How Big Mountain Resort Can Maximize Returns ?

Context

Big mountain is a top class skiing resort in Montana. It has some of the finest facilities for skiers and riders of all levels and abilities. Around 350000 people visit and enjoy skiing and snowboarding each year at the resort. The resort charges premium in above average market prices.

Problem

How exactly Big Mountain can increase revenue without undermining profit through

1. Increasing ticket prices and/or
2. Increasing facility utilization

Data

We have up to date information about resorts which operate in same market segment. This information contains details about location, facilities, number of days open, ticket price etc.

Scope

Focus of this initiative is to analyse and predict fair ticket price which Big Mountain can charge in the next season. We will not analyse cost details as they are unavailable.

Stakeholders

Jimmy Blackburn - Director of Operations
Alesha Eisen - Database Manager
Executive members

Success Criteria

Make a recommendation for a new pricing strategy to the executive members.

Recommendations

- ★ Big mountain resort charges $81 for a skiing ticket and it is the most expensive resort in Montana.
- ★ Our model is suggesting that there is scope to increase ticket prices. We propose some solutions below where we can justify the price hike to customers by adding additional facilities.
- ★ Solution 2 stands out in terms of profitability, feasibility and acceptability.

	Impact	Solution
01	**Revenue : + 7.0 million** **Profit : + 7.0 million**	• Increase the ticket price by $4. • The projected fair price is $95.8 with +/- $10.4 variation. We can safely increase price to lower bound of $85.
02	**Revenue : + 5.9 million** **Profit : + 4.2 million**	• Increase vertical drop by 200 feet, install new chair and close 5 least used runs • Increase ticket by $3.4 • Assume effective cost change is $1 per ticket
03	**Revenue : + 3.5 million** **Profit : + 1.9 million**	• Increase vertical drop by 150 feet, install a chair and add a run • Increase ticket by $2 • Assume effective increase in per ticket cost is $0.9
04	**Revenue : + 3.5 million** **Profit : + 1.8 million**	• Scenario 03 + increase snowmaking area by 2 acres • Increase ticket by $2 • Assume effective increase in per ticket cost is $1

★ We are assuming 350,000 visitors in the next season and an average of 5 tickets/visitors. Vertical drop can be increase to 200 feet.

Data Processing

Raw data contains **330 rows and 27 columns**.. Each row represents an unique resort and each column represents a characteristic of that resort. Data is already in tidy format.

Between AdultWeekday & AdultWeekend ticket price, AdultWeekend has less missing values, more variation and is always greater than AdultWeekday price. Hence, we choose **AdultWeekend** as our target.

We have **dropped** the **records**(~16%) where target AdultWeekend is missing. We dropped AdultWeekday and fastEight **columns** because of high missing %.

We have scrapped population data from Wikipedia to get state population & area information.

We have **resort attributes** as location, different types of chairs, vertical drop, elevation, skiable area during day and night, number of runs, number of days open during etc of a resort. In addition to this, we have **derived features** on state level competition like per capita and per area resort density. The resort's competitive standing is quantified using **ratio features** like ratio of resort's skiable area to total state skiable area.

