Statistical Modeling on Big Mountain

Pricing, Investigating, and Cost Controlling Strategies

Guided Capstone by Yuan Yin

Problem Statement

How can Big Mountain Resort increase profit by $1.54mn for the next season by accurately pricing tickets as per the facilities and also through cutting costs without negatively affecting overall revenue?

1 Context

Big Mountain Resort has been to charge a premium above the average price of resorts in its market segment. But there is a suspicion that Big Mountain is not capitalizing on its facilities as much as it could. Basing the price on just market average price does not provide the business with a good sense of how to increase revenue, such as, which facilities are worthy of investing, or whether it is a good idea to cut cost without undermining the ticket price.

2 Criteria for success

- A statistical model will be developed for an adult weekday price and adult weekend prices

3 Scope of solution space

- The pricing model restricts to adult weekday price and adult weekend price.

4 Constraints within solution space

- The information provided by the data set is about 330 resorts that can be considered part of the same market share.

5 Stakeholders to provide key insight

- Jimmy Blackburn - Director of Operations
- Alesha Eisen - Database Manager

6 Key data sources

- A CSV file that contains information from 330 resorts in the US that can be considered part of the same market share

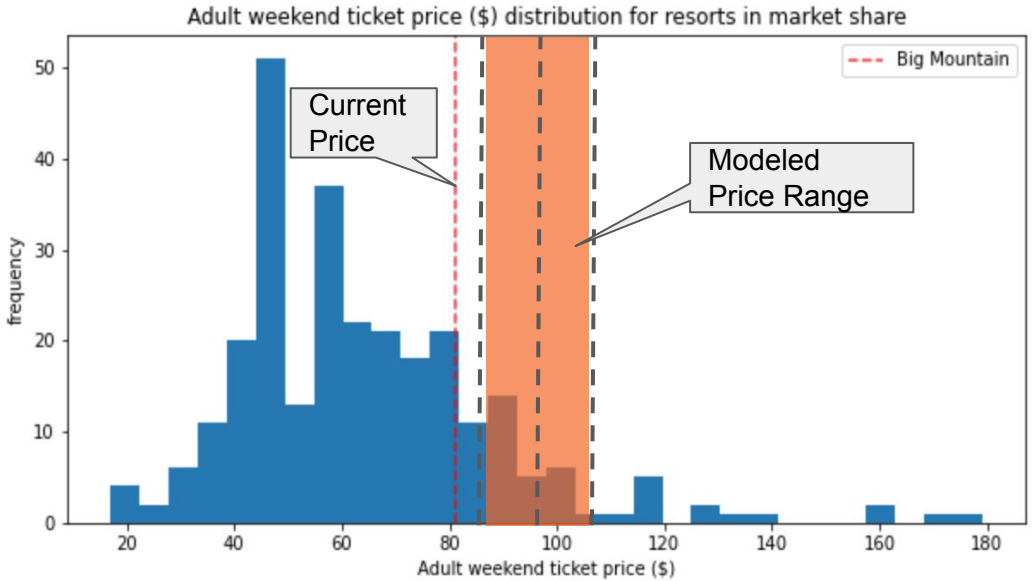
H D E I P

Recommendation and Key Findings

- Increase the adult weekend ticket price to **$95.75±10.39**.
- The revenue increase is about **$25.8 million** on average.
- Investigate a combination of some of the most valuable facilities to increase revenue
- Cut costs with a less negative impact on revenue.

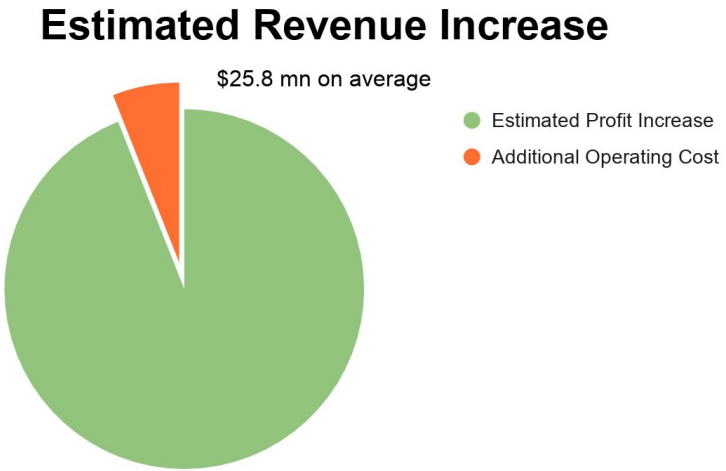
Modeled Adult Weekend Price

- A random forest model suggests Big Mountain's adult weekend ticket price is **$95.75**.
- Even with the expected mean absolute error of $10.39, there is room for an increase.



