Clustering and prediction modeling for customer engagement and activation

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ABSTRACT

Clustering in the timeshare industry is to understand the different segments of customers for a timeshare exchange platform. The aim of this study it to build a customer segmentation model which is scalable and feasible, a predictive model estimating likelihood of buying and suggest strategies leading to better conversion and greater revenues. This study will help identify the most active and dormant customers based on what value they bring to the company in terms of bookings. The aim is to find a similar group of customers who can be targeted with the right marketing content and use these groups for further recommendations of listed properties. Using data such as inventory, members, transactional etc., Various models have been applied, such as Logistic Regression, Random Forest and decision tree classifier with gradient boosting and neural networks to predict customer's travel preferences and likelihood of purchase, the RFM and K-means clustering will be helpful in grouping members with similar behaviour so that businesses can target them together.

INTRODUCTION

A timeshare exchange platform offers owners of these timeshares an opportunity to swap their bookings for new travel experiences and are critical to the industry's success. The success of a business is determined by the quality of its products and the loyalty of its customers. It is important to identify loyal and dormant customers for a business. This helps provide suitable suggestions to those who are more likely to respond to specific marketing campaigns and product offerings, thus avoiding cash drains.

Clustering is an effective and widely used strategy for market segmentation in market research, identifying targeted markets and customer segments. We tried answering some core questions through our analysis like:
- Which customer likely to purchase?
- How to activate dormant customers?

Fig 1. Customer Segmentation

LITERATURE REVIEW

Clustering is an effective and widely used strategy for market segmentation in market research, identifying targeted markets and customer segments. Clustering, one of the most important analytic approaches in data mining, can be used as a stand-alone tool to exhibit data distribution and examine cluster characteristics. In the context of clear organization strategies, business models, and targeted markets, customer segmentation refers to classifying consumers based on their value, desires, preferences, and other characteristics. Customers who belong to the same group share some traits, whereas customers in various subdivided groups have different qualities. A customer segmentation model is created by categorizing customers according to criteria based on segmentation parameters.

METHODOLOGY

The study aims to solve customer segmentation and predictive modelling problem for a timeshare exchange platform using certain python libraries, relevant models and visualization tools and making it a scalable and feasible solution that will lead to greater lead conversion and higher revenues. For this, the following approach was adopted:
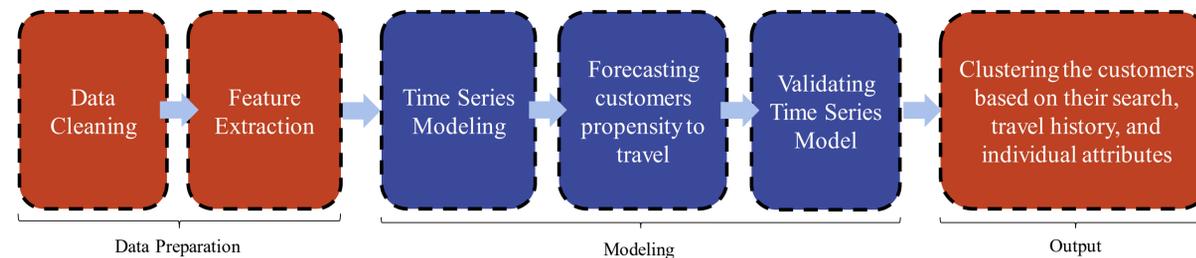

Fig 2. Methodology

STATISTICAL RESULTS

For the predictive modeling, we used three models and random forest model gave the best results with high ROC and AUC (Area Under the Curve). As the Random Forest classifier has provided better AUC, it was considered as the preferred model.
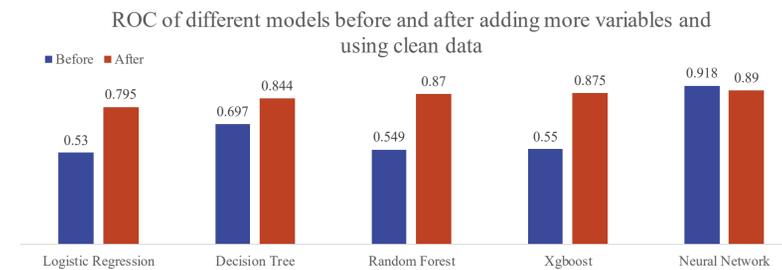

