Guided Capstone Project Report - Welliver

Big Mountain Resort Profitability Opportunity Assessment

– Sections –

Problem Space

The goal is to derive a predictive pricing model for ski resort tickets in Big Mountain's market segment. Big Mountain believes it may not be maximizing returns, relative to its position in the market. There is also a belief that we lack clarity on what facilities matter most to visitors, particularly which ones they're most likely to pay more for.

Ultimately, this model can be used by Big Mountain's leadership team for guidance on pricing and future facility investment plans.

Summary of Findings

There are two scenarios that we uncovered that could improve profitability for the resort:

- **Scenario 1- Closing a lift.** This would increase profitability, as we could close one lift to reduce costs, while not having a negative effect on revenue.
- **Scenario 2 - add a run, increase the vertical drop by 150 feet, and install an additional chair lift..** These actions supported an increase in additional revenue of $4.1 million. We would however have to balance this against the cost of operating an additional lift.

Overview of Analysis

We explored a dataset with 27 features from 300+ resorts in the United States. The resorts varied broadly across characteristics like geography, size, and features offered at the resorts. We explored this dataset and applied a rigorous analysis to arrive at a model which can be used. **Ultimately, we landed on using the price of a weekend ticket as the dependent variable for the analysis.**

Important features of resorts

The visuals below show which features were most important for our respective Linear Regression and Random Forest models. Four features in particular were important in both models: 1) fastQuads 2) Runs 3) Snow Making_ac 4) vertical_drop

