Big Mountain Resort

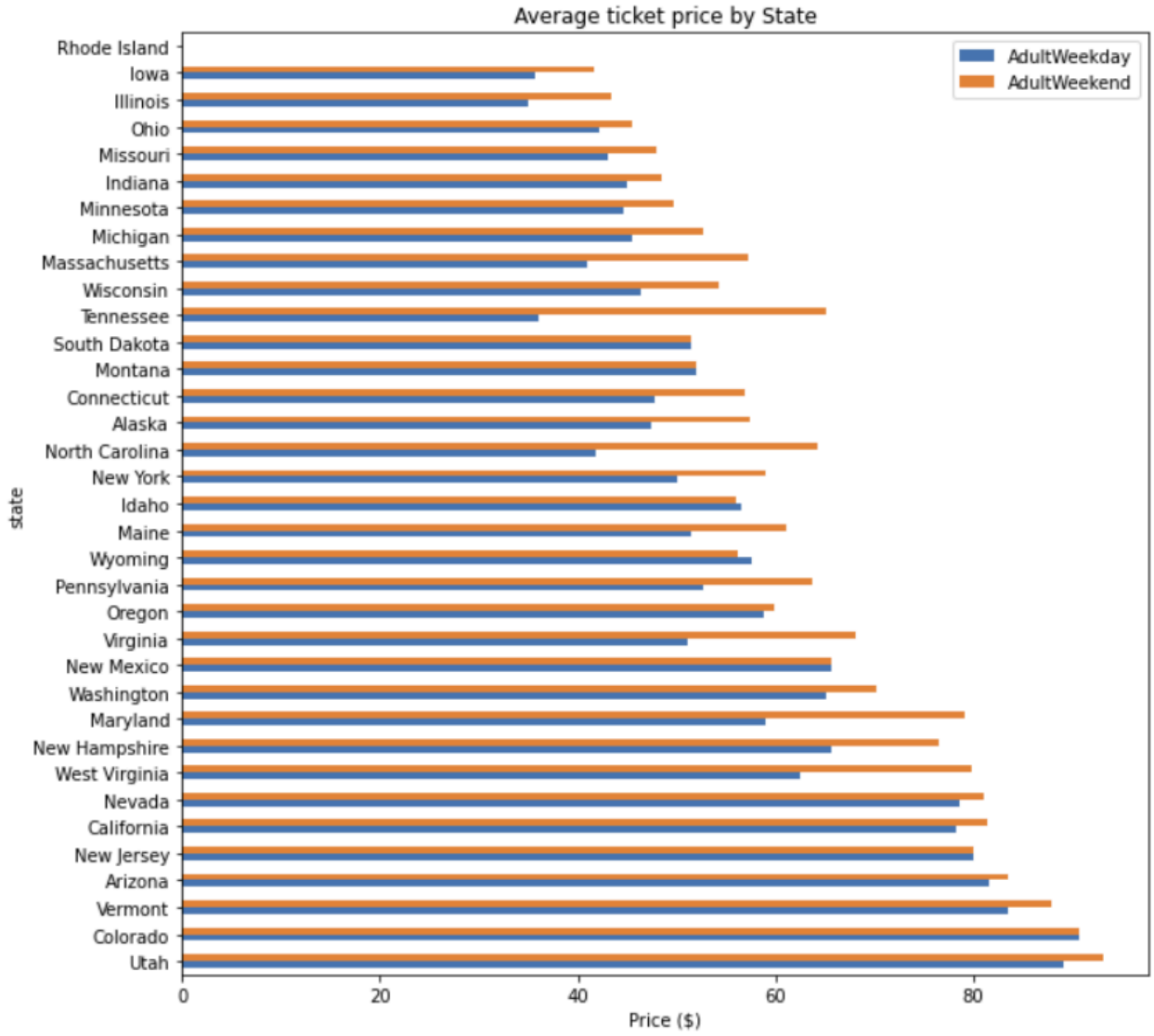
Big Mountain Resort is a ski resort located in Montana. Big Mountain Resort offers spectacular views of Glacier National Park and Flathead National Forest, with access to 105 trails. Yearly about 350,000 people ski or snowboard at Big Mountain. Big Mountain Resort has recently installed an additional chair lift, this addition increases their operating costs by 1,540,000. The business wants guidance to develop and implement an effective business strategy for their ticket.

Problem Identification:

What opportunities exist for Big Mountain Resort to effectively develop a new pricing strategy that can maximize capitalization in their facilities investments to offset their recent additional operating cost by $1,540,000 this season.

