

## Unlocking the Future of Grocery Shopping: Graph Neural Network-Based Cold Start Item Recommendations with Reverse Next Item Period Recommendation (RNPR)

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**Abstract :** Recommender systems play a crucial role in connecting individuals with the items they require, as is particularly evident in the rapid growth of online grocery shopping platforms. These systems predominantly rely on user-centered recommendations, where items are suggested based on individual preferences, garnering considerable attention and adoption. However, our focus lies on the item-centered recommendation task within the grocery shopping context. In the reverse next item period recommendation (RNPR) task, we are presented with a specific item and challenged to identify potential users who are likely to consume it in the upcoming period. Despite the ever-expanding inventory of products on online grocery platforms, the cold start item problem persists, posing a substantial hurdle in delivering personalized and accurate recommendations for new or niche grocery items. To address this challenge, we propose a Graph Neural Network (GNN)-based approach. By capitalizing on the inherent relationships among grocery items and leveraging users' historical interactions, our model aims to provide reliable and context-aware recommendations for cold-start items. This integration of GNN technology holds the promise of enhancing recommendation accuracy and catering to users' individual preferences. This research contributes to the advancement of personalized recommendations in the online grocery shopping domain. By harnessing the potential of GNNs and exploring item-centered recommendation strategies, we aim to improve the overall shopping experience and satisfaction of users on these platforms.

**Keywords :** recommender systems, cold start item recommendations, online grocery shopping platforms, graph neural networks

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