Big Mountain ski resort case study

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Overview:

- *Problem identification*
- Recommendation and key findings
- Modeling results and analysis
- Evaluation/Conclusion(s)

Problem identification:

What is the problem?

- How can the Big Mountain Resort obtain higher annual resort revenue from ski resort customers through either more attractive ski resort facility equipment investments, or by either cutting operational costs in areas where the resort is overspending?

Scope of the solution:

- It is smart to focus on reducing the big mountain ski resort's operational costs through reduced facility attractions
- Increasing the price of the ski resort's ticket would be a plausible way to augment revenue

Key stakeholders:

- Director of Operations, Jimmy Blackburn
- Database Manager, Alesha Eisen

Problem identification:

Problem constraints:

- The key dataset given to us, does not have any associated quantifiable operational costs for the big mountain resort amenities, this makes it hard to reduce operational costs with resort attractions

Data source(s):

- A single CSV file, which contains ski resort data obtained from the database manager

Recommendation and key findings

- One way to increase the big mountain ski resort revenue would be to increase the target variable, *AdultWeekend* ticket's price category by $1.99
- The ticket price increase stems from adding 1 additional run, an extra 150ft of vertical drop, and 1 additional chair lift to the ski resort's amenities

Modeling results and analysis

For our modelling step:

- Two models were explored and tested on the cleaned and pre-processed ski_data dataset.
- The models considered were a simple *linear regression* and a *random forrest regressor*
- Each model had several features that influenced the problem's target variable (*AdultWeekend price*)
- For the linear regression model, the key features were: *vertical_drop, Snow Making_ac, total_chairs, and fastQuads*
- For the random forrest model, the key features were: *fastQuads, Runs, Snow Making_ac, and vertical_drop*
- For each model, a pipeline with simple imputation and data scaling were defined to make scripting workflows easier to follow
- A five-fold cross validation step was performed for each model to test model performances

Modeling results and analysis

- For each model, the metric for evaluating model performance was the mean absolute error (mae) score.
- The random forrest model saw a lower value for the mae score (9.53 vs. 11.79 for the linear regression) in a five-fold cross validation, which relates to the model being better at predicting the AdultWeekend price
- The random forrest model predicts the ticket price to be $95.87, whereas the actual ticket price was $81.00

Summary and conclusion

Summary:

- Further investigation into different combinations of key features should be looked into to see if the ticket price can be increased even when operation costs from additional chair lifts are added to the resort, which will help in maximizing profit while not losing demand from reduced resort facility utilities.
- I also suggest additional columns for resort operational cost metric be added so the dollar-value for operational costs can be quantified accordingly

Conclusion:

- Assuming that the big mountain resort witnesses 350,000 visitors and that each visitor buys at least five day tickets, it can be concluded within our modelling step that the resort should expect an AdultWeekendprice increase of $1.99.
- The ticket price increase will lead the resort to obtain approximately $3,500,000 in revenue