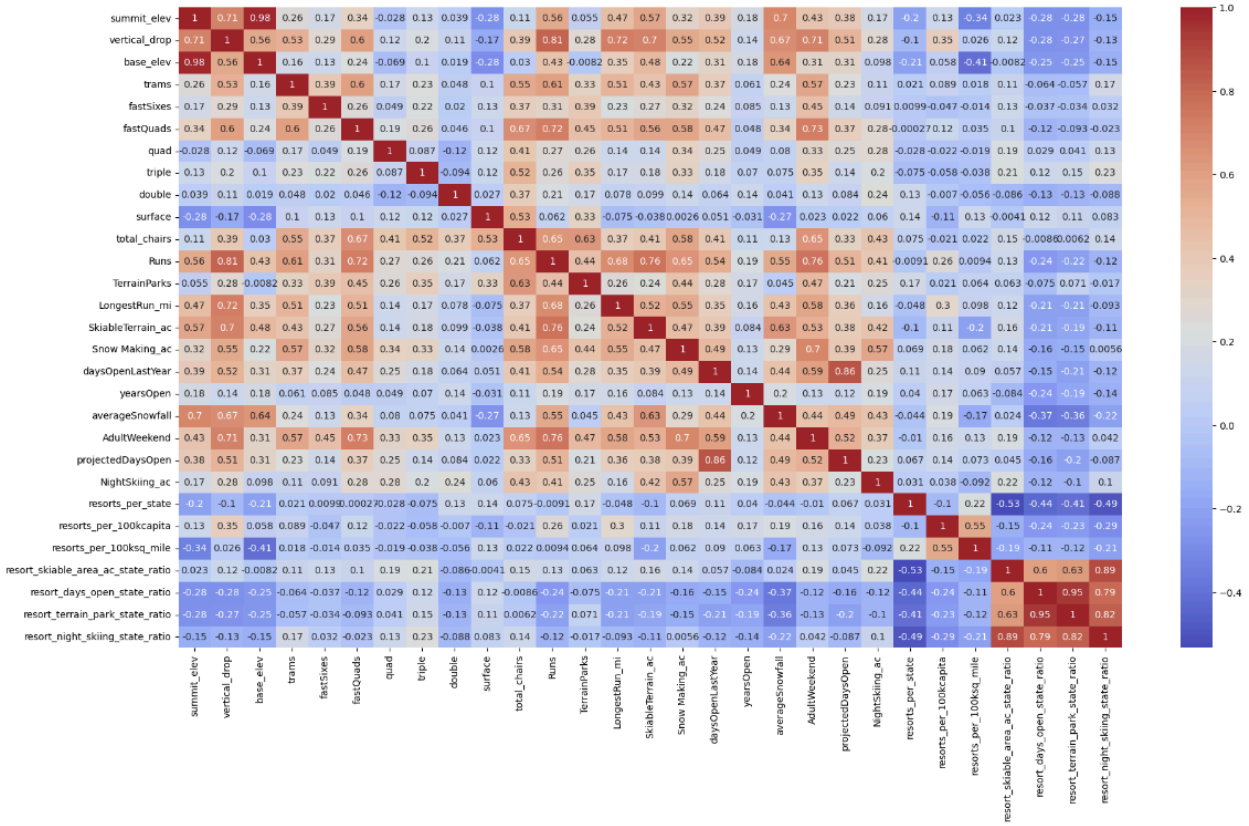
Data Wrangling:

Concatenate information about missing values, Investigate categorical features, Visualize distribution of weekday and weekend ticket price by state, Plot histograms of each numeric feature, Prepare the state_summary DataFrame, Remove rows where both price values are missing, Prepare a DataFrame with population and area information of states, Refocus on ticket price, And check missing values for each resort. Below is the Average ticket price by state:



