Guided Capstone Project Report

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Purpose:

The purpose of this project is to create a pricing model for the Big Mountain Ski Resort tickets utilizing the market data of other ski resorts. The leadership of the resort suspects that the facility is not maximizing its returns compare to its position in the market. In addition, it is not defined what matters most to visitors, especially the ones most likely to pay more for the tickets. The objective of this project is to develop a predictive model for the ticket price and future facility investment initiatives.

Background:

Big Mountain Resort offers spectacular views of nature, convenient chair lifts, and one of the longest runs in the country. The operating cost of the facility has increased due to the integration of a new chair lift. There is a suspicion that Big Mountain is not capitalizing on its facilities as much as it could. For this reason, the data science team developed a mathematical model based on the data from others ski resort.

Ticket Prices Market:

Exploring the ticket prices by states shows that most prices appear to lie in a broad band from around 25 to over 100 dollars. In addition, figure I illustrate that the price variability change by state. For example, some states like Montana and Soth Dakota presents small variability in ticket prices, and the prices do not change between weekdays and weekends. On the other hand, Nevada and Utah show the most range in prices.

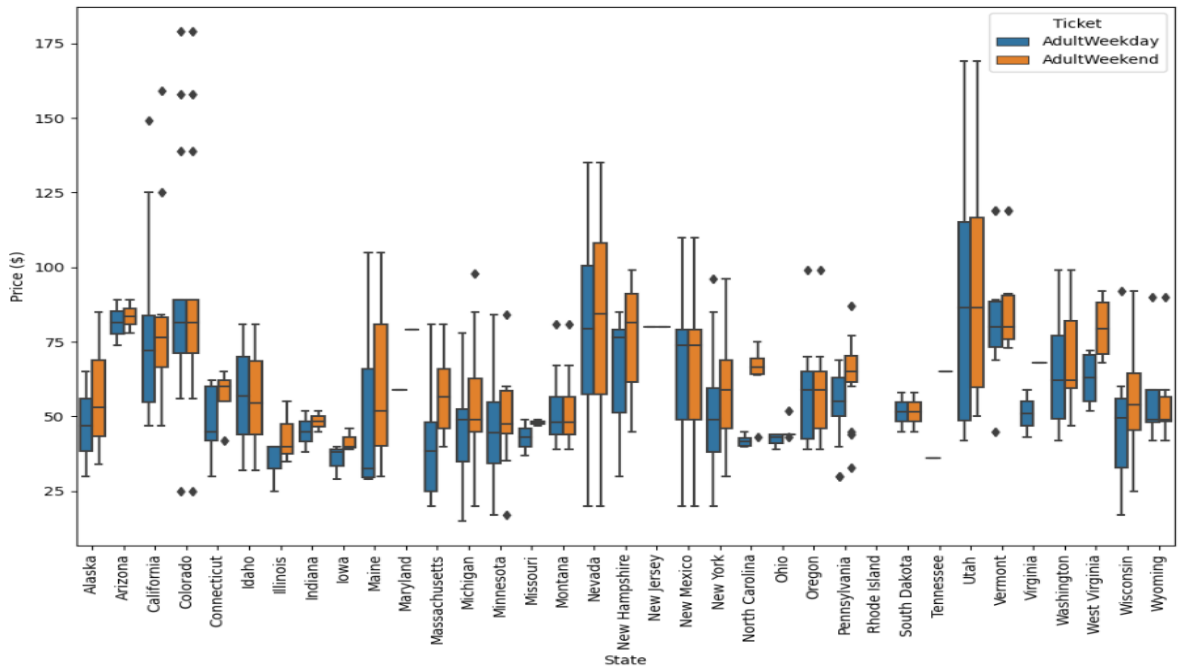

Figure I: Ticket Prices per State

Exploring the Data:

The natural attributes and characteristics of Ski Resorts in Montana provides competitivity in the market. The total area of the state of Montana is third nationwide ,(147,040 mi^2), respect to the other state with Ski Resorts. In addition, the resort's state of Montana was in the top five for size but doesn't figure in the most populous states. New York state has the most resorts, but the amount of skiing area is not in the top five. However, Montana is in the top five of the most skiable areas with 21,410 mi^2. The state of Montana is not highly density populated nonetheless the resort density per capita is four in the country 1.122778 per 100,000 habitants.

The principle components analysis (PCA) is a technique to find the linear combinations of the original feature that are uncorrelated with one another and order them by the amount of variance the explain.

