes down 3 runs, it seems that closing down 4 or 5 shows no further loss in ticket price. Increasing the closures down to 6 or more leads to a large drop.
  - Adding a run to a point 150 feet lower supports a price increase of nearly $2 per ticket. Given an average of 350,000 guests a year would generate nearly $3.5 million over the course of the season. This would require an additional chair lift, but the cost can be amortized by the additional revenue generated by the ticket price increase

MODELING SUMMARY

- Linear Regression was the first model compared to the mean.
- Using k-fold cross validation and hyperparameter searching, it was found that 6 parameters had a positive correlation with ticket price. These 6 parameters included:

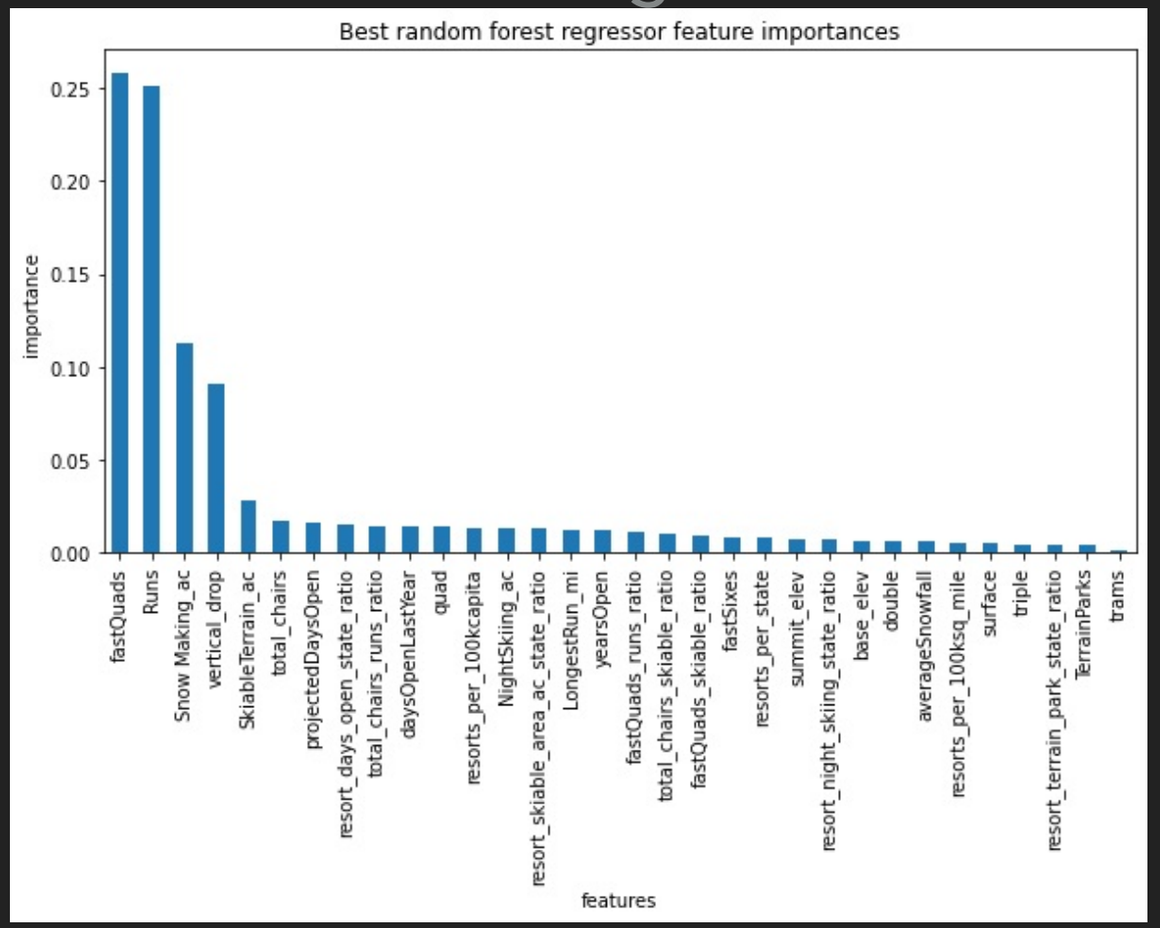
1. Vertical Drop
2. Snow Making Acreage
3. Total number of chair lifts at the resort
4. Number of Fast Quads chair lifts
5. Number of runs at the resort
6. Length of the longest run



