Ideological and political exploration for teaching contents of recommendation system course

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Abstract: In the current process of vigorously promoting curriculum ideological and political education, big data and artificial intelligence courses are the forefront of ideological and political construction, and recommendation system is an important direction of big data and artificial intelligence. In this paper, some ideological and political elements are integrated into the deeds of outstanding figures and the examples in the recommendation system course. From the spiritual quality of outstanding figures, which is reflected in the process of scientific research, and the ideological and political replacement and emphasis of basic materials of some examples, students are helped to put up correct "Three Outlooks" and feelings of family and country and it is expected to promote the ideological and political construction of the recommendation system course to a certain extent.

Key words: Recommendation system course, teaching contents, deeds ideological and political education, examples ideological and political education

1. Introduction

A recommendation system will provide users with personalized recommendations based on their interests, hobbies or browsing/ purchasing behaviors. The recommendation system has a wide range of application scenarios, including not only familiar music recommendation, video recommendation, rating and comment, online game, seat recommendation and news recommendation, but also novel directions such as signal prediction, household energy waste and auction. It is an important branch and popular direction in the fields of big data and artificial intelligence at present and in the future.

Nowadays, with the development of curriculum ideological and political education in full swing in China, a large number of courses have been carried out the construction and reform of ideological and political teaching contents, teaching styles, teaching methods and teaching designs, including many popular big data and artificial intelligence courses in recent years. In terms of big data, the courses integrating ideological and political elements include big data technology[1], big data application practice[2] and medical big data[3], etc. In terms of artificial intelligence, the courses integrating ideological and political elements include artificial intelligence[4-5], introduction to artificial intelligence[6], introduction to computing and artificial intelligence[7], introduction to intelligent building design and construction[8], and artificial intelligence and intelligent manufacturing[9]. At present, there are some researches[10-11] on "recommendation system + curriculum ideological and political education", but they are scientific researches on how to design ideological and political courses and recommendation systems about teaching resources. So far, no teaching research has been found on integrating ideological and political elements into the recommendation system course. This paper focuses on how to organically integrate ideological and political elements into the teaching contents of the recommendation system course.

The recommendation system course has been set up in the school of computer, school of information management, school of automation, school of artificial intelligence, school of big data, school of statistics and school of mathematics in many universities. This course is in line with the development of the times and is deeply liked by students, but there is no education and teaching research on the ideological and political aspect of the recommendation system course at present. Under the tide of domestic curriculum ideological and political education, how to organically integrate ideological and political elements into the teaching contents of the recommendation system course is the research that this paper focuses on. Through the study of the ideological and political recommendation system course, students can not only understand or master collaborative filtering methods based on users and items, filtering methods based on item attributes, and recommendation methods based on classification analysis and clustering analysis, and experience the important applications of data mining and machine learning methods in recommendation systems, but also be helped to put up correct "Three Outlooks" and feelings of family and country, be made to understand the truth of life and work, and truly achieve the goal of cultivating virtue and talent.

2. Ideological and political deeds of outstanding figures

The reflections of outstanding figures in the field of recommendation systems in the ideological and political aspect are as follows:

First, pioneering and innovating: The deeds of outstanding figures reflect the spirit of continuous pioneering and innovating, and they have proposed new methods and technologies to improve or optimize the performance of recommendation systems. Their deeds inspire students to innovate and explore the importance of knowledge, and stimulate students' enthusiasm for participating in scientific and technological innovations. For example, Israeli computer scientist Yehuda Koren firstly proposed the collaborative filtering algorithm based on matrix decomposition, which improved the accuracy of recommendations. He has long focused on analyzing implicit feedback data, solving the problem of data sparsity, and considering time factors and studying dynamic recommendations to adapt to the changes of users' interests and behaviors.

Second, social responsibility: Designed recommendation systems need to meet the needs of users from different cultures and

backgrounds, and outstanding figures have rich theoretical and practical experiences in this respect, whose deeds can make students realize the importance of social responsibility and encourage them to design inclusive recommendation systems. For example, Professor Julian McAuley from San Diego of University of California proposed an algorithm that did not transmit recommendation contents with gender, race, or other potential biases to users, advocating for enhancing the transparency and interpretability of recommendation systems and enhancing the trusts of users.

