

Individualized Movie Recommendation Algorithm Based on Machine Learning

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Abstract. With the continuous acceleration of economic growth and the remarkable improvement of people's living standards, people's individualized needs have increased. Moreover, due to the growth of computer technology and network technology, many forms of entertainment and services have been integrated into the network. The recommendation engine actively pushes the information that meets the user's taste and preference to the user by analyzing the user's behavior data on the website when the user's needs are not clear. This article will study how to apply the deep learning algorithm to the field of movie recommendation system to solve the problems existing in the traditional recommendation algorithm based on machine learning (ML), and combine the existing mainstream big data (BD) to improve the execution efficiency of the model. Individualized movie recommendation system saves users the time of searching, viewing and screening, and discovers users' potential movie preferences at the same time. Most users think that the algorithm can help them find the type they want from a large quantity of film and television resources, so as to meet the needs of users and tap their potential interests.

Key words: Machine learning, Individuation, Film recommendation.

1. Introduction

At this stage, with the growth of society and the progress of sci & tech, and the integration of numerous data and information in the era of BD, people will receive various types of data and information in the process of production and life [1]. In daily life, apart from the wide variety of goods and services to choose from, different people's hobbies are also very different. Everyone is a differentiated individual, born with different personality characteristics, and their living environment and education level are also very different, which leads to different personal interests and preferences [2]. In most cases, users don't really know what they need, which is probably because they can't find suitable and accurate keywords to describe their needs, or users need content that is more in line with their preferences and personal tastes [3]. The individualized recommendation system for movies is a targeted individualized system made by using the extremely popular Internet and mobile terminals and the computer recommendation algorithm mode.

The recommendation system not only provides users of movie websites with movies that they may be interested in, but also does not need users to screen from a large quantity of movies. Moreover, it also seeks audiences who may be interested in their films for film manufacturers, so as to promote their films accurately [4]. Through computer technology and network technology, a lot of information that people don't understand or don't use often can be transformed and passed on to people in a simple mode, which can significantly improve people's production and quality of life [5]. Different from the general search engine, the recommendation system makes individualized recommendations by studying users' own interest preferences [6]. The recommendation engine actively pushes the information that meets the user's tastes and preferences to the user by analyzing the user's behavior data on the website when the user's needs are not clear [7]. A good recommendation system can automatically tap users' interest points and guide users to find their own information needs. Individualized movie recommendation system saves users the time of searching, viewing and screening, and at the same time discovers users' potential movie preferences, providing users with more movies that they may be interested in [8-9]. This article will study how to apply the deep learning algorithm to the field of movie recommendation system to solve the problems existing in the traditional recommendation algorithm based on ML, and combine the existing mainstream BD to improve the execution efficiency of the model.

2. Movie recommendation algorithm based on Spark ML

The core of recommendation system is the algorithm it uses. Most of the classic recommendation algorithms are ML algorithms. Although they can complete the recommendation task, with the continuous expansion of the user scale and the quantity of projects, there are still problems such as sparse matrix and cold start [10-11]. Diversity represents the richness of item types in the recommended item collection. Because each user's favorite items are often not a single type, but many types, so the recommendation results should also reflect this richness. As an important branch of ML, deep learning has made breakthroughs in different application scenarios in recent years.

According to the state dimension of situational information, the user's viewing situation is divided into static situation and dynamic situation. Static situation refers to the user's own characteristics that will not change easily for a long time [12]. Static features determine users' viewing preferences, which will not change easily after a long period of training. Dynamic situation affects the user's choice of movies at a certain moment, because dynamic situation is unstable and easy to change. User's movie viewing preference is influenced by short-term movie interest and long-term movie interest, so the interest preference of user's music can be expressed as:

$$D = \{M, N\} \quad (1)$$

In the formula: M represents short-term movie interest, and N represents long-term movie interest. Due to the variety of movie interests, M and N are respectively expressed as:

$$M = \{S_1, S_2, \dots, S_n\} \quad (2)$$

$$N = \{L_1, L_2, \dots, L_n\} \quad (3)$$

The user's movie interest preference is expressed as:

$$U = \{S_1, S_2, \dots, S_n, L_1, L_2, \dots, L_n\} \quad (4)$$

For each S_i , L_j , the category attribute variables E_i , E_j and weight attribute variables F_i , F_j are introduced, so S_i , L_j are expressed as:

$$S_i = \langle S_i, F_i, E_i \rangle, i = 1, 2, \dots, m \quad (5)$$

$$L_j = \langle L_j, F_j, E_j \rangle, j = 1, 2, \dots, n \quad (6)$$

Users' needs and scenes for watching movies are diverse, but we don't need to get all the user's situational information, but we need to find effective situational categories. If effective user context can be obtained, the difficulty and complexity of context acquisition and calculation can be reduced and the accuracy of recommendation system can be improved. Novel recommendation refers to recommending items that users have not browsed before, which can improve the probability of users taking action. If the system recommends a movie or an item that the user has watched on this website or other websites before, it is unlikely that the user will watch the movie again or buy the item again.

