Data-Driven Strategy for Big Mountain

How much should a day at Big Mountain cost?

What factors are important to consider when selecting a ticket price?

Is Big Mountain getting the most out of its facilities?

These are the questions we set out to answer.

Key Findings

With its existing facilities, Big Mountain Resort should support a ticket price of $94.22 per day. This is significantly higher than the current price of $81.00.

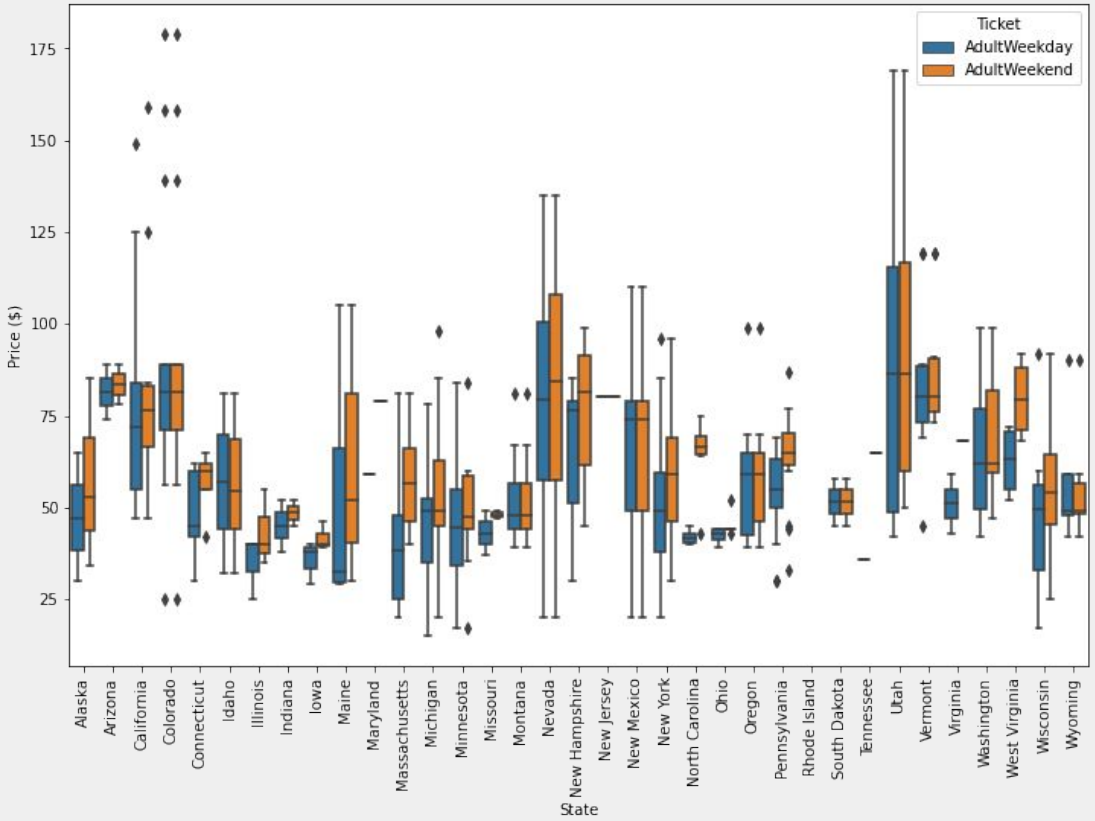
Big Mountain should either close one run and leave ticket price unchanged, or close five runs and reduce the ticket price by roughly $0.70.

Adding one run, one chair lift, and 150 feet of vertical drop would support a price increase of $1.99 per ticket, which would translate to a $3,474,638 increase over the season.

