

Addressing cold start problem through unfavorable reviews and specification of products in recommender system

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Abstract

Importance and usage of the recommender system increases with the increase of information. The accuracy of the system recommendation primarily depends on the data. There is a problem in recommender systems, known as cold start problem. The lack of data about new products and users causes the cold start problem, and the system will not be able to give correct recommendation. This paper deals with cold start problem by comparing product specification and the review of the resembled products. The user, who likes the resembled product of the new one has more probability of taking interest in the new product as well. However, if a user disagreed with resembled product due to some reasons which the user mentioned in the reviews. The new product overcomes that issue, so the user will greatly accept the new product. Therefore, the system needs to recommend new product to those users as well, in this way the cold start problem will get resolved.

1. Introduction

Internet users increase tremendously with the passage of time, it rises the online shopping and business. There are many recommender systems which recommend products to users interested to promote the business. Important benefits of recommender systems include personalization, up-to-date information and cross-selling. There are many techniques used in recommender systems to give recommendations such as collaborative approach, content based approach and many more [1]. In collaborative approach the system analyzes purchase of similar user while in content based approach item contents are taking into consideration.

Recommender system normally recommends products with high rating and frequently purchased history. Therefore, the system will not be able to recommend a product having low rating and low purchased history. It leads to major issue of recommender system known as 'cold start problem'. The system needs to promote new product with any rating and purchase history instead of ignoring it. If the system ignores or giving no priority to new product, then it will not get any rating or purchase history.

Various methods are adapted for addressing cold start problem, such as classification [11], clustering [1], association rules [2], hybrid [3][6][7] and many others [4] [9] [10]. One of the most commonly used methods includes similarity matching to find similar products with some rating and purchase history [5]. The users of that similar product will be targeted for the new product as well. Therefore, the system should recommend the new product to users of the similar product. Product similarity based on the product specification, manufacturing organization and other parameters.

In this paper, we target the interested users of the similar product and analyze the reviews of uninterested users of those products. Based on the reviews if a user is not interested in the matched product due to some undesirable reasons and those reasons have addressed in the new product then the system recommends the new product to that user. In this manner, the users of the new product increase and the product promotes easily.

In rest of the paper, section 2 describes related work, proposed methodology is discussed in section 3 and section 4 concludes the paper.

2. Related work

Silvana Aciar et al. [5] described the possible solutions to the cold start problem based on their specification. They determined similar products to the new product if similar products are popular in the market with high rating and users are taking interest in those products. Then the system considered the new product as a recommended product for those users interested in the similar products. In this way, the new product gets value in the market. Increases rating, and gets feedback from users.

Hridya Sobhanam et al. [1] combined two existing techniques to a hybrid one for handling the cold start problem. The identified and selected all the associated products using association rules technique, then found the similar products and user's profiles using clustering technique. Finally, they recommend the high ranked product in the selected cluster to the new user. Similarly, they promote new products by recommending to the user having interest in the similar products.

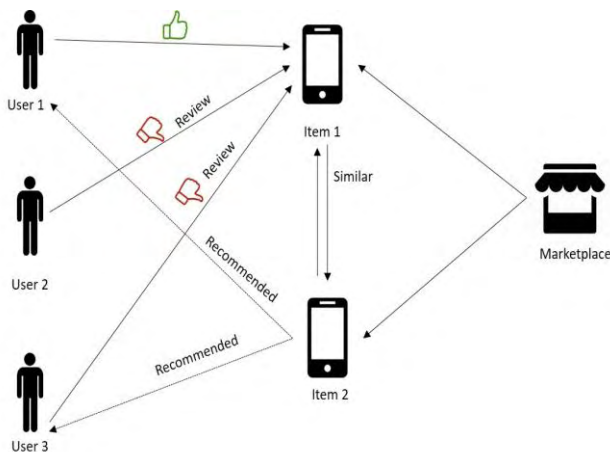
Sebastian Feil et al. [8] applied different approach to tackle the cold start problem. They use "Gamification concepts to engage the users. They invite users to give rating to the product and award them, therefore, more users get interest and engage in the game. In this way, the users get bonus points for rating and the product gets rating which leads to promotion of the product.

3. Proposed Methodology

Recommender systems recommend products based on ratings and user reviews. The new products lack ratings and reviews, and recommender system ignores and gives low priority against other products. However, we need to promote new product and recommender system should recommend those products to interested users. Finding interested users of the product is a major challenge. In this research, we handled

this problem by targeting two types of users, as shown in figure 1, which will most likely be showing their interest in the product.

Initially, we recommend the new product to those who are interested in similar products. We retrieve similar products by using specification based similarity matching algorithm to find the similar products. This algorithm takes product specification as an input, and after performing similarity computation, retrieves similar products. We fetch demographic information of the users which showed their interest in the retrieved similar products. Therefore, it's more likely that these users may also be interested in the new product and we select those users as initial target users, and recommend, the new product to them.



(Figure 1) Idea diagram of the proposed technique

On the other hand, some users, associated with similar products, which have lost their interest due to some limitations of those products mentioned in their reviews. Based on those mentioned reasons in reviews, we compare the causes with specification of new product. When the specification of the new product is same as other similar products and have some distinguish features to eliminate their shortcomings then the user has high possibility to get interest in the new product.

In this research, we increased the number of target users for recommendations, which helps the product to get value in the market. It also helps to receive ratings and reviews base on its performance and distinguished features.

4. Conclusion

Cold start problem is resolved by targeting more related users for a new product. In this research, we focus on two types of users for recommendations. The ones, who have interest in the products with similar specifications. Secondly, those don't have interest in similar product with some reasons which are addressed in the new product. In this approach, the new product promote in markets and cold start problem can be resolved.

Acknowledgment

This work (Grants No.C0395816) was supported by

Business for Cooperative R&D between Industry, Academy, and Research Institute funded Korea Small and Medium Business Administration in 2016.

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