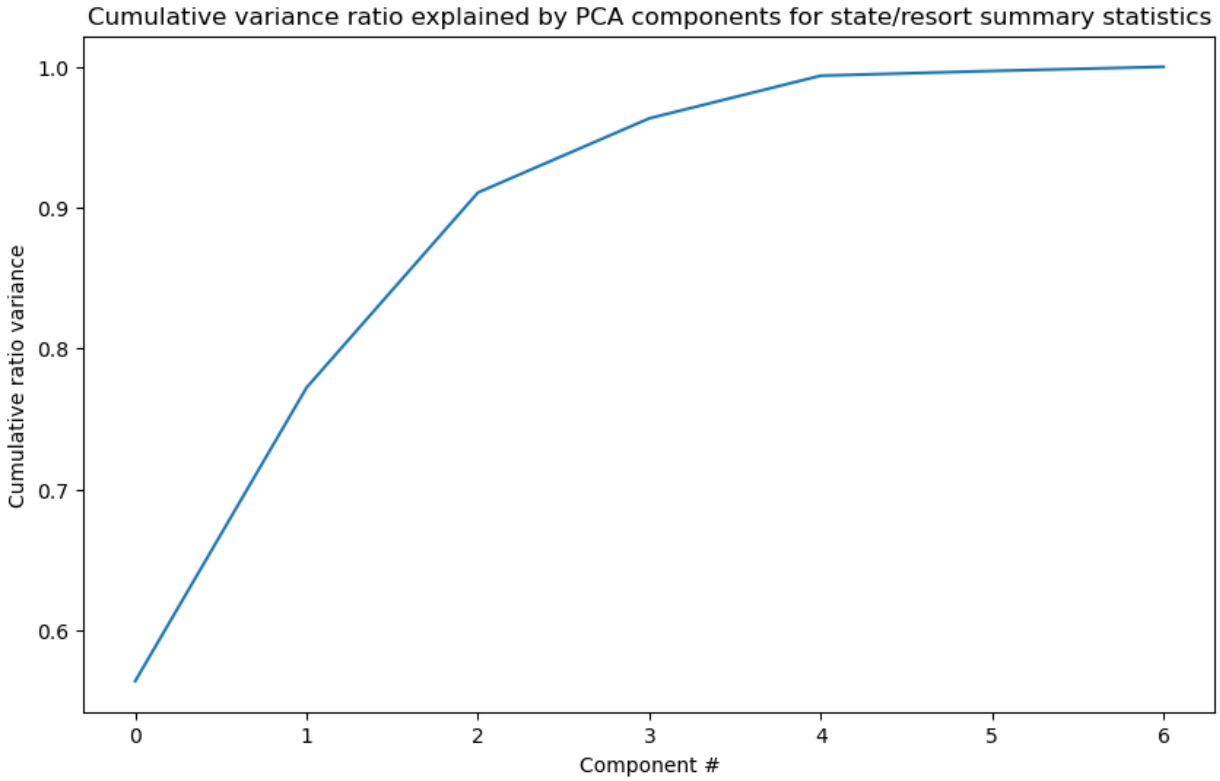

Figure II: Principle Components Analysis for the Data Set

As Figure II shows, the first two components ,(resorts per state and state total skiable area), provide 75% of the variance. In addition, the first two components plus the next two ,(state total days open and state total terrain parks), account for 95% of the variance of the data set. Another important piece of information to explorer is the correlation between components. The correlation heatmap (Figure III) is an excellent tool to obtain relationships among the characteristics of the data. Based on the results from the correlation heatmap, summit-base elevation and night skiing -resorts per capital present high correlation. However, AdultWeekend ticket prices do not have a strong correlation as the previous cases but illustrate correlation with fastQuads, runs, and snow making_ac.

