PRESENTED BY BRIAN INGRAM

ADDING VALUE TO BIG MOUNTAIN RESORT

BUSINESS PROBLEM

- **Big Mountain Resort wants to ADD VALUE to their resort by adding features to increase revenue that covers ~$1.54M cost of adding a new lift to improve accessibility throughout the resort.**
- **Data source – One csv file containing 330 resorts across the U.S. with 27 columns. Only cost data is ticket price.**
- **The first criteria for success - develop model that accurately predicts ticket price with the best features from data set.**
- **The second criteria for success - develop business strategy that ADDS VALUE to resort and either reduces cost or increases revenue to offset operating costs.**

KEY FINDINGS

Scenario 1 – Close up to 10 runs: Closing 3 runs is the same as closing 4 or 5 but closing six runs leads to a big drop in ticket price and revenue.

Scenario 2 – Add a run, increase vertical drop by 150 ft and add one chair lift: Increase in ticket price by $8.61 and increase in revenue of over $15 million.

Scenario 3 – Same as scenario 2 only adding 2 acres of snow making area. Increased ticket price by $9.90 and revenue by over $17 million

Scenario 4 – Increase of longest run by 1/5 of a mile and adding 4 acres of snow making area with no difference to ticket price.

WHAT IS OUR TARGET?

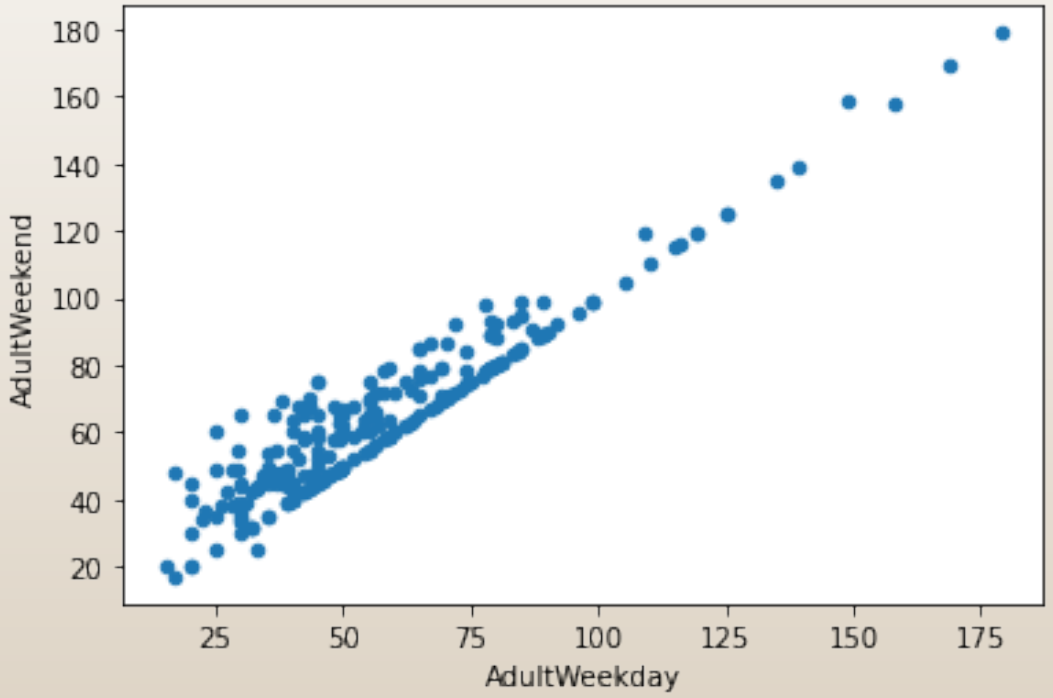
There are some resorts with higher weekend ticket prices but most of them are under $100 per ticket.

Pricing is equal in Montana.

Rows that had no pricing data at all were dropped (~14%).

