Predicting Ticket Prices at Big Mountain Resort

Presented By: Anita Beauchamp

Problem Identification - Business View

- Increased operating costs due to installation of additional chair lift.
  - $1,540,000 increase for the season
- BMR's pricing strategy may not fully capitalize on facilities
  - Current state: Charge a premium above avg price of resorts in same market segment.
  - Future state: Set price based on unique BMR facility offerings.
- Unclear which facilities customers care about the most.
- Unclear how much customers are willing to pay for current BMR facility offerings.

Key Takeaway: BMR seeks opportunities to increase revenue and reduce costs by providing facilities that support strengthened ticket prices and closing facilities that do not.

Problem Identification - Project View

Problem Statement

How should Big Mountain Resort adjust its pricing model for Adult tickets in order to increase the profitability of its facilities while remaining competitive in its market segment?

Project Scope:

Use data analysis and machine learning to predict a new Adult ticket price based on relevant features for businesses in the same market segment as BMR.

Recommendations & Key Findings

- Increase Adult Ticket Price to $95.87 *(+/- $10.39)*
  - $14.87 increase from current price of $81
- Select Scenario 2 to Further Increase Revenue
  - Scenario 2: Add run to increase vertical drop by 150 feet & install additional chair lift
  - Supports $1.99 increase in Adult ticket price
- Use Caution When Closing Runs
  - Generally results in weakened price support.
  - Being strategic can prevent losses.

Modeling Results & Analysis - Data Wrangling

- Primary Data Source: ski_resort_data.csv
  - Obtained from database manager.
  - Contains region/state, facilities data, ticket prices, and other characteristics for ski resorts in the same market segment as BMR.
  - Ticket prices broken into two categories: Adult Weekend and Adult Weekday.
- Secondary Data Source: US population data by state
  - Sourced from Wikipedia
  - Used to create resort density and population density ratios by state to determine the competitive landscape of each state.

Modeling Results & Analysis - Preproc & Model Selection

- Target variable: Adult Weekend ticket price
- Split dataset into train/test set.
  - 70/30 train/test split.
- Established a baseline metric for comparing various model performance.
  - Baseline used mean ticket price as predictor.
  - Similar to BMR’s current pricing strategy.
- Tested two different types of models
  - Linear Regressor
  - Random Forest Regressor ← used for final prediction
    - Less error and variability

Modeling Results & Analysis - Model Training

- Selected the Random Forest Regressor for the final prediction.
- Refit model using all available data, excluding BMR.
  - The prediction is based on data from all other resorts to prevent biasing model with current pricing data.
  - This allows BMR management team to compare current pricing strategy with the ML strategy.
- Calculated ticket price for BMR
  - Big Mountain Resort modelled price is $95.87, actual price is $81.00.
  - Even with the expected mean absolute error of $10.39, this suggests there is room for an increase.

Modeling Results & Analysis - Important Features

Based on the modeling & analysis, the following features are important factors in ticket pricing:

- Vertical drop
- Snow-making machine coverage
- Total chairs
- Fast quads
- Runs
- Longest run
- Trams
- Skiable Terrain

NOTE: Features are not shown in order of importance since feature importance varies based on model selection. Use as a general guide, but consult model when making final determinations.

Summary & Conclusion

- Ticket prices should be increased based on BMR facility offerings.
  - Model recommends an adult ticket price of $95.87 +/- $10.39. This is higher than the current price of $81.
- Ticket prices can be further increased with the addition of a new run and chair lift (Scenario 2).
  - This scenario supports an additional $1.99 adult ticket price increase.
- Closing runs generally results in weakened pricing, but not all successive closures result in price dips.
  - Executive team should use caution and consider net profit loss/gain when evaluating closures.