Market Optimization using Propensity Models

Executive summary

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Summary

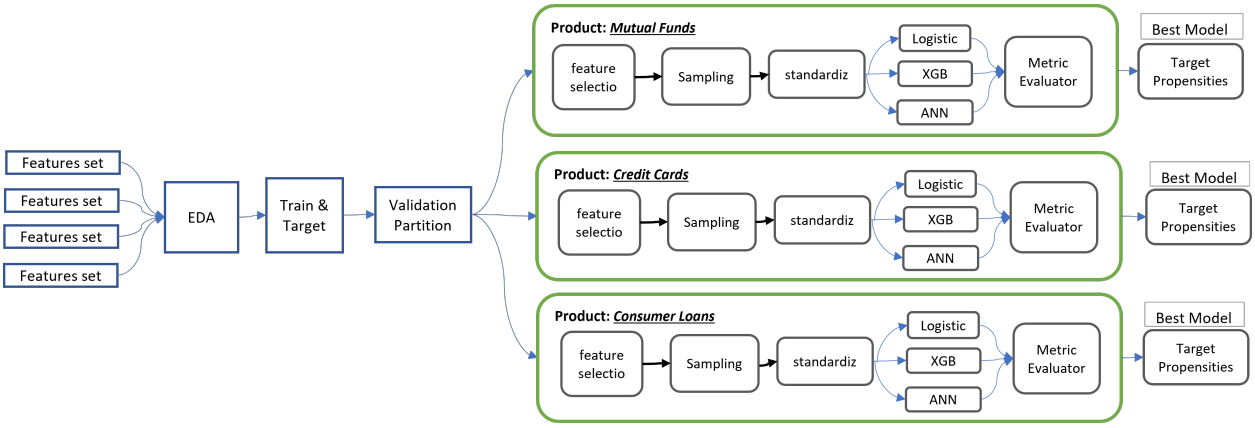
Identifying the potential customers accurately is the backbone of successful marketing campaign. The campaigns are optimized by reducing the investment cost and increases the effectiveness by focusing on right set of clients. In this analysis, highly potential customers for three types of products are identified by propensity models. The expected revenue from the future highly potential clients for these products are estimated from the existing revenue data. Finally , we get a set of propensities for the each client towards the product and their expected revenue. This estimated expected revenue can help in planning the budget for the marketing campaigns and also tells which type of customers to focus on.

Challenges

Product Sales data is always complex in patterns when it come to propensity modelling. Because, lack of enough data for one class of labels makes it difficult to the model to identify the unique pattern of minority class. Where as the majority class tries to influence the model largely to over-fit with majority class. Some times balancing techniques will not provide a good solution, at that situation we go with the trade-of between the precision and recall. The other main challenge is that there are high number of dimensional features to analyse. The makes the linear algorithms useless. Out of these challenges, creating train-ready data-set involves in many problems with finding outliers in the high dimensional setting and dealing with features with many observations being null.

Goal and Strategy

The main objective is to find a way using data to achieve a maximum profit by offering *n(3)* different products to *m (15%)* customers while taking into account of all the above challenges. Highly recommended stategy is to first identify the type of clients who will not buy at least one product and set them out of the further analysis. Because, these type of customers create the ambiguity in the modelling, meaning, the behavioral pattern for buying a product in the data will fade out with the presence of these customers. Then individual set of propensity models are made for each product and also multi-label propensity model for whole products. Cost sensitive learning is applied to all the models. The weights are calculated from the label proportions and the fed into the model. The cost function at every epoch tries to give more weights to the misclassification of minor classes. There by giving more weights to their backpropogation weights adjustments. Three types of algorithms are used from different families, Linear, Trees(Non-linear), Neural Networks. It is assumed that models from same family have similar properties. The expected revenue data is not associated with any of the available features. Hence, the Expected revenue is computed from the identified potential customers by average costs and revenue (Heuristic) approach from the research Optimization models for targeted offers in direct marketing: Exact and heuristic algorithms.



Future Considerations

The accuracy of the propensity models can be still improved by adjusting the threshold(confidence p) for the class probabilities, changing something above or below 0.5 based on the business goal for marketing. Collecting more data of the minor class labels can make them even more accurate and stable. Ensemble methods can be applied on the built models to get perfect combination of Precision and Recall.