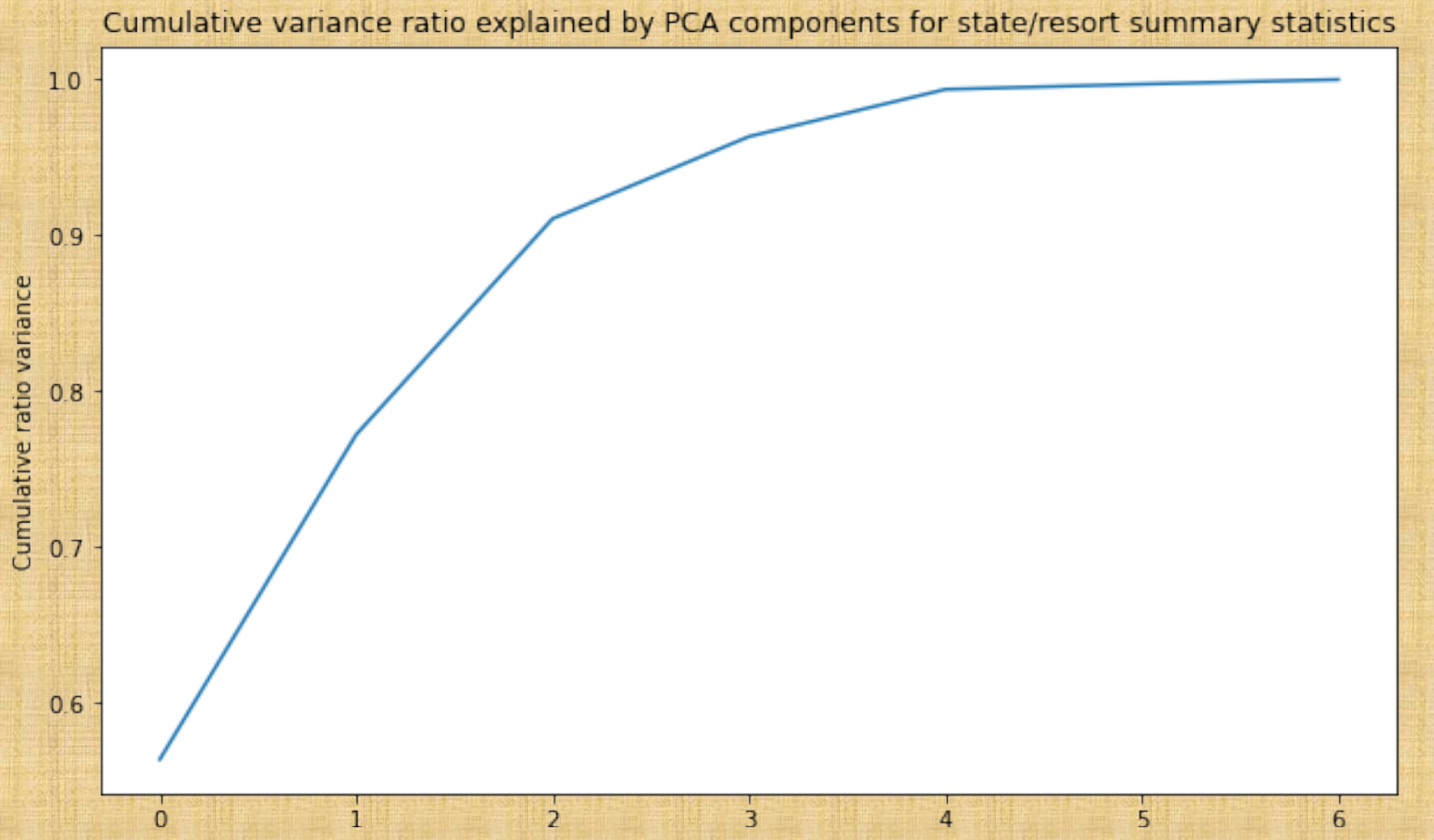
More missing values for weekday pricing.

Weekend pricing is our target variable.



