

# A Systematic Approach to Reduce the Issuance in the E-Commerce Testimonial System

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**Abstract**— In the present day to day life, E-commerce has acquired the most important stretch. With the advancement of the internet and the shopping sites, it has become much harder for the consumers basically to discover the product they want. Even though the existing E-commerce site gives the recommendation only to the users who has the earlier purchasing history made by them, it faces challenges in providing the recommendation to the newly registered users with no transaction history. This paper mainly focuses on the three important works i.e. cold start problem, limited resource and data valid time. An algorithm is proposed in order to handle problems.

**Key words:** E-Commerce, Limited Resource, Cold Start, Recommendation

## I. INTRODUCTION

The emergence of the E-commerce has been one of the most remarkable developments in the Internet world in the recent couple of years. Online shopping has become trend nowadays and more users like shopping online rather than going out and buying products as it provides an easier and quicker way to purchase. As the users increased with the emergence of the internet, the E-commerce started facing challenges with the improvement of the application. This makes complexity for the customers to find the products they are searching for [1].

As the people turned towards shopping online, more and more E-commerce sites started emerging which increased competition in business. The E-commerce sites frequently come up with updation of an application to retain its trusted customers. Due to the above reason, recommendation feature is added in the shopping site [2].

The recommendation of the product is given to the customer if he/she has a transaction of the product. This transaction is recorded and a particular profile is assembled. Based upon this collected information in the database, the system gives the recommendation prognosticating how the user might want.

The three important works which are considered in the paper are discussed below.

- 1) The product with minimum quantity must be favored with need in which customers can purchase with delight.
- 2) The transactions made by the user long back are not considered since it is referred to as erroneous information.
- 3) The newly registered customers must be provided with the recommendation.

The market value of the E-commerce sites increases with the increased number of users when an application is provided with the recommendation of the products [3].

## II. PROPOSED SYSTEM

### A. Recommendation Process

To find the recommendation of the products from the corresponding neighbors, the proposed system makes use of collaborative filtering with the following steps.

- 1) The representation of user information: The registered customers who have the purchasing history of the products need to be recorded and modeled.
- 2) The generation of neighbor users (consumers):
- 3) The similarity of consumers can be computed according to the transaction history and the collaborative filtering algorithm. A neighbor consumer list can be calculated on the basis of the similarities.
- 4) The generation of product recommendations: According to the purchasing history of his neighbors, the top N products will be recommended.

### B. Generation of Neighbors

- 1) Neighbor users are generated mainly based on the similarity between each user.
- 2) Suppose that the set of all consumers  $S = \{S_1, S_2, \dots, S_n\}$ , for each consumer  $S_i$  ( $i=1, 2, \dots, n$ ), the system calculates the neighbors list including the top N consumers with similarity higher than the given threshold.
- 3) Here the similarity between the customers is calculated using Cosine method.

CUSTOMERS	PRODUCTS				
	P1	P2	P3	P4	P5
T1	1	0	1	1	1
T2	0	1	1	1	1
T3	1	0	1	1	0
T4	0	1	1	0	1
T5	0	1	0	1	0

Table 1: Purchasing History of Customers

$$sim(T_i, T_j) = (|S_i| \cup |S_j|) / (|S_i| \cap |S_j|)$$

Based on the above equation and table (1) we calculate the similarity between T1 and the other customers as follows

$$sim(T1, T2) = (|S1| \cup |S2|) / (|S1| \cap |S2|) = 3/5 = 0.6$$

$$sim(T1, T3) = (|S1| \cup |S3|) / (|S1| \cap |S3|) = 3/5 = 0.6$$

$$sim(T1, T4) = (|S1| \cup |S4|) / (|S1| \cap |S4|) = 2/5 = 0.4$$

$$sim(T1, T5) = (|S1| \cup |S5|) / (|S1| \cap |S5|) = 1/5 = 0.2$$

If the value of threshold  $\theta$  is set to be 0.5, then the neighbors of T1 are T2 and T3.

### C. Generation of Recommendations

Recommendations of products are computed by the purchasing times of neighbors. According to the calculation

above, we know that the neighbors of customer T1 are T2 and T3, so we can list all the purchasing history of all the products so as to summarize the most popular ones. As listed in Table 2, the products P3 and P4 are purchased more number of times from the neighbor.

CUSTOMERS	PRODUCTS				
	P1	P2	P3	P4	P5
T1	1	0	1	1	1
T2	0	1	1	1	1
T3	1	0	1	1	0
TOTAL	2	1	3	3	2

Table 2: Purchasing History of Neighbor Customers

At the point when new customers enter the system, there is generally inadequate data to deliver recommendations for them due to no acquiring history of the new shoppers. The usual solution of the cold start problem is similarity calculation between each user by profile information, such as user area of interest, sex, department, semester, etc.

### III. CONCLUSION

E-commerce continuously struggles to retain its customers by offering better products and better services. This paper mainly emphasizes on giving recommendation for the newly registered user which is not taken into account in the existing system. The products with less quantity are preferred with priority to the users as the recommendation. As the customers interest dynamically changes, the proposed project uses only previous one month transaction of data to recommend the products more accurately.

### IV. FUTURE ENHANCEMENT

To increase user friendly nature of the application we can add the "visitor query module" as a future enhancement to the application, where administrator can receive visitors' queries of the website. The discussion forum module can be added to application where customers can post their queries to find answer from customer support team and other advantage is new customer can chat with the old customer to know to product well.

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