Educational Website Based on Dynamic Recommendation and Filtering Techniques

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Abstract— The main objective behind creating an educational website is to provide accurate notes and study material to students who wish to learn more about the subject in a precise manner. There is a need to efficiently deliver an especial, pertinent data to attenuate the issue of information overloading, which has created barrier for various education-based website users. To solve the growth of this problem our website follows dynamic recommendation system, content based filtering and collaborative filtering techniques which ensures that the best of the content is shown to the user. To make learning even more fun, we are giving an opportunity to our users for earning money by uploading notes. This project will serve its impetus to the ones who are going to download material from our website too. The mechanism follows simple methods and algorithms. A scratch card will be rewarded on each review the downloader gives to the notes uploaded on the website. Our vision is to be one of the leading sites providing education and a simple channel to earn money.

Keywords—collaborative filtering, recommendation system, content-based filtering, hybrid filtering, dynamic recommendation

I. INTRODUCTION

The website came into existence after days of discussion and market survey done by the team members. On understanding the current demand and interest we decided our niche. The functionality of the website involves effective methodology which makes it highly efficient in terms of usability. The root of the website is completely based on dynamic recommendation system, collaborative filtering and content-based filtering mechanism [1].

A recommending system basically searches through vast magnitude of data in order to provide the end user the best content based on their requirements. Recommendation systems also improves the decision-making capability & standard of content [2]. It is used as a tool which will help our users to find records which is in accordance to their preference [3],[4]. Content-based filtering is a domain-dependent algorithm and it highlights on complete analysis of the ascribes of materials for generating the best material from the set of records. This website has been curated with keeping two ends in mind. The first one promises to be helpful for the ones uploading the study materials. For each download user will be credited with a certain amount.

The links for each file the user uploads is going to be made sharable which will help them to reach out to a larger audience. The next are the type - B users, they are called the downloaders. For each review that these users give for the notes being uploaded will fetch them a scratch card. These scratch cards will follow up rotations, meaning the user will win a certain amount on the basis of lucky draw. This website also looks forward in collaborating with various colleges in the country on its launch.

II. RELATED WORK

The recommending system has a strong decision-making ability for the users under complicated information environment [5]. A recommender system is defined from the viewpoint of E-commerce websites or applications as a tool which helps users to search for records that is most relevant to user's area of interest [6]. Various techniques for building recommendation systems have emerged in the past, that can make use of collaborative filtering, content-based filtering or hybrid filtering [7] [8],[9].

A Collaborative filtering algorithm is the most fully developed and a frequently implemented technique. It makes automatic predictions about the interests of a user by collecting preferences from enormous users [10]. The following techniques have been used:

A. Hybrid Recommendation

Recommendations have an imperative role in the selection process. Recommending similar merchandise is one such recommendation set of units [16]. Flipkart helps users to locate merchandise alike to the ones they preferably want. Flipkart uses hybrid of content and collaborative filtering algorithms for producing 'recommending similar merchandise'. The product matching is solved with the use of attributes and images that are present in the log of the website [14]. The collaborative filtering algorithm is used at users browsing data (i.e., no of times product has been viewed, add to the cart, saved products etc.). To find out the most frequently searched product, these criteria are taken into consideration and a final list by combining these relevant sources is presented to the user [12].
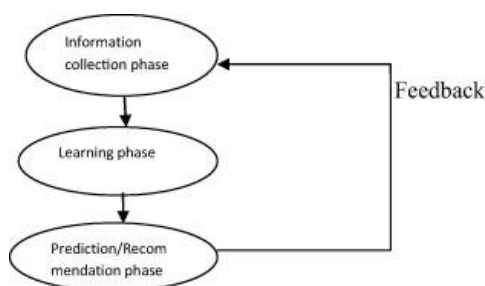

