

Predict Product Recommendations for Next Best Offers

Degree programme : MAS Data Science

Build on and extend existing customer relationships is increasingly important for companies in the financial service sector. But cross-selling as a strategic direction causes additional workload for client advisers. Multi-label classification or recommender system algorithms are able to provide reliable cross-selling recommendations, allowing client advisers performing their advisory function. This data-driven decision support for advisers is the focus of this thesis.

Introduction

Competitive conditions in the financial service sector are putting financial institutions to the test. It is especially important for them to proactively find new ways to realise profits and simultaneously ensure customer satisfaction. A cost effective way to increase revenue is cross-selling. Cross-selling is preferable due to its lower costs compared to gaining new customers in saturated markets. To decide, which customers to contact on what matter, companies have started to use machine learning algorithms. Automating the detection of potential cross-selling opportunities reduces the workload of client advisers and allows them to dedicate their time to advise customers.

Goal

In this paper, we consider a decision situation that was requested by a Swiss financial intermediary. The intermediary aims to provide customer advisers with personalised and automatically generated product recommendations for their customers.

Literature

Previous research concerning cross-selling in the financial service sector has evaluated either multi-label classification or recommender systems in isolation. Bogaert et al. (2019) are the first authors who compared those two categories. Hence, the generalisability of their results is to be verified.

Methodology

We respond to this request by predicting product affinities using algorithms belonging to the categories multi-label classification and recommender systems. Throughout this paper, we compare these algorithms. The underlying data is provided by the financial intermediary and consists of information about customers and product ownership and usage.

Results

The best-performing algorithm is a random forest in combination with the binary relevance method. In comparison, the best-performing recommender system algorithm, item-based collaborative filtering, performs significantly worse. Considering the systematically lower results of recommender system algorithms and the differing calculation of performance measures compared to multi-label classification algorithms, we question the direct comparability of the two categories.

Outlook

For further investigations, we propose two approaches to improve our research. On the one hand, there is room for better data. The sparsity problem is not entirely solved by simply excluding the sparsest products and should be addressed with adequate methods treating imbalanced data, e.g. sampling. On the other hand, we suggest including more complex multi-label classification and recommender system algorithms. An alternative to the here applied multi-label classification algorithms could be a hierarchical multi-label classification algorithm, also taking into consideration the categories the products belong.

Bibliography

Bogaert, M., Lootens, J., Van den Poel, D. & Ballings, M. (2019), 'Evaluating multi-label classifiers and recommender systems in the financial service sector', European Journal of Operational Research 279(2), 620 – 634.



André Bodmer