Big Mountain Resort

New chair lift cost recoup project

By
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Problem Identification

- Big Mountain Resort has recently installed additional chair lift, which increased the operating costs by $1,540,000 this season.
- The goal of this project is to find a solution to maintain business profit margin at 9.2% after the addition of the new chair lift.

Modeling and Analysis

- The data provided contains the following information

Column	Description
Name	The name of the ski resort.
Region	The region within the United States where the resort is located.
state	The state name where the resort is located.
summit_elev	Elevation in feet of the summit mountain at the resort.
vertical_drop	Vertical change in elevation from the summit to the base in feet.
base_elev	Elevation in feet at the base of the resort.
trams	The number of trams.
fastEight	The number of fast eight person chairs.
fastSixes	The number of fast six person chairs.
fastQuads	The number of fast four person chairs.
quad	Count of regular speed four person chairlifts.
triple	Count of regular speed three person chairlifts.
double	Count of regular speed two person chairlifts.
surface	Count of regular speed single person chairlifts.
total_chairs	Sum of all the chairlifts at the resort.
Runs	Count of the number of runs on the resort.
TerrainParks	Count of the number of terrain parks at the resort.
LongestRun_mi	Length of the longest run in the resort in miles.
SkiableTerrain_ac	Total skiable area in square acres.
Snow Making_ac	Total area covered by snow making machines in acres.
daysOpenLastYear	Total number of days open last year.
yearsOpen	Total number of years the resort has been open.
averageSnowfall	Average annual snowfall at the resort in inches.
AdultWeekday	Cost of an adult weekday chairlift ticket.
AdultWeekend	Cost of an adult weekend chairlift ticket.
projectedDaysOpen	Projected days open in the upcoming season.
NightSkiing_ac	Total skiable area covered in lights for night skiing.

Across a total of 266 resorts across U.S. in the data (after filtering out the outliers).

Modeling and Analysis

- 3 Linear Regression Prediction Models were implemented.

Model	Explained Variance	Mean Absolute Error	Features Dropped
Model 1.	0.7247	6.3462	-
Model 2.	0.7082	6.6311	'state'
Model 3.	0.7118	6.7751	'state','summit_elev','base_elev'

Model 1 had the lowest Mean Absolute Error while contained all the variables, and thus was chosen because it is plausible that different states will effect ski resorts' ticket prices.

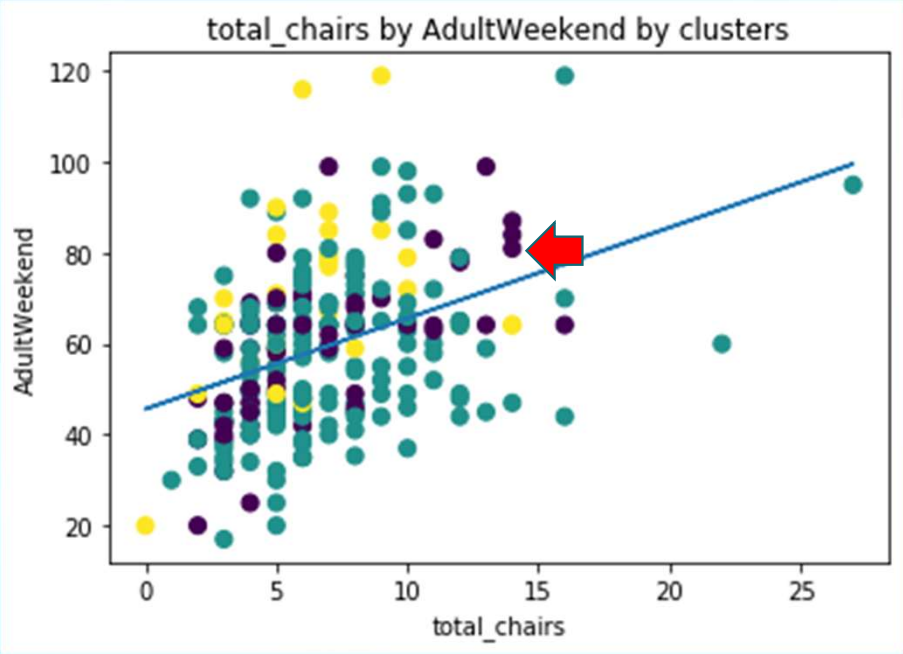
Modeling and Analysis

AdultWeekend	1
AdultWeekday	0.87
Runs	0.58
vertical_drop	0.52
fastQuads	0.51
Snow Making_ac	0.47
total_chairs	0.4
daysOpenLastYear	0.39
LongestRun_mi	0.38
projectedDaysOpen	0.38

