BIG MOUNTAIN CASE STUDY

PROBLEM STATEMENT

What can Big Mountain do to increase its profit through a combination of pricing optimization and cost saving strategies?

Context
The resort's pricing strategy has been to charge a premium above the average price of resorts in its market segment. Management is keen to find out whether there is a better pricing strategy, as well as ways to save cost.

Criteria for success
Build models using other US ski resorts data to infer reasonable price based on current offerings of Big Mountain. Explore the possibility of changing facilities offerings based on predicted pricing benchmark to recommend optimal solutions.

Scope for solution space
Find evidence to support price increase;
Find evidence to support cutting cost.

Constraints with solution place
Getting access to proper data
Might encounter oppositions from management who has other plans/ideas based on their judgment

Stakeholders to provide key insights
Director of Operations, Jimmy Blackburn
Alesha Eisen, the Database Manager
CEO, CFO

Key Data Source
CSV file from database manager
State level population/area information from internet

RECOMMENDATIONS

1 Raise the ticket price from $81 to $91 for adult weekend price

2 Identify up to 8 least used out of total 105 Runs to stop operating

3 Add a new chair lift to extend the vertical drop by 150 feet

SANITY CHECK & DATA PREPROCESSING

Check duplicates

Although resort names have duplicates, resort name is unique within each state.
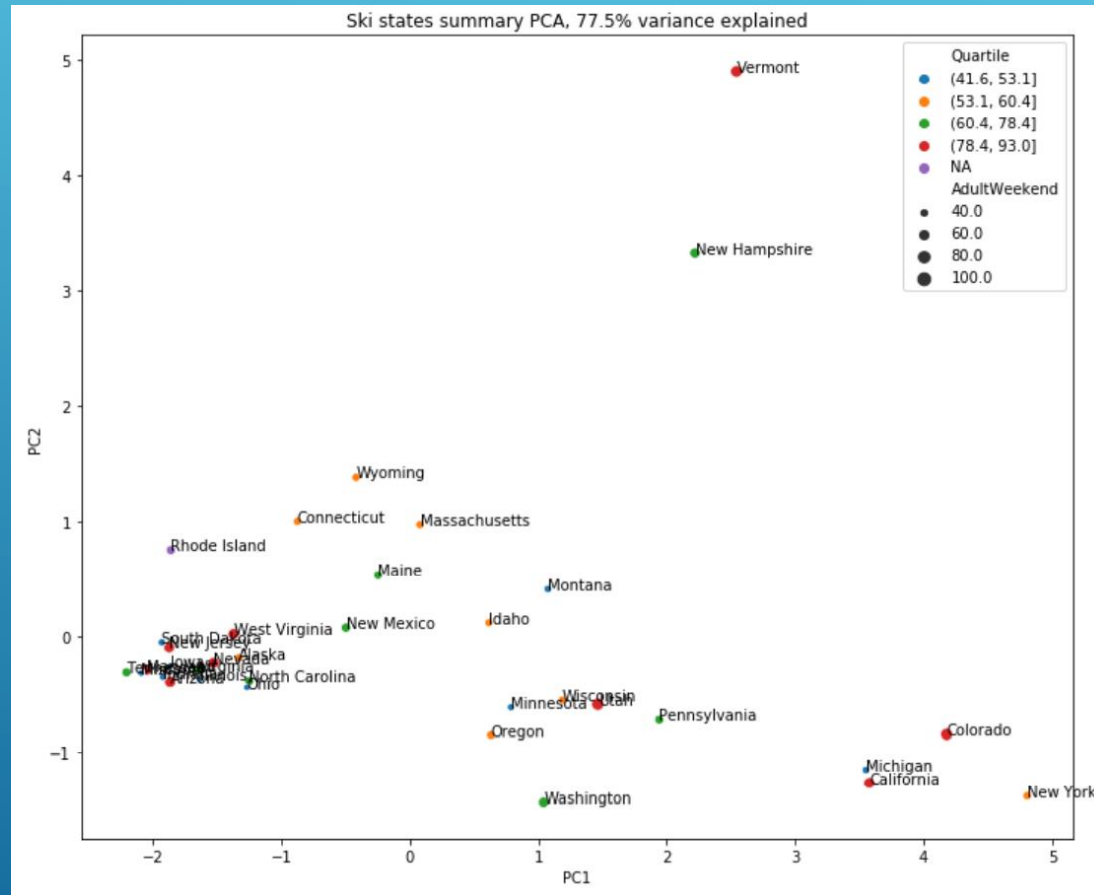
Remove data

