

Ideological and political exploration for some recommendation methods

Jianxi Zhao

School of Applied Science, Beijing Information Science and Technology University, Beijing 102206

Abstract: In the current wave of curriculum ideological and political education in China, artificial intelligence course is an important and frontier field of ideological and political construction. Recommendation system is one of the core directions of artificial intelligence, and recommendation system course has been widely offered in numerous colleges and universities. This paper tries to integrate ideological and political elements into some collaborative filtering methods based on users and items, filtering methods based on item attributes, and recommendation methods based on classification analysis and clustering analysis. The ideas/formulas/characteristics of the methods are compared with some ideological and political contents, such that some abstract statistical analysis methods can be visualized, students can be enlightened to understand the truth of life and work, and they can be helped to put up correct “Three Outlooks”.

Key words: recommendation system, recommendation methods, curriculum ideological and political education

I. Introduction

A recommendation system will provide personalized recommendation services for users based on their preferences or behaviors. At present, the recommendation system has been widely used in entertainment fields such as music, video, game, movie and tourism, as well as novel application fields such as furniture, medical care and education. For example, in the field of smart home, the recommendation system can recommend suitable home products for users according to their living habits and preferences. In the field of health care, the recommendation system can recommend suitable treatments for patients according to their conditions and medical histories. In the field of education, the recommendation system can recommend suitable courses and textbooks for students according to their learning situations and interests. Recommendation system has become one of the hot directions in the field of artificial intelligence and will continue to play an important role in the future.

In August 2019, the General Office of the Communist Party of China Central Committee and the General Office of the State Council issued Several Opinions on Deepening the Reform and Innovation of Ideological and Political Curriculums in Schools in the New Era that clearly proposed to comprehensively promote the construction of curriculum ideological and political education in colleges and universities. In May 2020, the Ministry of Education issued the Guidelines for the Construction of Curriculum Ideological and Political Education in Colleges and Universities that laid out a comprehensive plan for the construction of curriculum ideological and political education. Nowadays, the ideological and political education of university courses is being carried out in full swing. Many courses have been carried out the construction and reform of ideological and political teaching contents, teaching styles, teaching methods and teaching cases, including the widely concerned artificial intelligence courses such as computer vision, machine vision, pattern recognition, machine learning, data mining and machine learning, deep learning, medical information retrieval and utilization, natural language processing, graphics and image processing, artificial intelligence and intelligent manufacturing, etc. At present, the work on the combination of recommendation system and curriculum ideological and political education is mainly about the scientific research on the design of the recommendation systems of ideological and political teaching resources, and there is no education and teaching research on the integration of ideological and political elements into recommendation methods.

Recommendation system course has been set up in many colleges and universities in the schools of computer, information, automation, artificial intelligence, big data, statistics and mathematics. This course keeps up with the development trend of the times, has extensive applications, and is well received by students. However, up to now, there is no education and teaching research on the aspect of curriculum ideological and political education of recommendation system course. Under the tide of domestic curriculum ideological and political education, how to organically integrate ideological and political elements into recommendation methods is the focus of this paper. Through the study of 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, but also understand important applications of data mining and machine learning methods in recommendation system, which can also help students to put up correct outlooks on life and values. It enables students to understand the truth of life and work, and the goal of cultivating virtue and talent can be truly achieved.

II. Ideological and political exploration for recommendation methods

In this paper, ideological and political contents (socialist core outlook on values, basic principles of life and work and so on) are integrated into some collaborative filtering methods based on users and items, filtering methods based on item attributes, and recommendation methods based on classification analysis and clustering analysis. In this paper, some recommendation methods are compared with some ideological and political contents, such that some abstract statistical analysis methods are visualized. Thus, students can

intuitively understand the recommendation methods and the truth of life and work.

When teaching user-based collaborative filtering, we mainly learn several recommendation methods such as Manhattan distance, Euclidean distance, Pearson correlation coefficient and cosine similarity. Each recommendation method has its own advantages and disadvantages: the calculation speed of Manhattan distance is fast and Pearson correlation coefficient can solve the difference problem of different users' rating ranges, but these two methods have high requirements for data integrity. Fortunately, cosine similarity can effectively analyze sparse data. Through the comparison of advantages and disadvantages of different recommendation methods, students are educated to "learn from others' strengths and make up for their own shortcomings", appreciate and respect others' advantages and strengths, and examine their own shortcomings for seeking improvement and development. User-based collaborative filtering recommends potentially interesting contents by analyzing the similarity between users, which is similar to the collectivism spirit and teamwork quality in ideological and political education.