Fig 3. Performance of different models

One important feature that we used for clustering was the dormancy of the customer. For calculating the dormancy, we observed customers who have not purchased anything in the last 'x' months before 30th Sept 2019
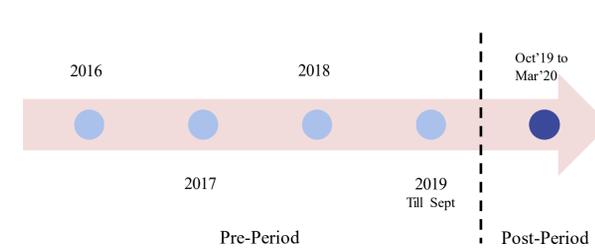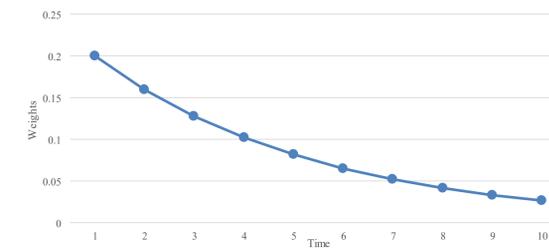

Fig 4. Time Period Selected

Fig 5. Weighted Search Score

We used the equation of Search Score = $\alpha * Search_t + \alpha(1-\alpha)(Searches)_{t-1} + \alpha(1-\alpha)^2(Searches)_{t-2}$ to calculate the weighted search scores for the customers.

We also calculated the transact score similarly to the search score using purchase data of the customer.

Then we formed clusters on the basis of the search score and transact score like high Searchers and low transactors became the customers of interest as they had the highest propensity to purchase on the platform. Then we suggested different type of promotion for clusters with high search score but low transact score and so on.

		Search Score	Transact Score
28%	Last 6 months	34	24
21%	6 – 12 months	24	5
29%	12-24 months	8	0.8
17%	More than 24 months	5	~0

Fig 6. Transaction and Search Scores

EXPECTED BUSINESS IMPACT

- Assuming the CTA is $1, By sending out mails to target audience for that particular quarter, we can reduce the CTA to $0.7
- By sending out the marketing emails to the right target audience, we can get more bookings from members
- There is more likeliness of unpaid members to become paid members to get hands on the best listings and hence generate more revenue
- If a member has purchased in the past 12 months, there is a greater possibility for him to deposit/purchase in the next six months and hence, serving any promotional offers could convert that lead. If there is an offer on any resort, priority is given to those with gold membership for first 15 days. There is a likelihood of increase in paid customers with this advantage.
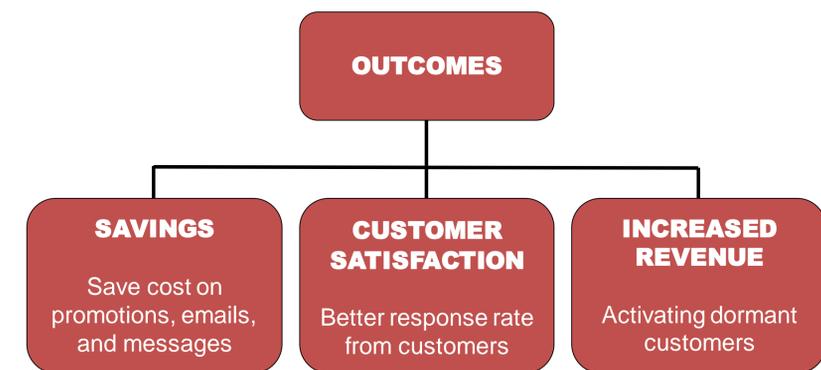

Fig 7. Outcomes

CONCLUSIONS

- The first suggestion to the client was to reach out to the members with high propensity to purchase for better conversion ratios that will lead to cost savings and greater revenues.
- With the help of cluster analysis and precision marketing (a method to customize content based on the audience persona and use data driven techniques to serve the right content to the right audience at the right time.) we can have successful marketing campaigns.
- This model is feasible and scalable to be applied in the future for the company as well.
- Lastly better customer engagement will lead to better business for the client.

ACKNOWLEDGEMENTS