Big Mountain Resort Ticket Pricing Analysis

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Problem Identification

Situation:

- Big Mountain Resort is evaluating its ticket pricing and market positioning.
- Ticket price is suspected to be undervalued.
- This season operating costs have increased by $1,540,000 due to installation of a new chair lift.

Can these costs be balanced by an improved ticket pricing strategy?

- **Goal 1:** to align ticket pricing with value provided.
- **Goal 2:** to explore operational adjustments and facilities modifications for increased returns.

Recommendation and Key Findings

Recommendation:

- Close one of the less used runs.
- Increase vertical drop by 150 feet with a new chair lift.
- Do not alter the snow making area.

Key findings:

- These modifications support an increased ticket price of $95.87
- Potential benefits amount to $3,474,638. This is 2.3 times the cost of the additional chair lift ($1,540,000).

Modeling Results and Analysis: Data and Preprocessing

- Dataset contains information about 330 resorts, including name, region, state, ticket price, areas of skiable terrain and snow making, installations, etc.
- Weekend and weekday ticket prices are the same in Montana. We focus on weekend ticket as it has fewer missing values.

Important assumptions:

- Other resorts are setting their prices according to the public demands
- States are treated equally throughout our analysis.

Modeling Results and Analysis: Model Selection

We have considered two models: a linear regressor and a random forest regressor.

Model performance will be assessed by cross-validation (CV) mean of mean absolute error (MAE).

Linear regression performance:

- With median imputation:
- CV + hyperparameter search for best number of features yields k=8
- CV mean MAE: 10.50, standard deviation: 1.62
- MAE on test set: 11.79

Modeling Results and Analysis: Model Selection

Random forest regression performance:

- With median imputation:
- CV + hyperparameter search for number of trees yields n=69
- CV mean MAE: 9.64 , standard deviation: 1.36.
- MAE on test set: 9.58

Winning model:
Random forest $\rightarrow$ lowest cross-validation MAE, lower standard deviation

Modeling Results and Analysis: Scenarios Evaluated

Four scenarios have been considered by Big Mountain Resort for cost-cutting/increasing revenue:

- Scenario 1: Permanently closing down up to 10 of the least used runs.
- Scenario 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
- Scenario 3: Same as number 2, but adding 2 acres of snow making cover.
- Scenario 4: Increase the longest run by 0.2 mile to boast 3.5 miles length, requiring an additional snow making coverage of 4 acres.

Modeling Results and Analysis: Scenarios Evaluated

According to our Random forest model:

- Scenario 1 results in a decreased revenue if more than one run is closed.
- Scenario 2 supports a ticket price increase of $1.99. Revenue over the season expected to amount to $3,474,638.
- Scenario 3: same as Scenario 2.
- Scenario 4: No ticket price difference

Summary and Conclusion

Conclusion:

- Our random forest model suggests a ticket price increase of $1.99
- Revenue over the season is expected to amount to $3,474,638.
- This is 2.3 times the costs of the new chair lift.

Points to consider for future work:

- Include state as a categorical feature.
- We dropped many entries with missing values. Do research to complete the dataset and rerun models with more data.