Big Mountain Ski Resort Ticket Price Analysis

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Problem Statement – Hypothesis Formation

Create data driven models to determine the optimum price for tickets at Big Mountain based on features compared to competitors. Identify features that are not attracting people and may be eliminated, and features that could be added to increase the price. Present models and results by February 15th.

1 Context

Our strategy has been to charge a premium above the average price of resorts in its market segment. We know there are limitations to this approach. We suspect that Big Mountain is not capitalizing on its facilities as much as it could. Basing our pricing on just the market average does not provide the business with a good sense of how important some facilities are compared to others.

2 Criteria for success

Success is determined by producing a model that enhances understanding of what features control price, and indicates an optimum price for tickets at Big Mountain by February 13th, 2021.

3 Scope of solution space

We will be focusing exclusively on features of ski resorts in our market segment. Additionally this project will focus on analysing the data currently available, not finding new data sources.

4 Constraints within solution space

Since this is a quick project using currently available data sources, the largest constraint is the data. Additionally communicating the technical results to a non-technical management will be essential to ensuring the model is properly received.

5 Stakeholders to provide key insight

- **Alesha Eisen - Database manager**
- **Jimmy Blackburn – Director of Operations**

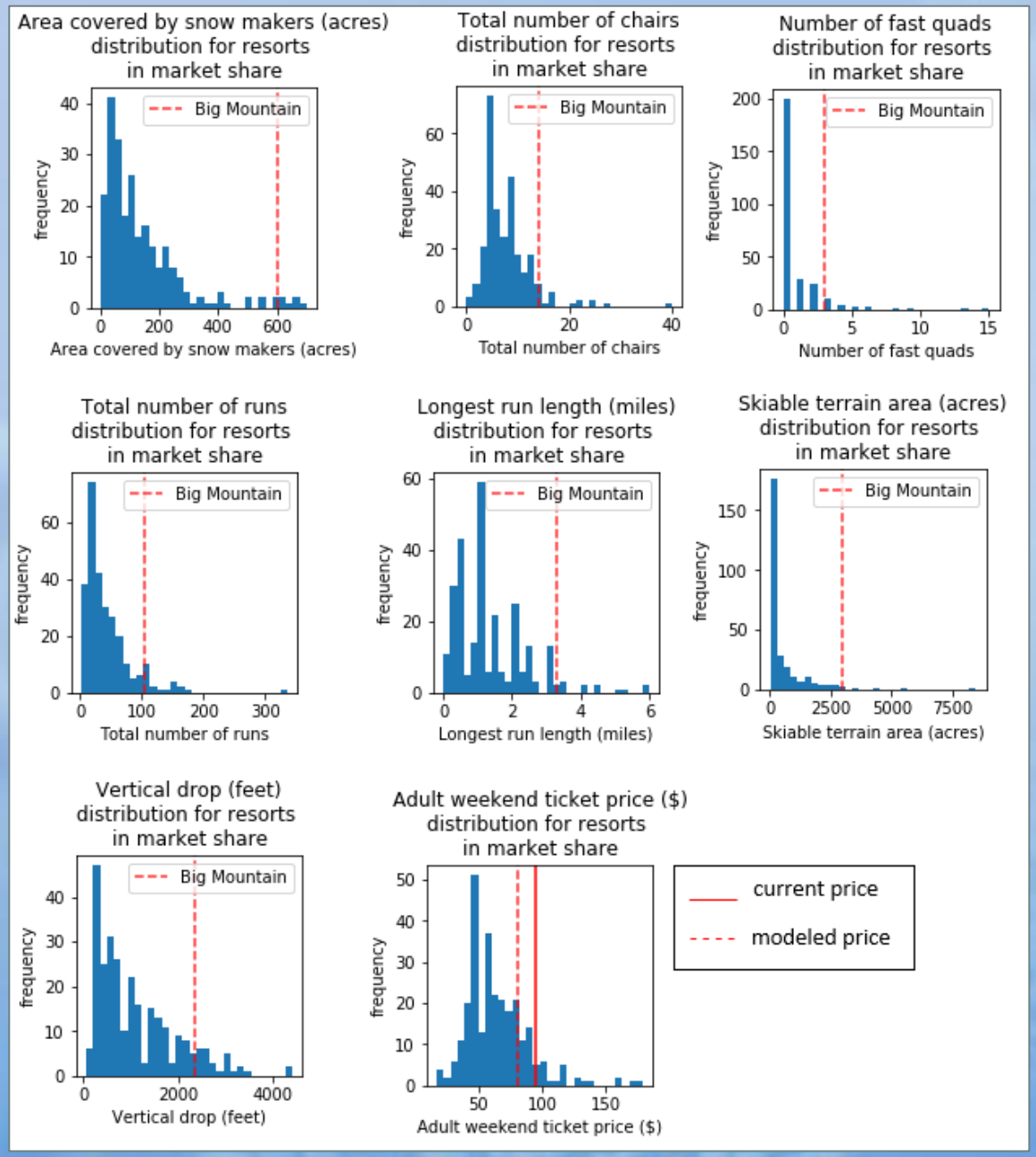
6 Key data sources

Database with features and ticket prices for both competitors and Big Mountain. Alesha has provided the data.

Current State of Big Mountain Ski Resort

- Current Price per Ticket: **$81.00**
  - Estimated Revenue*:
  - **$141.750 million**
- Modeled Price per Ticket: **$94.22**
  - Estimated Revenue*:
  - **$164.885 million**
  - **(+ $23.135 million)**

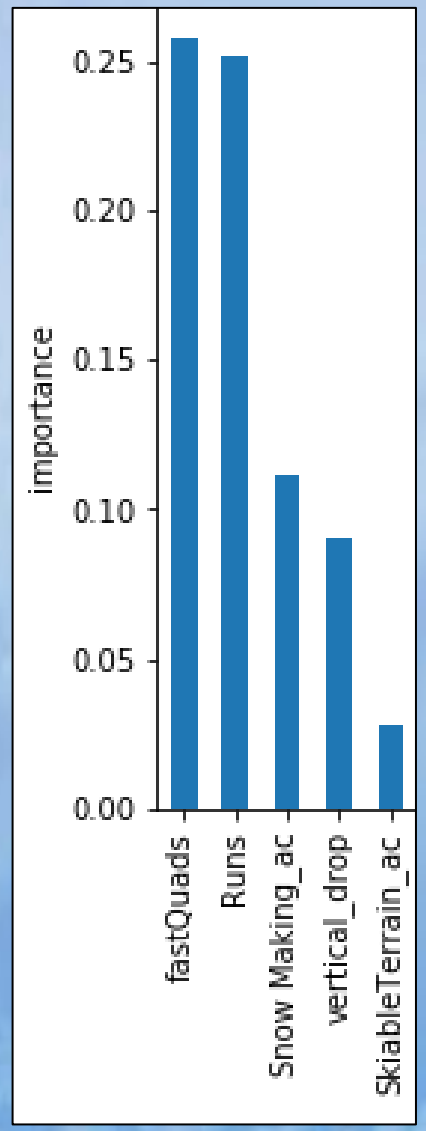
*Revenue estimated assuming 350,000 visitors each purchasing 5 tickets



