Problem identification

By analyzing the data regarding the ski resorts in the United States, we want to predict how a resort's facilities affect operating costs and ticket prices so we can decide how Big Mountain Resort can cut costs and raise ticket prices over the course of this season

Recommendation and key insights

Raise ticket prices

We trained a random forest model on all the data (excluding Big Mountain) before using it to model Big Mountain's ticket price

- Predicted price: $95.87
- Actual price: $81
- Expected mean absolute error: $10.39

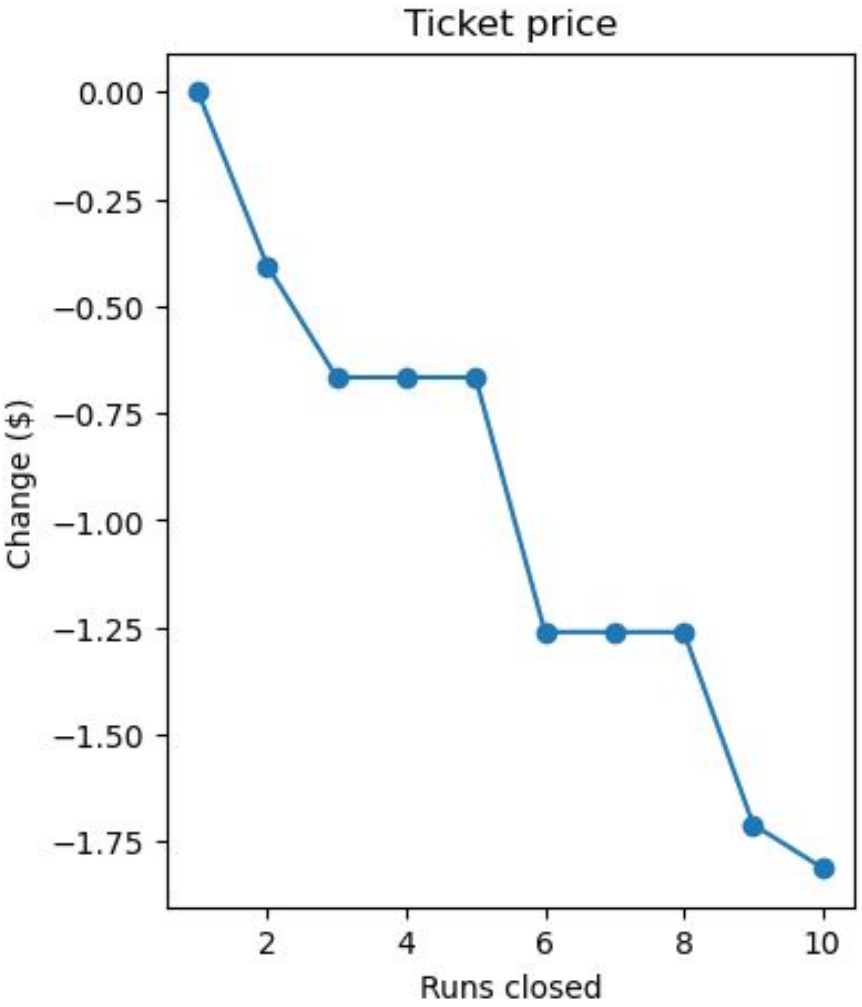
This suggests there is room for a price increase.