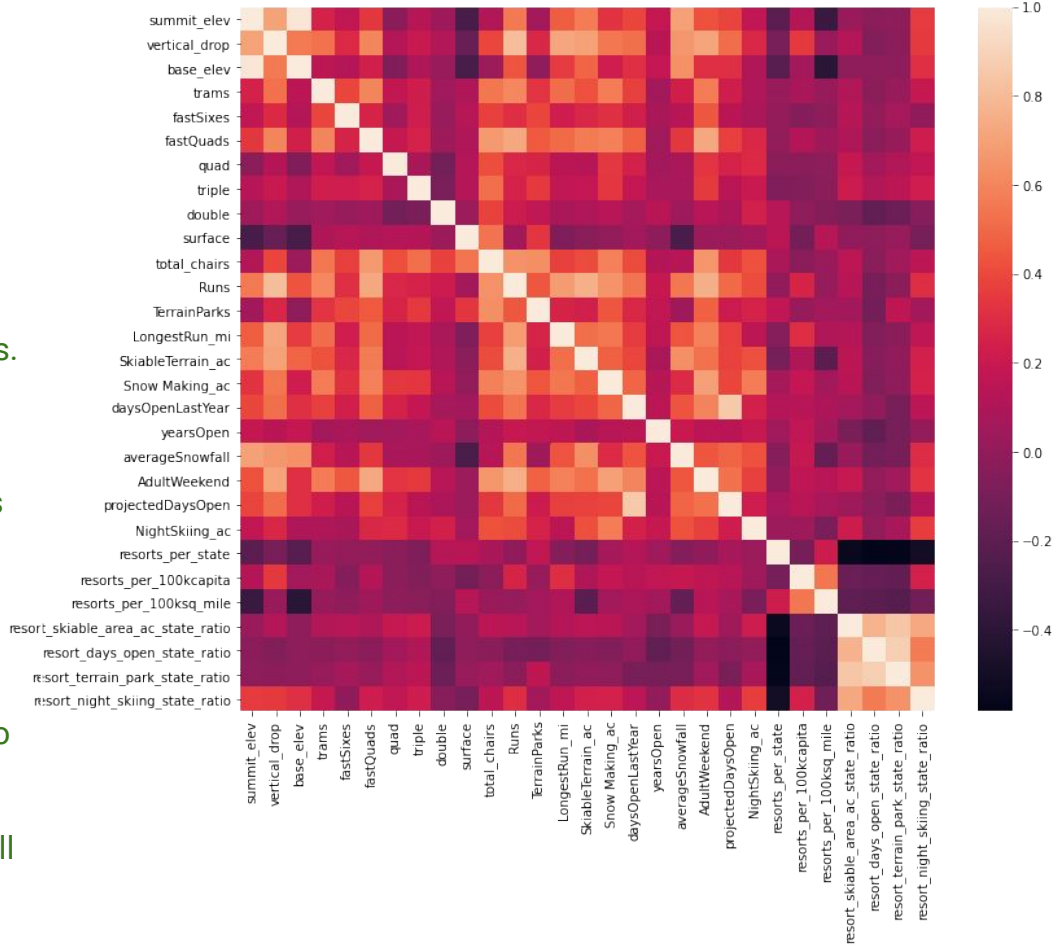
Finally, we have **277 rows and 37 columns**.

Data Insights

Shall we treat all states on equal footing? Yes:
We performed PCA using state features and analyzed the spread of state wise average ticket price on the first 2 PCA components. These 2 components seem to capture the relevant information about states with respect to ticket prices.

Correlation with target:
Ticket price is highly correlated with Snow Making acres. This correlation is stronger than correlation with total skiing area. It suggests that some guarantee of snow can fetch premium in ticket price. Vertical drop is positively correlated with ticket price. This is intuitive as it will incur higher transport & maintenance costs. fastQuads , Runs are highly correlated with ticket price.

Correlation within features:
Total chairs and Runs are correlated with each other. This seems intuitive as more runs means more chairs to ferry people. Ratio features are negatively correlated with the number of resorts in each state because if you increase the number of resorts in a state, the share of all the other state features will drop for each.



Modelling

Data Split : We exclude Big Mountain Resort entry and then split the data in 70/30 for train/test.

Matrix: We are using Mean Absolute Error(MAE) to access how good our model prediction is.