Expected Revenue Growth

- Based on the predicted price and the expected number of visitors, the revenue increase will be about **$25.8 mn** on average.
- The additional operating cost, $1.54 mn, of the newly installed chair lift, will be covered.



Valuable Investigating

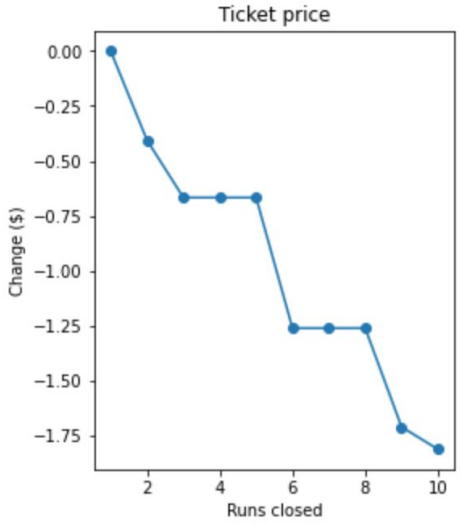
- Four facilities were evaluated as the most positive features by random forest model:
  - vertical drop
  - the area covered by snow making equipment
  - the numbers of fast four-person chairs
  - the number of runs
- The model is available to test any new combination of parameters in a scenario.

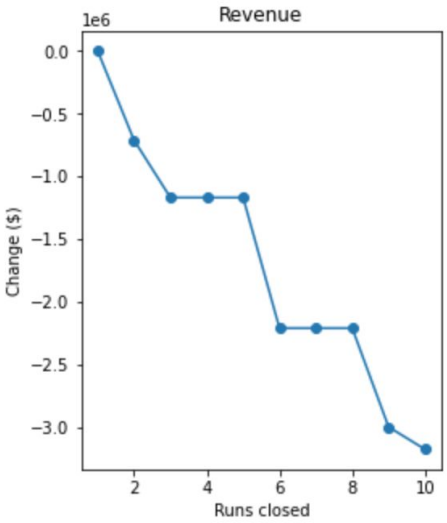
Investigating	Features								Estimated Change	
	Vertical Drop (feet)	Snow Making Area (ac)	Fast four-person chair	Runs	Total Chairs	Longest Run (mile)	Trams	Skiable Terrain (ac)	Ticket Price ($)	Revenue ($)
Curent Status	2353	600	3	105	14	3.3	0	3000		
Scenario 1	+150			+1	+1				+1.99	+3474638
Scenario 2	+150	+2		+1	+1				+1.99	+3474638
Scenario 3		+4				+0.2			0	0

Cutting Costs with Impact on Revenue

Cutting Costs	Features								Estimated Change	
	Vertical Drop (feet)	Snow Making Area (ac)	Fast four-person chair	Runs	Total Chairs	Longest Run (mile)	Trams	Skiable Terrain (ac)	Ticket Price ($)	Revenue ($)
Scenario 1				-1					0	0
Scenario 2				-2					-0.41	-710,144
Scenario 3				-3,-4,-5					-0.61	-1,666,666
Scenario 4				-6					-1.26	-2,20,6521

- Closing 1 run makes no difference.
- If closing down 3 runs, there's no further impact on the ticket price to close down 4 or 5 runs.
- Increasing the closures down to 6 or more leads to a large drop.





Summary and Conclusion

- The result of random forest modeling supports the ticket price increase. The predicted price is **$95.75±10.39**.
- The estimated revenue growth is about **$25.8 million** on average, which will cover the additional operating cost of the newly installed chair lift.
- The model is available to test any new combination of parameters in a scenario, including investigating and cutting cost.