Finding Potential Customers to advertise Carribean Holiday Tour

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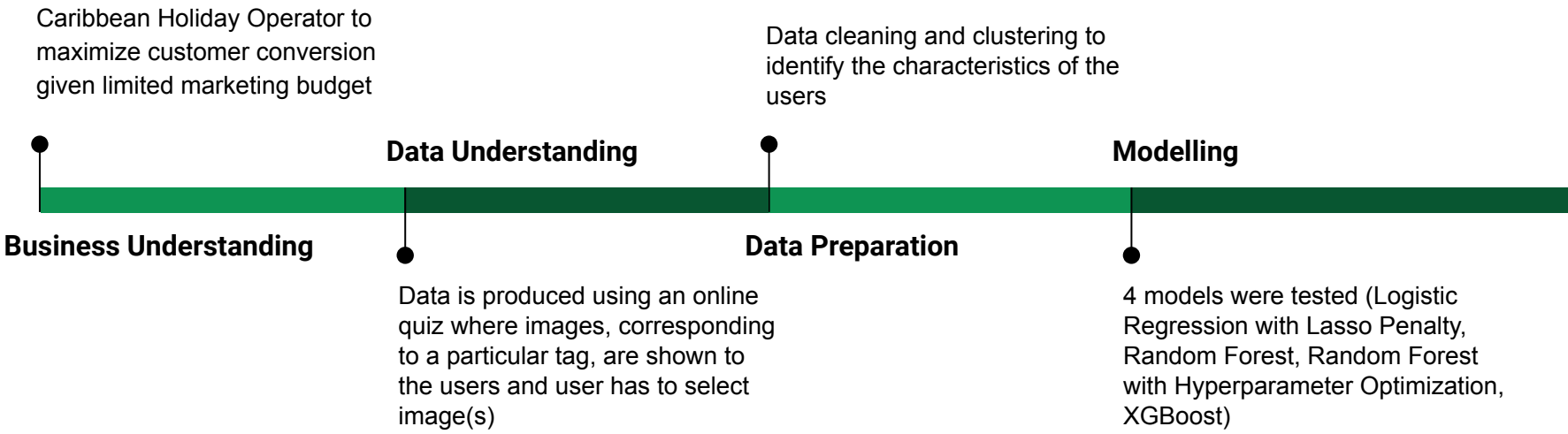
The challenge

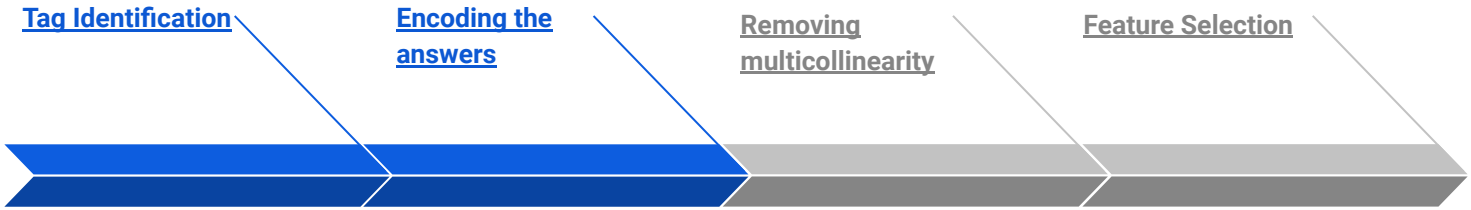
We are consultants hired by a Caribbean Holiday Operator to advertise their trips to potential customers online.

We have list of customers who have bought the tour from them in past. Now we have to predict which of the other users in the dataset are likely to be interested in their offers as well.

