



Mobile English Learning Platform Based on Collaborative Filtering Algorithm

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Abstract. With a large number of digital resources as the carrier, mobile learning breaks through the shortage of resources and the limitation of time and space under the current learning mode. However, its rich resources also bring information overload, which greatly affects the learning efficiency. The mobile English learning platform based on collaborative filtering algorithm not only makes full use of the advantages of mobile learning, but also recommends learning resources according to the learning needs of different learners to meet the learning needs of different learners, saving learners' time and effort to a certain extent all. It has certain practical significance.

Keywords: Flow teaching algorithm · Information education · Recommendation system

1 Introduction

Internet shows an explosive growth. A large amount of useless and redundant information seriously interferes with and hinders netizens from obtaining and analyzing correct and valuable information efficiently and quickly. How to efficiently and quickly obtain useful personalized information in the vast ocean of information has become an urgent demand of the majority of Internet users. Traditional information systems, such as search engines, can search the information required by users according to the input keywords, so as to retrieve some high-quality and specific information. For example, academic journals, papers or commodities can be retrieved by using search engines. Therefore, the traditional information system can partially solve the problem of "information overload". However, for the same users, the results returned by search engines are the same, so the traditional information system is lack of personalization. In order to solve this problem, information recommendation system came into being. The core idea of information recommendation system is: firstly, collect and analyze various information characteristics of users through the information system, then use various machine learning methods to learn users' personalized interests and behavior patterns, and finally recommend personalized goods or services for the user according to the user's interests and behavior patterns obtained from learning analysis. Information recommendation system. Figure 1 shows the process of personalized recommendation algorithm.

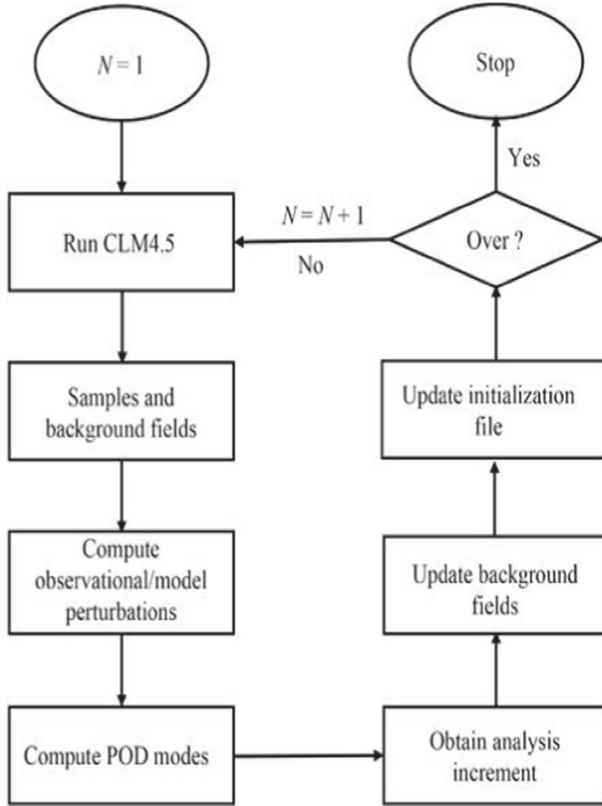


Fig. 1. Personalized recommendation algorithm process

In order to meet the needs of students at all stages of learning and continuously improve their English level, I will focus on English to meet the needs of learning intelligent content. Autonomous Learning Platform Based on collaborative filtering recommendation algorithm, build voice and video resource database and semantic database, integrate fragmented time, and give full play to students' learning initiative from listening, speaking, reading and translation and other dimensions. This paper consists of the following parts. The first part introduces the relevant background and significance of this paper, the second part is the related work of this paper, and the third part is data analysis. The fourth part is example analysis. The fifth part is conclusion.