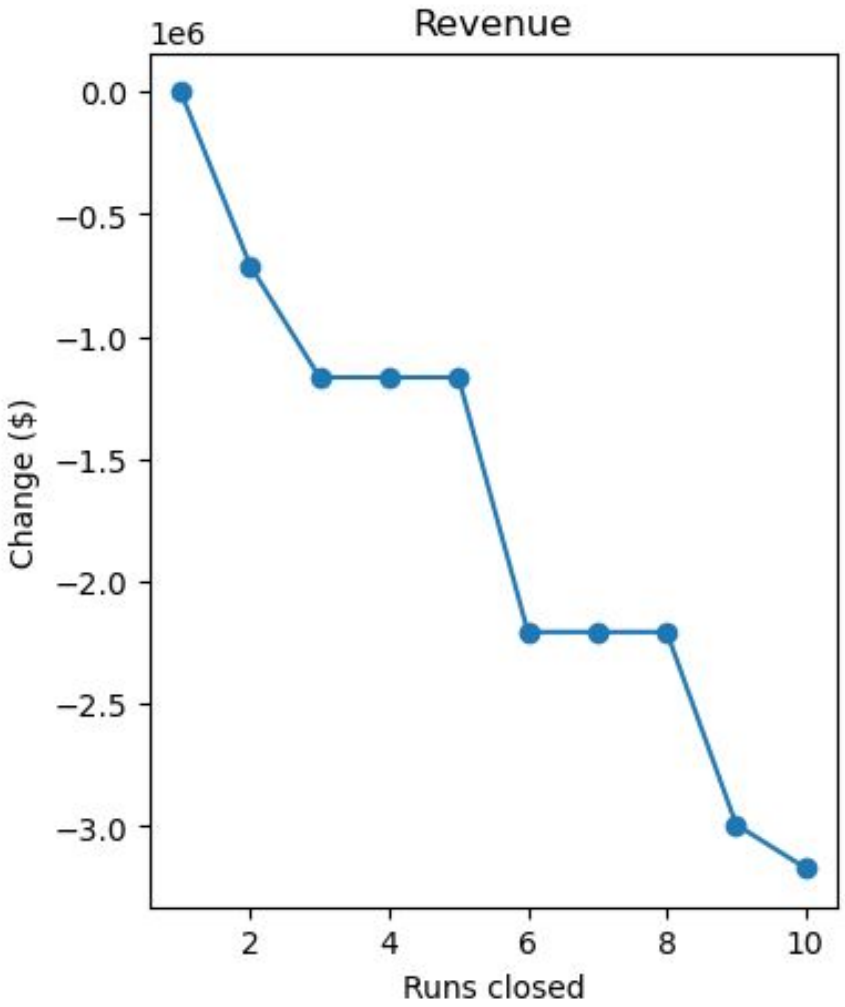
Increase vertical drop

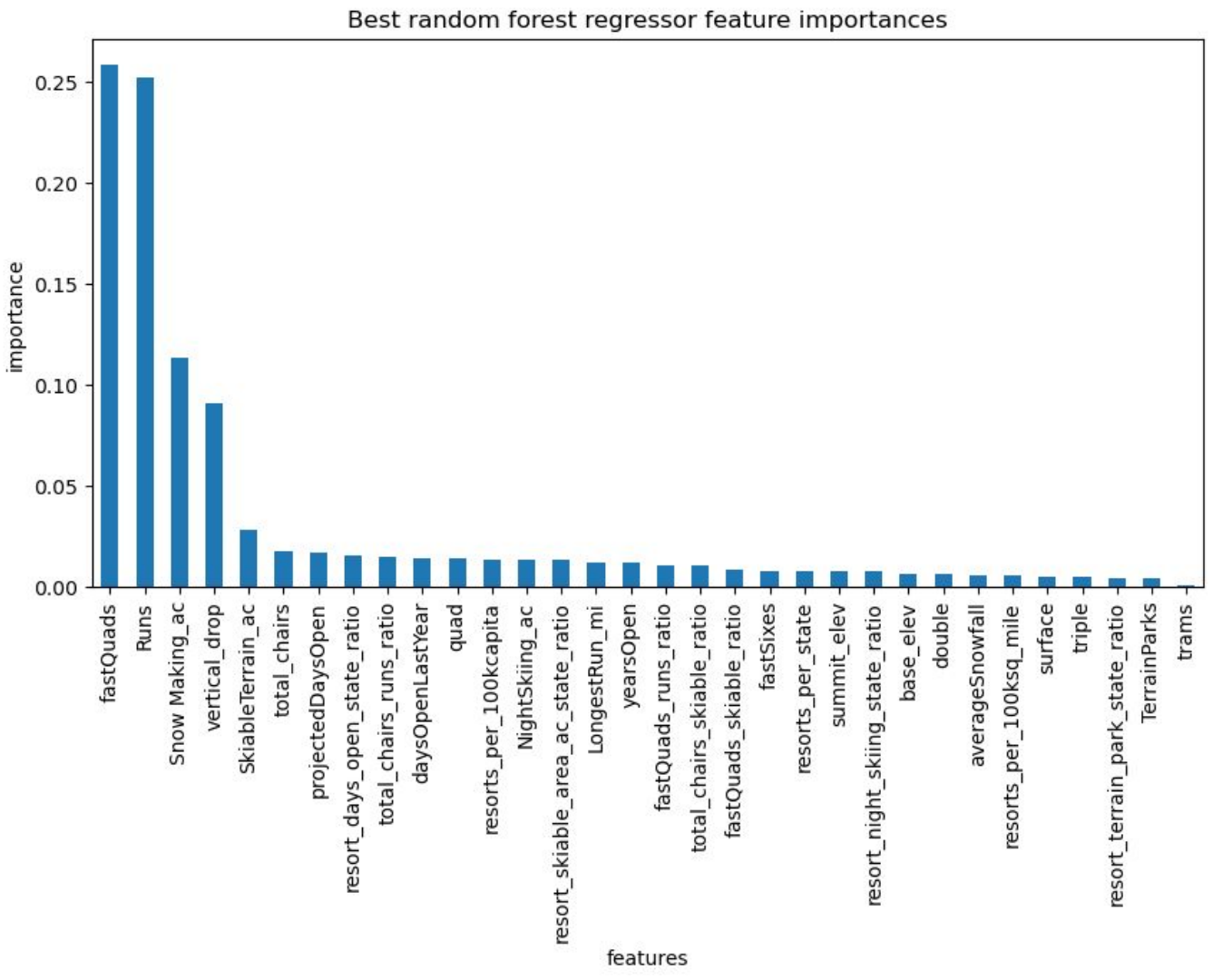
After modeling increasing vertical drop by 150 feet (which requires an additional chair lift), we found that ticket price/revenue increases by $1.99/$3474638. This provides room for further price increase.