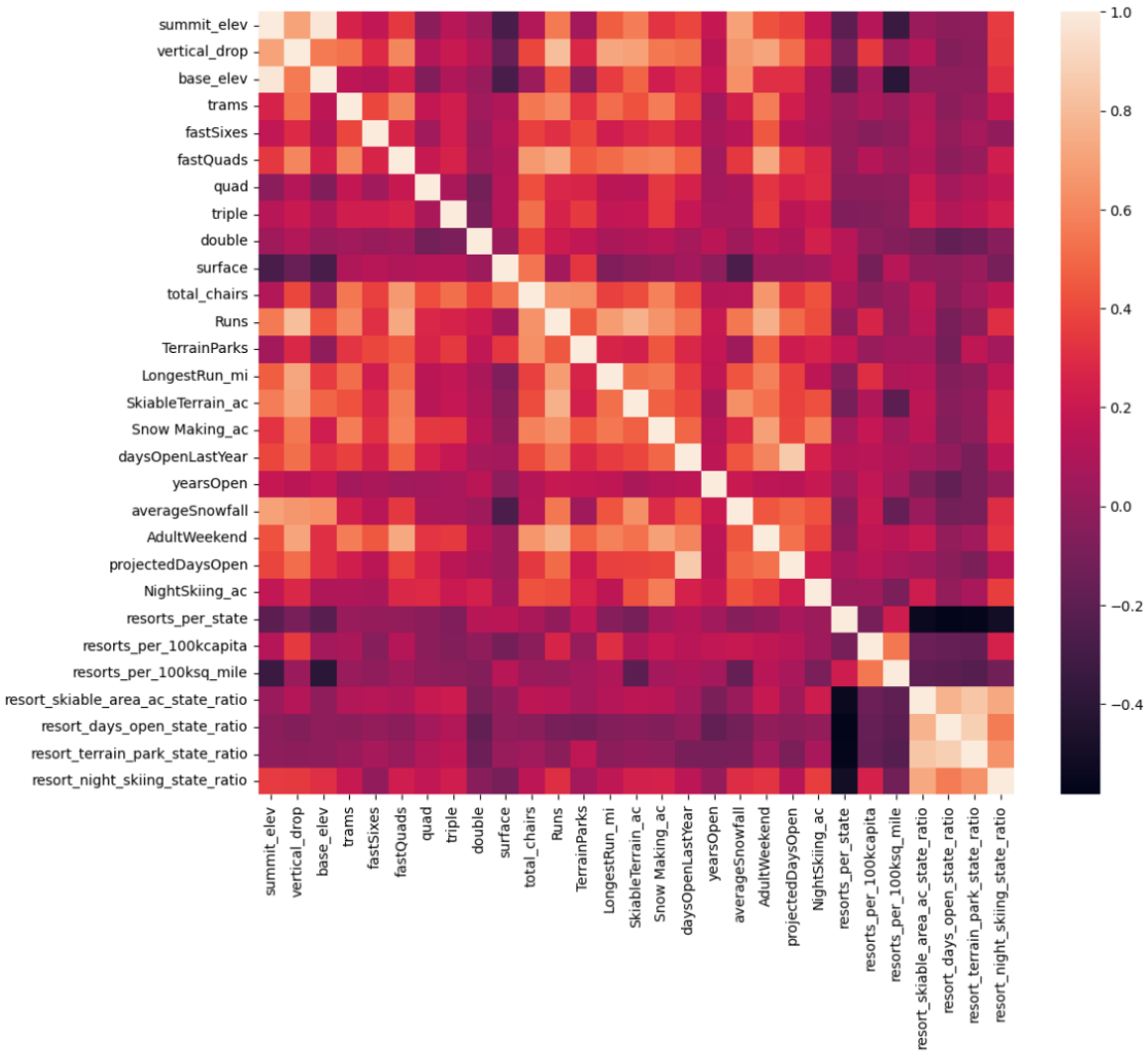

Figure III: Correlation Heatmap

The correlation heatmap provides evidence that some variables in the data affect the tickets prices. For this reason, the next step for the analysis is to create a scatterplot (Figure IV) of numeric features against ticket prices to find how the ticket prices change with other numeric features . Figure IV identifies a highly positive correlation of the ticket prices with the vertical drop. Also, some correlation with fastQuads, runs, and total chairs. Another interesting insight is that when the number of resorts per 100k capital is low the prices fluctuate a little. In addition, the price of the tickets tends to go low as the climbing upwards as the number of resorts per capital increases.

