Big Mountain Resort Business Report

1. Big Mountain Resort Overview:

Big Mountain Resort is a high-level resort located in Montana. It has base elevation 4464 feet, summit elevation 6817 feet, with vertical drop distance 2353 feet. Big Mountain Resort is equipped with 14 chair lifts including 3 fastQuads lifts, 2 Quad lifts, 6 Triple lifts and 3 surface mats. With a total of 105 runs, Big Mountain Resort has 4 terrain parks, 3000 square feet of skiable area. In terms of snow condition, Big Mountain Resort manages to maintain a snow making machine to cover over 600 square feet area which is around 20% of total skiable area, not to mention about the average annual snowfall of 333 inches. Additionally, Big Mountain Resort also offers 600 square feet of night skiing area.

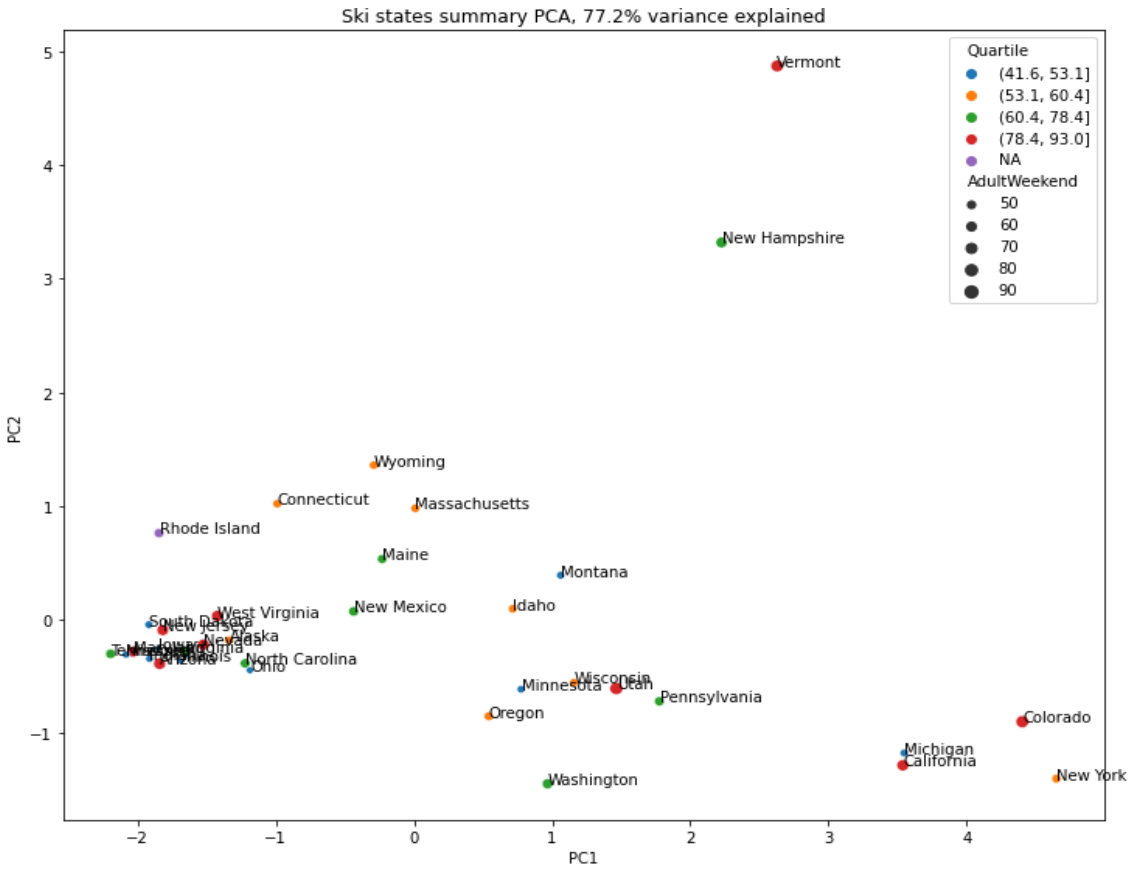
2. Problem Identification

Big Mountain Resort has recently installed an additional chair lift, which increases their operating cost by $1540000. We want to increase Big Mountain Resort's revenue this season by 10% by adjusting the ticket price to a better value.