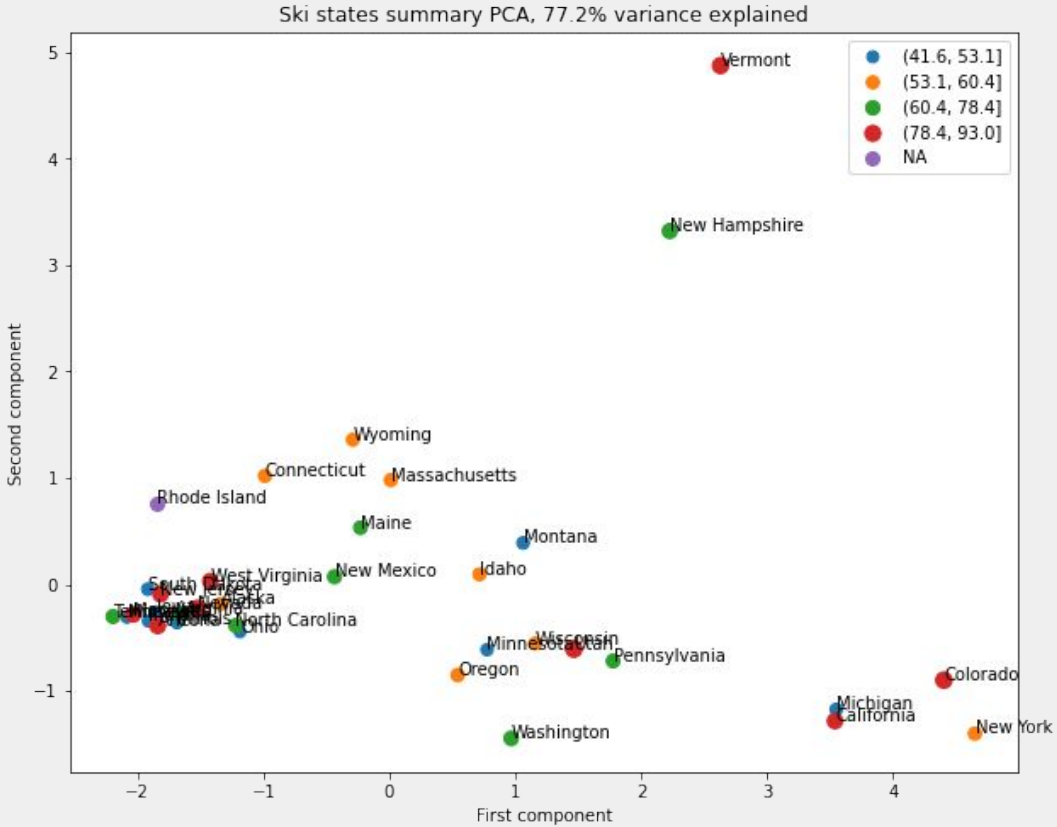
Repeating the scenario above, but adding two additional acres of area covered by snow machines showed no additional increase in expected price.

Analysis and Modelling Results

This plot shows that average price varies quite a bit from one state to another, as does the spread of prices and the difference between weekday and weekend prices. For Montana there is no difference between weekday and weekend prices.



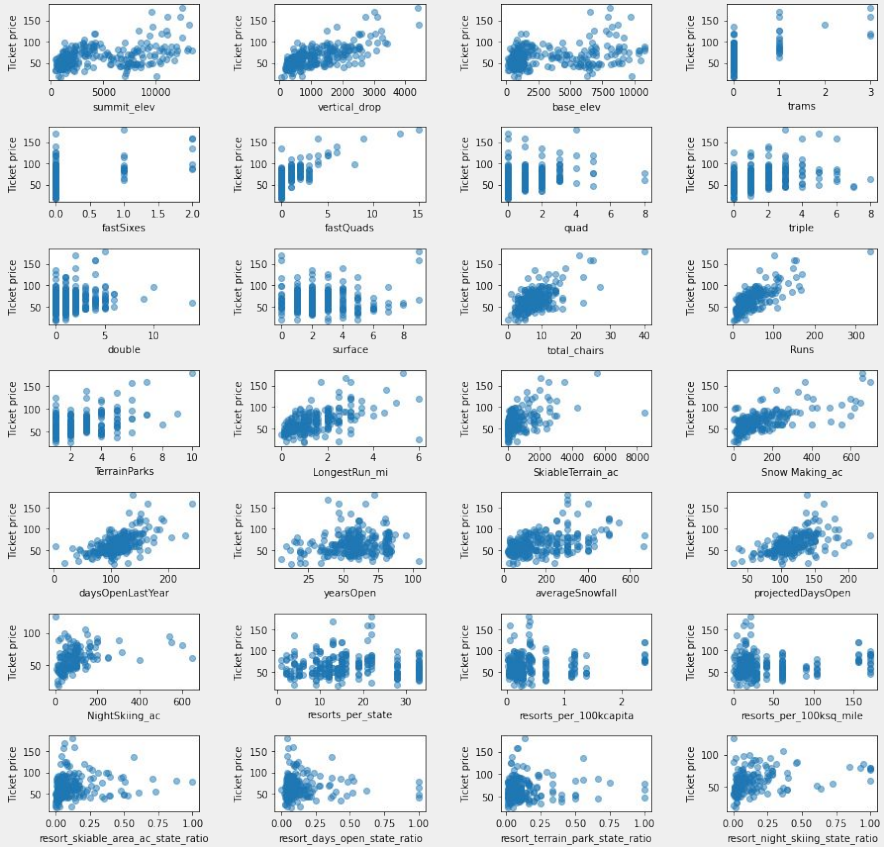
Does State Matter?