Methodology



Data Preparation



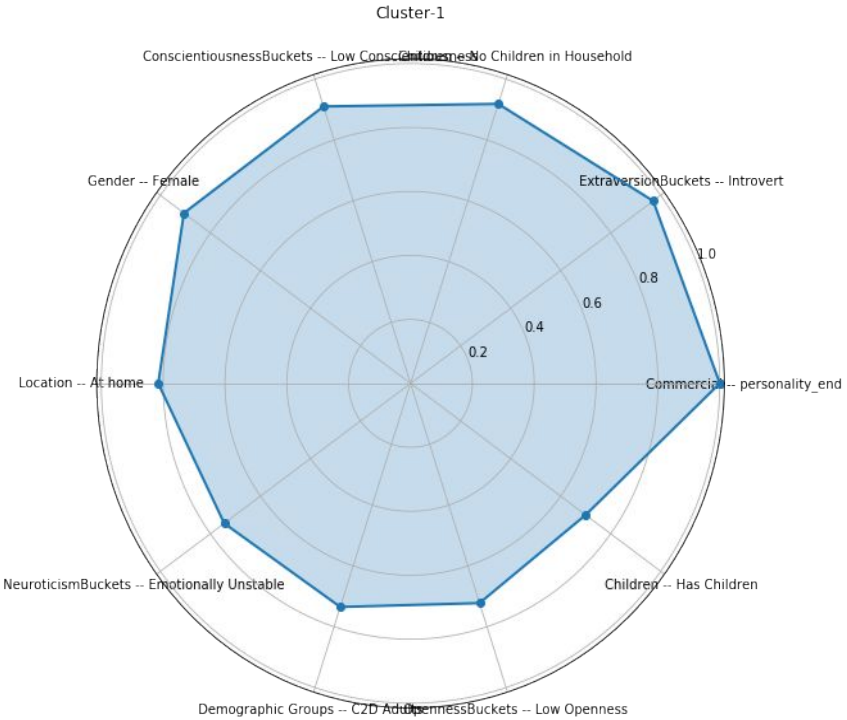
Identifying the columns where user was not shown the option.

Assigning 1 & -1 as per user response and 0 when user didn't have opportunity to respond

Removed the correlated columns with a Pearson correlation of more than 0.75

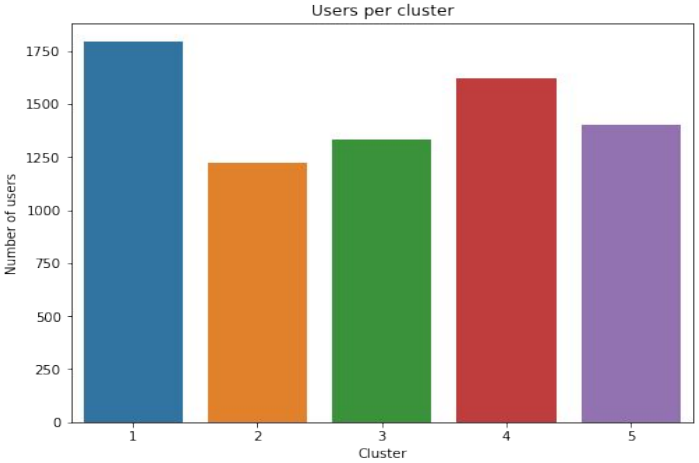
Removing the tags where option was not shown in more than 50 percent of cases

Clustering

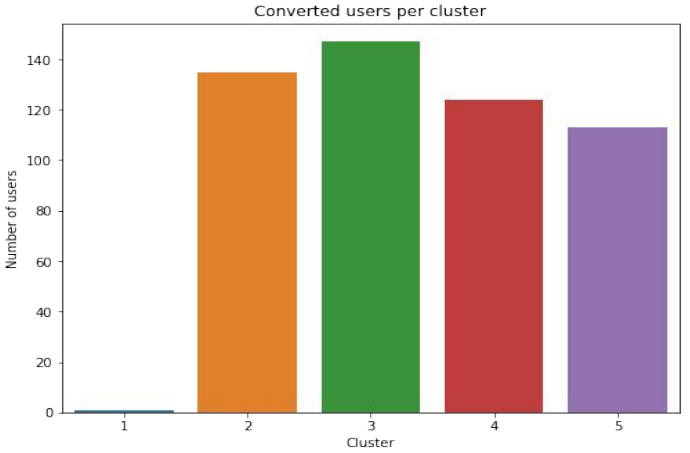


Top-10 user Characteristics in Cluster-1

Clustering for the entire user database



Clustering for the converted users



Modelling

	Accuracy	Precision	Recall	F-1 Score
Logistic Regression with GridsearchCV (Lasso Penalty)	0.98	0.92	0.98	0.95
Ensemble - Random Forest	0.94	0.92	0.79	0.85
Ensemble - Random Forest with Hyperparamter Optimization	0.98	0.92	0.98	0.95
Ensemble - XGBoost	0.98	0.92	0.97	0.94

1. Classification scoring metric including Accuracy, Recall, Precision and F1 scores were compared.
2. 'Recall' was prioritized over other metrics because logically speaking, the cost of False Negative outweighs False Positive, representing the loss of potential sale vs loss of marketing cost.
3. All the models (except Random Forest) have similar performance.
4. Logistic regression(with Lasso Regularization) is computationally cheap and would be using only 9 columns instead of 226. So, Logistic regression with Lasso Regularization is used to find the final probabilities for the users.

