Big Mountain Resort Ticket Price Analysis report

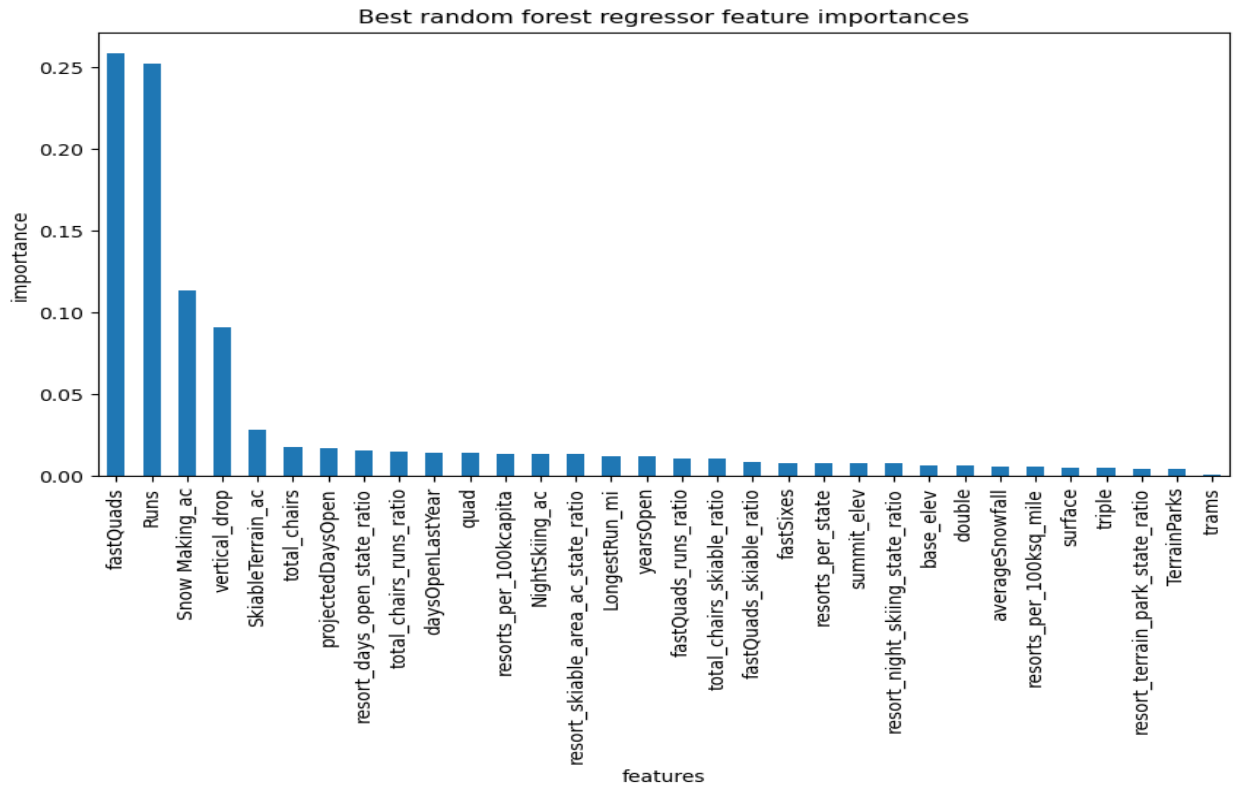
Big Mountain Resort, a ski resort located in Montana, has recently invested money on its facilities. However, despite charging above-average prices compared to its competitors, the resort needs a better business strategy to increase its revenue. This project aims to address this issue by exploring how Big Mountain Resort can increase its revenue by 10% in the next financial year through adjusting its pricing strategy and/or cost factors. To achieve this, the project will require the cooperation of Jimmy Blackburn, the Director of Operations, and Alesha Eisen, the Database Manager. Alesha has provided the primary data, which includes information about a list of ski resorts such as location, facilities, ski conditions, ticket prices, and schedules.