2 Related Work

Firstly, the background of mobile learning is introduced and a Conversation-Activity-Distribution theoretical model, CAD, is proposed with activity theory, situation cognition theory and distributed cognition theory as the cognitive basis [1]. Ref [2] aim to identify whether this platform could significantly improve the proficiency of English as a foreign language (EFL), yield learner satisfaction, and reduce learners' cognitive loads

in EFL classes. The subject of Ref [3] is to investigate the mobile tools (based on Web 2.0 platform) for language activities in English lessons for non-linguistics students as well for linguistics specialized group of the two universities. Therefore Ref [4] aim to explore the incorporation of collaborative learning in an English course using WhatsApp and to identify the students’ perception toward that tool in an English course. Li discussed the flipped classroom English translation teaching model based on the fusion algorithm of network communication and artificial intelligence [5]. Based on this module, the platform software is designed according to the three steps of database design, platform encryption technology, and learning recommendation algorithm to create the English mobile learning platform [6]. Therefore, from the perspective of English vocabulary deep learning investigate the main mobile vocabulary learning in the functional architecture and its advantages and disadvantages in promoting English vocabulary, and designs and develops a mobile platform oriented English vocabulary deep learning system [7]. The overall framework of the English mobile learning platform is designed [8]. Ref [9] present the English language teaching applications created based on the interface. The background management system adopts the latest SSM framework of Java EE, which effectively solves the problem of server-side development [10]. The classic recommendation process for mobile English platfor design is generally divided into two steps: first, obtaining user information, in this paper, it refers to obtaining the user’s (student’s) score information on some.

2.1 Overview of Collaborative Filtering Algorithm

English materials, for example, the user’s score on some learning materials according to their preferences is an integer from 1 to 5 [11], of which 5 points means like and 1 point means don’t like; second, the user’s score on some learning materials is an integer from 1 to 5, The similarity of ratings among users is analyzed and the preference of target users for a certain data is predicted. Figure 2 shows the general process of harmonious influence.

As you can see in Fig. 1, the basic recommendation strategies of collaborative filtering include prediction and top-N recommendation. In the predictive recommendation strategy, the recommender system learns the user’s preference according to the scored information, and predicts the non scored items; In this strategy, we don’t need to know the user’s rating of each item, but only need to generate the recommendation list of the items most related to the user’s preference, That is to say, it is equivalent to ranking items by learning users’ preferences; In this strategy, classification accuracy and sorting accuracy are generally used to evaluate the effectiveness of the algorithm.

$$m_1 = \int_0^t e^{(pk_f + m_2 + m_3 - \lambda)(t-\tau)} e^{-\lambda t} \|\Delta u_k(\tau)\| d\tau \tag{1}$$

$$\lim_{k \rightarrow \infty} \|\Delta u_k(t)\|_\lambda \leq \frac{1}{1 - \rho} m_5 d \tag{2}$$

There are many kinds of collaborative filtering algorithms. Breese et al. Divided collaborative filtering algorithms into storage based algorithms and model-based algorithms. As shown in Fig. 3, the memory algorithm and the model-based algorithm.