Third, persevering in tenacious efforts: When facing difficulties and challenges, outstanding figures firmly believe that various problems can be solved and scientific and technological progress and field development can be promoted by continuous efforts and innovations. Through their deeds, students can understand the importance of perseverance in tenacious efforts for scientific research. For example, Susan Dumais, a researcher at Microsoft Research Institute, has been engaged in the research on personalized recommendation algorithms for a long time, and has presented a number of methods and technologies that have significantly improved the effectiveness of search engines and online advertising recommendation systems. Her long-term research accumulation and perseverance in tenacious efforts have had a significant impact on her in the academic community.

3. Ideological and political transformation of recommendation system examples

Examples are an important part of teaching contents, and their function is to make knowledge points easier for readers to understand. In the teaching process of the recommendation system course, there are introductive examples used to introduce a problem or connect the past and the future and typical examples about specific applications of recommendation methods. As an important aspect of ideological and political teaching contents, appropriate examples should be adapted for ideological and political purposes. The adapted examples can be roughly divided into two types: edification and enlightening.

The basic materials in the examples are replaced with the patriotic materials for edifying students' patriotic sentiments, and these ideological and political examples are classified as edification type. For example, (1) At the beginning of user-based collaborative filtering, after someone had browsed a book about China's strategy on the Amazon website, the website recommended similar books to him. These books show the contributions of our country to the development of the world. The Amazon website makes the recommendation by combining two parts of information: the first part is that I read the book "The Belt and Road from A Global Perspective"; the second part is that the customers who read this book also read the book "The Silk Road: A New World History". The recommendation methods learned in this chapter belong to user-based collaborative filtering. It is called "collaborative" because it makes recommendations based on other users' preferences (browsing or purchasing behavior). The process for people to make recommendations by collaborative filtering is as follows: If I want to recommend a book to you, I will search the Internet for the customers who have similar interests and hobbies to you and recommend the books that they are likely to like (browse or purchase) to you. Ideological and political education: "The Belt and Road" is not only an economic belt, but also a cultural belt. It creates more convenient conditions and a broader platform for cultural exchanges among the countries along the route. It helps the countries spread and accept the excellent cultures of other countries, advocates the cultural diversity, and promotes the common prosperity and development of culture. "The Silk Road" is an international corridor with profound historical significance, and the first bridge for connecting China and the western world. It connects the ancient cultures of China, India, Persia and Arabia with those of Greece and Rome, and promotes the exchanges between the eastern and western civilizations. (2) In the chapter of user-based collaborative filtering, the Manhattan distance between any two users is calculated according to the rating scores of the patriotic songs rated by the users. Assume that we serve an online streaming music provider and want to provide users with better experiences by recommending songs. Users can rate different songs on a scale of 1 to 5 stars, with half a star allowed. We need to calculate their Manhattan distances based on the patriotic songs that both users have rated. For example, if we want to calculate the Manhattan distance between Zhang Hua and Wang Ming, we need to use the rating scores that the both users have rated for "My Chinese Heart", "Ode to The Red Flag", "Mountain Red", "Nan Shan Nan" and "Fragrance of Rice". The patriotic songs in this example are used to convey the ideological and political contents of patriotism, national pride and national consciousness, which is helpful to cultivate students' patriotic feelings and stimulate their sense of social responsibility and feelings of family and country.

By emphasizing the important points in the examples, students are inspired to understand the truth of life and work, and these ideological and political examples are classified as enlightening type. For example, if the values of attributes with different orders of magnitude are not preprocessed, the calculation results will be easily dominated by the attributes with higher orders of magnitude. The values of attributes should be standardized so that the values of all attributes are of the same order of magnitude, inspiring students on the importance of "equality for all" and "equal communication". Assume that there is a dating website that believes that the best attributes for gender matching are age and salary. The maximum difference of age is 28 years old, while the maximum difference of salary is 72000 dollars. Because the maximum differences of the two attributes are very different, salary is dominant. If any distance calculation method is used, it is obviously unreasonable that Brain who is 53 years old will be recommended to Yun who is 35 years old. The solution is to use the standardization of the maximum difference to preprocess the data of age and salary respectively such that the values of the attributes are of the same order of magnitude. It enlightens students that "equality for all" and "equal communication" are the foundations for constructing the fair, just and harmonious society and interpersonal relationship. They help to create a better social environment, improve individual and collective happiness and satisfaction, and promote social progress and development.

4. Conclusions

This paper explores the ideological and political transformation of the teaching contents of the recommendation system course. From the three aspects of pioneering and innovating, social responsibility, and persevering in tenacious efforts, some ideological and political elements are integrated into the deeds of outstanding figures in the field of recommendation systems, and the appropriate examples are adapted from the two aspects of edification and enlightening, in order to help students put up correct "Three Outlooks" and feelings of family and country.

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