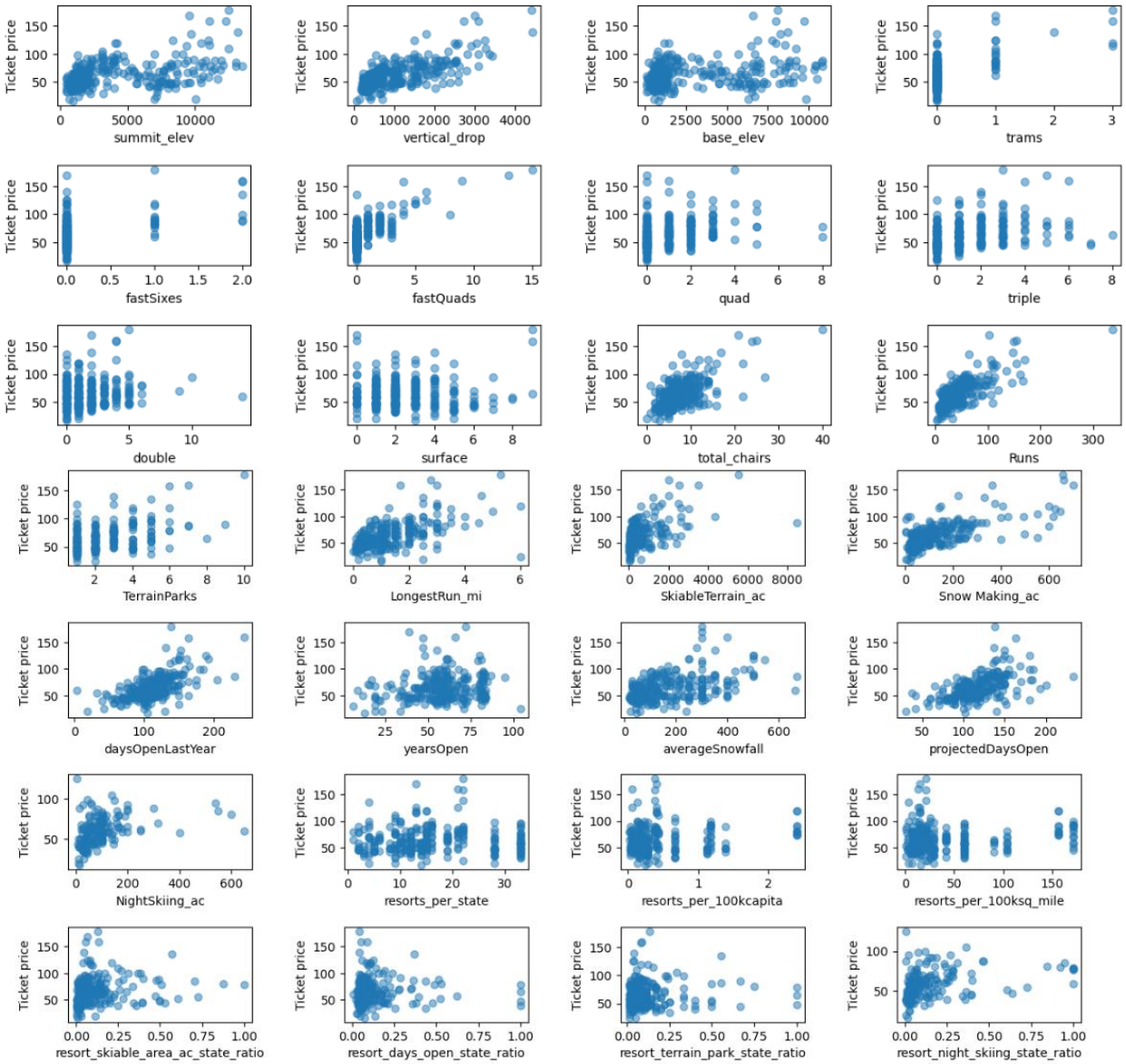

Figure IV: Scatterplots of Numeric Features Against Ticket Price

The scatterplots prove some relationship of the ticket prices with fastQuads, runs, and total chairs which are related to how easy a resort can transport people around. The next scatterplots (Figure V) show how the ratio of chairs to runs can impact the price of ticket and describe how easy and quickly the visitors could move to the next ski slope. The results of figure V show that if a resort does not have so many chairs, the prices of the tickets can be higher. In addition, if the resort has fewer chairs, the number of visitors is low, but the price of the tickets is high. Finally, if the resort does not have fast quad, the price of the ticket is limited. For this reason, having fast quads can be favorable for the ticket prices.

