THE BIG MOUNTAIN RESORT

Guided Capstone project

PROBLEM IDENTIFICATION

- The Big Mountain Resort has recently installed an additional chair lift to increase distribution of visitors across the mountain.
- This recent addition is increasing the operating costs by $1.54M per season.
- Need a solution to increase this year's annual revenue to offset the increasing operating costs.
- Scope of solution would be to target the 330 competitors that would be not just limited to local Montana region but even across other states across the US.
- Focus on renewed marketing strategies, ticket pricing, increased capacity offering to attract more visitors

RECOMMENDATIONS AND KEY FINDINGS

Key Findings

- One important factor chosen for the scope of this project was Average Weekend ticket price.
- The resort is already positioned in the premium segment of the market and priced competitively.
- The price predicting model supports increasing the adult ticket price for big mountain to compensate additional operating cost. But they may need to add additional enhancements to the facility to support the price increase.

Recommendations

- One day adult ticket is currently priced at $81 for big mountain resort. Assuming average visitors ski for 5 days and 350,000 visitors in the coming season, the model supports increasing ticket price by $1.99 while adding a run, increasing the vertical drop by 150 ft, installing an additional chair lift and adding 2 acres of snow making.
- These increased ticket prices should be one of the options that could help the Management achieve their goal ta have the same profit margin despite additional operating cost.

MODELING RESULTS

Important considerations before building model

- Duplicate and null values were handled appropriately as a part of data cleaning/ wrangling.
- 'Adult Weekend price' was chosen as the dependent variable and marked as ticket price
- The data exploratory step revealed vertical_drop, Snow Making_ac, total_chairs, fastQuads are the most important features for modelling the ticket price of our resort as there is a strong positive correlation. Runs, Longest Run_mi, trams are also can be used.

Models Applied

Linear Regression

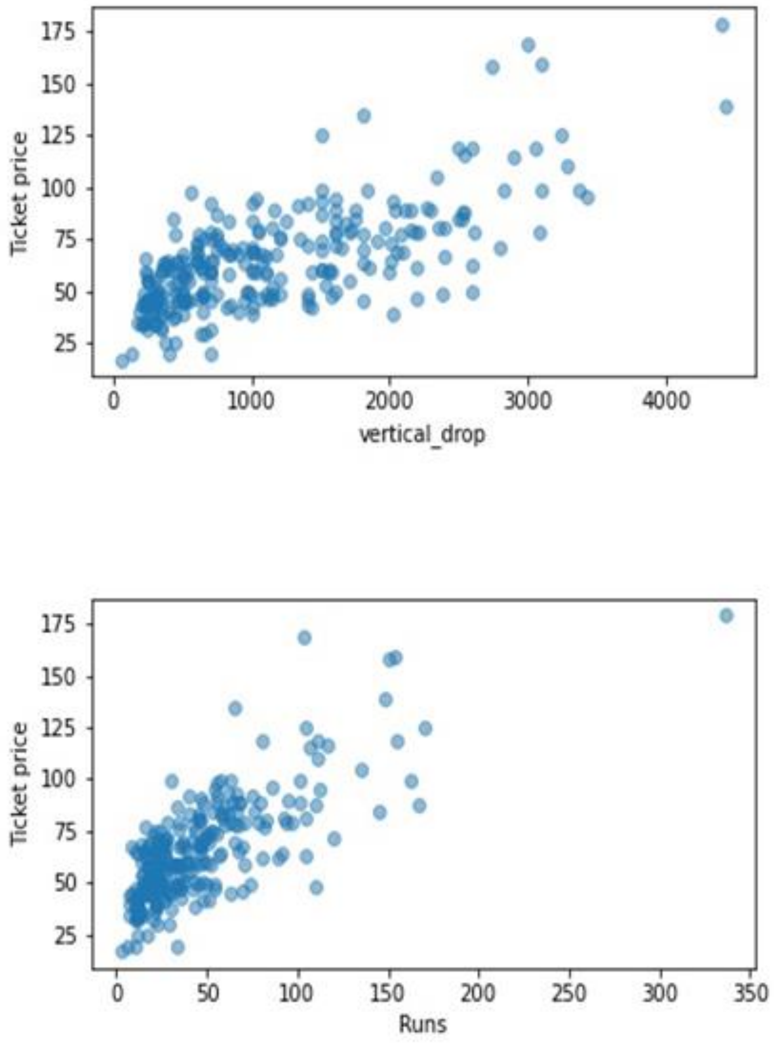
linear regression model is tried putting missing values with mean and median. Assessing model performance on metrices R2, mean absolute error and mean square error suggest results don't seem very different with either mean or median input

Random Forest

Random Forest regressor model is also tried by exploring different values for the number of trees with and without feature scaling and tried both the mean and median as strategies for imputing missing values.

The dominant top four features are in common with both the models : fastQuads, Runs, Snow Making_ac and vertical_drop.

