INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY HYDERABAD

R&D SHOWCASE 2021
Technology, Social Impact

A Revenue-based Product Placement Framework to Improve Diversity in Retail Businesses

Objective

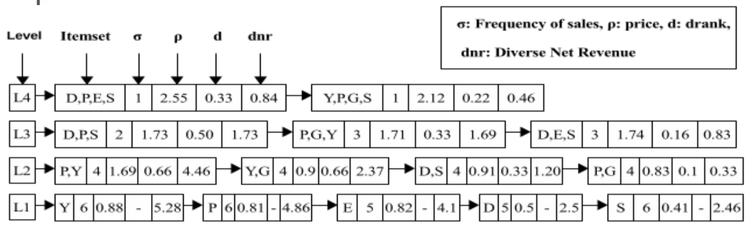
To design a framework for extracting diverse itemsets from a transactional database and placing those itemsets in given slots to increase the revenue and improve diversity in retail store.

Introduction

Product placement in retail stores has a significant impact on the revenue of the retailer. Earlier works have explored use of high-utility patterns, extracted from log of user transactions, while placing itemsets. Another approach could be to provide a wider range of options to the user. In this work, we provide an approach which leverages both high-utility and diversity to get the best of both worlds.

Methodology

Building of the CDRI index: Each level of the CDRI corresponds to a hash bucket. The data is stored as a linked list of nodes at each level. The node is a data structure having required information for an itemset. Each node in the -linked list at the k th level contains a record consisting of the following fields: <itemset, σ, ρ, DRank, dnr>. Here, ρ is the price of the given itemset itemset, σ is the frequency of sales of the itemset. Here, dnr = DRank × σ × ρ.



The **Diverse Net Revenue** of each itemset in given transaction T i.e., dnr = DRank × σ × ρ

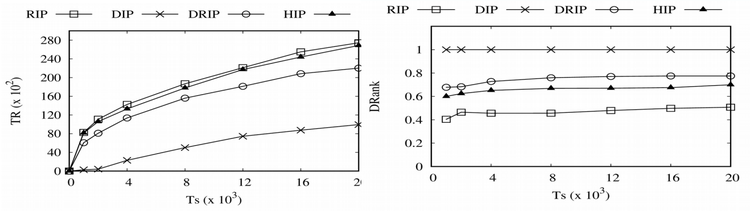
Proposed Approach

The approach consists of two steps.
i) Build a CDRI index from the dataset
ii) Use the CDRI index to place itemsets of size > 1 until all the slots are filled.

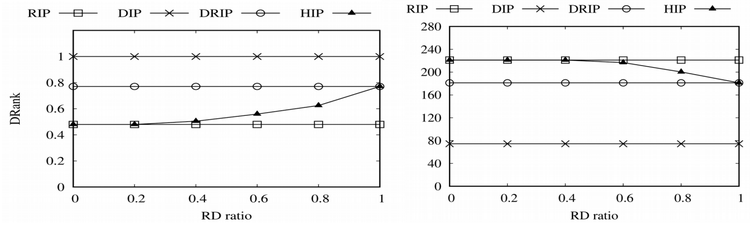
Dataset

We have used *Instacart Market Basket Analysis* dataset for the experiments.

Performance Evaluation



Effect of Variations in Number of Slots



Effect of Variations in RD_ratio

As can be observed, combining both diversity based and revenue based approach gives high retailer revenue plus high diversity.

Publication

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