
BLACK MOUNTAIN RESORT



ticket price evaluation

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SUMMARY

Objective

Big Mountain Resort wants to know whether their ticket price could be adjusted based on the services they provide, before the next fiscal year. Big Mountain Resort is a premium skiing resort that offers services beyond their competitors. Big Mountain is considering increasing services by adding a chair lift but is not certain that their current facilities are being valued as they should be.

Data

As you can see in figure one, BMR's home state Montana has approximately twelve resorts and is in the top fifteen states for quantity of resorts. You will notice in the second figure that Montana does not have the same price range of data as the other states, specifically those like Michigan, New York, Colorado, and California which are the states with a high number of resorts. This offers us some insights into the comparable market for a resort like BMR, which is the present outlier for Montana's price data.

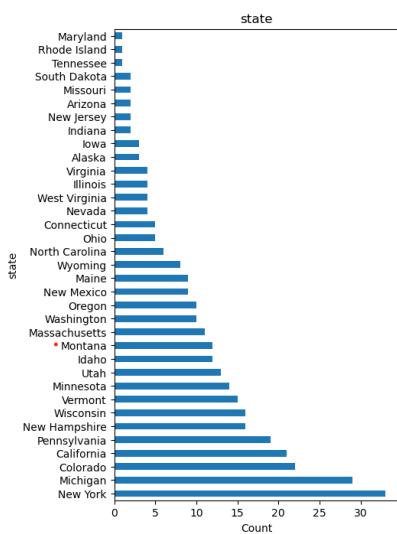


Figure 1

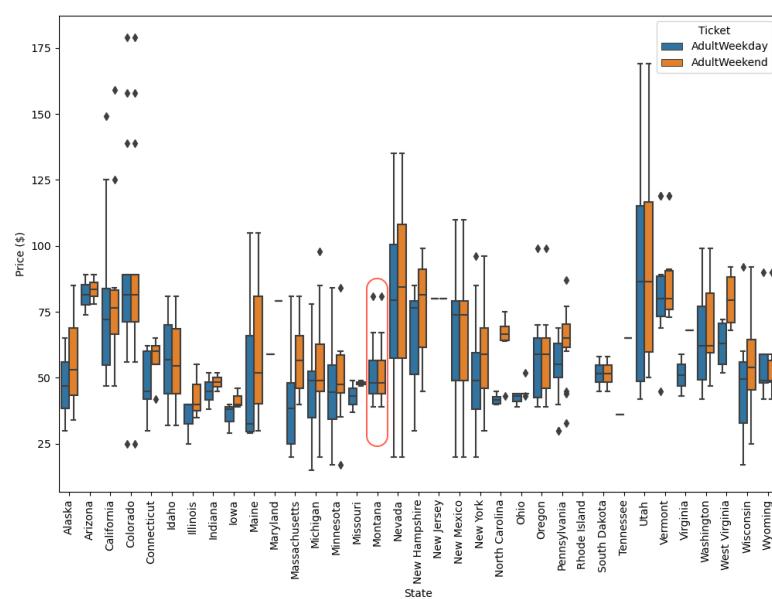


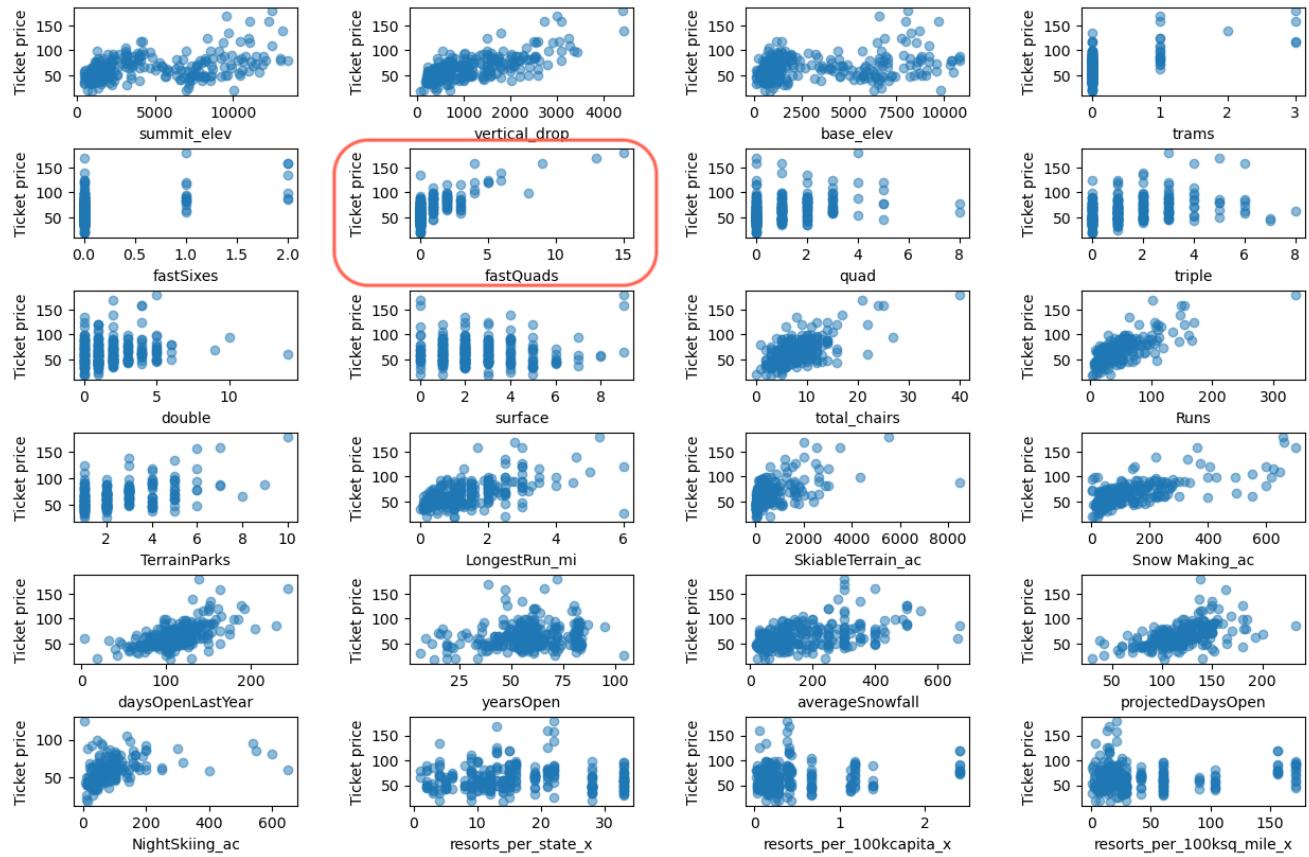
Figure 2

I examined the role that different features of a resort have on price, but it is important to note that the quantity of "fast eights" were not included in the evaluation of features, as there was too much missing data from other resorts.

In terms of predicting ticket prices it would be useful to collect data as to whether or not clients at BMR are local or from out of state. There are potentially other nearby resorts in Idaho and Wyoming which might be in competition with BMR and it might make our groupings by state less relevant. It would be good to have a geographical indicator of which other resorts are closer to Black Mountain and which are farther away, this will help us to gauge whether the market is saturated in the Black Mountain Hills and in Montana or the region. On the other hand, in case there are customers from out of state, we might be able to charge more than state measures of price distribution indicate. BMR would be a destination resort that can attract visitors from across the US.

Analysis

I then looked at the data by each feature to see what could be most strongly correlated with changes in ticket prices. I then trained and tested a model to use the features most strongly correlated with changes in price to generate a pipeline and predict price values based on these resort features. The top five features were number of runs, fast quad chair lifts, snow-making acreage, vertical drop, and skiable terrain, although the best quantity of features to use for predictions were the top fifteen. I have some questions about the importance of fast quad chair lifts, but it may just be an indicator of the quantity of visitors rather than a feature of interest. As you can see here the outliers in the right tail of fast quads might generate a higher correlation than a feature we might expect, such as summit elevation. However, summit elevation is not in our power to change, so we will focus on the model at hand.



Modeling

In the current state of affairs, Black Mountain Resort currently has a ticket price of eighty-one dollars. After refitting a model strictly based on Black Mountain Resort, I found the predicted ticket price to be approximately ninety five dollars, with a mean absolute error of about ten and a half dollars. This could suggest that Black Mountain has some room to adjust prices based on their facilities in comparison with other similar resorts. Unfortunately, we do not have data on whether customers are strictly from in state or whether BMR is a destination resort. The prices within Montana are lower on average than other states and customers within the state might not be willing to spend more for a luxury experience. It does appear that BMR is not in the top quartile of prices for all states, despite having comparable facilities to other resorts in the market share. BMR has fewer total chairs and no trams, which is something that could be improved without needing additional property.