When teaching item-based collaborative filtering, in the adjusted cosine similarity formula, each user's rating score minus the mean of the rating scores for making all users' rating scores "zero-centered", which educates students that everyone is equal and we should respect people with different backgrounds, cultures and viewpoints, cultivate students' ability of cross-cultural communication and cooperation, and identify and combat inequalities in society. In the process of globalization of today's society, cross-cultural communication and cooperation have become a necessary competence. By learning this ability, students are able to better understand and respect people from different cultural backgrounds, such that they can cooperate better with others in a diverse environment. Through the weighted Slope One algorithm, students are made to realize the importance of "collective thinkings and democratic decision-making". In work and life, many problems need to be solved by collective thinkings. The weights of different users may be different, and the votes of different users may have different degrees of influence on the results, which inspires students to attach importance to the power of "collective wisdoms and democratic decision-making", learn to listen to collective thinkings, and actively participate in the process of "collective discussions and decision-making".

When teaching filtering methods based on item attributes, the traditional Z-Score standardized method is easily affected by outliers, which is because Z-Score standardized method takes the mean as the center for data conversion, while outliers are often far away from the mean, resulting in less accurate standardized results. The improved Z-Score standardized method solves this problem well using the median instead of the mean for data conversion. Because the median is robust to outliers, the improved Z-Score standardized method is also robust to outliers, and can significantly improve the accuracy and reliability of content-based collaborative filtering recommendations. Through these two methods, students are enlightened about the importance of stability for the country. National stability is an important foundation for maintaining social harmony, attracting foreign investment, promoting economic growth and safeguarding the national economy and people's livelihood. A stable national environment can maintain good social order, provide a solid economic foundation, and create better living conditions and development opportunities for people. As citizens, we should cherish and maintain national stability and contribute our share to the development of our country and society. No matter in life or work, people need to face various changes and challenges. Only by maintaining a steady and tenacious mind can we cope with all kinds of difficulties.

When teaching recommendation methods based on classification analysis (kNN method and Bayesian formula), students are inspired to find the best group for them according to their specialties and interests, and share knowledge, experience and insights with like-minded people. Experienced people can provide them with guidance, advice and feedback. With excellent peers, they can stimulate their sense of competition. Building relationships with people in the group can lay the foundation for future collaboration. Classification methods summarize and simplify complex things, so they can help people to better understand and solve problems and inspire students to understand and transform the world with rational and logical thinkings. KNN method determines the category of samples to be classified by the category of their adjacent samples, which is in line with the spirit of collectivism. Individual interests are closely related to collective interests, and individuals should obey the decisions of organizations. At the same time, it inspires students to live in harmony with the people around them, reduce conflicts and contradictions, and jointly maintain social stability. Some improved kNN methods, in addition to considering the distances between the samples to be classified and other samples, also considering the attributes of the samples to be classified, inspiring students to not only improve their professional abilities, but also cultivate their moral quality, so as to achieve both virtue and talent, in order to better serve society. For Bayesian formula, ideological and political exploration from the following three aspects: open thinking: dialectical thinking emphasizes open thinking and multi-view thinking on problems. Through Bayesian formula, students can obtain new information and update their views from different perspectives and information sources. They can examine and reevaluate their opinions, accepts new evidences and perspectives, such that they think more holistically. Reflection and revision: Bayesian formula calls for reflection and revision for probabilities. In ideological and political education, students can constantly reflect on and revise their own outlooks on values and world through the mode of thinking of Bayesian formula. They can actively seek out new information, different viewpoints and diverse experiences to update their cognition and mode of thinking. Comprehensive ability cultivation: Bayesian formula requires the synthesis of prior probability and conditional probability to obtain a more accurate posterior probability. In ideological and political education, students need to synthesize various ideas, subject knowledge and practical experience to form their own comprehensive thinking ability. They can integrate different viewpoints and information through the mode of thinking of Bayesian formula to form their own thinking system and judgment.