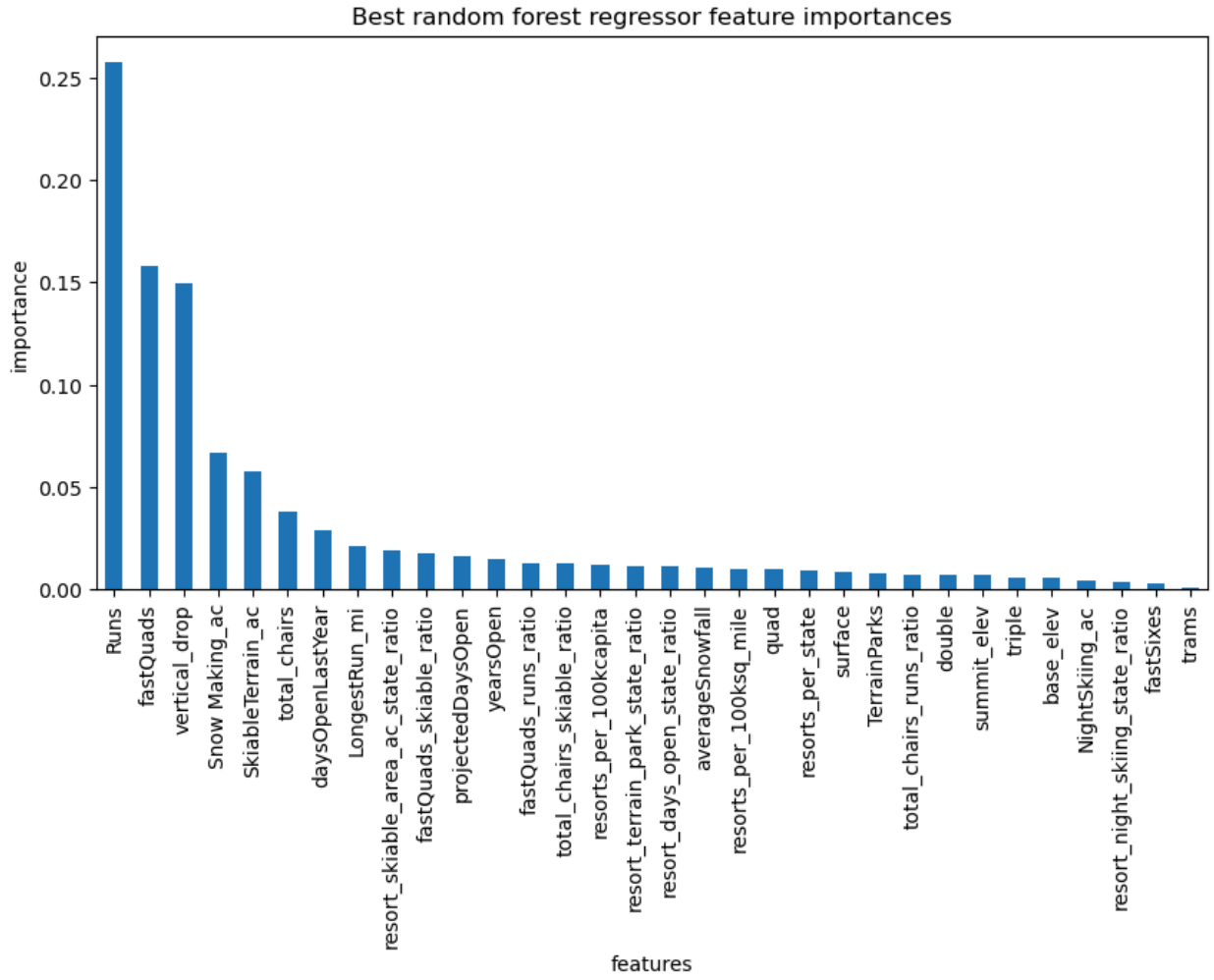
Exploratory Data Analysis:

We examined the correlation strength among features by plotting the heat map below:



Preprocessing and Training Data:

In the initial stages of model development, the mean of prices was used as a baseline for comparison, revealing an average prediction error of 19 subsequently, a linear model was built with imputed missing values resulting in a 9 prediction error. However, the initial linear model exhibited overfitting, requiring adjustment by limiting features through cross-validation. A random forest model was developed with imputed missing values and highlighted the importance of Runs, fastQuads, vertical_drop and snow_making_ac as top four features. Comparing the linear and random forest models, the project opted for the random forest regression model due to consistent performance on the test set and lower cross-validation mean absolute error. This decision was reinforced by the recognition that scaling features in the random forest model, unlike the linear model, was not as impactful. The project is set to move forward with the chosen random forest regressor for ticket price prediction.



Modeling:

In modeling our data shows permanente close down to up to 6 (Closing down 6 or more leads to a large drop) of the least used runs. This doesn't impact any other resort statistics.

Increasing the vertical drop by 150 feet, and installing an additional chair lift this scenario leads to ticket price increase by $11.74 over the season predicted amount of $20,542,614.

Adding two acres of snow making could boost the ticket price up to $13.51 over the season predicted amount of $23,644,886.

Conclusion:

In conclusion we see that we have the opportunity to reduce The Big Mountain Resort operations cost by closing down some of the least used runs. In addition to the cost reduction we have room for ticket price increase as our data modeling showed us.

Future scope of work:

The model could serve as the foundation for generating periodic reports or be seamlessly integrated into an application. This application could empower users to establish their own parameters and subsequently observe the predictions that ensue.