Figure - Feature importance for random forest

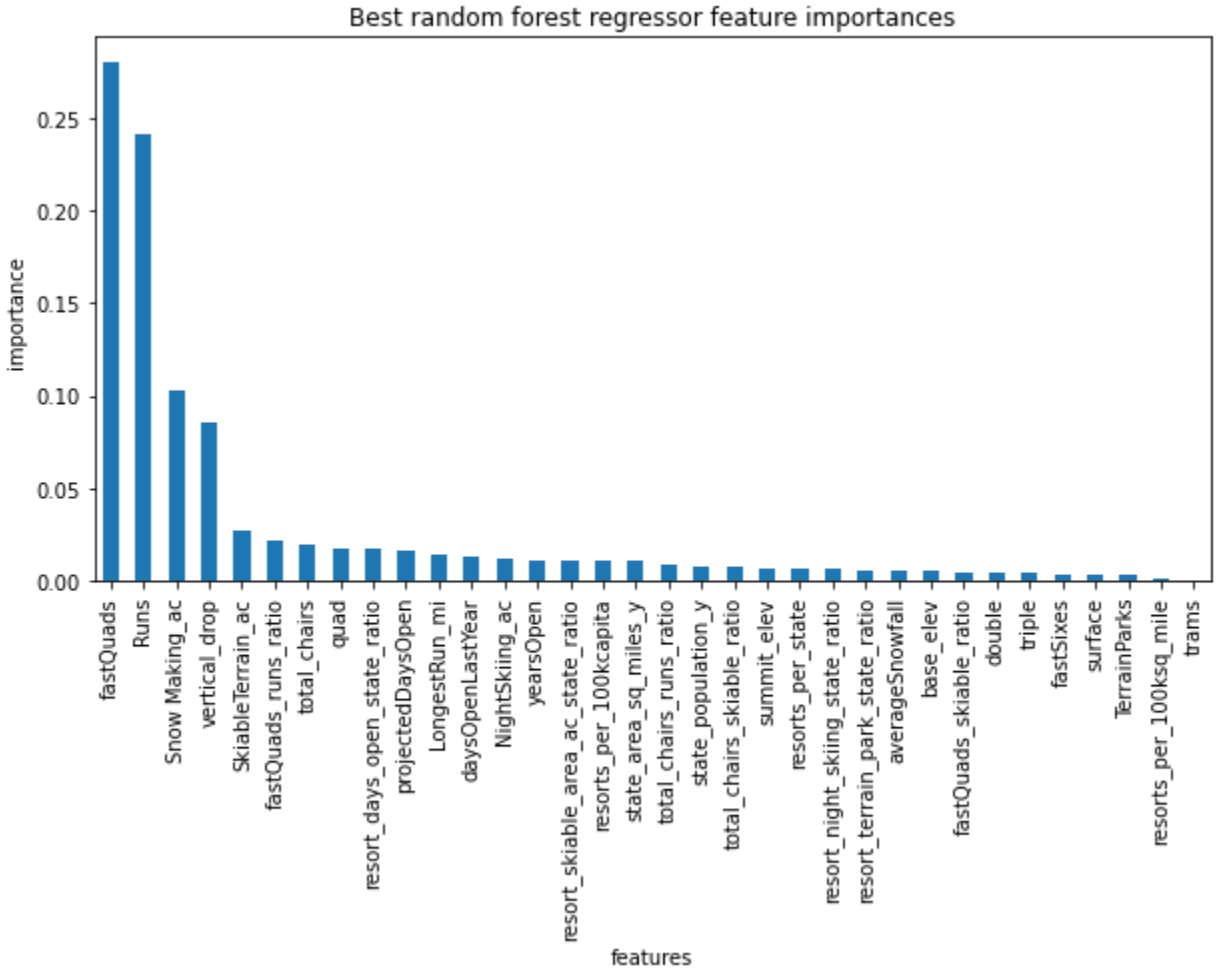


Figure - Coefficients of variables for linear regression

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

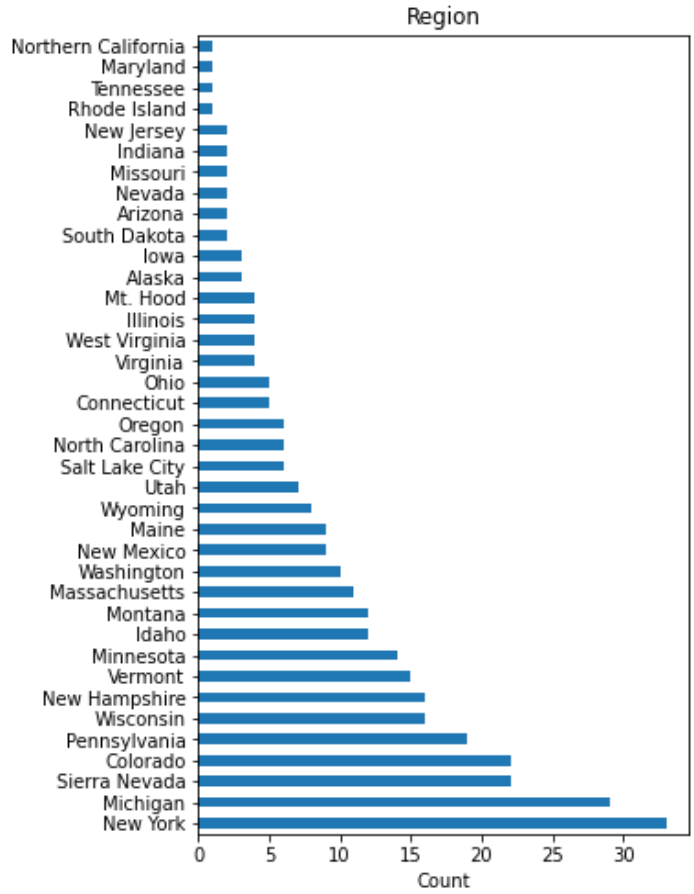
Modeling techniques employed

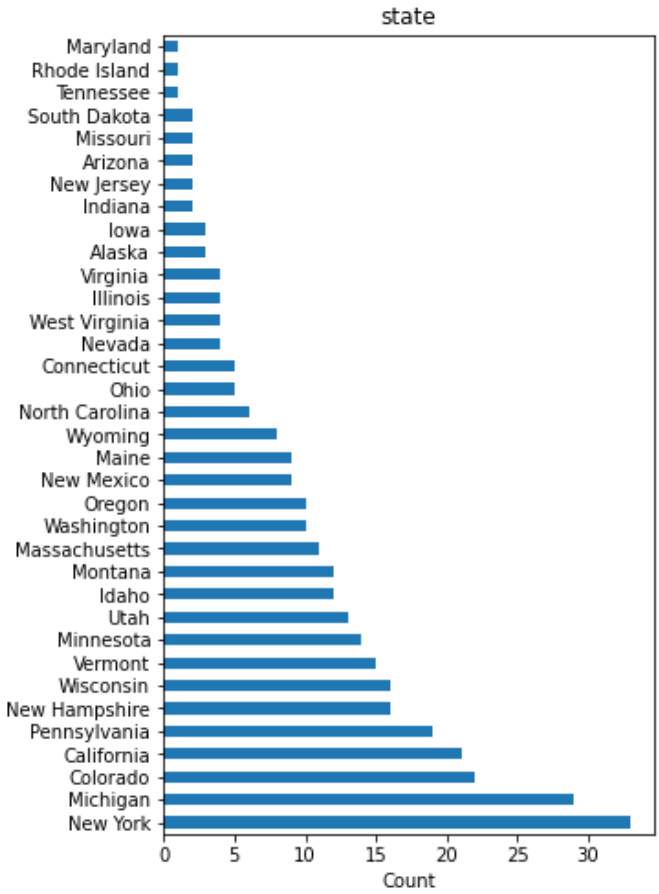
We tested two models and compared results between the two: Linear Regression and Random Forest. The Random Forest proved to be a more effective model, therefore our final model to be used moving forward employs this technique.

