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Diversity Optimization for Recommendation Using Improved Cover Tree

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Abstract

Recently, diversity optimization has played an increasingly important role in recommender systems to improve user satisfaction, and it has attracted more attention in the research community. In this paper, we propose a novel diversity-optimization method based on a time-sensitive semantic cover tree (T2SCT). Specifically, we first define T2SCT and its construction algorithm. Based on T2SCT, we present details of the diversified item-selection algorithm and two supplement algorithms to obtain a complete diversified item list. Then, we give a theoretical analysis to prove the correctness of the proposed method. In general, the proposed method can make diverse recommendations with very little compromise on accuracy. Moreover, the proposed method converges quickly and exhibits good item novelty, owing to the inherent superiority of T2SCT. We conduct extensive experiments on a real-world dataset to verify the performance of our method. Results illustrate that the method is effective and efficient, outperforming other conventional approaches.

Keywords: Recommender Systems, Diversity, Optimization, Novelty

1. Introduction

Recommender systems [1] are used to filter out redundant or undesired items (e.g., movies, books, apps) and handle the information overload problem in many online applications [2]. Unlike the representative information

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