3. Result analysis and discussion

User's behavior data mainly depends on the front-end buried point, and then collected by the data collection module. Considering the characteristics of high concurrency and large amount of data, the data collection module adopts BD tools Flume and Kafka to solve the problem of log collection. The recommendation effect of movie recommendation system is not only affected by the algorithm, but also by the architecture used by the system and the operational efficiency of the algorithm in the implementation process. In this article, the computational efficiency of Spark computing engine is optimized, and the cache strategy of Spark memory calculation is improved to improve the efficiency

of data calculation in the process of Spark executing tasks. Figure 1 shows the comparison of users' subjective scores on the traditional movie resource acquisition model and the individualized movie recommendation model in this article.

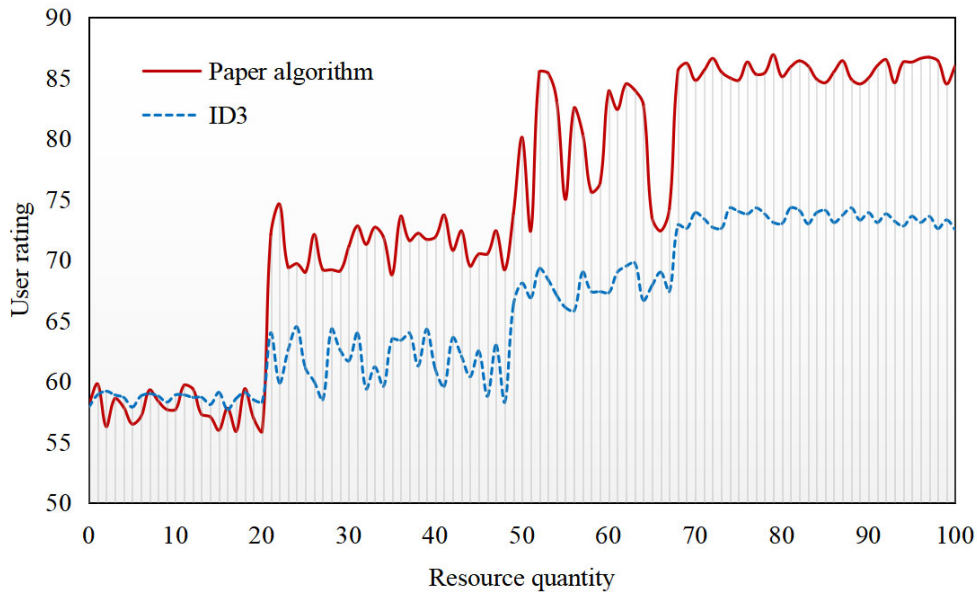


Figure 1. User's subjective contrast

Most users think that the algorithm can help them find the type they want from a large quantity of film and television resources, so as to meet the needs of users and tap their potential interests.

After the user completes the registration of basic information, the individualized recommendation system can transform the user's various behavioral characteristics into numerous data information, and store them in a huge database, which will be fed back to the system by the user's characteristics, and the system will recommend individualized movies according to the feedback content of the user's characteristics. The recommended accuracy test result of ID3 algorithm is shown in Figure 2. The recommended accuracy test results of this algorithm are shown in Figure 3.