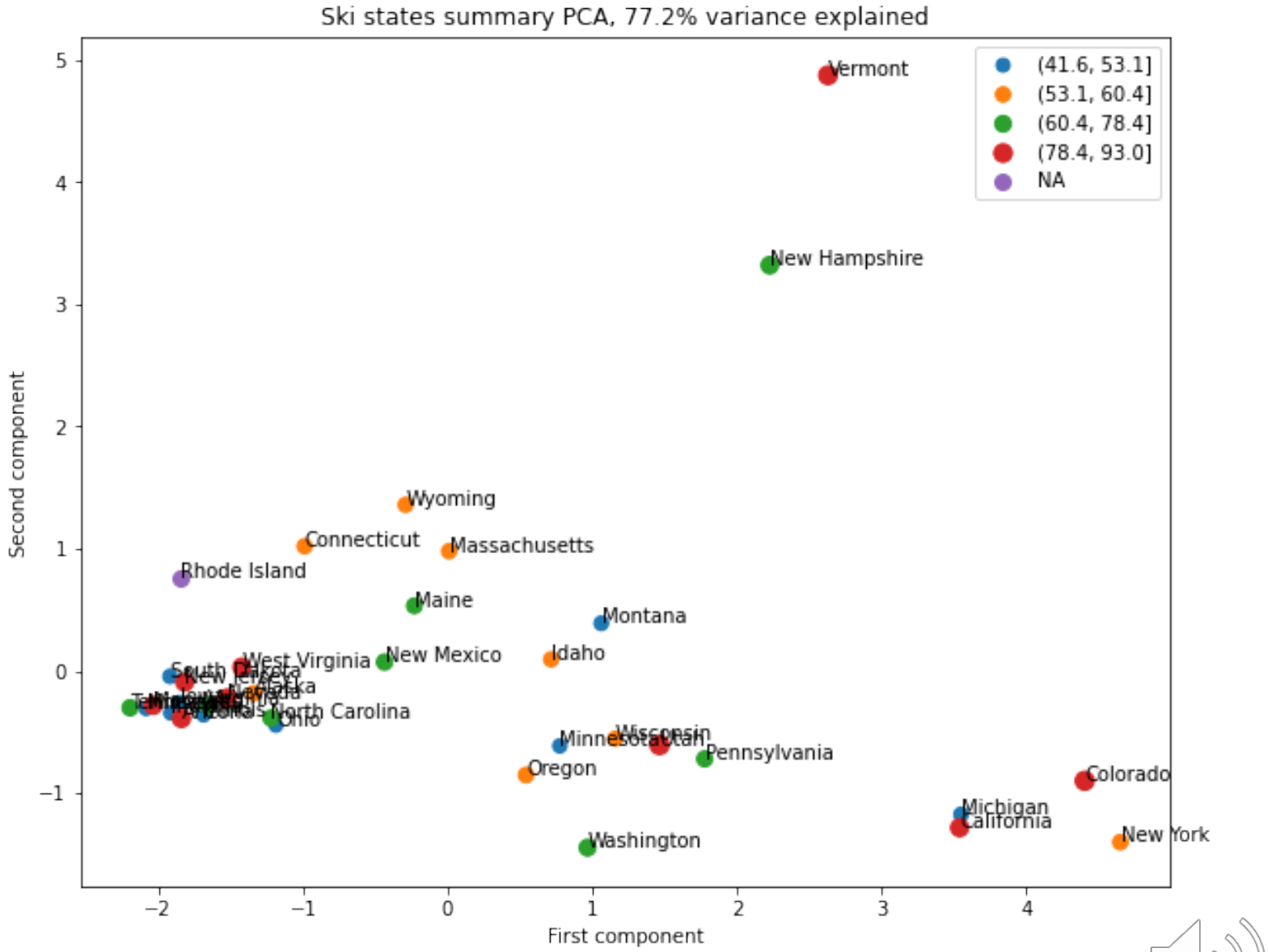
PRINCIPAL COMPONENT ANALYSIS(PCA)

- The first **two** components can explain about **75%** of the variance in the data.
- The first **four** components can explain about **95%** of the variance in the data.

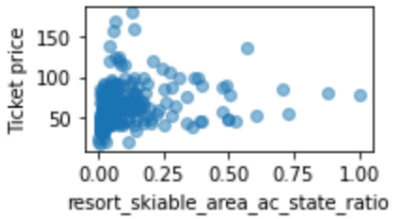


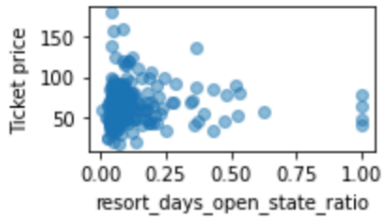
HOW DO WE TREAT STATE DATA?

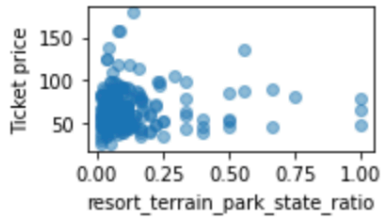
THIS GRAPH SHOWS THAT THERE IS NO REAL PATTERN FOR STATE AND TICKET PRICE.

