Problem Identification

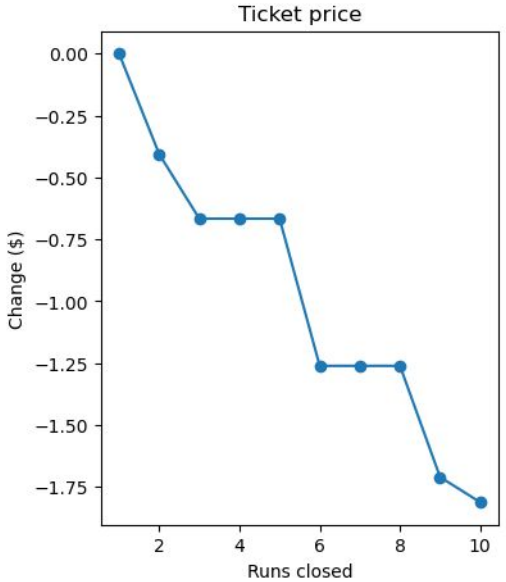
Big Mountain Resort is planning on adding an additional chair lift to their ski resorts which will add an additional cost of $1,540,000 to their normal operating costs for this current season. The problem is that they are currently basing their price on the average cost of other resorts and simply just adding a premium on top of the average and they want to have a more data driven approach to deciding on their pricing. They also want to make decisions on other changes that will lower their operating costs while adding value so that they can charge more for a ticket or at least cut costs and have the ticket prices remain the same.

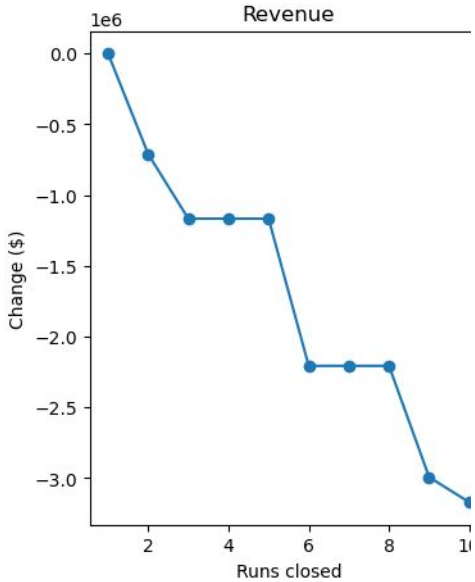
Recommendation and Key Findings

We were able to identify the most important features that have impact on the cost of a ticket as well as what features could be scaled back or removed without having much of an effect on ticket price. We found that removing the 5 least used runs will reduce operating costs but will potentially reduce ticket price but removing 5 has no additional decline in ticket price that removing 3 runs, therefore it is recommended to remove 5. We were also able to show that increasing the vertical drop and installing a new lift would allow an increase of $2 which would result in a $3,474,638 increase in revenue. Before even accounting for any changes to the resort, our model predicts that Big Mountain could be charging almost $15 more per ticket with a predicted error of about $10. Even if we assumed the lower end of the range, you could charge the $2 increase for the added amenities and at least $5 extra to the base price for a total of $7. This number could be increased slowly over time since $7 is still at the bottom range but the $7 increase times the total amount of expected tickets to be bought would equal roughly 12 million dollars! Some numbers would have to be crunched to see if that would cover the costs of increase vertical height and adding the additional lift but it is highly likely that this results in a net gain in revenue. Ultimately we recommend removing the 5 least used runs, increasing vertical drop to the tallest run and adding in the new lift.

Modeling Results and Analysis

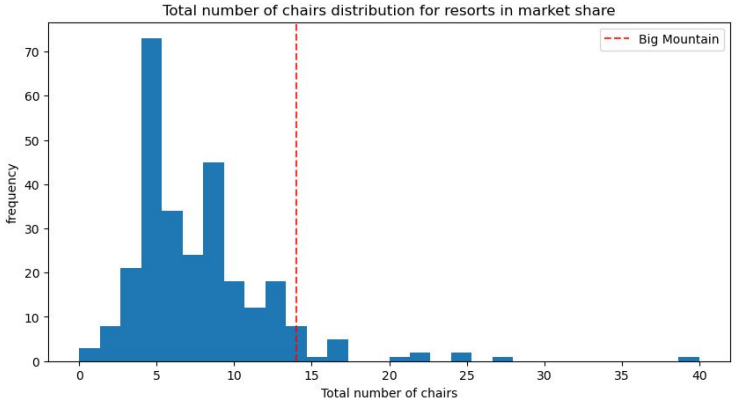
Here, you can see that removing 5 runs makes no difference in price reduction than removing 3 which is why we recommend removing 5 as to maximise operation costs.

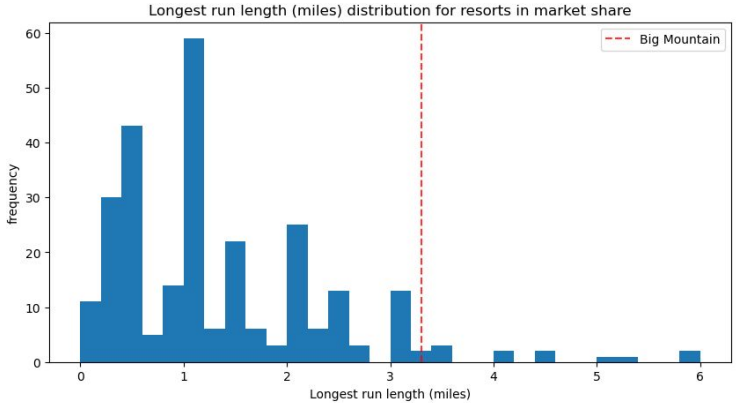




Modeling Results and Analysis

Here is a distribution of two of the features that are shown to increase ticket price and Big Mountains position is indicated by the red line. Big Mountain is a top performer in all of the features that the market considers valuable which is why we believe a premium price is justified.





Modeling Results and Analysis

The following code shows our model predicting what the market value of a ticket for Big Mountain would cost before making any changes.

print(f'Big Mountain Resort modelled price is ${bm_pred:.2f}, actual price is ${y_bm:.2f}.')

print(f'Even with the expected mean absolute error of ${mae_mean:.2f}, this suggests there is room for an increase.')

Big Mountain Resort modelled price is $95.87, actual price is $81.00.

Even with the expected mean absolute error of $10.39, this suggests there is room for an increase.

Modeling Results and Analysis

The following code predicts how ticket price would increase by adding a run, adding 150 ft to vertical drop and adding 1 lift. Even without adding the run, the price increase is still $1.99

```
ticket2_increase = predict_increase(['Runs', 'vertical_drop', 'total_chairs'], [1, 150, 1])

revenue2_increase = 5 * expected_visitors * ticket2_increase
```

This scenario increases support for ticket price by $1.99

Over the season, this could be expected to amount to $3474638

Conclusion

To conclude, we identified that increasing runs had no effect on ticket price since Big Mountain already has enough runs. We decided that removing runs would actually have very little impact on the price and would reduce operation costs. We also found that vertical drop and chairs were very valuable and recommended adding the chair and increasing vertical drop on the highest run. Between the added value from the new amenities and the models prediction of the price before making changes, we would recommend to remove 5 runs, add vertical height and add one chair. We would recommend starting on the lower end of the ticket price increase and go from $81 to $89 because it is still likely to cover all of the costs of the added features and still result in a net positive revenue especially after factoring in the reduced operations cost from cutting 5 runs. We recommend monitoring if the price change makes any difference to total tickets bought, and to steadily raise the price to up to $100 if visitors and tickets dont seem to be effected.