Results

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Best Penalty:  {'C': 0.05}
***RESULTS SUMMARY***
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Model: Logistic Regression with Lasso Penalty
Dataset: Validation Set
Target distribution:


Class: 0 / Count: 790 / Pct: 79.0
Class: 1 / Count: 210 / Pct: 21.0
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Metric Scores:

Accuracy score: 0.98
Recall score: 0.98
Precision score: 0.92
F1 score: 0.95
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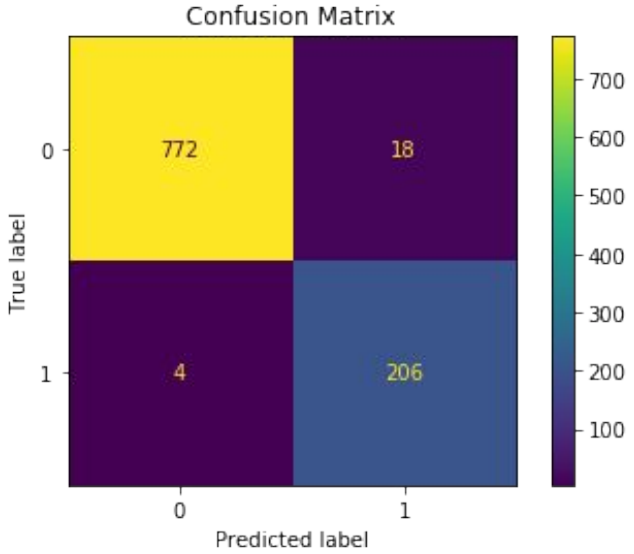

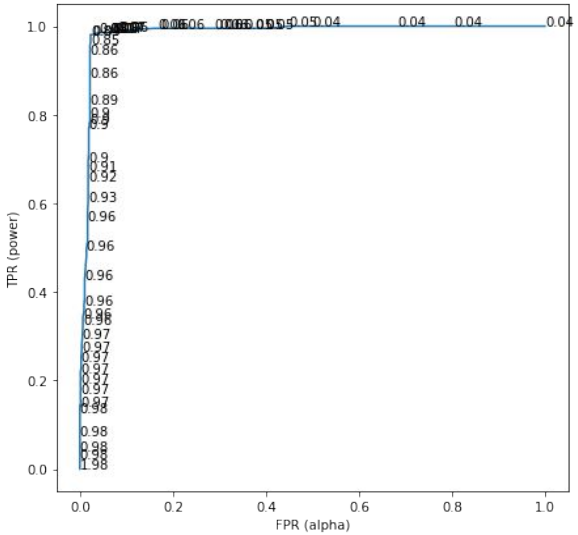

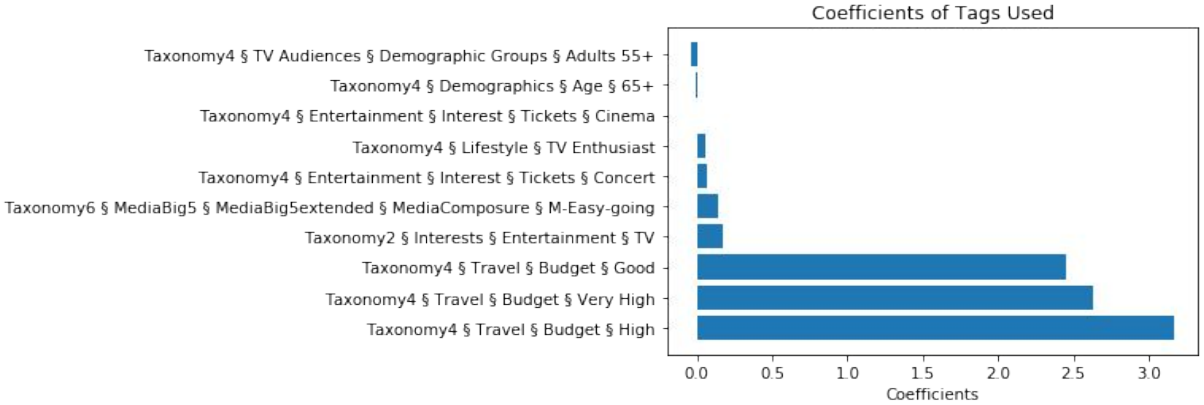

Q&A