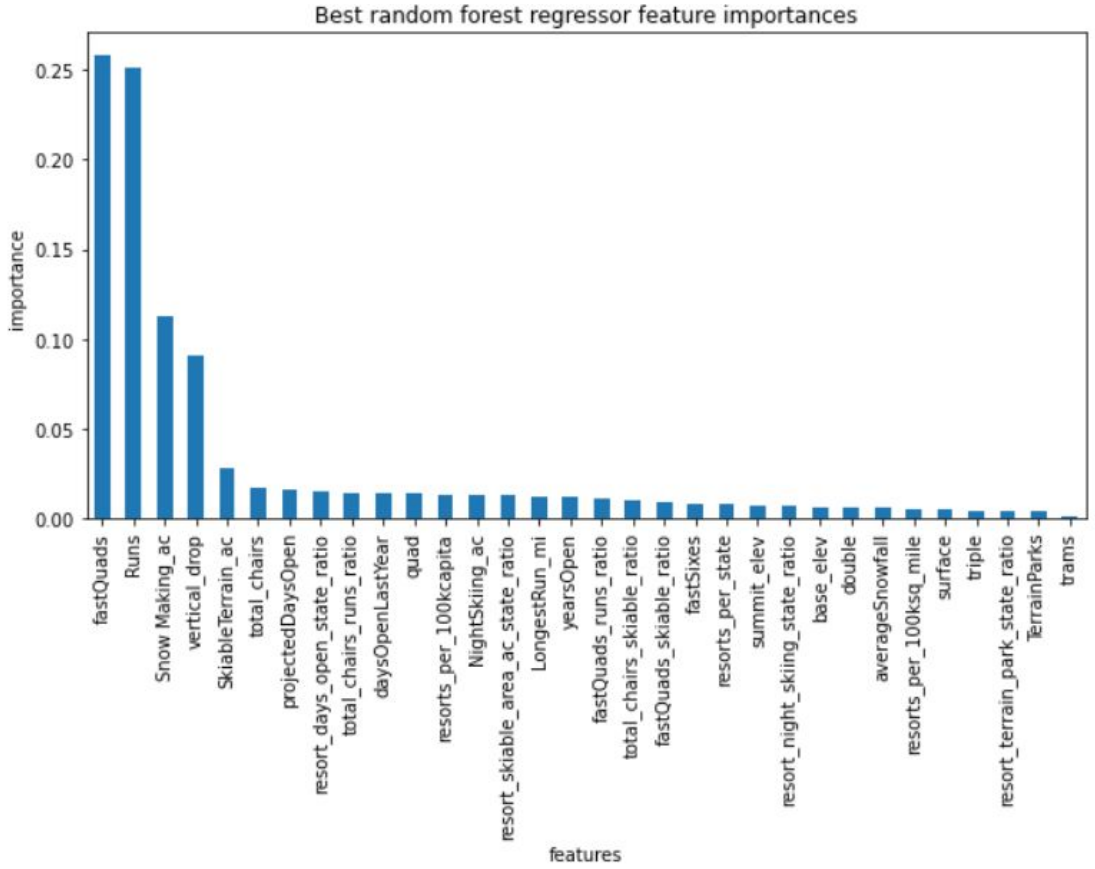
Cross-Validation: Using cross-validation, we observe that MAE in

1. Median < Mean imputation
2. Random Forest < Linear Regression

Hence, we choose Median imputation & Random Forest model for better predictions.

Feature importance:

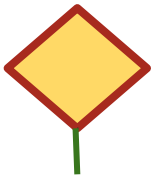
1. Top 4 features are common in both the RF & LR models, indicating stability.
2. These are fastQuads, Runs, Snow making acres, vertical drop. This makes intuitive sense and is consistent with observed correlation.
3. Selecting top 8 features in RF gives us best bias-variance trade-off .



Conclusion

Top Class Resort

The Big Mountain is a top class resort in term of facilities it offers. It is amongst the resorts with the largest amount of skiable terrain. A very few resorts have more chairs, fastQuads, Longest Run than Big Mountain. It is the most expensive resort in Montana.



Scope to increase price

Big Mountain is charging $81 per ticket,. Given the facilities Big Mountain offers, there is a good opportunity to increase the ticket price by $14 as per best estimate and $4 as per conservative estimate. This is without adding a new facility or service.

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Recommendation

Big Mountain can increase ticket price by $3.4. And, it can increase vertical drop by 200 feet, install a new chair and close 5 least used runs. This will lead to $4.2 million increase in profit. It is feasible to do so and will lead to more acceptability of price hike among customers.

Next Steps

Step 1 - Add Expenses

We do not have operating cost information for facilities except for new chair. With additional information on operational costs, we can quantify and analyze marginal profit of adding/removing particular resource.

Step 2 - Add Consumer Attributes

We do not know anything about number of customers visiting other resorts. With this, we can gain insight into popularity and price appeal of resorts, and we can perform price elasticity analysis. It will also help us in determining optimum resource utilization of a resort eg total chairs to number of daily visitors ratio.