I used the random forest model I generated and trained to make some predictions about price value of tickets in different scenarios for BMR:

- It could close down up to ten of the runs.
- It could increase the vertical drop value by adding a run, but it would require an additional chair lift, and would not have additional snow making coverage at this point. (An additional lift would cost approximately one and a half million dollars.)
- As above, but with additional snow making coverage.
- It could increase the longest run by a fifth of a mile to a total of three and a half miles, but it would require an additional four acres of snow making coverage.

I assumed that the expected number of visitors is 350,000 based on last year and that on average skiers stay for five days.

In the first scenario, It appears that closing up to ten runs would decrease revenue by just over two dollars given ticket prices and possibly decrease revenue by as much as four dollars given that people stay for five days on average. However, removing only one run makes no real difference for prices. In the next scenarios, we checked what would happen if the vertical drop was increased by one hundred and fifty feet and an additional chair lift was installed. In scenario ticket prices could be increased by approximately a dollar with an increase in revenue of approximately two million. After increasing the vertical drop and installing an additional chair, I modeled what would happen if the snow making cover was increased by an additional two acres, this also allowed for a ticket price increase of about a dollar with an increase to revenue of two million. In the last scenario I modeled a change from increasing the longest run by a fifth of a mile to a total of three and a half miles, which made no difference to predicted price values. It seems that this feature is not important to consumers.

I would recommend adding to the vertical drop and adding another chair lift provided that the increase in revenue would cover the additional cost of installation. In case the business is considering any run closures, I would recommend starting with only one closure and soliciting customer feedback about whether additional closures would affect their decision to purchase tickets or return in following years.

Going Forward

I recommend gathering data on whether customers are from in or out of state. It would allow us to know whether in-state or market share comparisons are more appropriate when modeling ticket price data. It is also important to gather data on how many customers return after previous years based on their experiences in the past year; this will allow us to know whether things like closures are likely to affect the customer base for upcoming years. A new chairlift would cost one and a half million, so less than predicted revenue from the combination of increasing the vertical drop, adding the chair lift, and increasing snow covered acreage, but it is not already tested how much a new chair lift would contribute on its own or whether the other features would have additional costs as well. I think the mismatch between forecasted prices and actual prices has to do with the market in Montana specifically, and that the prices within the state are lower than other states with comparable resorts.