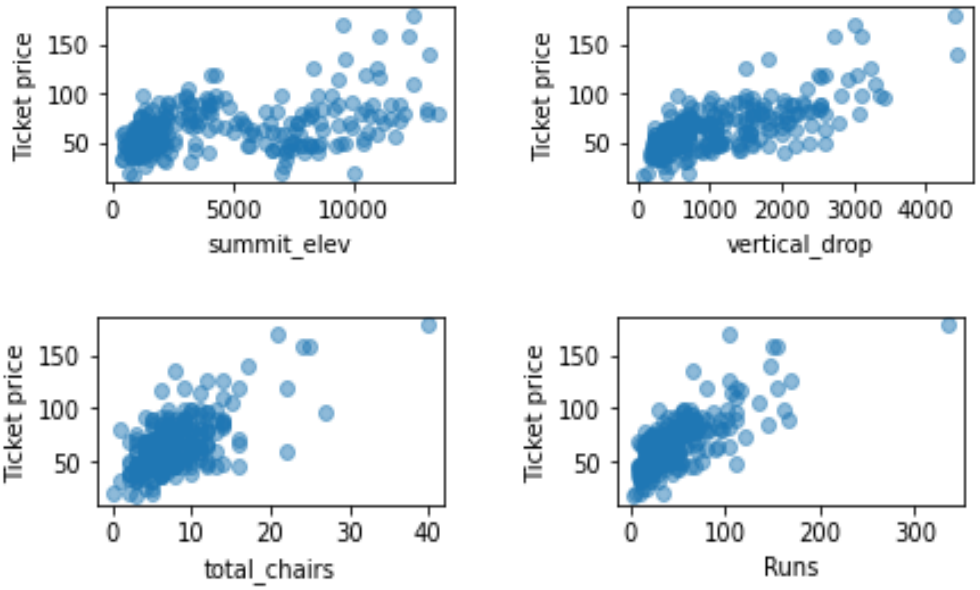
3. Data Insight

After some data preprocessing and wrangling, our dataframe contains 277 records of ski resorts and 36 different features about these resorts. Based on the raw data, we add several features related to states' domestic market share including ratio of resort skiable area to total state skiable area, ratio of resort terrain park count to total state terrain park count etc.

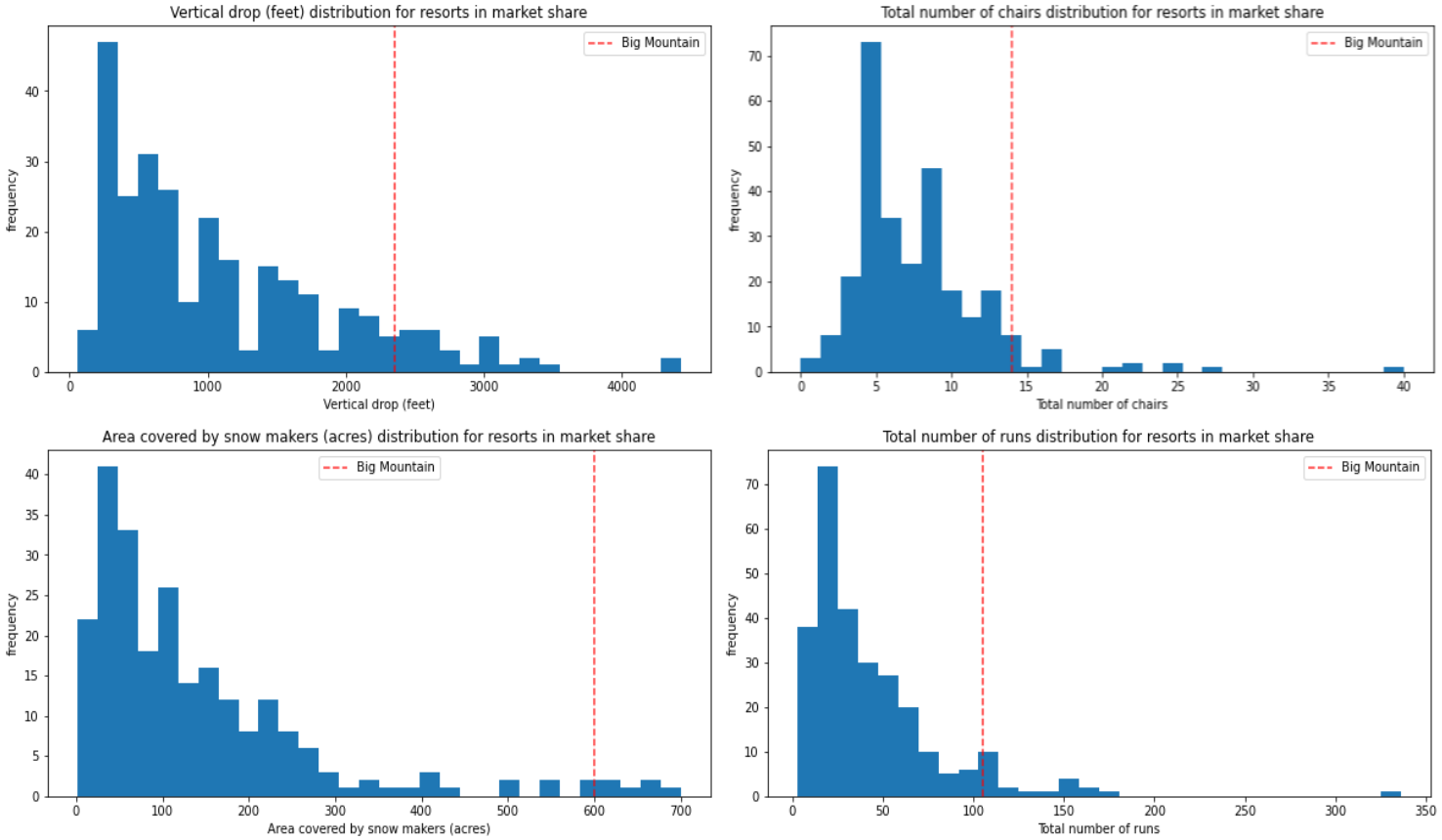
We conduct Principal Component Analysis on state summary data and generate a scatter plot to investigate whether there is a specific pattern of resort ticket price of each state. The scatter plot below shows no obvious relationship between state and ticket price. Therefore, we can input all ski resorts' data to the price model without being worried about the difference among states.



