

A Hybrid Approach of Collaborative Filtering and Genetic Algorithm for Product Recommendation System

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ABSTRACT

Data mining is an critical research space in recent times that focuses on the supply of facts in records. this is in which records from the internet site is mined so that informative facts can be processed and used correctly and correctly through people. Its cause is to expect and interpret. one of the functions of data mining is the association Rule mine. It consists of two procedures: First, locating the frequently used objects on the web site the usage of a little assist and developing a rule of relation to commonplace items with a unique confidence. it is related to the affiliation of items wherein in all A-occasions, there may be a B-occurrence. This mine could be very effective in reading the marketplace basket. That app is useful for clients who purchase positive gadgets. that during the entirety they bought, it can be something / matters that could be mixed with some thing offered. MLP and genetic algorithm are the most widely used association mining association set of rules.

Keywords

Genetic algorithm, collaborative filtering, Recommendation system

1. INTRODUCTION

Collaborative filtering is a technology for recommending similarities. There are two types of integrated filters: User-based interactive filters and object-based collaborative filters. A user-based collaborative filtering algorithm is an effective way to recommend useful content to users by using the feeling that the user can select the preferences of the same users. So, initially, the algorithm attempts to find the user's neighbors based on the user's similarities and then integrates the neighboring user's rating score using supervised learning as a genetic algo. Object-based collaborative filtering algorithm has the same program as user-based interactive filtering through the user rating scale. Instead of close neighbors, it looks like a collection of items; the target user has already rated the objects and this algorithm covers how the objects look like the target object under the recommendation. After that, it reassembles the previous customer preferences based on this item matching.

To improve customer experience and increase sales of products, almost all companies are trying to create some kind of a simple but effective system. So the completion of this commendation program comes to light. The system works in two steps, firstly,

it analyzes the user's search for the item and the users' interests, and second, it attempts to find the same set of items that the user may be interested in. This leads to better choices between products. and websites. This helps people understand the ongoing changes in their surrounding and help them stay tuned to the latest updates.

2. MODULE IDENTIFICATION

Algorithm: Collaborative filtering and genetic algorithm

Input: Item database and user or customer database

Output: Product Suggestion

Module 1: Website

Creating the first user interface creates a product website.

Module 2: Product Details

User should be able to navigate to products> product details

The user should get the required product details

User should be able to get a recommendation.

The user must be able to filter the products according to his needs.

Module 3: Cart Page

User should be able to navigate to the cart page.

The user must be able to add / remove products to the cart.

The user must be able to navigate in order to continue the purchase button.

User should be able to navigate to exit

Module 4: Exit

User should be able to navigate to the exit page.

The user should be able to explore different payment options

The user must be able to evaluate their products with relevant information

3. LITERATURER SURVEY

There are various fields which are related to the recommendation system. The recommendation system of books by Dhilip Subramanian, March 2020 recommends the similar books in which the user is interested. This system is working on content-based filtering. It is a system that recommends similar

books based on the description and name. The Fashion Evaluation Method for Clothing Recommendation Based by Xiang Liu, October 2017 recommends the garments. This system is working on Support Vector Machine (SVM) and uses SVM algorithm. It is a recommendation system which first evaluates the fashion level of the customers and recommend the appropriate fashion, the result of the fashion level is on the basis of their classification.

In [1], the authors propose to incorporate the temporal variation in the equation, leading to a time-conscious recommendation system. This enables us to track the emergence of user preferences over time. This is especially important in the field of music recommendation, where users' preferences vary greatly. To overcome this problem, [2] the authors propose a basic measurement model based on the standard deviation of user characteristics in the central nervous system. This approach to specific recommendations is also evaluated in [3]. In this paper, the authors propose to add an additional layer of understanding to the standard prediction model. The function of this layer is to identify

users the same depending on their understanding steps. In [4], the authors propose to introduce information graphs in RS, proposing a novel model called Neighborhood Aggregation Collaborative Filtering (NACF). It uses the information graph to spread and generate potential user interest, and re-injects them into the user's features by diverting attention.

4. SYSTEM ARCHITECTURE

Collaborative filtering process based on user history in the form of measurements provided by the user to the object as their source of information. It can be done by creating interactions between users or between objects. Collaborative filtering is divided into three types: user-based, object-based, and model-based.

User-based approach: A user-based approach creates a user-based recommendation with similar tastes.

