Data Science Project Report: Big Mountain Ski Resort Guided Capstone

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## Business Task:

The goal of this project is to provide Big Mountain Ski Resort with a more data-driven business strategy to address the increase in operating cost this season of $1,540,000 due to the installation of an additional chairlift. This project will provide the resort with a predictive pricing model for resort ticket prices within their market segment with the purpose of offsetting these additional operating costs. The final deliverables will be to provide guidance for Big Mountain’s ticket pricing and an investment strategy for future facilities.

## Data Preparation:

### Data Source:

[Ski Resort Data](https://github.com/emcuttle/DataScienceGuidedCapstone_EC/blob/master/raw_data/ski_resort_data.csv) – A table of data for all ski resorts in the U.S. including features such as state, region, summit elevation, vertical drop, etc.

## Data Processing:

### Summary:

1. Inspect the DataFrame for missing values & drop them when necessary.
2. Remove/investigate outliers.
3. Add features to the data that capture state-wide summary statistics for our market segment.
4. Select the target feature, i.e., adult weekend ticket price, for our pricing model.
5. Calculate resort densities using the state-wide summary statistics.
6. Perform PCA Analysis.
7. Feature Engineering
8. Set the State labels as the index, treating all states equally.

## Data Analysis:

[Guided Capstone Presentation](https://github.com/emcuttle/DataScienceGuidedCapstone_EC/blob/master/Notebooks/Guided%20Capstone%20Presentation%20EC.pptx)

## Summary of Findings:

Big Mountain Ski Resort currently charges $81 dollars for an adult weekend ticket. The modeled ticket price is $95.87 with a mean absolute error of $10.39, suggesting there is room for a price increase. Big Mountain’s resort features rank highly on the league charts when compared to other resorts. There were four investment strategies provided to either cut costs or increase revenue for ticket prices. Out of these four options, only one supported raising the ticket price and that was adding a run, increasing the vertical drop by 150 feet, and installing an additional chair lift. This option increases support for raising the ticket price by $1.99, which over the season, could be expected to amount to $3,474,638.

## Key Insights:

* The modeled ticket price is $95.87 with a mean absolute error of $10.39, suggesting there is room for a price increase.
* Big Mountain’s resort features rank highly on the league charts when compared to other resorts.
* Investment Strategies:
  + Option 1: Closing runs reduces support for ticket price, and so revenue.
  + Option 2: Increases support for ticket price by $1.99, which over the season, could be expected to amount to $3,474,638.
  + Option 3: Shows no support for further increasing ticket price.
  + Option 4: Has no effect on ticket price.

## Recommendations:

* Increase the current ticket price from $81 to as high as $95.87.
* Investment Strategy:
  + Option 2: Adding a run, increasing the vertical drop by 150 feet, and installing an additional chair lift to increase the support for ticket price by $1.99.

## Limitations:

* The price of installing an additional chair lift was not provided, only the operating costs were. This could negatively affect the revenue obtained from implementing Option 2.
* The operating cost of runs at the resort was not provided. This would have given us a full picture when deciding whether closing runs would successfully cut costs.
* The operating costs associated with each resort was not considered, which could vary widely across states and lead us to change our decision of treating all states equally.