Figure 1. Block diagram of hybrid recommendation system

B. Content Based Filtering

Content based filtering filters out products or information based on user preference. Google Play Store makes complete use of content-based algorithm. It allows you to filter out applications based on your own personal choice. The content filtering technique also show applications which are related to user's current search. [11] The rating provided to each application helps to decide which one to download. Play Store has a wide range of applications and content-based filtering solves the purpose of listing out apps based on user's requirement by simply segregating the other ones from the list. The level of filtration is divided in levels.
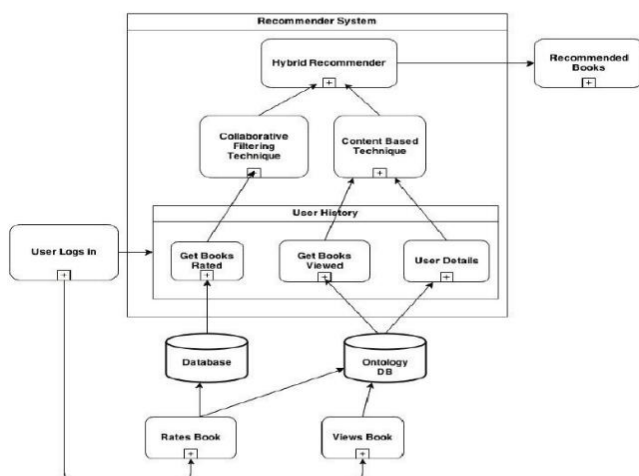

Figure 2. Flowchart representing Content Based Filtering

C. Collaborative Filtering

A collaborative filtering algorithm comprises of two senses a general and a narrow one. The narrow one works by giving automatic predictions in accordance to filtering done by the user. [12] These predictions are completely specific to the user, based on their likes and dislikes. The general sense, filtering filters out data or patterns using methods which involve collaboration among various agents, frame of reference etc. OLX, uses this algorithm in order to let its user buy or sell products. It also uses content filtering to separate products based on categories. This allows user to have list of options to select from. The following mathematical methods used in collaborative filtering algorithm:

- *User Based Collaborative Filtering:* This method is used to predict a rating that the user wishes to give out to the other files on the website. To ensure the result we make use of cosine similarity.

- *Item Based Collaborative Filtering:* Here similarities between two data's or products are resolved using cosine symmetric matrix. The rating user wants to give can easily be predicted using this uncomplicated weighted average method [13].
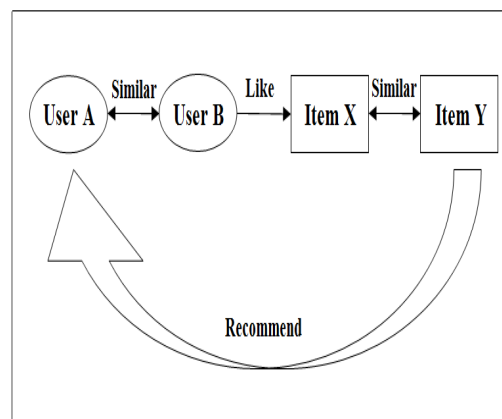

Figure 3. Collaborative filtering

III. ARCHITECTURAL FRAMEWORK

The website at first opens up displaying the home screen which includes all the necessary details that the new visitor would want to gather about the website before proceeding. The home screen provides two options, first one is the sign up and the other is the login screen which is for users who have already registered on our website. The architecture is simple and each component of the website are co-related with each other. The website makes complete interaction with the user's by asking them to choose the respective department as well as the college which are already stored on our database respectively. On selecting the required fields, a new page opens for them to either upload a file or download the file from the website. This completely works on the principle of content filtering. The information about whether the user likes the file or not can be analyzed simply

by the rating given by the users who have already reviewed it.

