Using ML Models to Select a Better Value for a Ticket Price at Big Mountain Resort

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Problem Identification

We have been charging a premium above the average price of resorts in its market segment.

Since a while ago, the management of the resort has suspected that this pricing method is undervalued.

how can we select a better value for a ticket price and cut operating costs?

Recommandation & Key Findings

We found the ideal price for one ticket to be **$ 95.87 (from $ 81)**

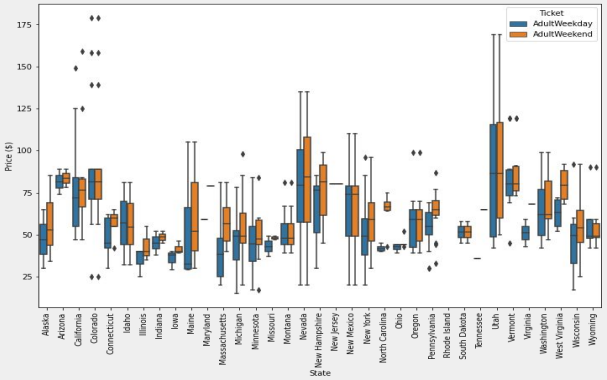
Adding one run, increasing the vertical drop by 150 ft, and installing an additional chairlift :

Would increase **$1.99** to the initial price and increase the total revenue by **$3.47 M**

- One run: cut operational cost & the new price will not be affected
- A 2nd run: ticket price drops by **$0.40** & total revenue drops by **$700K**
- A 3rd run: initial ticket price drops by **$0.67** & total revenue drops by $ **1.2M**
- A 4th & 5th run: same result as closing the 3rd run

Modeling Results & Analysis

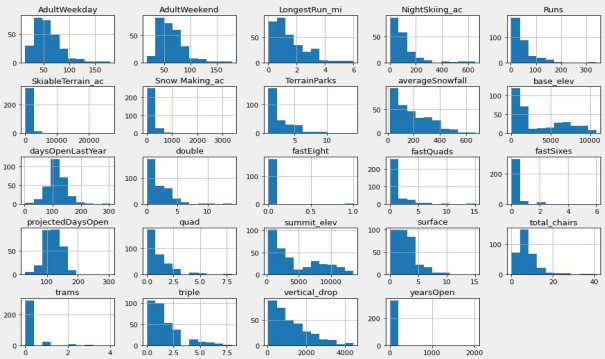
Distribution Of Ticket Price By State

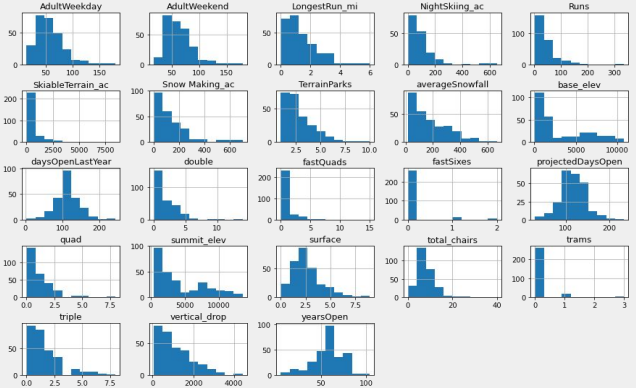


Most ticket prices appear to lie between $25 and $100, except in few states, such as California, Colorado & Utah

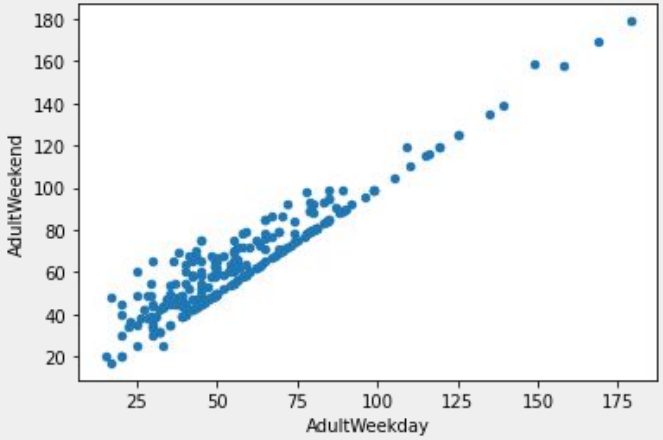
Some distributions looked wrong due outliers, we cured them before moving on with EDA