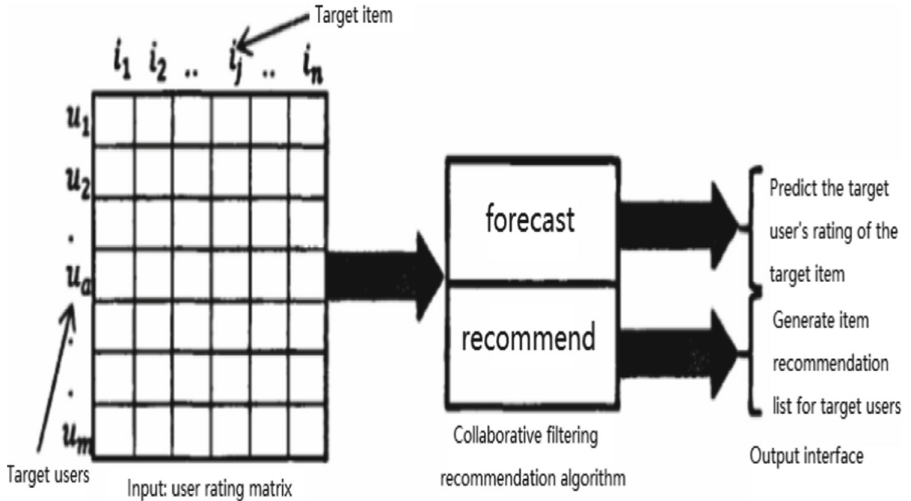


Fig. 2. General process of collaborative filtering recommendation

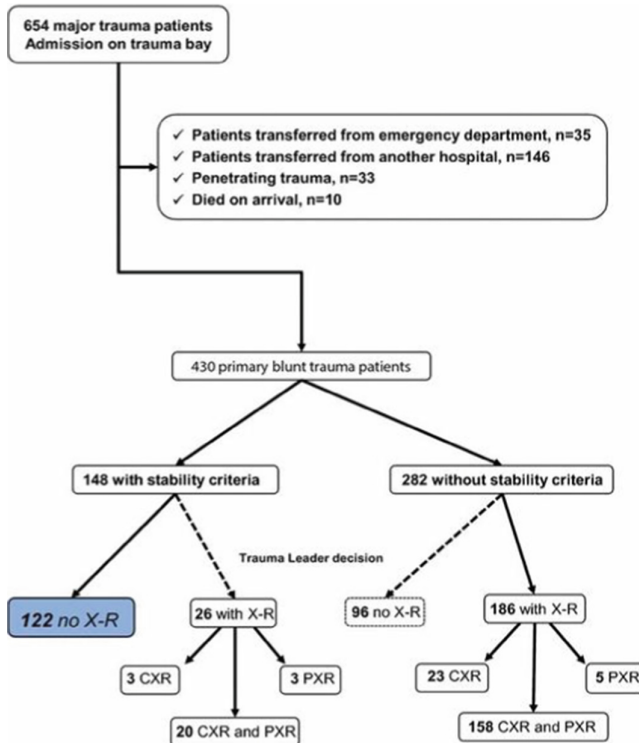


Fig. 3. Memory algorithm and model-based algorithm

2.2 Storage Based Collaborative Filtering Algorithm

The storage based algorithm uses a database of the whole user to complete the prediction. These systems use statistical techniques to find the nearest neighbor set of active users, who have the same history as the active users (they have similar evaluation of different items with the active users). Once the nearest neighbors of active users are found, these systems will use different algorithms to synthesize the evaluation of these nearest neighbors, and thus provide prediction for active users or recommend n highest evaluation items. This algorithm has the characteristics of simple calculation method and high accuracy. At present, most of the collaborative filtering algorithms used in practice belong to this type. However, any prediction must be based on all records of the database, which undoubtedly greatly increases the amount of calculation. In today's situation where the scale of users is often up to millions, this problem is particularly serious.

2.3 Model Based Collaborative Filtering Algorithm

Similarly, collaborative filtering algorithms are mainly divided into two categories: one is to process explicit preference data, such as explicit scoring data and the other is to process implicit feedback data, such as whether to click on the web page diagram of explicit scoring (left) and implicit feedback (right) data). In the real application environment, users' implicit feedback data is more extensive and easier to obtain, such as whether users have seen a movie, whether users have heard a song and so on. This kind of data does not require users to provide clear scores, so it is easier to obtain. Because the negative cases in implicit feedback data are uncertain and only positive cases can be clearly distinguished, the collaborative filtering problem based. The core task of collaborative filtering based on implicit feedback is to use various machine learning methods to learn and analyze these implicit feedback data, and learn the user's behavior and interest patterns, so as to sort the recommended object set according to the user's preference according to the user's preference. Considering that in the information recommendation system represented by e-commerce transaction system, most of the data processed by the recommendation algorithm is implicit data; At the same time, in academia, implicit feedback has become a recommendation system.

3 Data Analysis

Principle: put forward suggestions according to similar users or projects. Now the mainstream is around the two parts of the most typical advertising. That's user based advertising. Project based advertising strategy. Interview question: both methods have a common core. Since calculation is involved, there must be various formulas. Otherwise, we can't say algorithm at all. Therefore, there are relevant technical details below, which may be understood by PM with strong technology and algorithm logic. But it doesn't matter if there is no foundation in this aspect. I will tell the principle in vernacular and as much language as I can understand. (Supplement 1: let's talk about a very realistic thing. There are still some lost technical terms in this article. It's normal for PM not to understand

or understand, but if Baidu and even ask for search are unwilling, how can we learn and grow? You know, there are still a lot of PM competing with you in terms of salary increase and offers from large companies). As shown in Fig. 4, the learning platform adopts the collaborative filtering algorithm of memory.

Although collaborative filtering recommendation algorithm is widely used, it is rarely used in information-based teaching system. Although many students do a lot of exercises every day, they have no targeted exercises. Therefore, in the information-based teaching system, collaborative filtering recommendation algorithm can be used to provide personalized exercise recommendations for students, which can significantly improve students' grades.