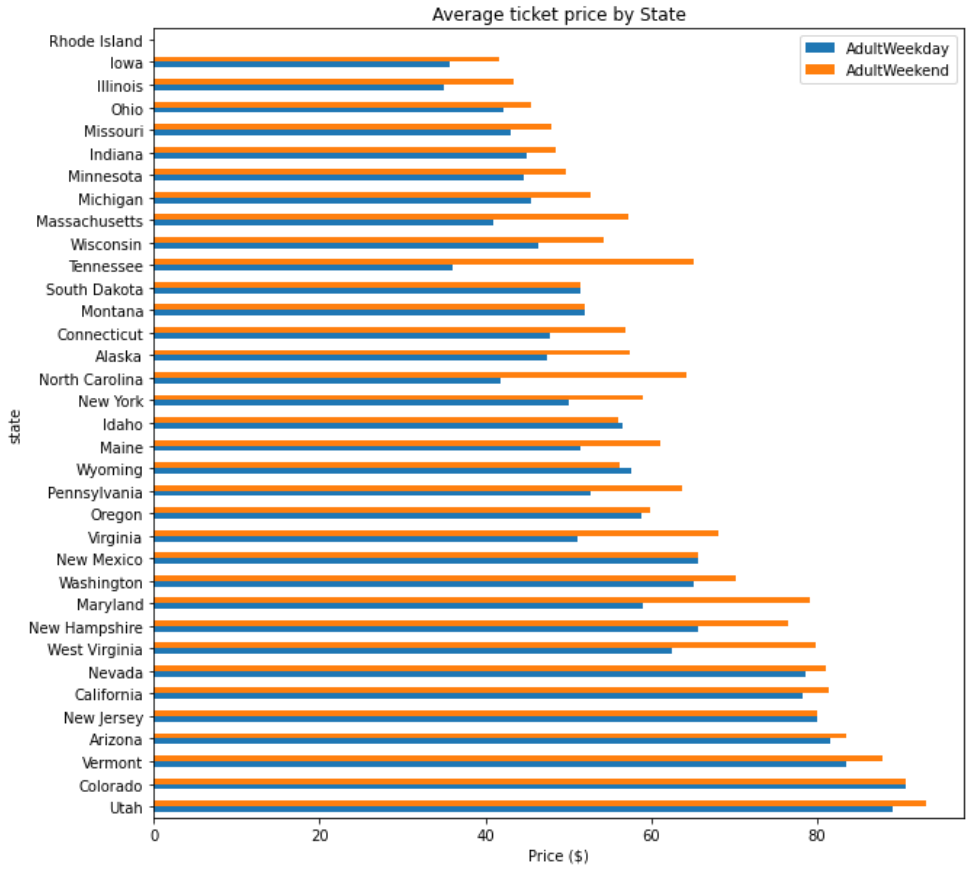
Notable deficiencies in data / areas for further exploration

