Big Mountain Resort

OpEx Cost Recovery Plan – July 2020

Contents

Problem Statement

How can Big Mountain Resort increase revenue to cover cost of new chair lift and maintain 9.2% profit margin in this financial year?

Context

- The resort has recently installed a new chair lift to increase the distribution of visitors across the mountain, adding an additional $1.54m to OPEX this year. The business has a profit margin of 9.2% and wants to maintain this going forward.

Criteria for success

- Identify a way to increase revenue to level that allows company to maintain 9.2% business profit margin for the upcoming season

Project Scope

- Understand if there is an opportunity for the resort to increase ticket prices by developing a model to predict optimal ticket price, and therefore drive additional revenue

Constraints

- Data availability
- Ability to increase ticket price may not be viable for other commercial or operation reasons

Recommendation

Use available data to model and predict Big Mountain price for upcoming year

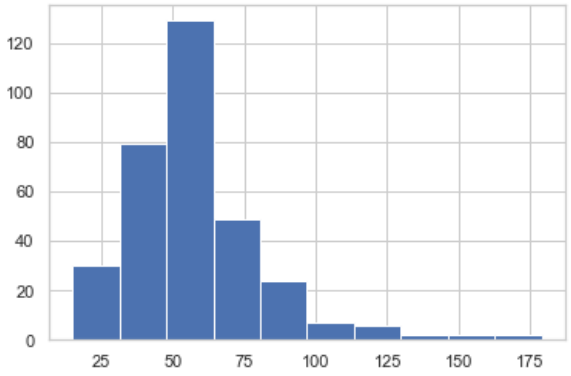
Steps:

1. **Access and understand data**
   - Gain access to required data
   - Explore data to understand trends and issues in data
   - Adjust dataset to put in shape for analysis / modelling
2. **Model data**
   - Model data with response variable of ticket price to better predict optimal pricing for Big Mountain Resort
   - Iterate through models to identify best fit for data
3. **Predict price**
   - Use best model to predict optimal price point for Big Mountain Resort going forward

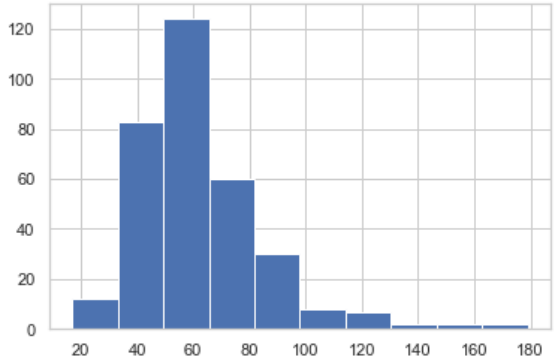
Model – Dataset

- Data
  - Acquired dataset with data on 330 resorts across the USA
  - 27 variables (see table with mean value, if applicable)
  - File updated to handle missing values
  - File checked to remove duplicates
- Response Variable
  - Focus on AdultWeekday and AdultWeekend as response variable to support problem statement