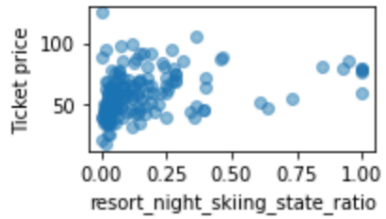


- Ratio of resort skiable area to total state skiable area
- Ratio of resort days open to total state days open
- Ratio of resort terrain park count to total state terrain park count.
- Ratio of resort night skiing area to the total state night skiing area

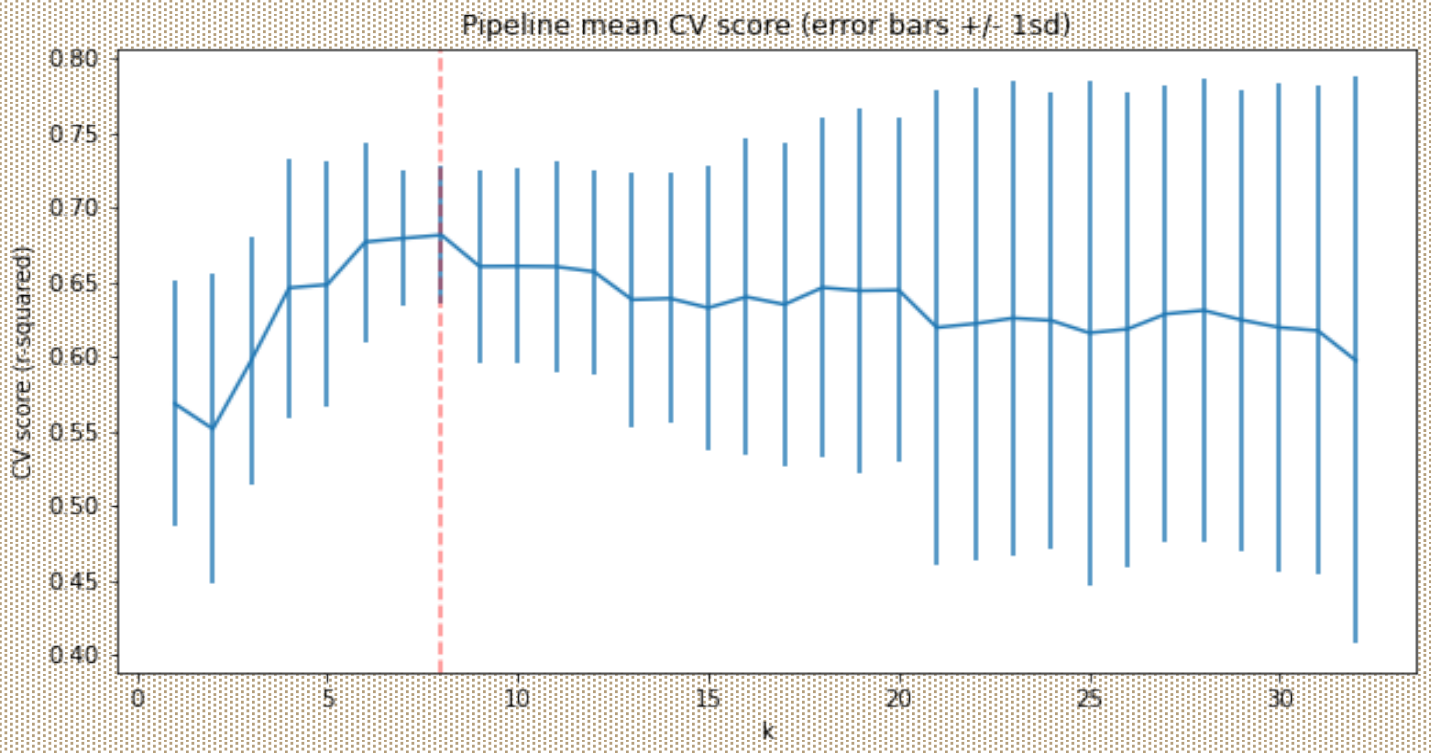








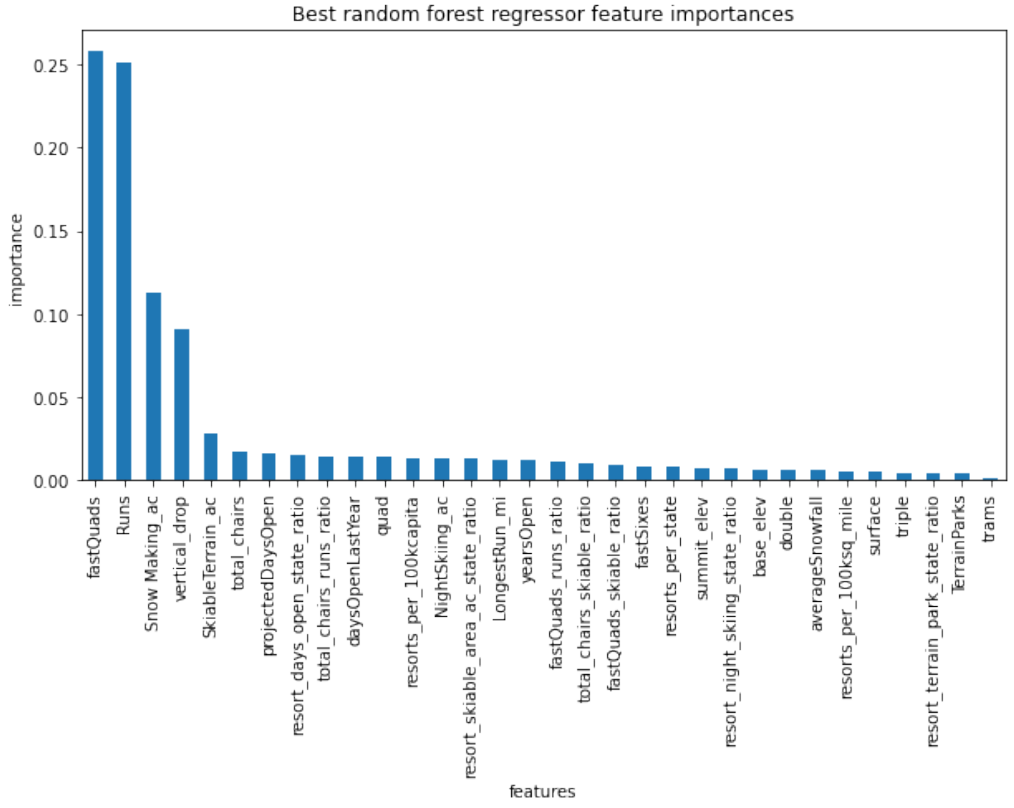
FEATURE ENGINEERING



- The training and test split is 70/30 (typical)
- Missing values are filled in with median
- Linear regression is used first and then a random forest model is used.
- R-squared of 0.818 and 0.72 on training and test sets, respectively.
- Mean absolute error is about $9.00
- Grid search cross validation shows there are 8 best features (k = 8).

MODEL CREATION

WHAT ARE THE 8 BEST FEATURES?