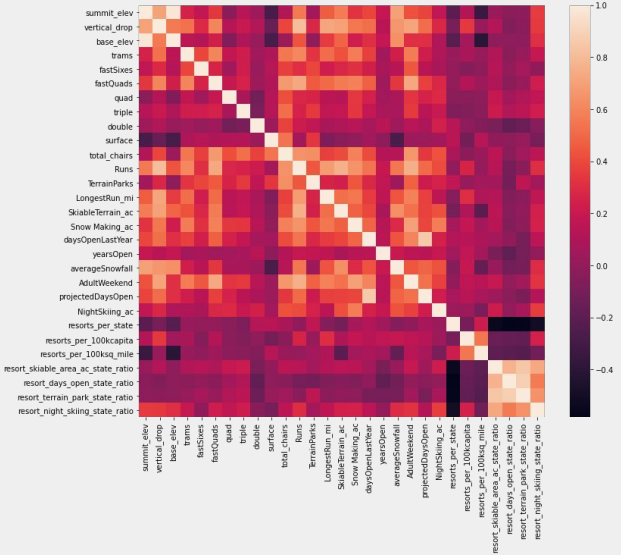
Distribution Of Feature Values





Modeling Results & Analysis





Our data analysis showed that weekday ticket prices and weekend ticket prices were mostly the same.

We used weekend ticket prices because they had more data

We investigated correlation between weekend ticket price values and other features:

Features most correlated to ticket price:

fastQuads, vertical_drops, snow_making_ac, total_chairs

Modeling Results & Analysis

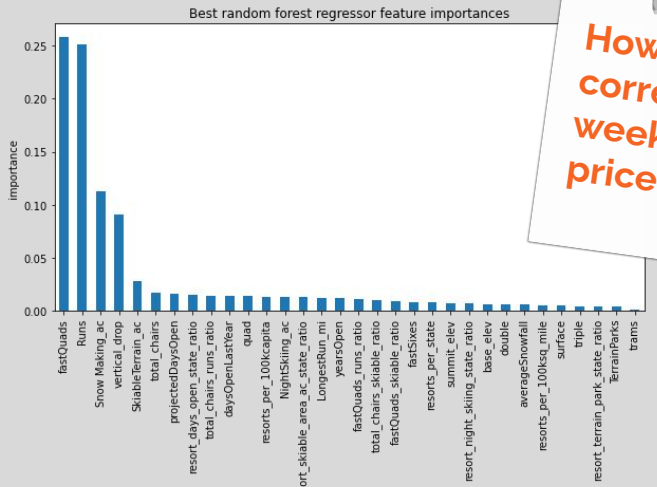
Linear Regression Model

vertical_drop	10.767857
Snow Making_ac	6.290074
total_chairs	5.794156
fastQuads	5.745626
Runs	5.370555
LongestRun_mi	0.181814
trams	-4.142024
SkiableTerrain_ac	-5.249780

dtype: float64

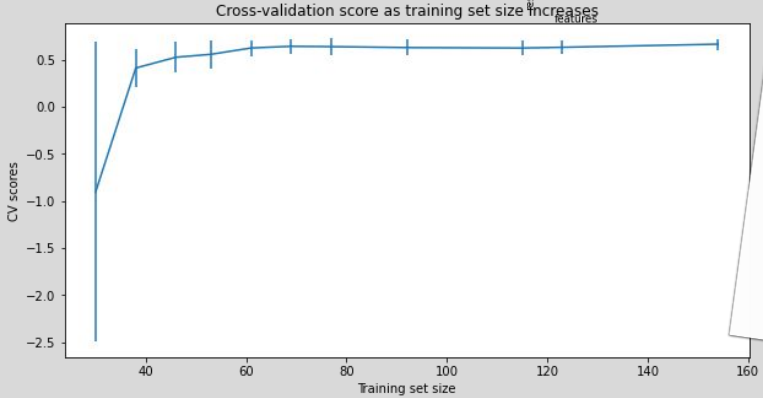
Most correlated features with weekend ticket prices