'fastEight' missing values & useless non-missing value

'yearOpen' with value 2019, also had missing ticket price

Remove records with missing 'adultWeekendprice'

Remedial actions

update value for 1 resort of SkiableTerrain_ac

Final table

EDA – PCA

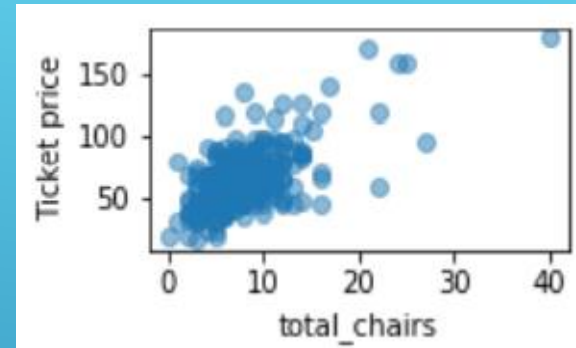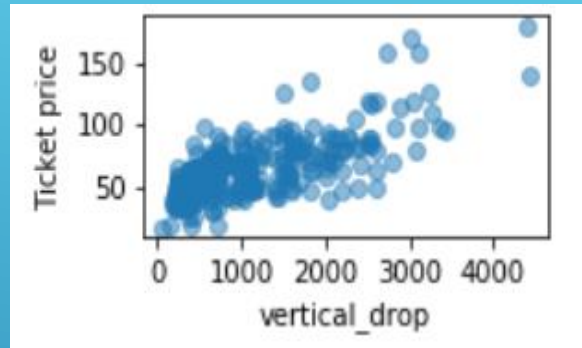Ski states summary PCA, 77.5% variance explained

The red points representing the upper quartile of price can be seen to the left, the right, and up top.

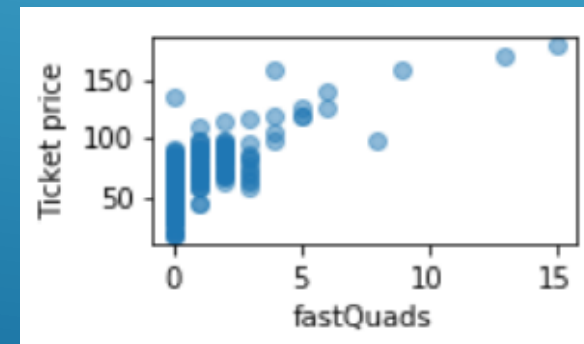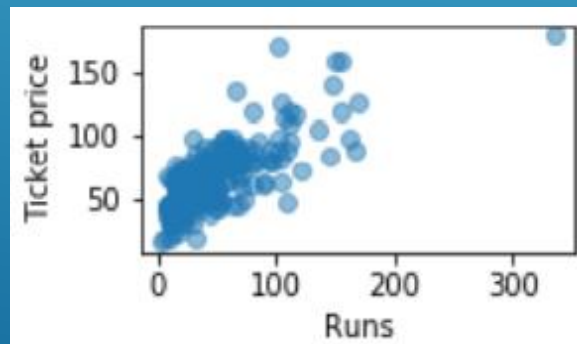Similar spread of other quartiles can be observed

PC1 & PC2 accounts for 77% of variance

Pricing model will consider all resorts without special treatments of states

EDA

There's a strong positive correlation with vertical_drop, fastQuads Runs and total_chairs.

MODEL SELECTION

Linear Regression

vertical_drop	10.767857
Snow Making_ac	6.290074
total_chairs	5.794156
fastQuads	5.745626
Runs	5.370555
LongestRun_mi	0.181814
trams	-4.142024
SkiableTerrain_ac	-5.249780

These results suggest that vertical drop is biggest positive feature.
The skiable terrain area is negatively associated with ticket price.

The top features align with linear model.
Based on R2 and Mean Squared Error, Random Forest is selected

