Cosmetic Product Recommendation Engine

F. Antonazzo[1], E. Brocchieri[2,3], R. Di Dio[4], D. Mastropietro[5,6]

Abstract

In e-commerce marketing, product recommendations are useful to increase sales volumes. Machine learning procedures are able to leverage the customers' purchase history in order to propose sensible product recommendations that target different customer segments. These predictive methods are known as collaborative recommendation engines, as they do not take into account customer and product characteristics but only their mutual interactions, providing a sense of informative collaboration among customers. Prominent examples are collaborative filtering, which is based on matrix factorization, and k-nearest neighbors. In this work, we propose to boost their predictive power by using information about each customer's browsing history, in addition to their purchase history. We adapt collaborative filtering and k-nearest neighbors to take both aspects of the customer's history into account, and we suggest methodological approaches that are able to account for the temporal dependence of browsing events, such as recurrent neural networks, factorization machines, and reinforcement learning.

References

[1] S. Rendle, "Factorization Machines", *2010 IEEE International Conference on Data Mining*, 2010, pp. 995-1000, doi: 10.1109/ICDM.2010.127.

[2] M.M. Afsar, T. Crump, and B. Far, "Reinforcement learning based recommender systems: A survey.", *2021 arXiv preprint arXiv:2101.06286*.

[1]*Inria, CNRS, Laboratoire de mathématiques Painlevé, Université de Lille, Villeneuve d'Ascq, 59650, France (filippo.antonazzo@inria.fr)*

[2] *Laboratoire de Mathématiques et Modélisation d'Evry, Paris-Saclay, CNRS, 23 Bd. de France, Evry, France (elisabetta.brocchieri@univ-evry.fr)*

[3] *Dipartimento di Matematica, Sapienza, Università di Roma, Piazzale Aldo Moro 5, 00185 Roma, Italy*

[4] *Inria, Sophia Antipolis, Université de côte d'Azur (riccardo.di_dio@univ-cotedazur.fr)*

[5]*CNRS, IRIT, 31071 Toulouse, France*

[6]*Université de Toulouse, INP, 31071 Toulouse, France (mastropi@uwalumni.com)*