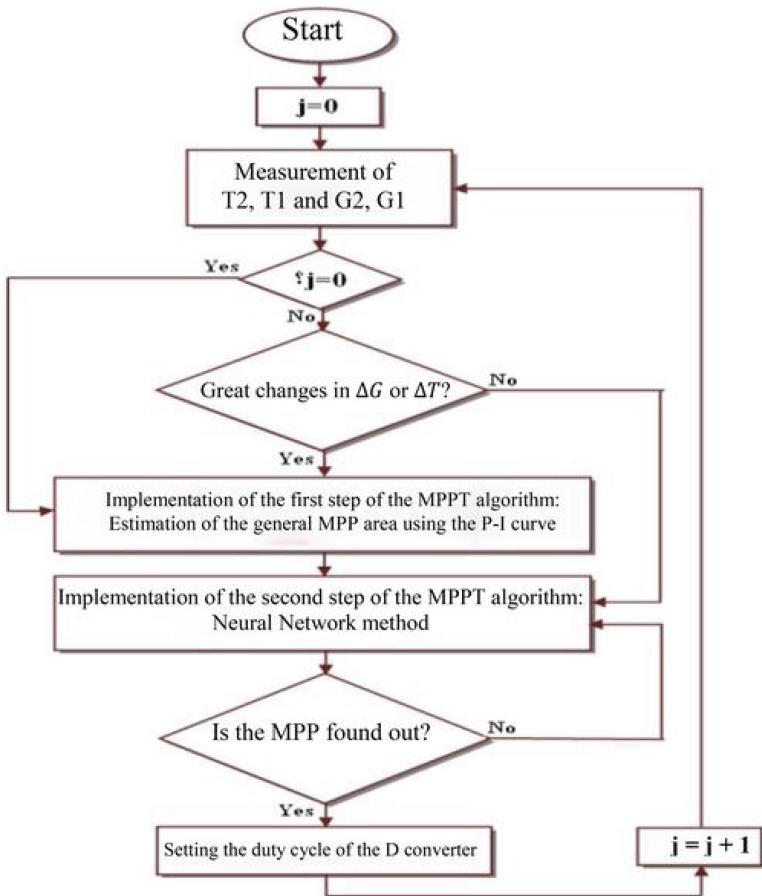


Fig. 4. The learning platform adopts memory collaborative filtering algorithm

Using the idea and principle of collaborative filtering algorithm, this paper applies it to the information teaching system, mainly focusing on exercise recommendation. The teaching system records students' problem making records, the algorithm predicts the

exercises that students have not done, and recommends the exercises with the prediction result of “doing wrong” to this student. Figure 5 shows the algorithm prediction process.

4 Example Analysis

Collaborative filtering, also known as collaborative filtering in English, is called CF for short. Note that this does not refer to game CF. For example, you want to go out to a movie with your girlfriend, but you don't know what to watch. At this time, you will think, why don't I ask my friends who have similar interests to me what's worth watching?

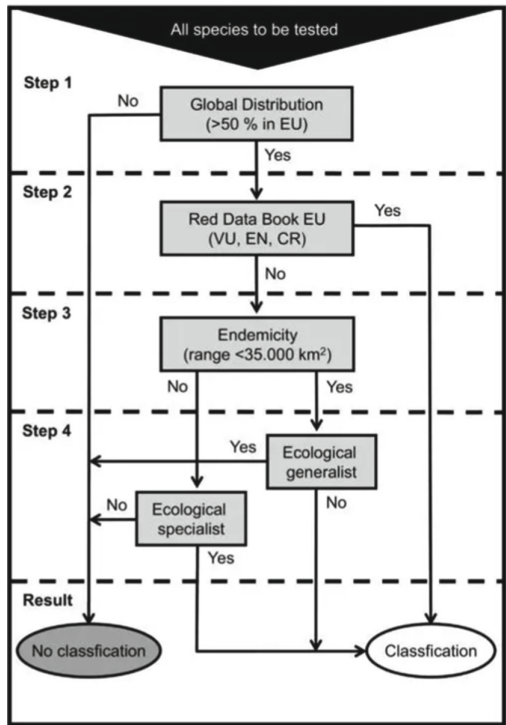


Fig. 5. Algorithm prediction process

Algorithm advantages:

Collaborative recommendation is the most widely used recommendation algorithm, which can filter out the construction of concept tags that are difficult to quantify;

Only user behavior is used for recommendation, which greatly improves the speed and accuracy;

Users' potential interests and preferences can be well found.