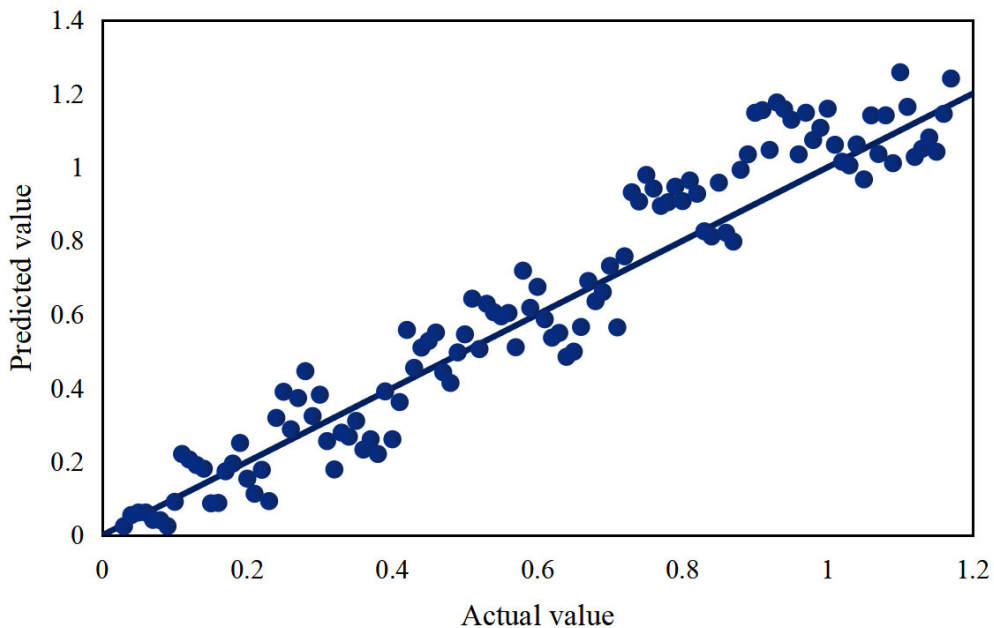


Figure 2. Accuracy test of ID3 algorithm

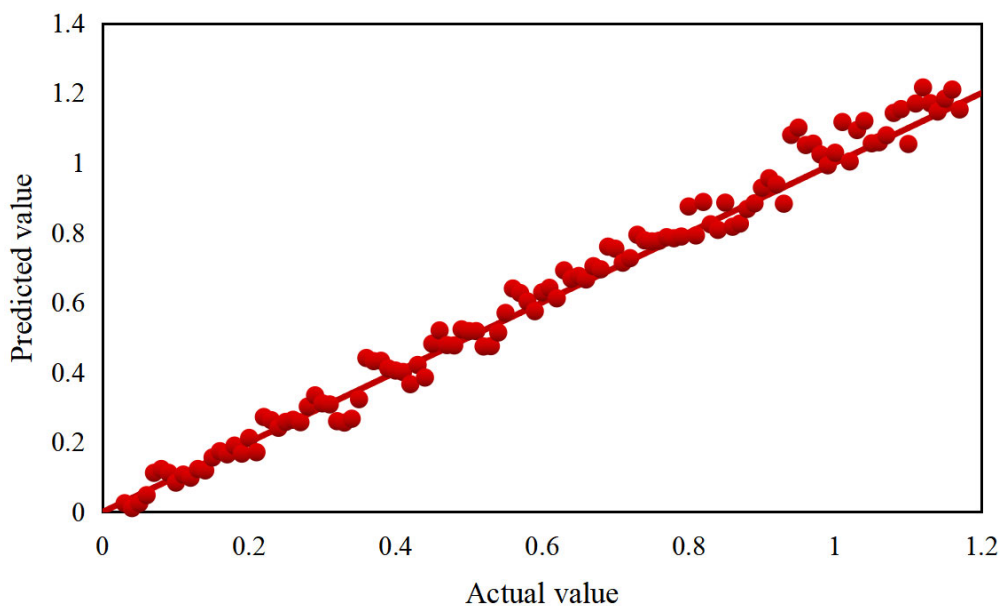


Figure 3. Accuracy test of this algorithm

Traditional movie recommendation is based on the similarity of movies. However, this method can't grasp the user's interest points well, and it can't handle data movies well. Compared with ID3 algorithm, it can be seen that this algorithm is superior to ID3 algorithm in video recommendation accuracy and user evaluation. Individualized movie recommendation based on context awareness uses the specific situation of users' current viewing to establish the corresponding user situation model, and then provides users with more appropriate and more relevant movie recommendation services that meet their interests and preferences.

4. Conclusions

As the core of recommendation system, the traditional recommendation algorithm can complete the recommendation task, but there are still some problems such as matrix sparsity and cold start. The recommendation algorithm based on deep learning mainly uses the strong feature processing ability of deep learning to process the features of users and projects, and takes the processed features as the input of the model to mine the hidden semantic relationship between them. This article will study how to apply the deep learning algorithm to the field of movie recommendation system, so as to solve the problems existing in the traditional recommendation algorithm based on ML and improve the execution efficiency of the model. After the design of recommendation system is completed, through further application experiments, it can be seen that this individualized recommendation system for movies based on ML will not only have a good user experience, but also have strong stability. Most users think that the algorithm can help them find the type they want from a large quantity of film and television resources, so as to meet the needs of users and tap their potential interests. When recommending, the system can consider multi-channel recall and joint recommendation, such as giving higher weight to recent popular movies to achieve mixed recommendation, thus improving the user experience.

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