MODELING RESULTS



MODELING RESULTS

Model	Explained Variance	Mean Absolute Error
Linear Regression	1.62	10.49
Random Forest	1.35	9.64

Chosen Model

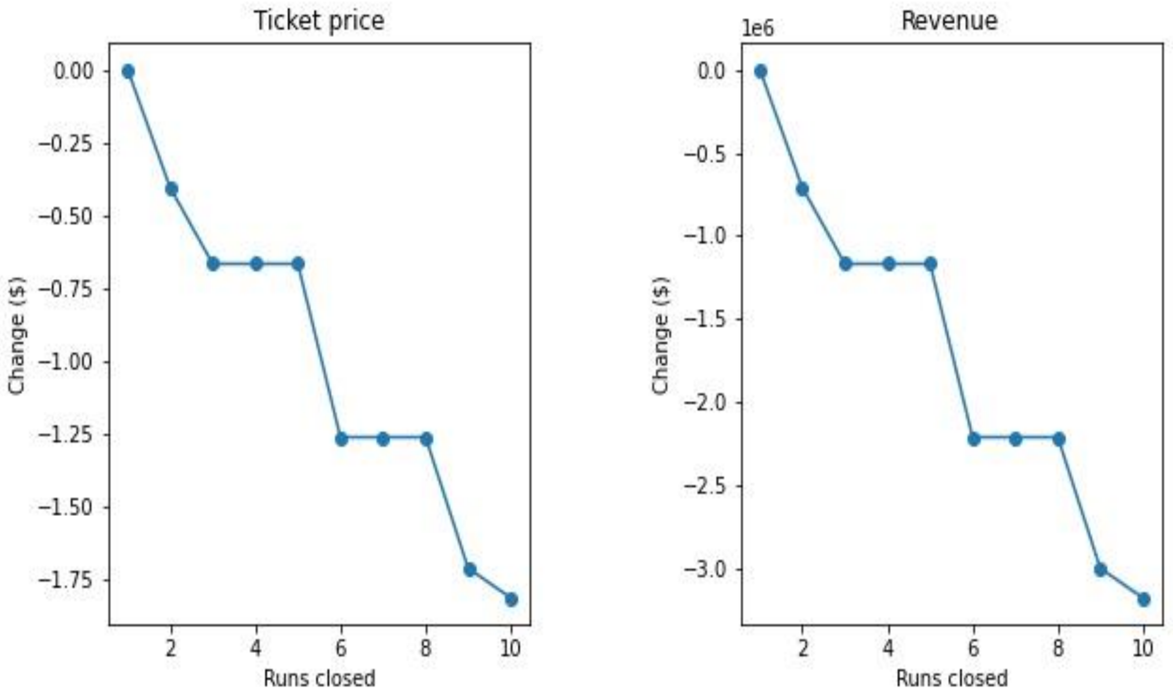
After comparing the linear and random forest model it seems the random forest model has a lower cross-validation mean absolute error by almost $1. It also exhibits less variability. Random forest model is chosen for its better performance for the next step to predict the big mountain resort ticket price.

MODELING RESULTS

PREDICTIONS ON THE TEST DATASET

The price predicting model supports increasing the adult ticket price to $83 or even higher for Big Mountain. Assuming average visitors ski for 5 days and 350,000 visitors in the coming season, the model supports increasing ticket price by $1.99 while adding a run, increasing the vertical drop by 150 ft, installing an additional chair lift and adding 2 acres of snow making.

The model also predicts closing one run makes no difference. Closing 2 and 3 successively reduces support for ticket price and so 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 AND CONCLUSION

Summary and Conclusion

- Data Cleaning is a very important step to ensure any unwanted data is cleaned for data consistencies

  There were number of missing values that led to several rows being dropped completely. Other obvious issues with some of the other features in the data, for example, led to one column being completely dropped, a data error corrected, and some other rows dropped.

- The problem was subsequently identified is to predict the adult weekend ticket price for ski resorts.
- Heatmap and histogram plots were important in the Exploratory Data Analysis phase to identify the type of datasets, relationship between variables, outliers.

  Vertical_drop, Snow Making_ac, total_chairs, fastQuads are the most important features for modelling the ticket price of the resort as there is a strong positive correlation. Runs, Longest Run_mi, trams are also can be used.

- Choosing the right model is important to improve model performance for better predictions.

  Random forest model is chosen for its better performance for the next step to predict the big mountain resort ticket price.

SUMMARY AND CONCLUSION(CONT.)

Assuming 350,000 visitors in the coming season and average visitors ski for 5 days the price predicting model supports increasing ticket price by $1.99 while adding a run, increasing the vertical drop by 150 ft, installing an additional chair lift and adding 2 acres of snow making.

The model, however, does not account for the additional capital expenditure and on-going operation cost since this data has not been provided. The resort is already positioned in the premium segment of the market and priced competitively. Upgrading the facility to charge higher price and attracting more visitors would increase resorts revenue to support additional operating costs.

Next step could be to improve the model to get a better price prediction by sourcing and incorporating data for operating cost and visitor volume across the U.S. A cross functional team of business experts could be formed to try the model and test the business assumptions.