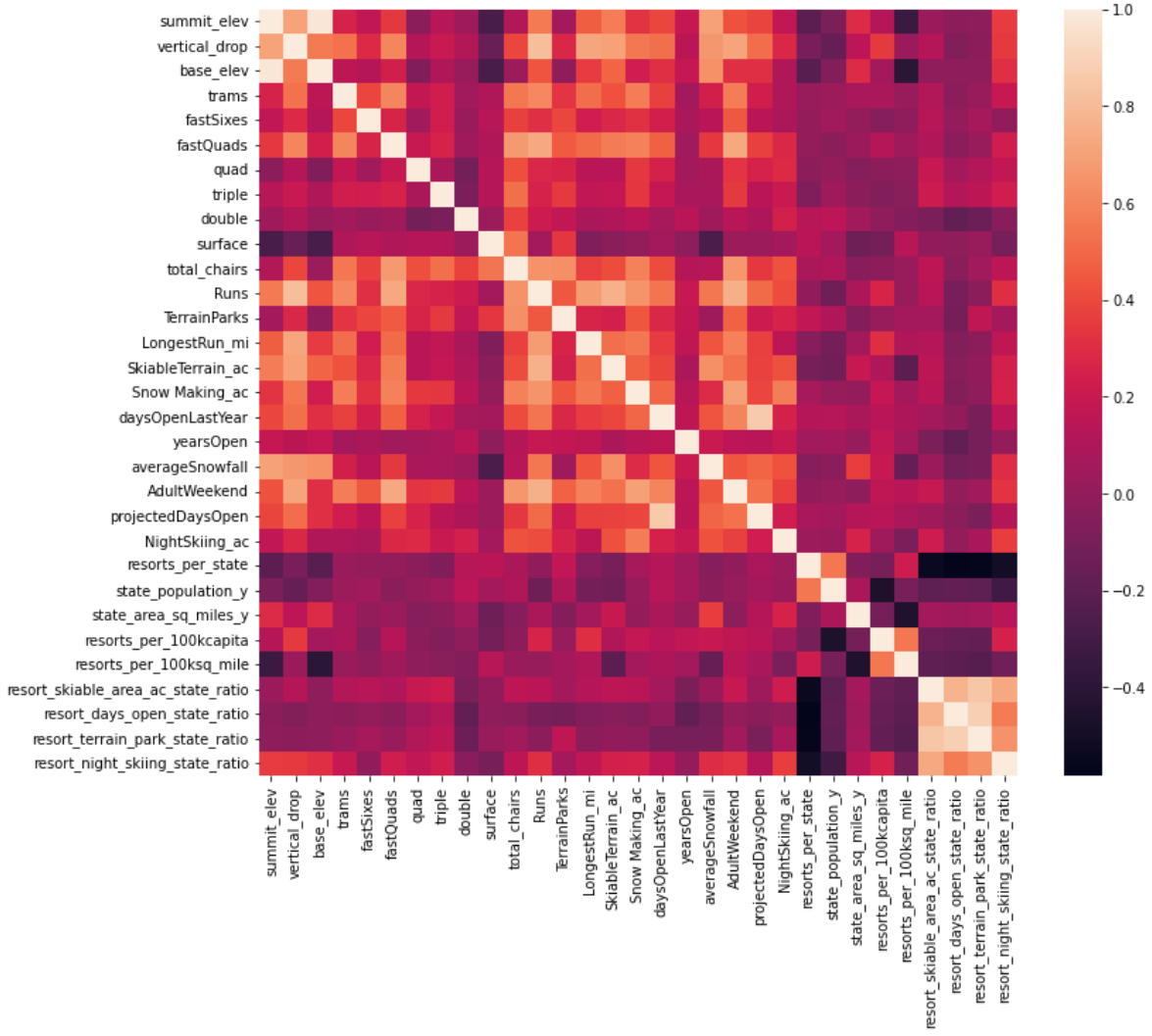
- Other means of generating revenue could potentially help here, for example paying for parking, concessions, rentals, daycare, lodging, to name a few. Increases in the number of visits would generate additional revenue based on these factors, which are beyond just ticket prices.
- The dataset also did not contain as much information on the cost side, so it would be beneficial to have information on additional costs incurred based on the revenue streams mentioned above, as well as personnel costs.

Useful data visualizations






Average ticket price by State
AdultWeekday
AdultWeekend
Rhode Island
Iowa
Illinois
Ohio
Missouri
Indiana
Minnesota
Michigan
Massachusetts
Wisconsin
Tennessee
South Dakota
Montana
Connecticut
Alaska
North Carolina
New York
Idaho
Maine
Wyoming
Pennsylvania
Oregon
Virginia
New Mexico
Washington
Maryland
New Hampshire
West Virginia
Nevada
California
New Jersey
Arizona
Vermont
Colorado
Utah
state
0
20
40
60
80
Price ($)


summit_elev
vertical_drop
base_elev
trams
fastSixes
fastQuads
quad
triple
double
surface
total_chairs
Runs
TerrainParks
LongestRun_mi
SkiableTerrain_ac
Snow Making_ac
daysOpenLastYear
yearsOpen
averageSnowfall
AdultWeekend
projectedDaysOpen
NightSkiing_ac
resorts_per_state
state_population_y
state_area_sq_miles_y
resorts_per_100kcapita
resorts_per_100ksq_mile
resort_skiable_area_ac_state_ratio
resort_days_open_state_ratio
resort_terrain_park_state_ratio
resort_night_skiing_state_ratio
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4