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Springboard Data Science
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Guided Capstone Project Report

Problem Identification Overview:

Big Mountain Resort has installed a new chair lift on the mountain. This addition has increased operating expenses for the year by $1,540,000. The investors of the mountain want to maintain annual profits at 9.2% by recouping this cost. Since this new chair lift would increase the value of a day spent at Big Mountain Resort, one avenue to recoup this cost might be to reflect this increased value in the cost of the lift tickets. We will specifically be looking at the extent to which we can adjust adult weekend lift ticket prices.

Data Preparation:

We were given a CSV file with all the available data we'd be basing our recommendation on. This CSV consisted of ski resorts and their various attributes.

The only cleaning we needed to do was to address the issue of some missing data in the file. We filled missing data with the average values of their respective columns. There are many ways to address issues of missing data, but since we had no prior assumptions with respect to the data we didn't want to make any assumption that would cause an artificial skew.

Modeling:

K-Means Clustering: We used K-Means clustering to identify subgroups of ski resorts in our dataset. In Figure 1 we can clearly see the 3 different groups of ski resorts when their vertical drop distance and summit elevation are plotted against each other.
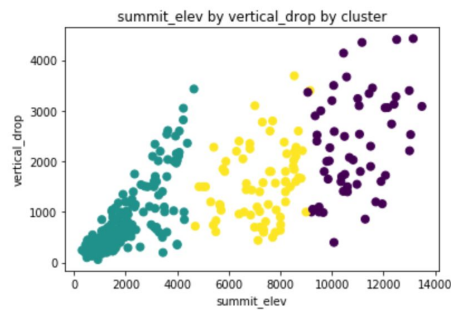
Figure 1

Linear Regression: In order to predict what the adult weekend lift ticket price should be, we used a linear regression model on the attributes of the ski resorts. We can observe that some attributes are linearly correlated with the price of adult weekend lift tickets.

Figure 2 shows us that adult weekday lifts ticket prices are very positively correlated with adult weekend lift ticket prices with an r-value of ≈ 0.94. Figure 3 shows us that the adult weekend lift ticket is somewhat positively correlated with the number of chair lifts at a resort with an r-value of ≈ 0.47. Another attribute our model took into account was the number of terrain parks at the resort. Figure 4 shows that the number of terrain parks is weakly correlated with adult weekend lift ticket price with an r-value of ≈ 0.29.
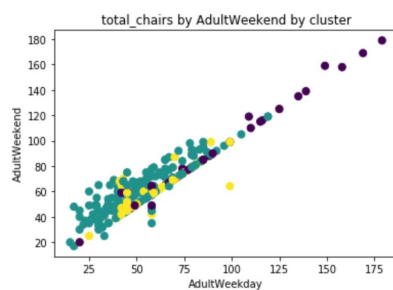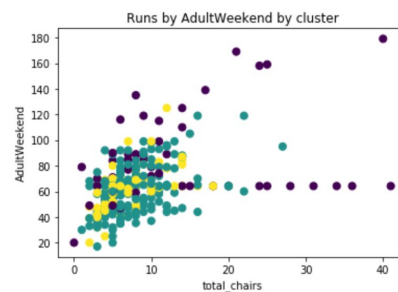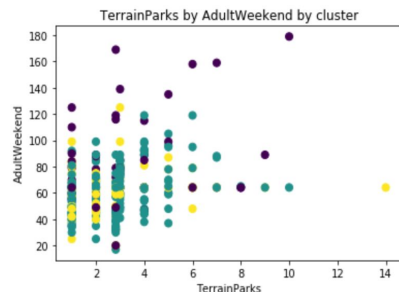

Figure 2   Figure 3   Figure 4

The model that gave the highest explained variance for the adult weekend lift ticket while excluding seemingly redundant data predicted that the adult weekend lift ticket price for Big Mountain / Whitefish Mountain is $88.28.

Conclusion & Next Steps:

While the current price of the adult weekend lift ticket at Big Mountain / Whitefish Mountain is $81, our model predicts that the price should be $88.28 to be in line with the market. While this 8.99% price increase would go towards recouping the cost of new lift, we don't have enough information to determine if it would actually cover the cost, and keep the annual profit at 9.2%. We would need to know the projected number of lift ticket purchases (weekday and weekend) for the coming year to fully answer this question.

Another next step would be to model the price of the adult weekday lift ticket price the same way we modeled the weekend price. This might help the stakeholders further recoup their lift cost.