Recommendation engine will generate recommendations for the user Based on the category of department and University chosen. The recommendation system is actually a module which completely evolves understanding user's activity on the website. Once the user searches for something, they will automatically get a list of files which are similar to it in order to give them more options to choose from. The top-rated products will be displayed right at the top so that the best content is given a higher priority.
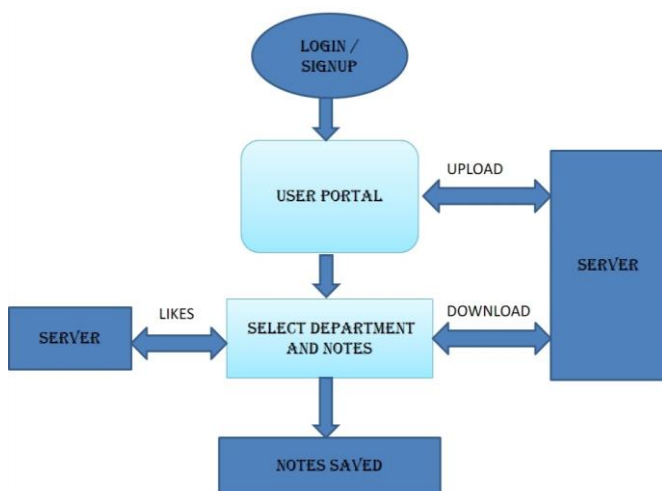

Figure 4. System Architecture

IV. SURVEY

Collaborative recommendation and dynamic recommendation system do the analysis based on users preference. It mainly gives recommendation based on similarities between the products or data which have been liked or preferred by the user earlier. E.g. In an E-commerce website like Amazon, the user searches for a certain product and a list of all the products which are alike are displayed below the selected one. The rating suggests the most useful item from the list. The next time user visits the website again, all the items that the user searched earlier are displayed in accordance to users liking [15]. Collaborative filtering systems recommends in accordance to items having same properties between users and items. The products which are recommended to the user are the ones which have been searched or liked by users having similar interests. Collaborative filtering technique is the most researched and also the most implemented recommendation method. The main characteristic of Collaborative based filtering technique is: It does prediction for data or items for a particular user completely based on items that have been rated or liked by users with similar interest. This ensures user has an easy search for items that he/she wishes to select or use.

A hybrid recommendation system is better when compared to content based and collaborative systems. Hybrid systems basically merges different data and collaborative system to suppress the disadvantages of both these recommendation methods. A survey on disparate e-commerce website was done. Various criterion was considered.

Based on all the different parameters an analysis was achieved. Which ensures more clarity. The survey included 4 e-commerce websites, like Flipkart, Koovs, Amazon and Snapdeal and 1- Educational website, Kopykitab. Different criterions were considered for this survey and these include: Rapidity of products that were recommended, number of items that were recommended, accuracy in recommending a merchandise, dissimilar products recommended etc. On considering all these fields we concluded that Amazon, Flipkart and Koovs were good in accuracy and speed. They provided the exact products which are similar to the one user was searching. Kopykitab proved the highest accuracy and did not lack in any of the above-mentioned parameters. Rest of the websites lacked these key factors respectively. The rapidity was considerably low, and it did recommend unlike products.

V. RESULTS AND ANALYSIS

Various e-commerce and educational based websites lack logical and basic sentiment recommendation attribute. Our website keeping this problem in mind solves this by effective methodology and simple filtering techniques providing good content recommendations.

The increasing number in terms of daily users of e-commerce websites encouraged us to launch our educational based website with all the advance recommending system. This will improve the performance of recommendation and also encourage students to gather best information from our website. The weight based techniques are a mathematical modelling which is shown above to understand the complete efficient functionality of the website. Our website provides accuracy at its maximum and simple integration of logical analysis while recommending is done to give users exactly what they want.

VI. CONCLUSION

Recommendation system has made a huge progress in the last few years in various industries affiliated online. Methods such as content-based filtration, collaborative and hybrid filtering techniques have been applied in recent times to enhance the quality for recommending an item to the respective user. The current mechanism of websites of the same niche lack certain essential attributes such as logical recommendation also referred as semantic in recommendation techniques. The proposed system completely integrates this problem and provides absolute logic and accuracy in recommending a file to its user. This is further enhanced using the rating mechanism that various users would provide for each file that has been uploaded on our website. Our website makes use of all the major filtration techniques ensuring great user experience.

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