The dataset comprises information about 330 ski resorts, where each row corresponds to a single resort. The "Region" and "State" columns identify the location of each resort, while the "AdultWeekday" and "AdultWeekend" columns are significant for pricing analysis as they provide information on ticket prices. In addition to these, other columns contain details about the resorts' amenities, hours of operation, and other relevant ski-related data. The "AdultWeekend" column is considered the primary price data because it has fewer missing values compared to "AdultWeekday". More data was sourced from Wikipedia to explore the connection between state average ticket prices and state-related information, such as population and area. The two data frames were merged for further analysis. After removing some irrelevant and missing values, the final dataset contained 277 rows and 25 columns.

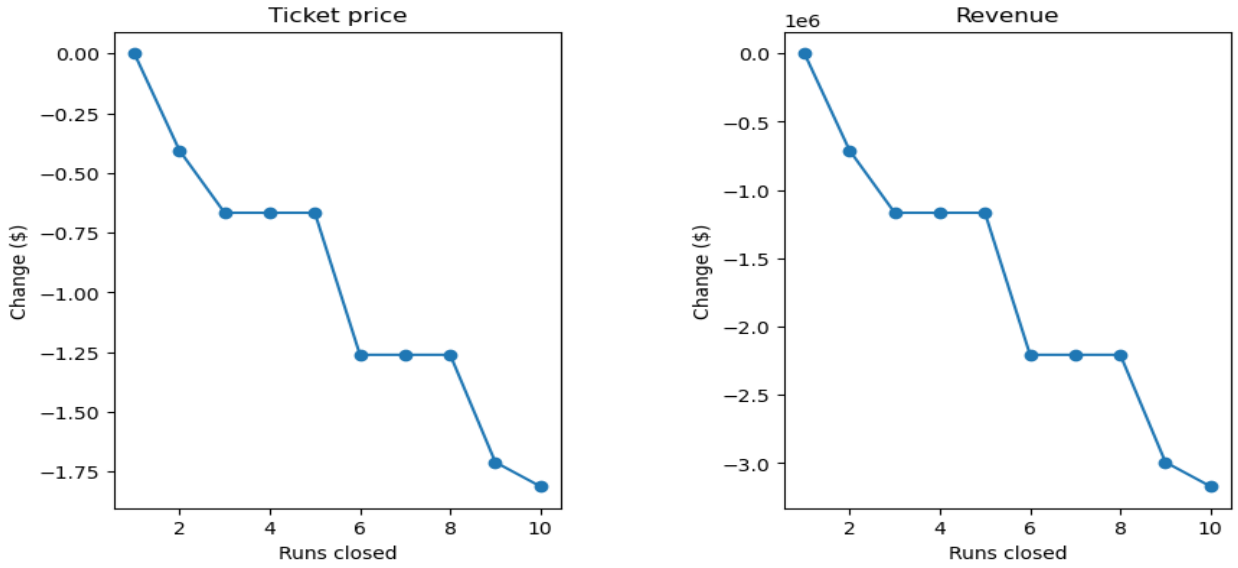
The PCA technique was utilized to capture 90% of the overall variance, indicating that all states could be treated uniformly while analyzing ticket pricing. Additionally, a heatmap of correlations in the ski_data was examined, which revealed that certain variables, namely Vertical_drop, fastQuads, total_chairs, and Runs, were highly correlated with the AdultWeekend ticket price. This relationship was further confirmed through scatterplots, which displayed a strong correlation between the ticket price and these variables.

The ski_data was randomly split into 'train' (70%) and 'test' (30%) datasets, and various models were applied to the 'train' data. The effectiveness of these predictors was assessed on the 'test' set using three metrics. A linear model was constructed with K=8 using cross-validation. The model identified 'vertical_drop', 'Snow Making_ac', 'total_chairs', 'fastQuads', and 'Runs' as the top five variables significantly associated with ticket prices.

Another model, the Random Forest Model, was constructed, which highlighted the four most important factors impacting ticket prices as 'fastQuads', 'Runs', 'Snow Making_ac', and 'vertical_drop'. This model was selected for further analysis based on its lower Mean Absolute Error and the similarity of its feature importance ranking to the feature correlation heatmap. The importance ranking generated by the Random Forest Model is provided below.



The model generated predictions for ticket prices and revenue at various levels of run closures, as illustrated in the chart below.



Based on the model's predictions, it is advisable for Big Mountain Resort to close four runs. This will result in operational cost reduction while still maintaining a high number of total runs (101). However, to determine which runs should be closed, further analysis is required, considering factors such as popularity, operational cost, and other relevant factors.