Ticket Price Model

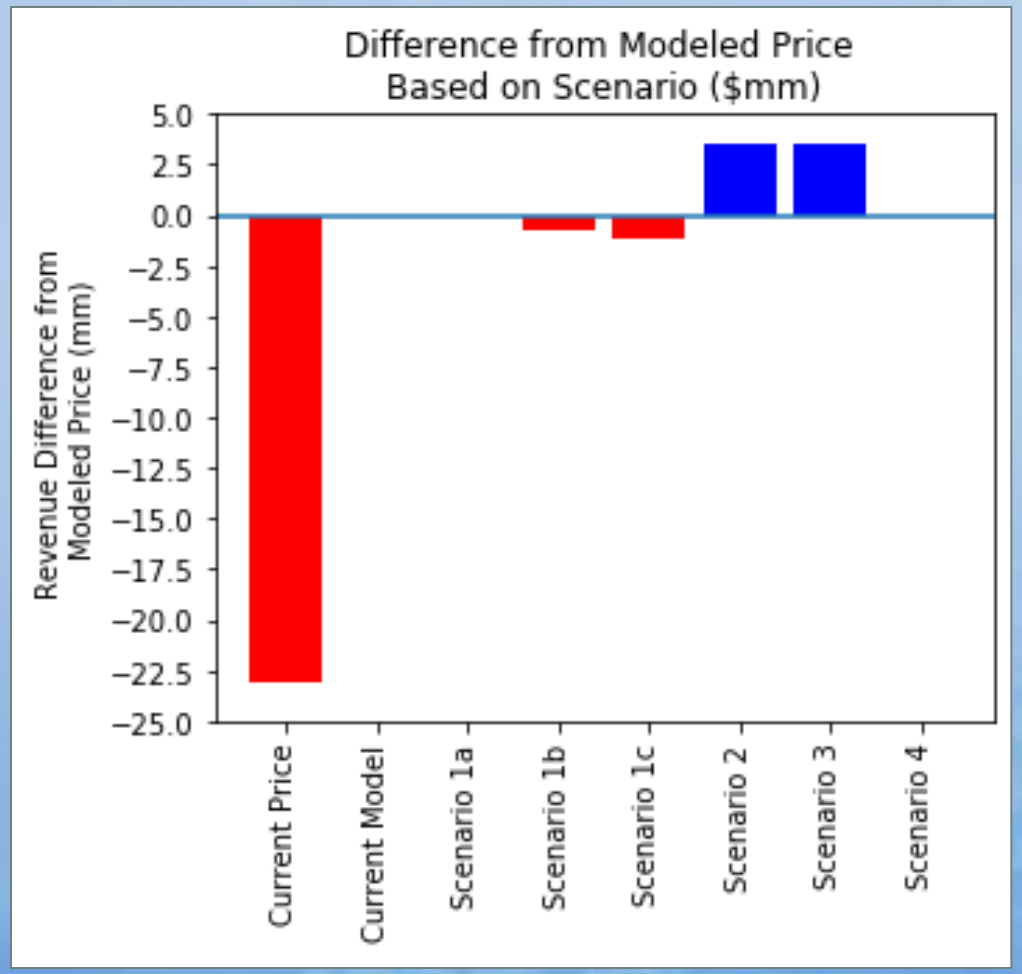
- Tested Linear Regression and Random Forest models
- Random Forest model proved to be a better predictor
  - Training Data (average 5 fold cross validation) Mean Absolute Error: $9.66
  - Blind Test Mean Absolute Error: $9.50

Top 5 Random Forest Regressor Feature Importances



Scenarios for Further Price Uplift

- Increasing Ticket Price has the largest impact!
- Removing one run has no impact on price
- Adding 150' of vertical drop and a chair lift increases the modeled price to $96.20



Scenarios for Further Price Uplift

Notes	Scenario	Price	Price Diff from Current Model	Revenue (mm)	Revenue Diff from Modeled Price (mm)
Current Price	*Current Price*	*81.00*	*-13.22*	*141.750*	*-23.135*
Current Model	**Current Model**	**94.22**	**0.00**	**164.885**	**0.000**
Removing 1 run	Scenario 1a	94.22	0.00	164.885	0.000
Removing 2 runs	Scenario 1b	93.81	-0.41	164.168	-0.718
Removing 3,4, or 5 runs	Scenario 1c	93.55	-0.67	163.712	-1.172
+150' Vert Drop, +1 Chair lift	Scenario 2	96.20	1.99	168.350	3.482
Scenario 2, +2 acres of snow making	Scenario 3	96.20	1.99	168.350	3.482
+0.2 mi longest run, +4 ac snow making	Scenario 4	94.22	0.00	164.885	0.000

Actions

- Raise ticket price
  - Currently $81.00
  - Suggested **$94.22**
- Shut down one run
  - Should not affect ticket price
- Perform savings analysis of shutting down 5 runs
  - Reduce revenue by $1.172 mm
- Perform cost analysis of adding 150’ of vertical drop and a chair lift to service it
  - Increase revenue by $3.482 mm

Appendix

Ticket Price Models

- Random Forest model
  - Training Data (average 5 fold cross validation)
    - Mean Absolute Error: $9.66
    - Standard Deviation: 1.35
  - Blind Test
    - Mean Absolute Error: $9.50
- Linear model
  - Training Data (average 5 fold cross validation)
    - Mean Absolute Error: $10.50
    - Standard Deviation: 1.62
  - Blind Test
    - Mean Absolute Error: $11.79

All Random Forest Regressor Feature Importances