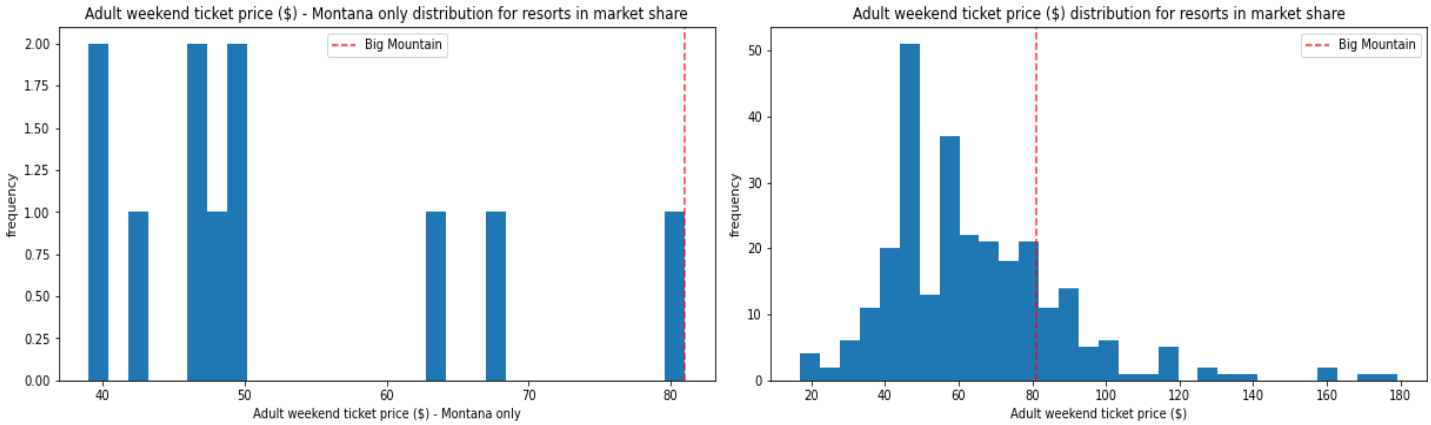
From the scatterplot below generated from all of the data, we found five features strongly correlated with ticket price: summit elevation, vertical drop distance, total number of chair lifts, total number of runs and total number of fast quads chair lifts.



We further draw the histogram of important continuous variables we found to observe the distribution. We can find out that Big Mountain Resort can be regarded as a first-class snow resort all over the United States.



The histogram below shows that Big Mountain Resort has the highest ticket price in state Montana and there is a huge gap to the second most expensive snow resort, while its price is reasonable compared to ski resorts from all states. We should be careful if we want to increase our ticket price since Big Mountain Resort is already the most expensive snow resort in Montana.



4. Price Model

We decided to pick a random forest model as our final model. Our modeled price is $95.87 while our current ticket price is $81. Our prediction model suggests that there is a huge room for the ticket price to increase.

Our model further predicts the ticket price under four different business plans. The four plans are:

1. Permanently closing down up to 10 of the least used runs;
2. Increase the vertical drop by adding a run to a point 150 feet lower down and an additional chair lift;
3. Based on option 2, add 2 acres of snow making coverage;
4. Increase the longest run by 0.2 mile and additional 4 acres of snow making coverage.

Our model suggests that business options 3 & 4 have no influence on ticket price, and they cannot help us increase revenue.

Under option 2, it is predicted that the ticket price will increase by 2 dollars, which can help us generate 3.47M dollars, while the expected extra operating cost of a new run and an additional chair lift is 1.54M dollars. However, the fixed cost of option 2 including installation cost and cost of grooming has not been considered yet. Not to mention Big Mountain Resort's ticket price is already the highest in Montana. Therefore, if we make further investment and increase the ticket price, the total number of tickets sold would probably decrease.

In short, I would recommend business option 1 while keeping the ticket price the same. The total number of tickets sold will not change too much since the ticket price will be the same. At the same time, we can save a huge amount of operating cost by permanently closing five runs.

	Modeled Price	Price Change	Operating Cost Change	Revenue Change
No Action	$95.87	—	—	—
Option 1 (5 runs closed)	$94.61	-$1.26	-$7.7M	-$1.2M
Option 2	$97.86	$1.99	$1.54M	$3.47M
Option 3	$97.86	$1.99	Over $1.6M	$3.47M
Option 4	$97.86	$1.99	Over $2M	$3.47M