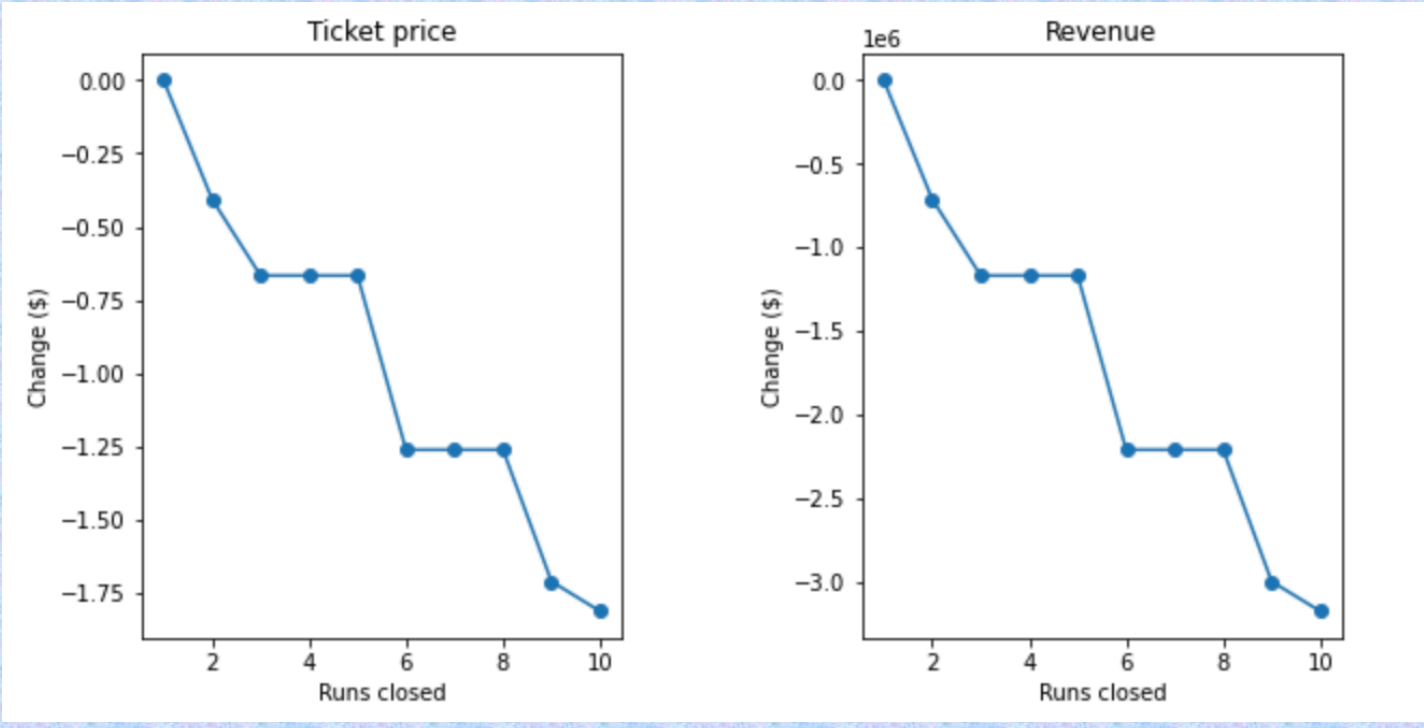

```
Out[92]: vertical_drop          10.767857
         Snow Making_ac          6.290074
         total_chairs            5.794156
         fastQuads               5.745626
         Runs                    5.370555
         LongestRun_mi           0.181814
         trams                  -4.142024
         SkiableTerrain_ac      -5.249780
         dtype: float64
```

WHERE DOES BIG MOUNTAIN LIE?

- Big Mountain is already the highest priced resort in Montana and is near the 75th percentile for all resorts in the United States.
- Big Mountain is doing well for vertical drop, but there are still quite a few resorts with a greater drop.
- Big Mountain is very high up the league table of snow making area.
- Big Mountain is among the highest number of total chairs, resorts with more could be outliers.
- Most resorts have no fast quads. Big Mountain has 3, which puts it high up the league table.
- Big Mountain has several total runs although there are some with more but not many.
- Big Mountain has one of the largest runs, but it is just over half of the longest run. The longer runs are rare.
- Most resorts have no trams like Big Mountain.

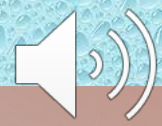
SCENARIO 1 – CLOSE UP T0 10 OF THE LEAST USED RUNS

- **Closing 3 runs is the same as closing 4 or 5 but closing six runs leads to a big drop in ticket price and revenue.**



THE REMAINING SCENARIOS

- Scenario 2 – Big Mountain Resort adds a new run, increases the vertical drop by 150 feet and installs additional chair lift. This scenario leads to an increase in ticket price by $8.61 and leads to $15,065,471 in additional revenue!
- Scenario 3 – Same as scenario 2 only adding 2 acres of snow making area. This scenario leads to an increase in ticket price by $9.90 and leads to $17,322,717 in additional revenue.
- Scenario 4 – This scenario calls for an increase of the longest run by 1/5 of a mile and adds 4 acres of snow making capability. This scenario showed no difference as the longest run does not influence this model significantly.



CONCLUSION

- Increased operating costs of adding the additional chair is only $1,540,000 which is small.
- Adding an additional fast four-person chair leads to an increase in ticket price by $28.19 and leads to $49,329,964 in additional revenue!
- The business has flexibility deciding on how to develop Big Mountain Resort.
- Hyperparameter tuning may lead to an even more accurate model for ticket pricing.
- More information on operating costs of the resort is needed.
- A market survey may be beneficial to gage visitor response to increased pricing.