Algorithm disadvantages

For new users or new items, the recommended quality will be poor, which is often called the cold start problem.

Calculation of similarity

In the calculation of similarity, SIM is used to replace English similarity, and $sim(a, b)$ is used to represent the similarity between a and B . The following are three classical algorithms about similarity. 1. Cosine similarity: cosine theorem similarity measure cosine distance.

Traditional collaborative filtering collaborative filtering algorithm first obtains the user set most similar to the target user by calculating the score similarity between users, then uses these nearest neighbors to predict the non scored items of the target user, and then recommends a group of items of most interest to the target user.

However, due to the increasing number of users and commodities, the problems of data sparsity, cold start and scalability in traditional collaborative filtering algorithms are becoming more and more serious. Therefore, to solve these problems, many researchers have proposed many new methods to improve the recommendation efficiency. Based on the sparsity of scoring data, a dynamic similarity calculation method is proposed. The algorithm is studied and optimized from the aspects of project similarity measurement method and project nearest neighbor selection, which effectively alleviates the problem of data sparsity. The non fixed k -nearest neighbor algorithm and conditional probability are combined, and the idea of step-by-step filling matrix is used to effectively improve the recommendation quality. The value of similarity is dynamically adjusted according to the common scoring times, and the weight affecting the recommendation result is adaptively adjusted according to the scoring support, so as to obtain a better recommendation effect.

In the mobile English learning platform designed in this paper, personalized recommendation module is the core module. The difficulty of this module lies in which way and which rules are used to recommend interested materials to learners. In order to be able to more accurately recommend English video materials to learners in line with personal preferences.

Step 1: let $L = \{l_1, l_2, \dots, l_i, \dots, l_N\}$ be the learner set; $M = \{m_1, m_2, \dots, m_i, \dots, m_n\}$ is the video data set; The interest function $g_{l,m}$ can be used to predict the user l_i rating of video m_i .

Step 2: which is recorded as $sim(x, y)$

$$sim(x, y) = \frac{\sum_{m \in m_{xy}} (g_{x,m} - \bar{g}_x)(g_{y,m} - \bar{g}_y)}{\sqrt{\sum_{m \in m_{xy}} (g_{x,m} - \bar{g}_x)^2 \sum_{m \in m} (g_{y,m} - \bar{g}_y)^2}} \tag{3}$$

Step 3: select the learner learner set, record it as L , and predict that is $g_{x,m}$

$$g_{x,m} = \bar{g} + \frac{\sum_{a=1}^k (g_{a,i} - \bar{g}_a)sim(x, a)}{\sum_{a=1}^k sim(x, a)} \tag{4}$$

5 Conclusion

This filtering algorithm on the English learning platform. From traditional media to modern intelligent media, production and distribution of content more personalized and

intelligent. The user platform based on artificial intelligence technology has an impact on media channels, and so does the intelligent English learning platform. The dissemination of English learning content has also changed, resulting in corresponding changes in English learning resources, English learning channels and English learning methods. How long does the English network teaching platform course take and how effective is it? For young children, 35–40 min will take too long to give feedback. Children's attention is not focused. Different children are different. Some children are chatting in full swing. Suddenly, the time is up, and the meaning is still incomplete. However, for young children, they can't sit still and move around for too long, so they should know their children's character and have a choice.

Who is the right home for so many online foreign teachers? Some parents only choose the well-known and popular English online teaching platform, and think that the hot teachers have good comprehensive strength. Some parents don't choose the hot ones, and think that a large scale means a large number of enrollment, and teachers will recruit a large number, so it is difficult to guarantee the teachers and the service can't keep up. I suggest that in the early stage of selection, choose more English online teaching platforms to finish the audition, and then list the advantages and disadvantages for comprehensive judgment.

Do you want to investigate Chinese teachers and customer service? The experience of people from the past tells you that Chinese education and customer service are very important. Chinese education has good business ability. It will introduce you very clearly. It will help you select appropriate courses according to the child's level and situation. After signing up for classes, if you want to refund, adjust the level, etc., all these need the help of Chinese education teachers. Another point is not to be very sticky customer service, Otherwise, calling you every day will make you unbearable.

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