Random Forest Model



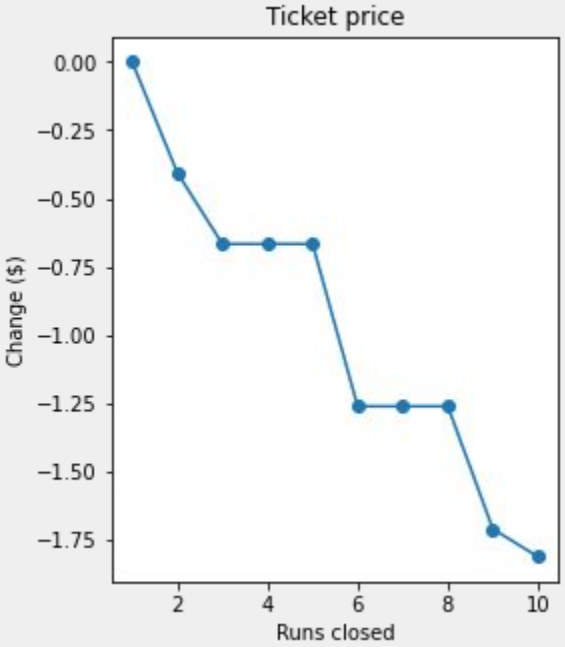
How features are correlated with weekend ticket price

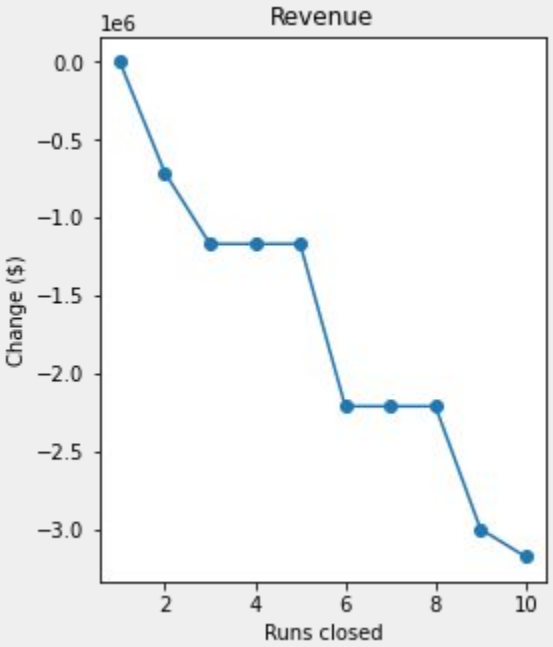
We chose the random forest (RF) model over the linear regression (LR) model, because the RF model was more accurate (its mean score accuracy was 69.76% vs 63.27% for LR model) and less variable (its mean absolute error was $9.64 vs $10.50 for LR model).



Assessing the data we have to train, it seems enough to make a prediction

Modeling Results & Analysis





?

The model says closing one run makes no difference. Closing 2 and 3 runs successively reduces support for ticket price and for revenue. If Big Mountain closes down 3 runs, it seems they 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.

Summary & Conclusion

In this project, we built a machine learning model that can predict the optimal ticket price for the Big Mountain Resort consistent with capitalizing on its facilities and cutting operational costs, based on provided data.

➔ Ideal price

Our model found that the ideal price for the Big Mountain Resort should be **$95.87** (**18.4%** increase from the current ticket price)

➔ Is that it?

We recommended different scenarios, where we could change features in some facilities and still get revenue higher than current revenue

➔ What's next?

Although we feel confident that the data we have is enough to make a decision, we recommend getting data about the number of visitors for each resort per annum and additional operating costs in order to improve our results