

Collaborative filtering method and its application in online sales recommendation systems

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Abstract: This study investigates collaborative filtering methods and their application in online sales recommendation systems. Collaborative filtering, a widely adopted technique in recommender systems, leverages user behavior data—such as purchase history and ratings—to predict preferences and generate personalized product suggestions. The research systematically analyzes key collaborative filtering approaches, including user-based and item-based algorithms, and evaluates their effectiveness in addressing common challenges such as data sparsity, cold-start problems, and scalability. Through experimental implementation on real-world e-commerce datasets, the study compares the performance of these methods in terms of prediction accuracy and computational efficiency. The findings demonstrate that item-based collaborative filtering offers superior performance in stable environments with sufficient historical data, while hybrid approaches combining collaborative filtering with content-based techniques mitigate cold-start limitations. This work contributes to optimizing recommendation quality for online retail platforms, ultimately enhancing user experience and increasing sales conversion rates. The results provide practical insights for deploying effective recommendation engines in dynamic e-commerce contexts.

Keywords: Collaborative filtering, Recommender system, Online sales, E-commerce