

Big Mountain Resort: Guided Capstone

Project Findings

Problem Identification Overview

What strategies Big Mountain Resort's Management team needs to resort to, in order to increase this year's annual revenue and keep it at desired level expected by the Investors, while offsetting against increasing operating costs to maintain profit margin for the business at ~9.2%?

Big Mountain Resort, who has recently installed an additional chair lift to increase distribution of visitors across the mountain has resulted in the operating costs increasing by \$1,540,000 this season. The resort investors are looking for a solution to increase this year's annual revenue in the form of more footfalls to offset the increasing operating costs keeping in mind that it faces tough competition from nearly 330 resorts in the US.

Data

Data cleansing was performed primarily focusing on the following

Handling the missing and NA values by filling null or mean or 0.

Use correlation matrix to drop variable that's high correlated to another variable but has lots missing

Removing duplicate rows

EDA

Use histogram to check whether there are normal distribution for the independent variables, as there are not many normal distribution for independent variables, we apply standard scaling to standardize the data

Use scatter plot to check that there are linear regression between independent variables and dependent variables, we can find there are linear regression between independent and

Model Description and Performance

Models applied

K-means Clustering

K-means Clustering was further applied to put the cleaned dataframe into groups (or 'clusters') for conveying findings in a clean graphical format. Number of clusters set to 3 by Elbow method.

Modeling performance

Model	Explained Variance	Mean Absolute Error	Features Dropped
Model 1.	0.92	5.46	-
Model 2.	0.91	5.77	'state'
Model 3.	0.92	5.70	'state','summit_elev','base_elev'

Linear Regression

(With chosen Model 2, since 'states', 'summit_elev','base_elev were removed)

Use P-value to choose out the significant variable, and analyse the importance of the factors according to the coefficients of the independent variables

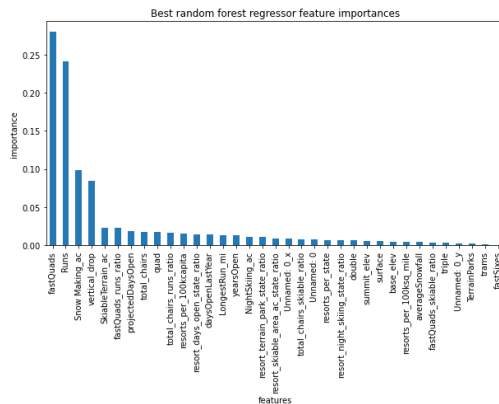
The most highly co-related variables to **AdultWeekend** (Weekend ticket price \$) are: Adult vertical drop, snow making, total chairs, fast quads, runs. The adult weekend price is positively

related to these factors, but according to the plot chart, we can see all these factors for big mountain are higher than average than those in the market.

```
vertical_drop      10.767857
Snow Making_ac     6.290074
total_chairs       5.794156
fastQuads          5.745626
Runs               5.370555
LongestRun_mi      0.181814
trams              -4.142024
SkiableTerrain_ac -5.249780
dtype: float64
```

Random Forest Regressor(Feature Importance)

Encouragingly, the dominant top four features are in common with your linear model:



Model Predictions

The actual Weekend ticket price for ‘The Big Mountain Resort’ is \$81, however, going by the predictions using the modeling, the expected ticket price should be targeted at \$91.14 to stay in-line with the other resorts depending on varied features Big Mountain offers vs. them. These increased ticket prices should help the Management achieve their goal of 9.2% of profit margin despite increased CAPEX.

If we don't want to increase price, we can also consider reducing vertical drop, snow making, total chairs, and fast quads, to keep the original price, but save on cost, so we can have more profit margin

Next Step

Big Mountain was already fairly high on some of the league charts of facilities offered, if we keep increase price, we might lose our customers, so maybe we can also take a look at some other factors like costs, avg weekday price, projected days to be open to reduce cost, instead of keep increasing price