AdultWeekday
Distribution



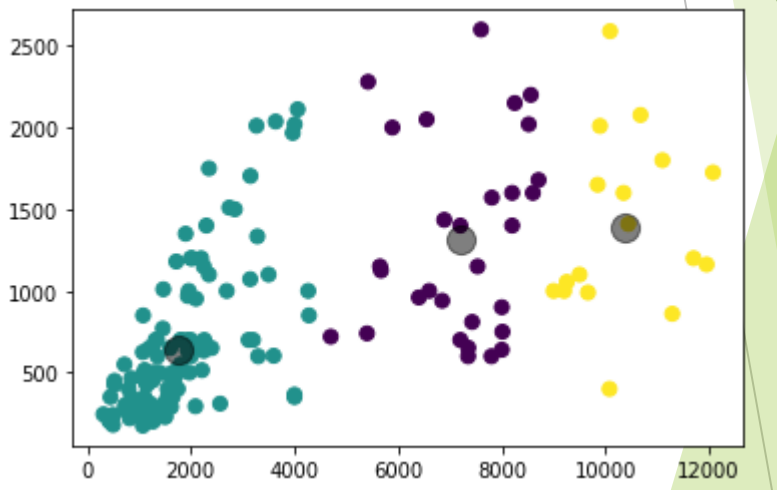
AdultWeekend
Distribution



Variable Name	Mean
Name	n/a
Region	n/a
State	n/a
summit_elev	4591.82
vertical_drop	1215.43
base_elev	3374.00
trams	0.17
fastEight	0.01
fastSixes	0.18
fastQuads	1.09
quad	0.93
triple	1.50
double	1.83
surface	2.62
total_chairs	8.27
Runs	48.21
TerrainParks	2.82
LongestRun_mi	1.43
SkiableTerrain_ac	739.80
Snow Making_ac	174.87
daysOpenLastYear	115.10
yearsOpen	63.66
averageSnowfall	185.31
AdultWeekday	57.92
AdultWeekend	64.17
projectedDaysOpen	120.05
NightSkiing_ac	100.40

Model – Exploratory Analysis

- Anomalies & Outliers
  - Removed rows with values outside Inter-quarterial range (IQR) reducing data to 176 resorts
- Data Relationships
  - Identify variables with high correlation (>0.95) to remove from data set
  - This included ‘base_elev’ and ‘sum_chairs’ that were dropped from data set
- Clusters
  - Used k-means clustering technique to identify three clusters in dataset (see beside)



Model – Modelling

- Three models performed
  - All included splitting data into training and test data (75/25)
  - Linear regression models
  - Performance of each model in table below
- **1st Model (including all features)**
  - Strong fit with 0.928 explained variance
  - States had the top 10 strongest coefficients of all features in this model
  - Provides little value to support action for Big Mountain Resort so removed from model
- **2nd Model (without 'state')**
  - Strong fit with 0.922 explained variance
  - Summit elevation and base elevation were in Top 3 strongest coefficients of all features in this model
  - Provides little value to support action for Big Mountain Resort so removed from model
- **3rd Model (without states or elevations)**
  - Strong fit with 0.924 explained variance
  - Provides model similar to previous but with different top 10 coefficients

Model	Explained Variance	Mean Absolute Error	Features Dropped
Model 1.	0.928	5.35	-
Model 2.	0.922	5.54	'state'
Model 3.	0.924	5.53	'state','summit_elev','base_elev'

Model – Result

- **3rd Model selected as best model**
  - Maintained high explained variance and similar mean absolute error compared to alternative models
  - Contains more relevant and actionable features than alternative model (see coefficient model on right)
- **Big Mountain Resort Prediction**
  - Ran model on Big Mountain Resort data to allow it to predict suggested pricing based on features included in model
  - **Model suggested price of $88.77 for Adult Weekend tickets**
  - This is +$7.77 higher than existing price of $81

Model 3 Coefficients

Feature	Coefficient
AdultWeekday	19.893397
averageSnowfall	1.982708
Runs	1.665804
quad	1.578662
triple	1.380822
vertical_drop	1.291189
surface	1.266572
daysOpenLastYear	0.829641
fastQuads	0.771395
clusters	0.766623

Summary

Objective

- Identify a way to increase revenue to level that allows company to maintain 9.2% business profit margin for the upcoming season
- Understand if there is an opportunity for the resort to increase ticket prices by developing a model to predict optimal ticket price, and therefore drive additional revenue

Outcome

- Model suggests that Big Mountain Resort could increase its Weekend Ticket price from current $81 to $88.77

Next Steps

- Develop forecast to understand if price increase will cover Opex cost
- Run similar model on AdultWeekday to understand if pricing opportunity exist
- Understand if any other commercial, operational or guest impacts to consider before implementing price changes