

## Guided Capstone Project Report

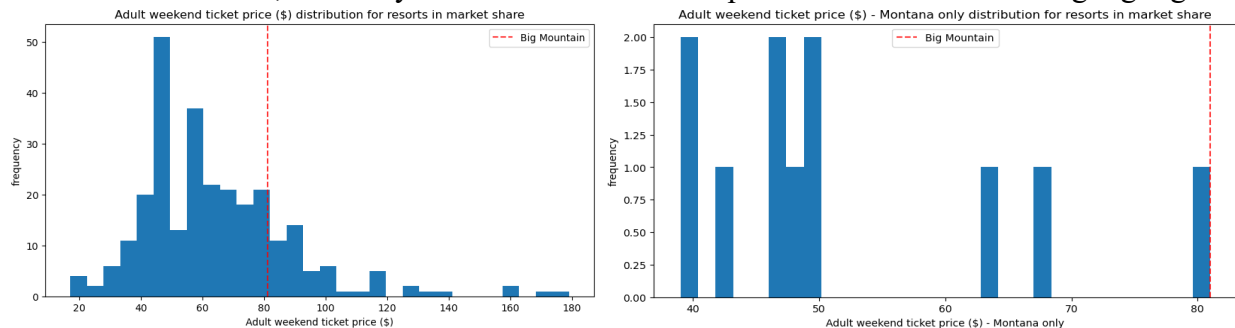
Big Mountain Resort has 105 trails; approximately 350,000 people ski or snowboard each year. The resort accommodates skiers and riders of all skill levels and abilities. The runs are served by eleven lifts, two T-bars, and a magic carpet for beginners. The longest run is Hellfire, which is 3.3 miles in length. The base elevation of the mountain is 4,464 feet, and the summit elevation is 6,817 feet, with a vertical drop of 2,353 feet. A new chairlift has been installed at Big Mountain Resort to improve visitor distribution across the mountain. This additional chairlift will result in an increase in operating costs of \$1,540,000 this season.

By using data from other resorts, we use a model to predict the maximum price Big Mountain Resort can charge its customers. Under a variety of scenarios, we analyze and examine various resort features and their responsiveness to changes. The model assumes that all other resorts set prices based on how much people value certain facilities, following the free market mechanism. The current ticket price at Big Mountain Resort is \$81.50. The model suggests that the price should be \$ 99.83.

The following features emerged as key in the modeling final and random forest models processes (variable names used in the model are in parentheses):

- Vertical change in elevation from the summit to the base in feet (vertical\_drop)
- Total area covered by snow making machines in acres (Snow Making\_ac)
- Number of all chairlifts (total\_chairs)
- Number of fast four-person chairs (fastQuads)
- Number of runs (Runs)
- Length of the longest run in miles (LongestRun\_mi)
- Number of trams (trams)
- Total skiable area in square acres (SkiableTerrain\_ac)

From the below chart, our analysis of the adult weekend price revealed the following highlights:



in Montana only, Big Mountain (red dashed line) charges the highest price for its ticket; however, compared to nationwide prices, Big Mountain Resort's price is in the mid-range. With one of the longest runs and the most skiable terrain, Big Mountain Resort stands out among its national rivals in features like vertical drop, snowmaking, fast quads, and total chairs (graphs not displayed here).

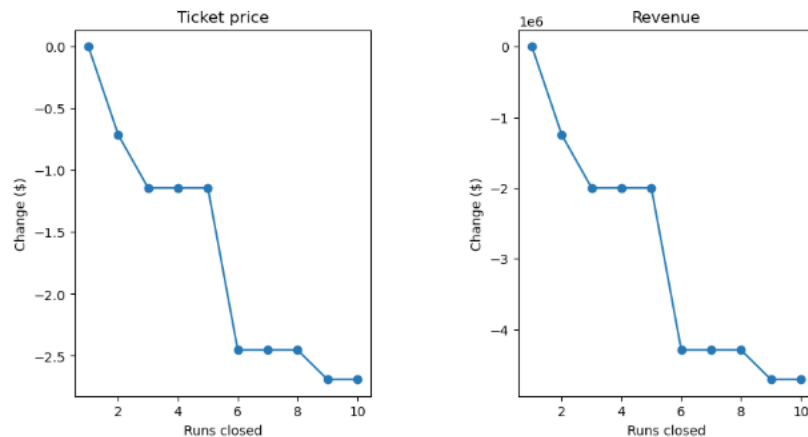
### Four different modeling scenarios to consider:

1. Closing down up to 10 of the least used runs
2. Installing an additional chairlift without additional snow making coverage to bring skiers back up after a 150-foot vertical drop.

3. Adding snow-making cover of 2 acres to scenario 2.
4. Increasing the longest (Hellfire) run by 0.2 miles to extend 3.5 miles length, requiring additional snow making coverage of 4 acres.

### Scenario 1

As shown on the graph, closing 2-6 runs reduces ticket price and revenue similarly. However, when closures reach 6 or more, it shows a significant drop in price.



### Scenario 2

The addition of a run, a vertical drop of 150 feet, and an additional chairlift could increase ticket prices by \$9.02. Over the season, this could amount to \$15,791,667. The calculations are based on visitors purchasing five-day tickets.

### Scenario 3

In addition to adding a run, a vertical drop of 150 feet, and an additional chairlift, 2 acres of snow will increase the ticket price by simply \$1.99. Over the season, this could amount to \$3,474,638.

### Scenario 4

Adding 4 acres of snowmaking capability to the longest run and increasing its snow coverage make no difference. While longest run was used in the linear model, long run is only at the bottom of the list of feature importance in the random forest model (which we selected due to its better performance).

### Recommendations:

Overall, I recommend scenario #2 since it offers the greatest amount of profit; however, it requires a great deal of investment to build a vertical drop of 150 feet. The resort's vertical drop is its most appealing feature, so it's worth it in the long run.

As a second-best alternative, I recommend closing down at most 5 least-used runs to save maintenance and operating costs, thereby increasing short-term profits.