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BIG MOUNTAIN

Guided Capstone Project Report

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Springboard DSCT Bootcamp

Time to get the right ticket price!

Summary

In our analysis, we first took into consideration the data from 330 Ski Resorts all over the US and its 29 more relevant features, what a mess! How could we even have made sense out of it? In fact, this was useful to do an extensive exploratory, analytical, and categorical data analysis which led us to come up with a completely useful data set containing the cleanest data about 277 resorts in the US, demographic, and specific population data that, together, provided us with X most relevant features to model the Weekend Ticket Price for Big Mountain Resort (BMR).

The resort's features that showed the best performance and, therefore, used to train the prediction model were: Vertical Drops, Snow Making Area, Total Number of Chairs, Fast Quads, Runs, Longest Run, Trams, and Skiable Terrain Area.

Additionally, because of the accuracy in the many trials, cross validation scores and comparison with different techniques, the best regressor for the computation of the math behind the model was selected to be a Random Forest Model.

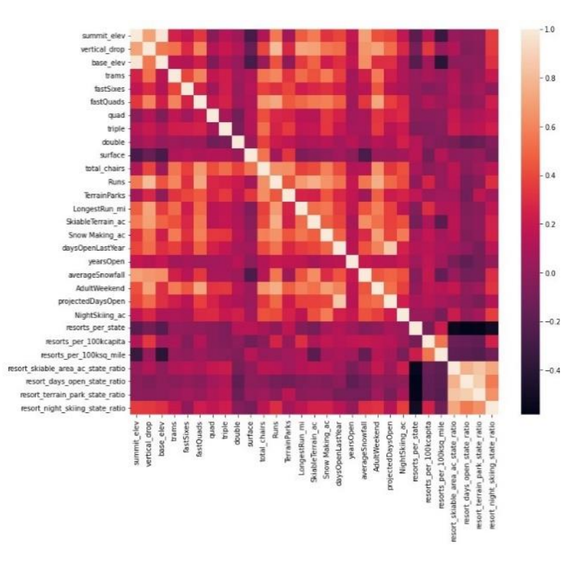
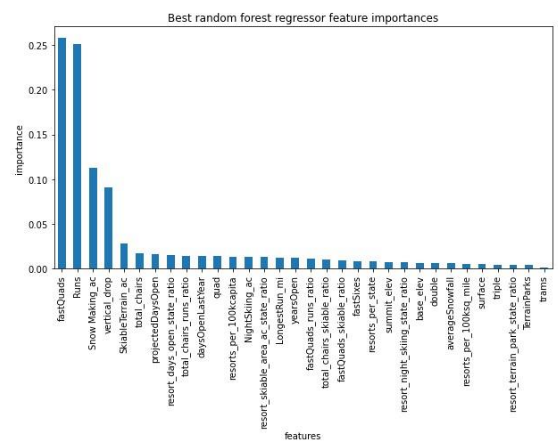


Image 1 - Correlation Matrix: This step at the Exploratory Data analysis was of paramount importance when identifying which features and computed ratios were the most relevant ones for a highly accurate modeled ticket price.



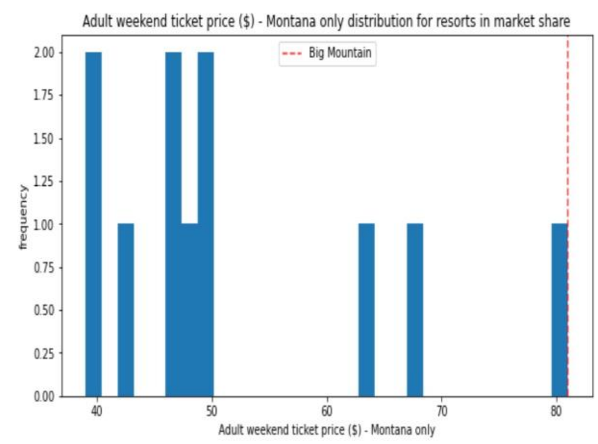


Image 2 and 3 – In these images, you can see (2) the estimated importance in considering the described features for the modeling and (3) out label feature BMR Ticket Price compared with the other resorts in the US and Montana.