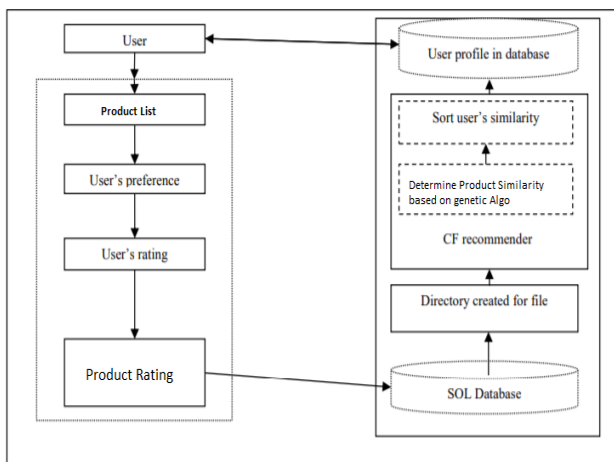


Fig 1. Architecture Diagram

5. WORKING OF THE PROJECT

For a new member he will register on the website by providing the necessary details. If already registered, then the user can directly login to the system. The system will differentiate as per the login as either a. Admin b. Seller c. Customer



Fig 2. Registration Page

2.1 Admin Console

Once admin is logged in, admin is given below options:

- Add Product: Admin can add product. Admin had to enter the details of product and data will be store in database. Product price and product category will also be store.
- Update Product: Product price, Image Name can also be updated by admin.
- Delete Product: Admin can delete product if it is no longer sold.
- Apply Algo: Admin can start the recommendation process, Once user purchase the product for the day than by EOD Admin can run the batch which will apply collaborative filtering.

Below is the portal of admin:

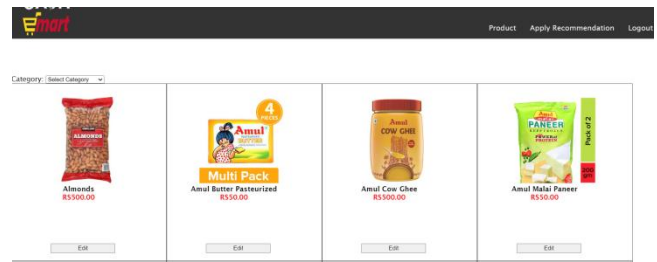


Fig 3. Admin Portal

2.2 Customer Login

Once member is registered by registration page. Member can login.

1. Order Product: Customer can order the product by using add option this will do addition of product into the cart. User can add multiple product into the cart. If user login still it will present in cart.
2. View History: Once order is placed than customer can check order history.
3. View Recommendation: If user want to see recommendation than link will be open.

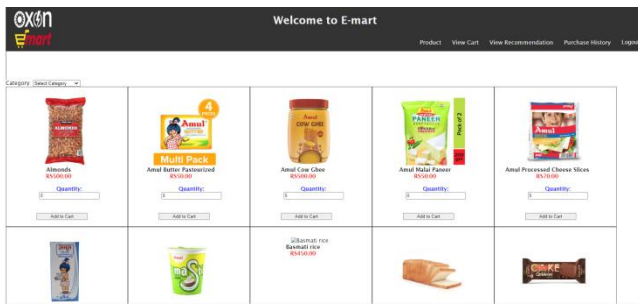


Fig 3. Customer Portal

2.3 Collaborative Filtering

We have used two type of collaborative filtering

1. User Based

A technique used to predict the items that a user might like on the basis of ratings given to that item by the other users who have similar taste with that of the target user.

- a. Identify the target user (according to this example, Jack is the target user)
- b. Find the same user who has ratings like the target user.
- c. Explore the interacted items.
- d. Forecast the ranking of unseen things of the target user.
- e. If the forecasted rankings are higher than the threshold, then suggest them to the target user.

2. Item Based:

The people who liked the product will enjoy the same product in the future

- a. Identify the target user.
- b. Find the matched items which have the same ratings as items the target user rated.
- c. Forecast the rankings for the same items.
- d. If the forecasted rankings are higher than the threshold, then suggest them to the target user.