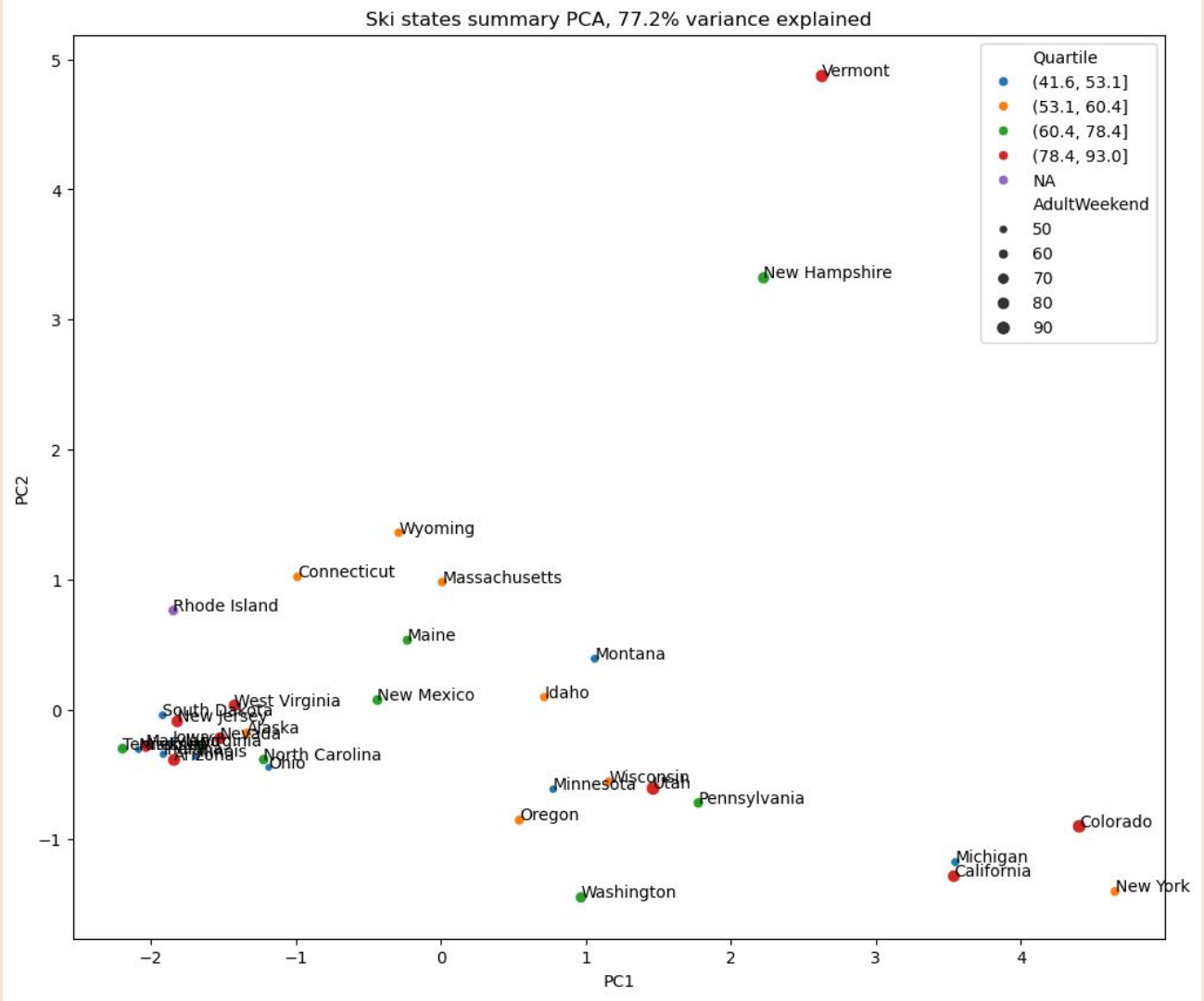
Close least used runs

After modeling closing up to 10 of the least used runs, we found that closing some runs had no effect on ticket price/revenue, while closing other runs dropped the ticket price/revenue by up to $0.75/$1.2M. We know we can close at least one run because closing just one run doesn't affect ticket price/revenue. See next slide for graphic


Ticket price
0.00
−0.25
−0.50
−0.75
−1.00
−1.25
−1.50
−1.75
Change ($)
2
4
6
8
10
Runs closed


Revenue
1e6
0.0
−0.5
−1.0
−1.5
−2.0
−2.5
−3.0
Change ($)
2
4
6
8
10
Runs closed


Best random forest regressor feature importances
importance
0.25
0.20
0.15
0.10
0.05
0.00
fastQuads
Runs
Snow Making_ac
vertical_drop
SkiableTerrain_ac
total_chairs
projectedDaysOpen
resort_days_open_state_ratio
total_chairs_runs_ratio
daysOpenLastYear
quad
resorts_per_100kcapita
NightSkiing_ac
resort_skiable_area_ac_state_ratio
LongestRun_mi
yearsOpen
fastQuads_runs_ratio
total_chairs_skiable_ratio
fastQuads_skiable_ratio
fastSixes
resorts_per_state
summit_elev
resort_night_skiing_state_ratio
base_elev
double
averageSnowfall
resorts_per_100ksq_mile
surface
triple
resort_terrain_park_state_ratio
TerrainParks
trams
features


Ski states summary PCA, 77.2% variance explained
PC1
PC2
Quartile
(41.6, 53.1]
(53.1, 60.4]
(60.4, 78.4]
(78.4, 93.0]
NA
AdultWeekend
50
60
70
80
90
Vermont
New Hampshire
Wyoming
Connecticut
Massachusetts
Rhode Island
Maine
Montana
West Virginia
New Mexico
Idaho
New Jersey
Alaska
North Carolina
Ohio
Wisconsin
Minnesota
Utah
Pennsylvania
Oregon
Colorado
Michigan
California
New York
Washington

Concluding with further work...

Price research

Our random forest model predicts a much greater price ($95.87) than the one Big Mountain currently charges ($81). Such a large difference cannot be ignored and is worth further, more comprehensive investigation.

Find cost data

Our ski resort data is missing costs, which is crucial. No business can function without understanding its costs.

Model costs

Once we find cost data, we can model costs (just as we have modeled ticket prices and revenue) to predict future costs and (in conjunction with revenue models) profits.