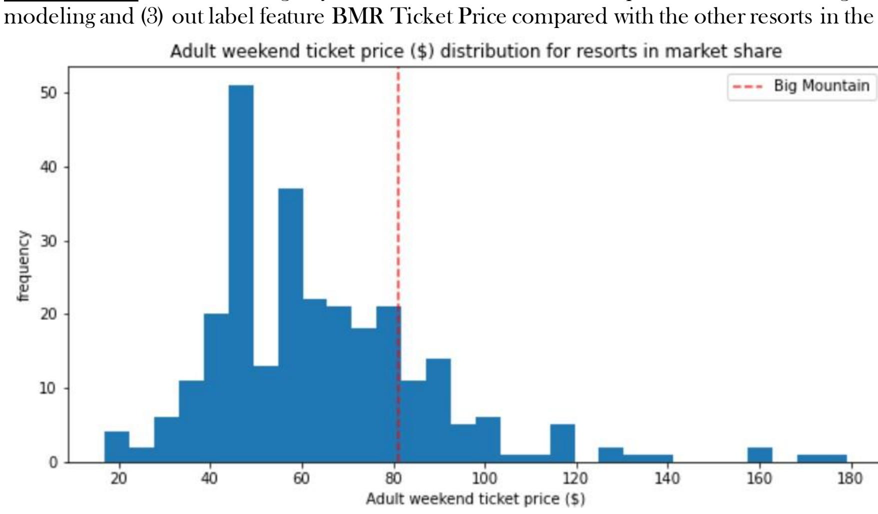


Image 4 - Our label feature BMR Ticket Price compared with the other resorts in the US.

Ticket Price Model Analysis

Findings and Predictions

Enough technicalities! It is time to dig further on where we are and what can be achieved by using this model. We then did some predictions using this model and obtained the following:

ACTUAL Ticket Price: **$81.00 USD**

MODELED Ticket Price: **$95.87 USD**

Which suggests that even with the expected error margin (MAE) of +/- $10.39 USD, there is a room for increasing the price, since, if we consider the worst-case scenario (where we are wrong by $10.39 USD), we could reach an increase of ticket price of $85.48 USD.

Nevertheless, this result should be looked at optimistically and doubtfully! The validity of our model lies in the assumption that other resorts accurately set their prices according to what the market (the ticket-buying public) supports.

As we can see **here**, BMR ticket price lies above the mean of the distribution of all resort ticket prices in the US. However, given the uniqueness that BMR shows in some of its features (detailed in the second page of this report), we can justify why BMR could land more to the right of this distribution like other resorts in the market

Additionally, the fact that our resort seems to be charging that much less that what's predicted suggests our resort might be **undercharging.**

But if ours is mispricing itself, are others? It's reasonable to expect that some resorts will be "overpriced" and some "underpriced." Or if resorts are pretty good at pricing strategies, it could be that our model is simply lacking some key data? Certainly, we know nothing about operating costs, for example, and they would surely help.

Status Quo

Actual Ticket Price

$81.00 USD

As we can see on the plots, this price is not too far above the mean of ticket prices in the US. However, for the state of Montana, this price is the most expensive one for this type of resort.

Where We Can Be…

Modeled Ticket Price

$95.87 USD

It is feasible to increase the ticket price by almost a 18% more considering that the market is accurate. In that sense, have sufficient evidence that support that BMR can be ranging in this price.

Useful Data for Future Work

Features to Consider

Operation costs in BMR and (if possible) other resorts, payrolls, utilities costs, customer surveys to determine which feature they value the most, visitors per resort, enough data to consider weekday ticket price as well.

Analysis on Features and Scenarios

Why BMR is unique among others?

Points to leverage for business decisions

In this step, we computed **a plot per each best performer** (Image 5) to determine where BMR could be located among other resorts and how these features could be relevant for clients in adding uniqueness, differentiation, and versatility of the BMR. These are the insights found:

BMR is doing well for Vertical Drop **(around 2400 feet)**, but there are still quite a few resorts with a greater drop.

BMR is very high up the league of Snow Making Area **(600 acres)**, with only a couple of them ranging on the same area and some other greater than that.

BMR has amongst the highest number of total Chairs **(14)**, resorts with more chairs appear to be outliers.

BMR is amongst the resorts with the largest amount of Skiable Terrain **(3000 acres)**.

Most resorts have no Fast Quads, BMR has **3**, which puts it high up that league table. There are some values much higher, but those are rare.

BMR compares well for the number of Runs **(around 110)**. There are some resorts with more, but not many.

BMR has one of the Longest Runs (around 3.3 miles). Although it is just over half the length of the longest, the longer ones are rare.

BI Scenarios Discussion

1. Closing to 10 of the least used runs can be significantly harmful on supporting for the ticket price and revenue if the number of runs closed beyond 5. On the other hand, closing 2 o 3 only will reduce this support mildly (image 6). Whereas closing one makes no difference at all.

2. Increase the vertical drop by adding a run to a point 150 feet lower down but requiring the installation of an additional chair lift to bring skiers back up, without additional snow making coverage increases support for ticket price by $1.99 USD.

3. Same as number 2 but adding 2 acres of snow making cover (supports $1.99 USD).

4. Increase the longest run by 0.2 mile to boast 3.5 miles length, requiring an additional snow making coverage of 4 acres shows no difference whatsoever.

