**Big Mountain Resort: Optimal Ticket Pricing Data Analysis**

# Introduction

This report presents the findings of the ticket pricing analysis for Big Mountain Resort. The resulting model will be used to provide guidance for Big Mountain's pricing and future facility investment plans.

# Data Overview and Data Wrangling

Data for over 330 resorts around the United States was provided. An analysis of the data determined that Montana resorts are in the bottom half of ticket prices and there is little variability in Montana between weekday and weekend ticket prices. Weekend prices also had less missing values, so the analysis focused on weekday prices.

# Exploratory data Analysis (EDA)

EDA was performed at the state level to look for potential relationships between state and ticket price. While no clear pattern emerged, some interesting relationships were uncovered in the numerical features.

A Principal Component Analysis (PCA) was performed to determine which features to focus on. The first two components of the PCA seem to account for over 75% of the variance, and the first four for over 95%. A scatter plot of the first two PCA components (by state), with point size scaled by average price was studied. No pattern was evident between state and average price.

A screen shot of a graph

Description automatically generated with low confidence

Both a feature correlation heatmap and a set of scatter plots for each feature vs ticket price were analyzed. These show several features that have a high positive correlation with ticket price The initial target features for modeling were determined to be resort\_night\_skiing\_state\_ratio, Runs, total\_chairs, vertical\_drop, and fastQuads.

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# Model Preprocessing and Feature Engineering

Model preprocessing was conducted using average price to gain a baseline, a linear regression model, and a random forest regressor model. Preprocessing was limited to imputing missing data points (with both the median and mean) and scaling features to zero mean and unit variance.

Both Random Forest and Linear Regression found the same top four features (fastQuads, runs, snow making\_ac, vertical\_drop) These are in line with the initial target features.

The Average Price was calculated to be $64 with a Mean Average Error of $19.

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| --- | --- | --- | --- |
|  | **MAE** | **Mean** | **Standard Deviation** |
| **Linear Regression** | $11.80 | $10.50 | $1.62 |
| **Random Forest Regressor** | $9.54 | $9.64 | $1.35 |

The Random Forest Regressor was chosen as it has a lower cross-validation MAE by almost $1 and exhibits less variability.

# Model Results and Price Recommendations

Big Mountain Resort currently charges $81 for an Adult Weekend Ticket. The Random Forest Regression modeled price is $99.99, an increase of almost 25%. An increase of this size would not go unnoticed by customers and would require a marketing strategy. Note that the model supports raising ticket prices by $0.81 for the new chairlift that was recently added.

Ticket price was also modeled under the shortlisted business options for increasing revenues and decreasing operating costs. Only two were found to be viable:

* Permanently closing up to 5 of the least used runs – closing down anymore would lead to a large drop in revenue.
* Increasing the vertical drop by 150 ft – the model supports raising the ticket price by $0.81

# Conclusion and Future scope of work

This model serves as a good basis for further work on ticket prices. If desired, it could be expanded to include operating costs and other revenue streams. Additional information could help us build a more robust model.

This model could be made available to business analysts through a simple app that would allow users to enter different scenarios and add/remove rows of data to see the impact on ticket prices. The modeling team would not be required unless the feature set changed.