Big Mountain Case Study Summary Recommendations

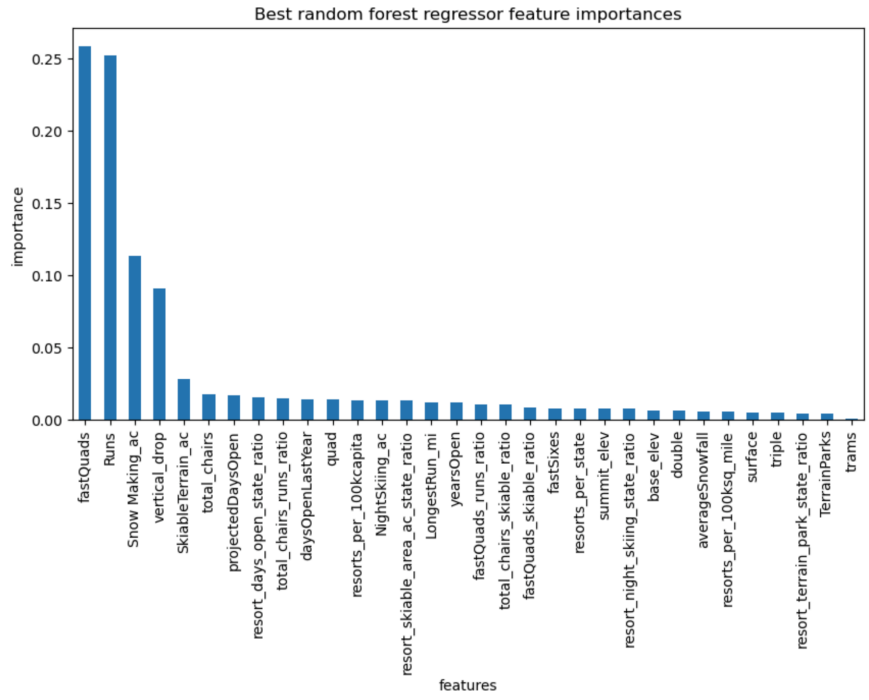
This project explores how Big Mountain Resort can increase its profits by either increasing its ticket price or cutting operating costs?

The problem was clearly defined, the initial dataset was wrangled and cleaned into an appropriate format. An Exploratory Data Analysis(EDA) was performed to identify key relationships between the target variable ***AdultWeekendPrice*** and other variables of the ski_data dataset. Additionally, the working dataset was pre-processed to prepare it for model training; this includes identifying and imputing any missing values and encoding any categorical variables that may exist. The dataset was trained using both a Linear Regression Model and a Random Forest Model.

For the Linear Regression Model, the most significant features that impact the ***AdultWeekendPrice*** were *vertical_drop, Snow Making_ac, total_chairs,* and *fastQuads* respectively.

```
vertical_drop        10.767857
Snow Making_ac        6.290074
total_chairs          5.794156
fastQuads             5.745626
Runs                  5.370555
LongestRun_mi         0.181814
trams                -4.142024
SkiableTerrain_ac    -5.249780
dtype: float64
```

For the Random Forest Regression Model, the top features to consider were: *fastQuads, Runs, Snow_Making_ac*, and vertical_drop respectively.



Both models were cross-validated using training and test data splits to evaluate performance. With a sample size of 40-50, additional data points were not deemed necessary to improve predictions accuracy. The Random Forest Model showed a better performance with a lower cross-validation MAE of 9.53 compared to 11.79 from the Linear Regression Model. This indicates greater confidence in the Random Forest Model which was used to model the ski dataset in a model pipeline.

Based on data for other ski resorts, the Random Forest Model predicted a ticket price of $95.87 for Big Mountain compared to its current ticket price of $81.00, suggesting that the Big Mountain was “underpriced” in relation to its peers. It is crucial to further dig into some scenarios and understand how key features would impact the model prediction.

Assuming the Big Mountain Resort attracts 350,000 visitors, with each purchasing five-day tickets, the expected revenue was estimated to be $3,474,638, which accounted for an incremental increase of $1.99 on the ticket price ($82.99 vs. $81.00). The price increase was driven by an additional 1 run, a 150-ft vertical drop increase, 1 extra chair lift, and 2 more acres of snowmaking coverage. Additionally, excluding snowmaking acres from the prediction still led to the same price increase of $1.99, indicating that the price was not highly sensitive to this feature.

The ski-data dataset would benefit from additional columns detailing the operating costs associated with each key feature. These costs are essential for accurately predicting ticket prices, as they would provide insights into the financial impact of increasing or reducing the use of resort facilities. This information will help key stakeholders understand the consequences of adjusting operating costs while ensuring ticket prices remain competitive.