Welcome to Product Recommendation System

Most Popular Products

Product Name	Price (in Rs.)	Order Link
AMUL BUTTER PASTEURIZED	50.0	Order Now
AMUL COW GHEE	50.0	Order Now

Item Based Recommendation

Product Name	Price (in Rs.)	Order Link
AMUL COW GHEE	50.0	Order Now
AMUL BUTTER PASTEURIZED	50.0	Order Now

Genetic Algorithm:

Genetic Algorithms(GAs) are adaptive heuristic search algorithms that belong to the larger part of evolutionary algorithms. Genetic algorithms are based on the ideas of natural selection and genetics.

Steps:

1. Individual in population compete for resources and mate
2. Those individuals who are successful (fittest) then mate to create more offspring than others
3. Genes from “fittest” parent propagate throughout the generation, that is sometimes parents create offspring which is better than either parent.

4. Thus each successive generation is more suited for their environment.

Module 1: Database

Building initial user interface creating product database.

Module 2: Product Details

User must be able to navigate to products & product details

User must get required product details

User must be able to get the recommendation.

User must be able to sort the products in his/her requirements.

Module 3: Cart Page

User must be able to navigate to cart page.

User must be able to add/remove the products from cart.

User must be able to navigate to continue shopping button.

User must be able to navigate to checkout

Module 4: Checkout

User must be able to navigate to checkout page.

User must be able to check different payment options

User must be able to check his/her products with correct details

Module 5: Implement the Algorithm

Step 1. Read Product catalogue Pd. For each item in product catalogue, Pdi

Step 2. Read customer data Cd. For each customer Ci who purchased Pdi

Step 3. For each item Pdi purchased by customer Cdi

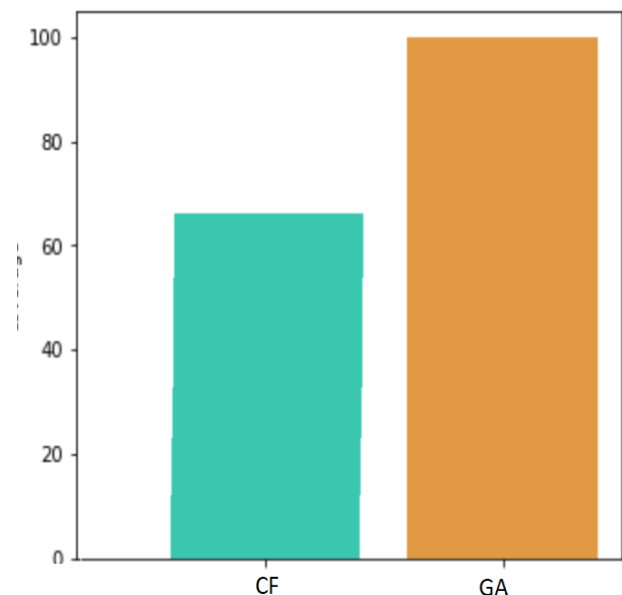
Step 4. Calculate similarity between Pdi and CdiSim(Pdi, Cdi)

Step 5. recommended products filtered

Step 6. Use genetic algorithm to algorithm the product suggested in step 5

Step 7. Display recommendation

Accuracy



6. APPLICATION

Recommender systems have become increasingly popular in recent years, and are utilized in a variety of areas including movies, music, news, books, research articles, search queries, social tags, and products in general. Mostly used in the digital domain, majority of today's E-Commerce sites like eBay, Amazon, Alibaba etc make use of their proprietary recommendation algorithms in order to better serve the customers with the products they are bound to like

7. ADVANTAGES

This Improved Average Order Value (AOV)

Better user engagement.

Higher conversions.

Reduces cart abandonment.

Optimized inventory.

Saves you time.

8. LIMITATIONS

1. Knowledge Engineering: It requires some knowledge engineering to find out the products which matches user requirements.
2. Static suggestion: These systems lack the ability of learning from user preferences. So, user has to provide its preferences every time in order to get recommendation.

9. CONCLUSION

The proposed work, the customers can be assured with a better satisfaction as the related products are suggested as soon as they select a product to purchase as the recommendation algorithm contains various techniques of finding the similar products. With the help of this system, the ecommerce platform can successfully increase the sales and also improve customer experience.

It will give customers a better choice of options which are based on their own personal adjustments, like tailor-made shopping experience. The system can work for any type of platform which requires an individualistic-approach to the user experience.

10. FUTURE SCOPE

This project can be enhanced further propose to develop an algorithm that solves the limitations faced by above developed [11]

recommender systems hoping that the issues presented in this paper would advance the discussion in the recommender systems community about the next generation of recommendation technologies.

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