MODELING SUMMARY

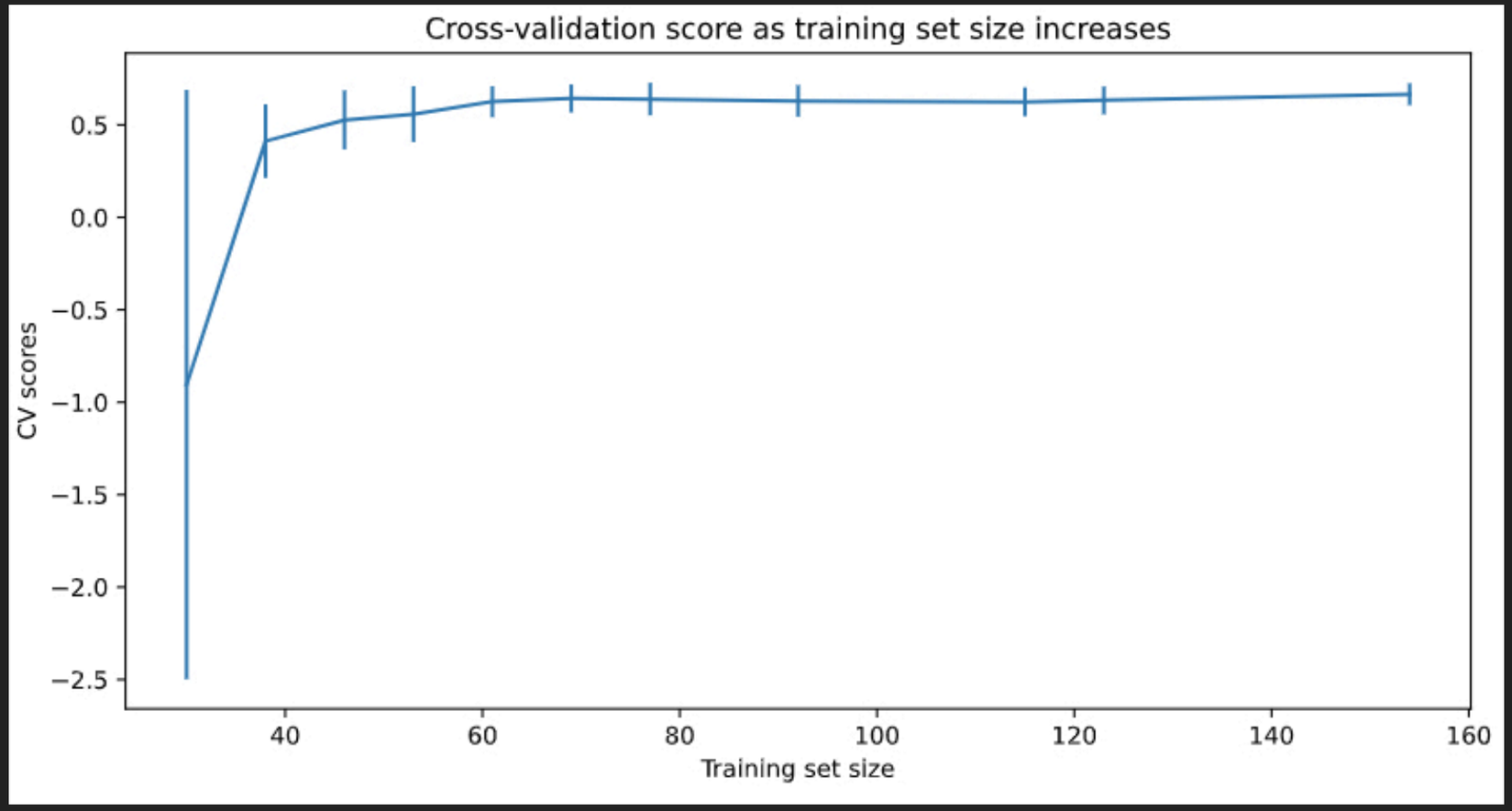
- A Random Forest Regression Model was then compared to Linear Regression
- Using k-fold cross validation and hyperparameter searching, it was found that the top 4 features were the same as Linear Regression. These Resort Features are:

