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IJIEMR Transactions, online available on 7th Mar 2018. Link
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Volume 08, Issue 03, Pages: 93–95.

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# A NEW PRICE PROMOTION BY USING OPTIMAL SKYLINE PRODUCT COMBINATIONS

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**Abstract:**

Nowadays, with the development of e-commerce, a growing number of customers choose to go shopping online. To find out attractive products from online shopping marketplaces, the skyline query is a useful tool which offers more interesting and preferable choices for customers. The skyline query and its variants have been extensively investigated. However, to the best of our knowledge, they have not taken into account the requirements of customers in certain practical application scenarios. Recently, online shopping marketplaces usually hold some price promotion campaigns to attract customers and increase their purchase intention. Considering the requirements of customers in this practical application scenario, we are concerned about product selection under price promotion. We formulate a constrained optimal product combination (COPC) problem. It aims to find out the skyline product combinations which both meet a customer's willingness to pay and bring the maximum discount rate. The COPC problem is significant to offer powerful decision support for customers under price promotion, which is certified by a customer study. To process the COPC problem effectively, we first propose a two list exact (TLE) algorithm. The COPC problem is proven to be NP-hard, and the TLE algorithm is not scalable because it needs to process an exponential number of product combinations. Additionally, we design a lower bound approximate (LBA) algorithm that has guarantee about the accuracy of the results and an incremental greedy (IG) algorithm that has good performance. The experiment results demonstrate the efficiency and effectiveness of our proposed algorithms.

## Existing System:

The present price promotion campaigns can be classified into two categories due to whether products can be chosen independently. The first category, namely, independent product selection, includes the campaigns such as "buy one product and get another product for free" and "25% discount for two pics" etc. Under these campaigns, customers can pick out the products meeting their demands independently and directly, and skyline queries could offer powerful decision support. The second category, namely, dependent product selection, consists of the campaigns such as "get $60 off every $200 purchase" and "$100 coupon every $500 purchase" etc.

**Disadvantages:**

Under these campaigns, customers can pick out the products meeting their demands independently and directly.

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**Proposed system:**

In these scenarios, customers always expect to select products which are attractive and bring the greatest benefit. Moreover, it needs to take into consideration the customer's willingness to pay which is an important issue that affects the customer's purchasing behavior. The skyline query is powerful to compute the skyline products that have a strong appeal to customers. However, it is inadequate to help customers select skyline product combinations with the greatest benefit. Considering the requirements of customers in this practical application scenario, we are concerned about a new problem of identifying optimal product combinations under price promotion campaigns. In this, we focus on the dependent-product selection campaigns that are much more popular but complicated with comparison to the independent-product selection campaigns.

**Advantage:**

This problem aims to find skyline product combinations which meet a customer's payment willingness and bring the maximum discount rate.

Skyline queries could offer powerful decision support

**Modules:**

**THE CONSTRAINED OPTIMAL PRODUCT COMBINATION (COPC) PROBLEM**

In the COPC problem, it needs to compute the skyline products by the skyline query which is a useful tool for decision support. The skyline query over all the attributes may give rise to loose some important product combinations.

**The Two List Exact problem**

Due to the COPC problem is closely related to the subset sum problem. Moreover, our COPC problem is much more complicated, and the approaches for the subset problem cannot be utilized to our problem directly. In this, we develop the two-list algorithm, which is a famous algorithm for the subset sum problem [24], [25], and

present a two list exact algorithm for the COPC problem.

**The Lower Bound Approximation**

Design a lower bound approximate algorithm for the COPC problem,The LBA algorithm first removes each product $p' \in SP$ whose actual payment is larger than $WTP$ (Line 1). Line 2 initializes a list $L$ with a set that contains an element "0". Thereafter, the list $L$ stores original prices of candidate skyline product combinations.

**CONCLUSION**

We formulate the COPC problem to retrieve optimal skyline product combinations that satisfy the customer's payment constraint and bring the maximum discount rate. To tackle the COPC problem, we propose an exact algorithm, design an approximate algorithm with an approximate bound, and develop an incremental greedy algorithm to boost the performance. We conduct a customer study to verify the significant of our COPC problem. Additionally, the experimental results on both real and synthetic datasets illustrate the effectiveness and efficiency of the proposed algorithms. This work opens to some promising

directions for future work. First, in addition to combinations of homogeneous products, we will focus on the COPC problem over products of different categories. After that, in reality, the customer's demands are diversification and individuation, and it is significant and interesting to compute optimal product combinations that meet different customer demands such as save or spend the most money under their budgets.

**References for the Project Development were taken from the following Books and Web Sites.**

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