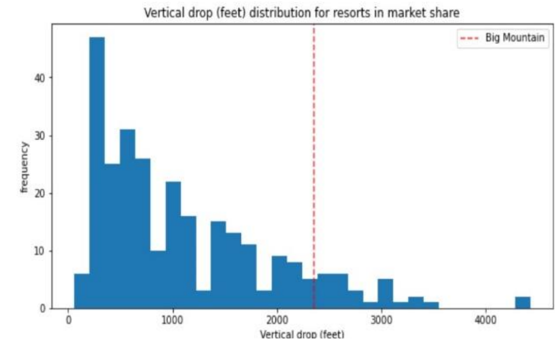
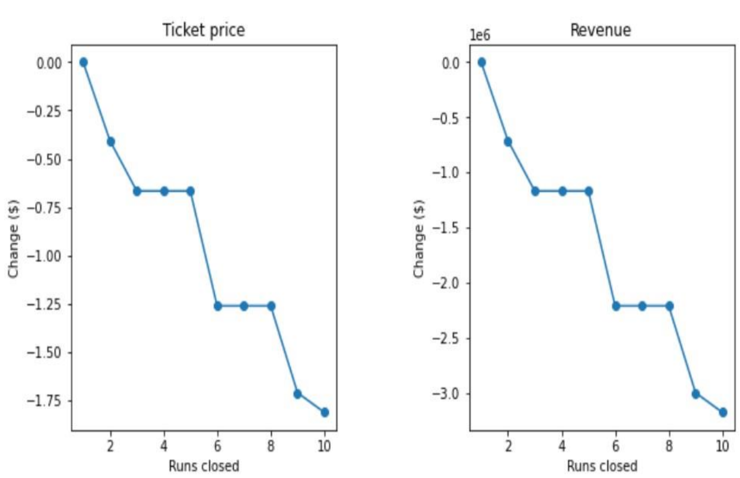


Image 5 – Example historgram for Vertical Drop



Assuming 350K visitors per year and a purchase of 5 tickets per visitor at $81 USD, this represents a gross income of **$141,750K USD.**

To get an extra $1,540K USD (chair cost), the ticket price must increase by **$0.88 USD.**

Image 6 and 7 – Modeling and visualizing different changes in closing different ammounts of runs (6-left). Estimating the ticket price increase necessary to cover the $1,540K USD expenses seen with the new chair. No, we haven't forget about the new chair implications! (7-right).

BI Scenario Selection

Best Scenario to Choose

Scenario 2: Most feasible option

Scenario 1 would be somewhat risky since removing runs (as we can see on Image 6), closing one run makes no difference; closing 2 and 3 successively reduces support for ticket price and so revenue; if BMR closes 3 runs, it seems we may as well close down 4 or 5 as there's no further loss in ticket price. Increasing the closures down to 6 or more leads to a large drop. So, the closing seems to have a great impact after closing 5 runs or more

Scenario 3 would represent an expensive change with the same results as Scenario 2 and Scenario 4 has no impact at all.

Thus, **Scenario 2** would be the most feasible option but if the following considerations are considered

If we consider that $0.88 USD will be used to cover the new lift char, it leaves us with $1.11 USD supported increase.

Assuming that this second new char will be as expensive as the first extra one, this will lead us to only $0.23 supported increase in ticket price. In this sense, the ticket price can be determined using two different approaches detailed in the next section.

Implementation Stage

What are our Options?

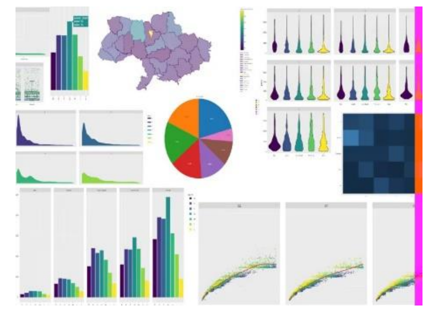
Two possible Implementations

An Educated Bolder Move

Taken into consideration the assumptions in our model and accepting that error margin, we would recommend putting the ticket price in **$95.00 USD** (since we would not be recommended to surpass $96.00 USD in a based-on analysis made on Scenario 2). For further and better insights on this scenario, an additional analysis on customer resistance and the second new chair needed will be more than worth it to consider before implementing it.

For the More Conservative Ones

If we only were to consider covering the costs of the new chair and leaving some margin for the second new chair required at Scenario 2, we would recommend putting the ticket price in **$87.00 USD** as a safe move.



Are you keen on exploring further scenarios and cutomized changes to test hypotheses, implications or outcomes based on Business Inteligence data? We can develop an interactive API for you so you can easily use it for your business decisions. You wouldn't need us anymore for this analysis!