

BDARec: Balancing Diversity and Accuracy of Recommendation Model with Graph Neural Networks

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Abstract

Based on research in cognitive psychology, humans typically seek a balance between their preference for familiar things and the exploration of new ones during decision-making. Therefore, studying the relationship between accuracy and diversity in recommendation systems is particularly meaningful. In recent years, recommendation systems based on Graph Neural Networks (GNNs) have garnered significant attention for enhancing recommendation accuracy or diversity. However, existing works often improve accuracy or diversity at the expense of the other aspect, which is inconsistent with the complex needs of users. In this paper, we propose a novel Recommendation model that Balances Diversity and Accuracy with GNNs, called BDARec. Firstly, BDARec proposes a balanced neighborhood aggregation strategy to select diverse and accurate neighbor nodes for updating node embeddings in user-item bipartite heterogeneous graph. Secondly, to accelerate the convergence of BDARec, an enhanced category-boosted negative sampling strategy is proposed to select negative samples from the same category positive samples with a certain probability. Thirdly, we put forward a dynamic feature for each item to measure the importance of items in training phase. Finally, we conduct extensive experiments on three real-world datasets. Experimental results show that our model can even improve recall by 22.04%, hit_ratio by 16.46%, and coverage by 10.27% when compared to the state-of-the-art comparison algorithm, which verifies that the proposed model can achieve the best balance between diversity and accuracy.