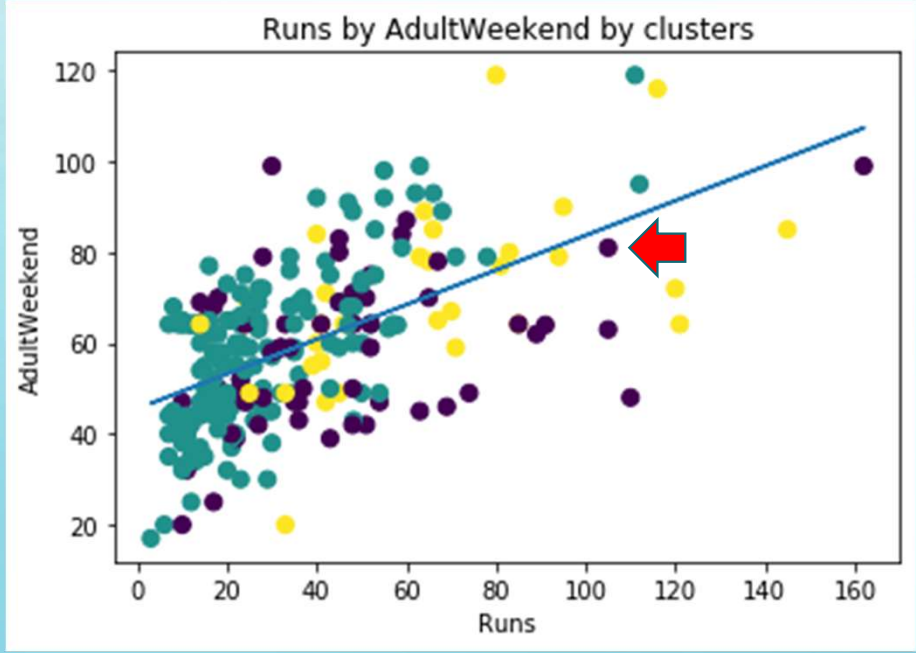
- This is the top 10 correlation coefficient table with the named variable to Adult Weekend ticket price.
- A scatter plot of the following variables by adult weekend ticket price were done for analysis: Runs, vertical_drop, fastQuads, total_chairs, LongestRun_mi.
- AdultWeekday was ignored b/c we have same ticket prices for weekday/weekends.
- Snow making was ignored, because it's snow is made only when necessary.
- Days opened last year was ignored because most of the resorts opened for 120 days, and we opened 123 days, which is right were most of the resorts were at.

Modeling and Analysis

- From this graph, we can see that resorts with more chair lifts is likely to have higher ticket price. And we currently have the lowest ticket price for resorts with similar summit elevation and chair lifts.



- From this graph, we can see that resorts with more runs also tend to have higher ticket price. And Big Mountain Resort, currently has its ticket price below the regression line.



Recommendation and Key Findings

- Since majority of the resorts had total of 120 open days, and it doesn't have much correlation to ticket prices, I will recommend to continue the operating days to be around that number like last season, which had 123 days.
- The linear regression model estimated Big Mountain Resort's Adult Weekend ticket price to be $86.
- A 5% increase due to inflation is acceptable, so we should add 5% of $81 to the estimated $86 and round it to the nearest dollar, which is $90. And since we had weekday/weekend ticket price to be the same, both should be increased to $90.

Summary and Conclusion

- Even though the top correlation variables by adult weekend plots' regression line has shown Big Mountain Resort to have higher weekend ticket price than the regression line for 4 of the plots. When all other information were taken into account, the model estimated the weekend ticket price to be $86.
- The linear regression model used had a standard deviation of 17.26, while the model's mean Adult Weekend ticket price is 59.35. The recommendation of $90 is still within 2 standard deviation, and thus, an acceptable range.