1. Number of Fast Quads chair lifts
2. Number of runs at the resort
3. Snow Making Acreage
4. Vertical Drop



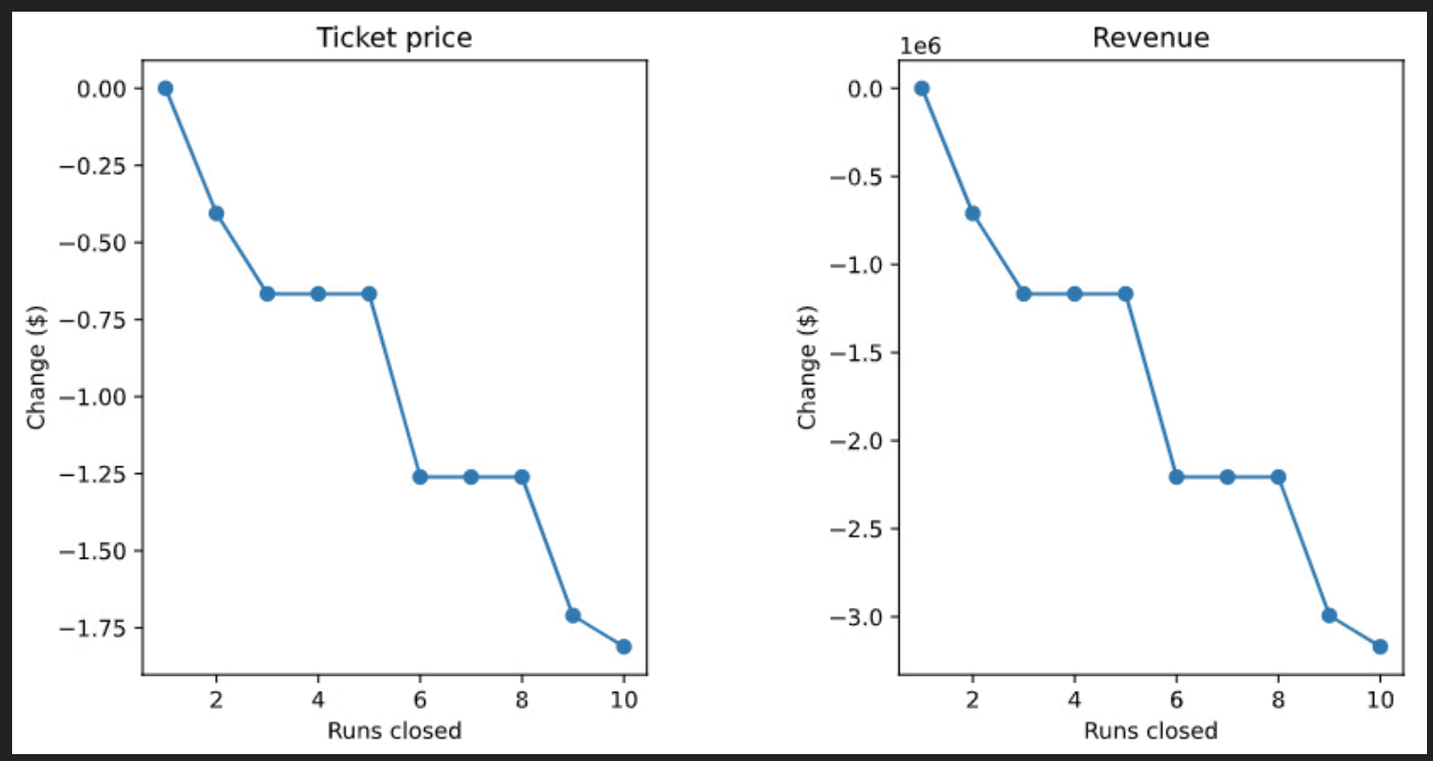
DATA QUANTITY ASSESSMENT

- Using sklearn's learning_curve function, it was confirmed that our training set was large enough to be confident in the cross-validation scores generated by the models



ANALYSIS OF PROPOSED CHANGES

- The chart below was generated when looking into the proposed option of removing runs to cut costs.
  - Closing one run makes no difference to ticket price. Closing 2 and 3 successively reduces support for ticket price and so revenue. If Big Mountain closes down 3 runs, it seems that closing down 4 or 5 shows no further loss in ticket price. Increasing the closures down to 6 or more leads to a large drop.



SUMMARY

- Although Big Mountain Resort ranks highest in Montana for price, the model still suggests a price increase
  - The model found 4 features, that regardless of the state the resort is in, contribute the biggest changes to ticket price
  - Big Mountain Resort ranked 1st in Montana for the number of Fast Quads chair lifts, tied for 2nd in the number of runs in Montana, 1st in snow making acres in Montana, and 3rd in Montana for vertical drop.
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