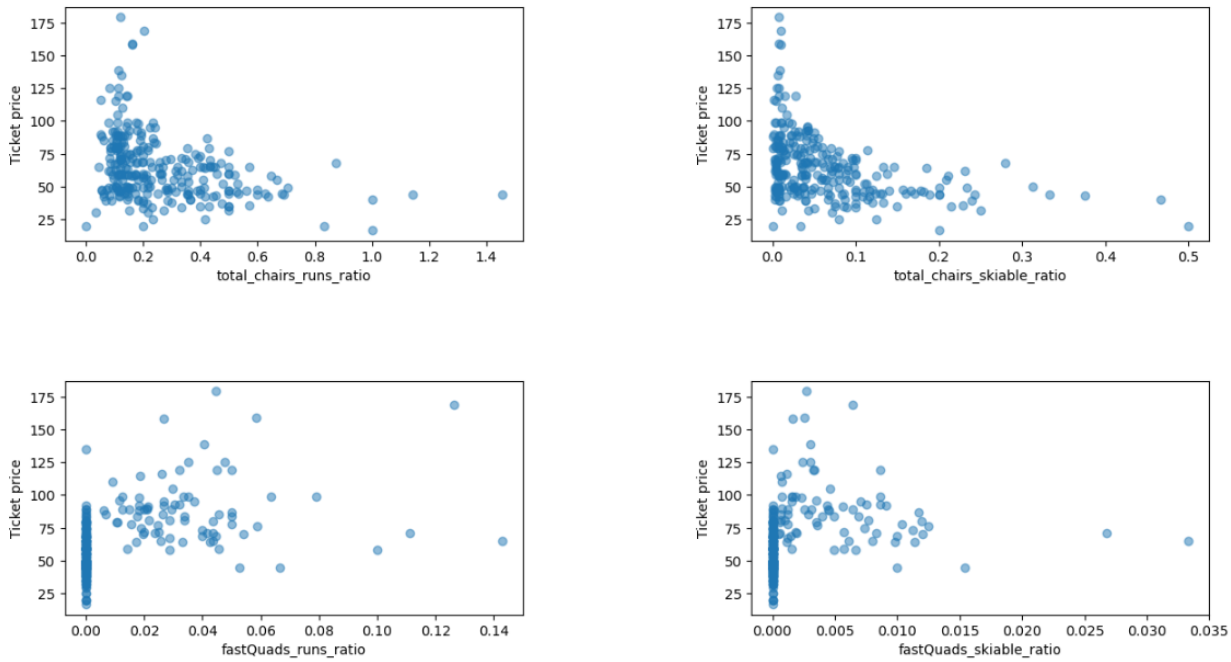

Figure IV: Scatterplots of Chair to Run Ratio

Modeling:

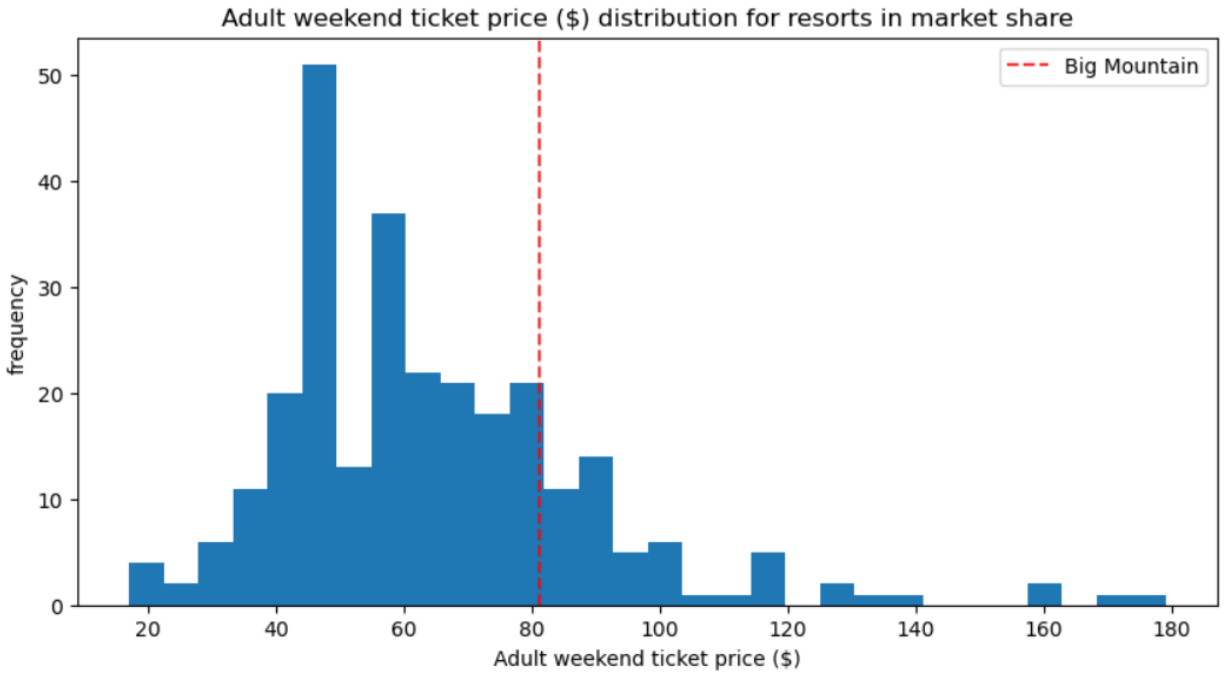

Figure IV: Pricing Model

The pricing model takes into consideration all the findings from the previous section. In summary, the components that impact the price of the ticket are vertical drop, snow making, total chair, longest run, runs, and skiable terrain. In addition, the current price of the ticket plus three other tickets pricing model were tested to create this model. As the model shown, Big Mountain Resort offers a competitive price in the market.