When teaching recommendation methods based on clustering analysis (hierarchical clustering method and k-means clustering method),

students are inspired to learn the truth that “birds of a feather flock together and people are grouped together”, helping them to understand the diversity of society. The clustering methods are used to divide users into different groups, and then personalized recommendations are made according to characteristics and needs of different groups, so as to improve the recommendation’s accuracy and users’ satisfaction, and recommend goods or services that are more in line with users’ interests and hobbies. People in same groups have same or similar values or cultural backgrounds. They may come from same regions or have common interests and hobbies. The clustering phenomena reflect the diversity of society, and there are significant differences and characteristics among different groups, which are valuable assets of human society. Whether at home, at school or in society, we should identify and tolerate the cultural backgrounds and living customs of different groups. Only by understanding and respecting each other’s differences can we build harmonious social relations and promote social stability and development.

III. Conclusions

As one of the core directions of artificial intelligence, recommendation system has been widely used in the service industry. In the current wave of ideological and political curriculum in China, this paper integrates ideological and political elements into some collaborative filtering methods based on users and items, filtering methods based on item attributes, and recommendation methods based on classification analysis and clustering analysis. The ideas/formulas/characteristics of some methods are compared with some ideological and political contents, such that not only the abstract statistical analysis methods are visualized, but also students are helped to understand the truth of life and work and put up correct “Three Outlooks”.

References:

- [1] Jinhua Wang, Guangmei Xu, Ning He, et al. Exploration and Practice of Integrating Ideological and Political Education into Postgraduate Curriculum System -- A Case Study of Computer Vision Course [J]. *Modernization of Education*, 2019, 7(56): 131-134.
- [2] Huagang Liang. Research on Ideological and Political Teaching Methods of “Machine Vision” Course [J]. *Journal of Electrical and Electronic Teaching*, 2021, 43(05): 112-115.
- [3] Wei Li, Zhen Zhang. “Wisdom Enlightenment” and “Feelings Education” in the Course of “Pattern Recognition” [J]. *Journal of Electrical and Electronic Teaching*, 2021, 43(03): 33-35+119.
- [4] Yage Wang, Yong Liu, Mengli Du, et al. Exploration and Practice of Integrating Curriculum Ideological and Political Education into the Teaching of Machine Learning Course [J]. *Computer Knowledge and Technology*, 2022, 18(33): 167-170.
- [5] Lingling Wang, Deyi Xu. Research on Integrating Ideological and Political Education into the Teaching of Data Mining and Machine Learning [J]. *Modern Vocational Education*, 2022(10): 25-27.
- [6] Xiaoxiao Hu. Teaching Cases of Deep Learning, into Which Integrating Curriculum Ideological and Political Education - Infinite Series [J]. *Mathematics Learning and Research*, 2023(3): 11-13.
- [7] Yaqing Fang, Lina Zhu, Huimei Hu, et al. Exploration and Practice of Teaching Reform of Medical Information Retrieval and Utilization from the Perspective of Curriculum Ideological and Political Education [J]. *Chinese Journal of Medical Library and Information*, 2022, 31(10): 75-80.
- [8] Jian Liao, Suge Wang, Shan Qi. Mining and Practical Research on Curriculum Ideological and Political Elements of Natural Language Processing Course for University Computers [J]. *Heilongjiang Higher Education Research*, 2022, 40(09): 156-160.
- [9] Ying Zhang. Practice of Computer Curriculum Ideological and Political Teaching under the Mode of “One Core and Two Integration” -- Taking Graphics and Image Processing Course as an Example [J]. *Guangxi Education*, 2022(29): 32-35.
- [10] Lingying Pan, Jianjia He, Yijing Fan. Exploration of Curriculum Ideological and Political Teaching under the Background of New Engineering -- Taking Artificial Intelligence and Intelligent Manufacturing Course as an Example [J]. *Theoretical Research and Practice of Innovation and Entrepreneurship*, 2019, 3(22): 55-56+59.
- [11] Zhipeng Yang, Xuexue Liu. Design of Resource Personalized Recommendation System for Ideological and Political Theory Based on Data Mining [J]. *Automation Technology and Applications*, 2023, 42(01): 93-96.
- [12] Fan Zhang, Guoquan Liu. Research on Recommendation System of University Ideological and Political Courses Based on Improved Collaborative Filtering Algorithms [J]. *Microcomputer Applications*, 2019, 36(09): 1-4.