The x and y axes of this plot show the top two principal components. These are the directions in which the data shows the most variance. The colors and sizes of the dots represent price. It is clear that there is no strong pattern in the colors, suggesting that state is not in an important factor when selecting a price.

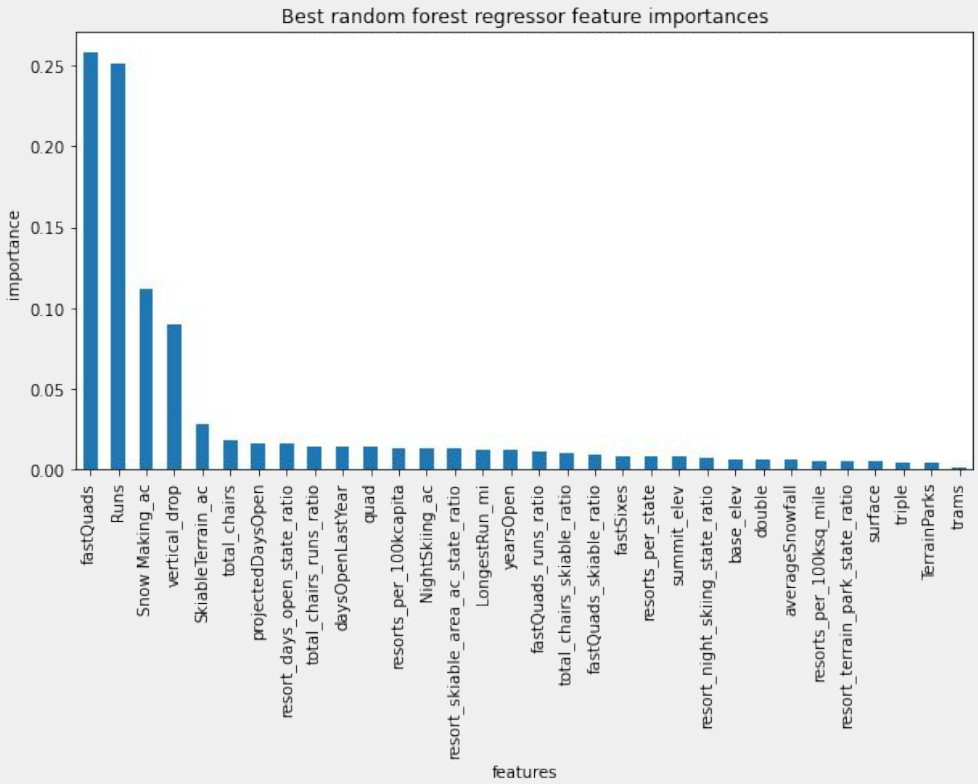
How do the features affect ticket price?

Each of these scatter plots shows adult weekend price on the y axis and each individual feature on the x axis. Vertical Drop and Fast Quads both show noticeable positive correlations, do Runs and Total Chairs.