Random Forest

Best random forest regressor feature importances
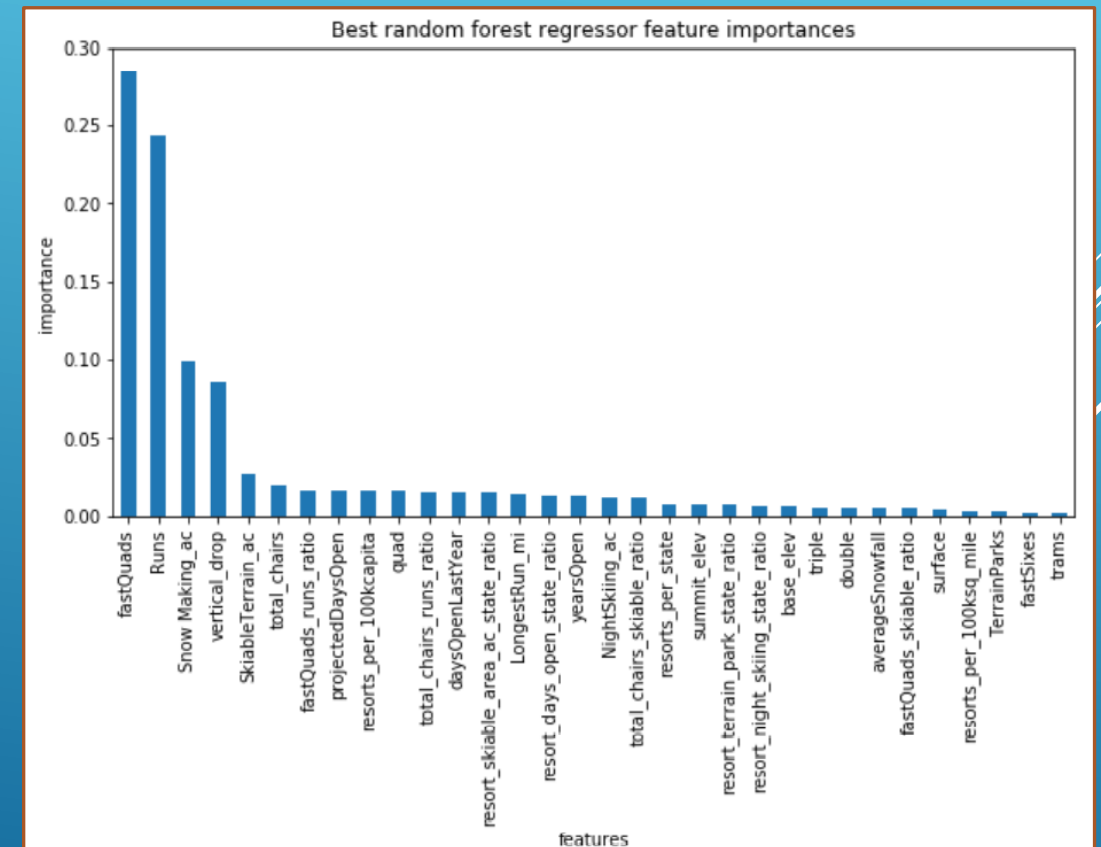
MODEL INFERENCE

Ticket price

Closing 1 run doesn't make difference; Closing 3 – 8 runs have the same impact on price

Raising vertical drop by 150 feet and having 1 additional chair could raise price by $1.88

Adding 4 acres of snow making or extending longest run by 0.2 mile doesn't have any impact on pricing
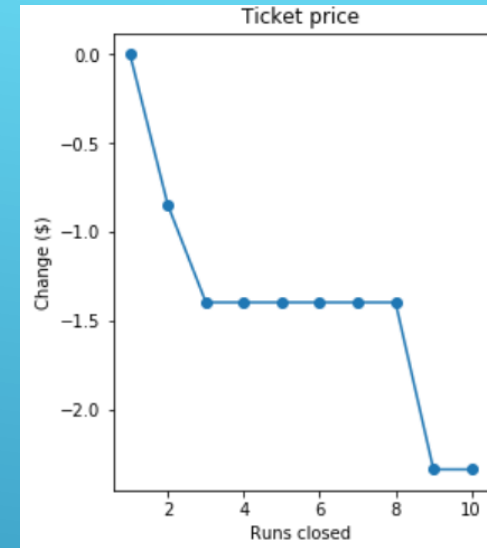
SUMMARY AND CONCLUSION

Based on current offering, model suggests price to be $100, a $19 improvement from current price. Model has an average error of $10, so the conservative recommended price would be $90, still an improvement of $9 from current pricing.

The operation of 105 total runs can potentially be downsized. Model suggests reducing 3-8 chairs will cut the price by $1.4 per ticket. Assuming 350K visitors and 5 days per visitor, that will amount to $2.45 million. However, if the operation cost of the 8 runs are greater than $2.45 million, then it does make sense to work closer with operation team to find out the least used runs to turn off.

Vertical drop is a major factor in ticket pricing. Increasing vertical drop by 150 feet and at the same time adding a new chair would increase the ticket price by another $1.88. This is a great marketing strategy if we can roll out this upgrade and at same time raise the ticket price. This compensates the effect of reducing number of runs, making $90 the final guideline price.

Adult weekend ticket price ($) distribution for resorts in market share

Adult weekend ticket price ($) - Montana only distribution for resorts in market share