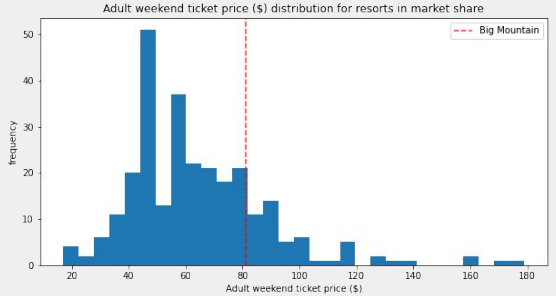
Machine Learning

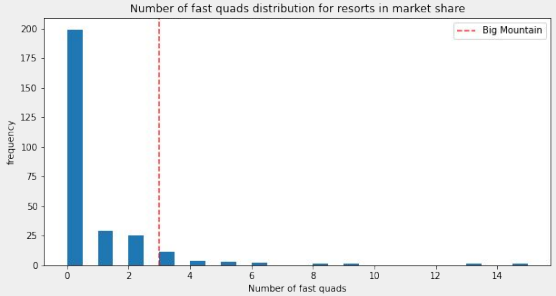
In the machine learning phase of the project, we experimented with a couple of different models. Ultimately we chose a random forest regressor, since it achieved the lowest error and the most consistent results. The plot shows the relative importance that the model places on different features. The mean absolute error for the model is roughly $9.40.

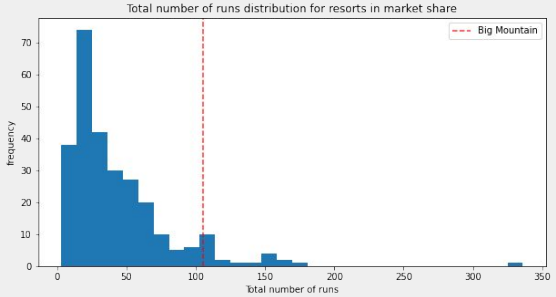


Conclusions

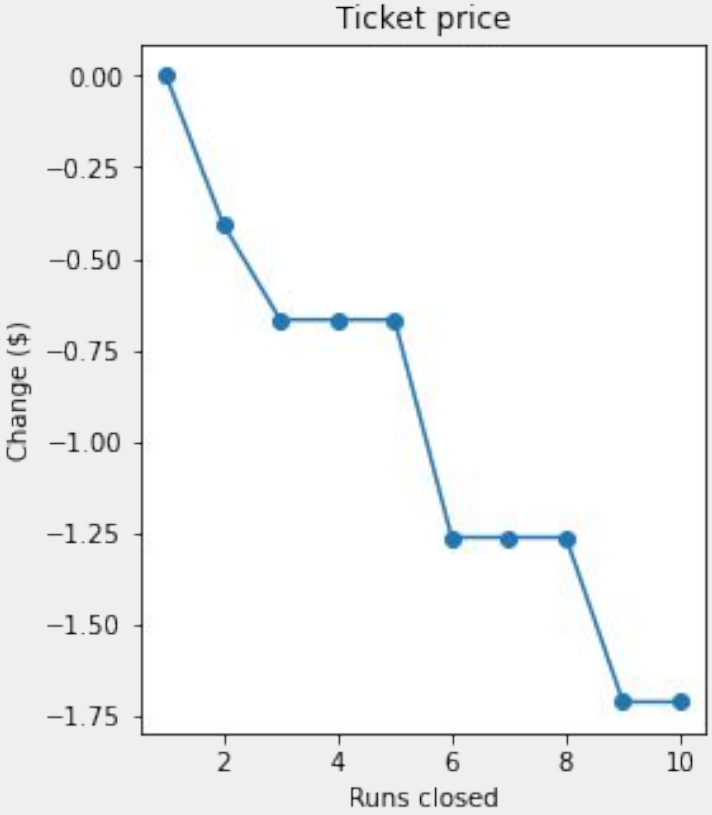
As previously mentioned, the model predicts a ticket price of $94.22 for Big Mountain Resort. This is considerably higher than the current price of $81.00, even considering the mean absolute error. What justifies such a high price? The plot on the top right shows where Big Mountain falls in the distribution of prices. It is above average, but not by a large amount. Meanwhile, the two lower plots show the distributions for fast quads and runs, the two most important features when determining price, and Big Mountain is far above the mean.







Conclusions continued



As for changing other features, this plot shows that Big Mountain could close one run without affecting ticket price. Closing two or three runs results in a decrease in the modelled price, but closing four or five runs causes no additional decrease. In another scenario we added one run, one chair lift, and 150 feet of vertical drop, causing a $1.99 increase in expected price. Repeating the scenario and adding two acres of artificial snow caused no additional increase. The model can also be used to experiment with countless other scenarios involving facilities and pricing.

Acknowledgements

Link to stock photo from Snapwire on pexel.com:

Black and White Image of Two Ski Lifts · Free Stock Photo