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Research Progress on the Design of a Personalised System for Graduate Employment Recommendation

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Abstract: According to the National Bureau of Statistics, the employment growth rate of graduates of colleges and universities in China has been declining year by year, and the employment pressure on students of colleges and universities has intensified, and the frequency of job changes for most graduates has increased significantly. Facing the severe employment situation, the employment guidance and recommendation work undertaken by colleges and universities also put forward new requirements. How to let students identify their own abilities and interests and preferences has become a key research issue in the employment guidance work of colleges and universities. At present, the employment information system of China's colleges and universities is not perfect, the employment guidance work is still based on the traditional employment counselling as the main way, which only contains the function of collecting and conveying the employment information and can not provide one-to-one personalised guidance to each student, not to mention that it can not dig out the characteristics of the students' own abilities, and recommend the suitable jobs for the students.

Keywords: System; Personalised; Graduate employment

Introduction

In recent years, a large number of public employment information websites have emerged, such as Wisdom Link, 58 Job Search and Lashou.com, etc. These websites contain rich job information, covering a wide range and simple reading. For newly graduated college students, these websites are based on the perspective of enterprises, more concerned about what kind of talents are recruited, which is more universal and lack of target for graduates. At the same time, the information resources contained in such websites are broader, but not divided according to standard school subject categories, which requires a lot of time for graduate job seekers with zero experience to search, and finding the target information quickly and accurately is a great challenge for graduates who are still in their study period [1]. Therefore, the construction of this type of employment recruitment website can provide an improvement direction for the innovation and perfection of the employment information service system of colleges and universities, and colleges and universities can also carry out effective mining and comprehensive analysis through the website of the University, according to the professional and development characteristics of students and their distribution of employment information of students in colleges and universities in previous years, and in response to the huge amount of information on job openings and job information big data. For each college graduate job seekers to provide real-time, targeted professional and personalised college employment recruitment information consulting services [2]. This approach is important for improving the employment rate and employment level of students.

1. Status of employment information systems in higher education

After preliminary research, foreign institutions have a high degree of information technology construction and are now widely using employment service information systems for their graduates. For example, Ivy League universities such as Columbia University and Yale University in the United States began to establish information technology services and management systems for their graduates in the 1970s. At the same time, the United States is also an important origin of modern computers and networks, so most colleges and universities have been using their own website platforms on the Internet for a long time to publish relevant job postings and collect detailed information about students' employment in the Internet [3]. However, as of 2018, according to the Employment Quality of U.S. Graduates report, U.S. college and university graduates are utilising employment information systems at about 40% [4]. In addition, while Japanese colleges and universities lag behind the United States in terms of employment information system infrastructure, they attach great importance to student career guidance. The employment system of Japanese colleges and universities is modelled on that of American schools, and therefore students make more use of the employment information system [5]. Some universities in Europe, on the other hand, cooperate with the government, which establishes a

professional career guidance centre to provide students with a perfect employment security system and services [6]. Therefore, for the development of employment information system in foreign universities, its characteristics are summarised as follows: early start, fast development, more perfect function and relatively high utilisation rate.

At present, the employment information system of domestic colleges and universities is still in the primary stage of development and construction, and many systems are not fully functional, and most college and university websites can only provide basic information services. At the same time, a large number of public employment service websites have emerged in recent years, further squeezing the development space of university employment service system. However, many social recruitment websites, such as MileagePlus.com, WisdomLink.com and China Talent.com, have a wide range of job information, but the distinction between job categories is vague, and they focus more on job seekers who are in need of social needs. For college graduates who have not graduated and have not entered the society, it cannot provide more professional services and guidance, and may even affect the future career development of college students due to the interference of the job information provided by some uneven websites [7]. In contrast, the employment information system for colleges and universities has not been adapted to market demand, employment information lags behind, and the construction of information systems is not sound.

2. Job referral system for graduates

For recommender systems, its idea as an important algorithmic application in machine learning theory originated in the 1980s of the last world [8]. The first boom in the research of recommendation algorithms was co-proposed by Goldberg et al. in 1992, who used the idea of collaborative filtering to categorise users for their webmail usefulness [9]. The concept of recommender systems was first proposed by Resnick et al. in 1997, and since then research on recommender systems has also served as an important field [10]. In recent years, the body of knowledge of recommender systems combining data information has been rapidly developing and expanding, and a great deal of its content contains knowledge and research results from several disciplines and fields related to recommender algorithms, such as data mining, information gathering and retrieval, and artificial intelligence, etc., and it is also widely used in its basic research, such as cognitive psychological sciences, fuzzy theories, theories of information retrieval and prediction, etc., related to the methods of recommender systems [11]. In recommender systems, the recommendation algorithm is its core content, which is specifically defined as the use of user preferences and behaviours to select the user's preferred or suitable objects from a large number of candidate objects through appropriate mathematical methods [12]. Because for the current recommender system application direction is more and complex, so the recommendation algorithm does not have a standard definition and classification, commonly used recommender system algorithms main types are: collaborative filtering based recommender system algorithms, knowledge-based recommender algorithms and content-based recommender algorithms and so on [13].

In the employment job recommendation system for graduates, due to the strong targeting and low attention, most of the studies use a single method, which is still dominated by the recommendation method based on collaborative filtering. This type of method is mainly based on the interests and historical employment preference information of other similar users, and after collecting and analysing their preference characteristics, the employment interests and historical job preferences of other similar users are browsed and recommended to the user. For example, Wu Di [14], based on the direction of employment preferences of previous graduates of his school, also recommended the historical employment destinations of previous graduates who were similar to the current graduates to the current graduates, respectively, by comparing the similarity of employment between the current graduates and the previous graduates after they left school. Cao Hongjiao[15] proposed an employment analysis and recommendation algorithm for college graduates based on the analysis and perception of user's personality and scenarios, which will comprehensively analyse the user's social relationship and actual scenario perception and use it as an algorithm used for employment recommendation, combined with the idea of collaborative filtration, to establish a demand and preference bias model combining the user's personality and scenarios. At present, the collaborative filtering-based recommendation algorithm is still the mainstream algorithmic framework, but it needs to collect a large number of users' historical information and needs to be oriented to multiple user objects, without paying attention to the personalised characteristics of the users themselves, and the overall process is too cumbersome to satisfy the practical application requirements of the university employment recommendation website system [16]. In recent years, graduates‘ personalised characteristics needs have gradually been taken as an important consideration in job recommendation systems, and there is a lack of research and use of content-based recommendation algorithms in university employment recommendation systems, mainly due to the lack of a large amount of recruitment information and the lack of in-depth research and analysis of students’ personalised needs.

3. System overview analysis and related technologies

Recommender system is an important research topic in the field of data mining, which has the requirements of real-time and good interactivity. The most important application areas of early recommender systems are information retrieval and information filtering. Of course, due to technical limitations, such related systems usually need to take a manual approach to operation and recommendation. The

disadvantage is the high cost of manpower, and the system may recommend the same information to all users, resulting in multiple users receive the same information, this approach is difficult to meet the needs of different users, and is very lack of relevance, and can not achieve personalised satisfaction of the recommendation effect. Research and application of new information retrieval methods and recommendation algorithms have also become an important scientific research and application direction. As a result, personalised recommendation systems and information management systems have emerged, which, to a certain extent, have allowed recommendation systems and information management systems to undergo new upgrading and transformation in terms of functionality, transforming from the previous information retrieval-oriented approach to the user's or the user's own preferences and needs as the main guide. At the same time, this kind of personalised recommendation system and information management system also completed the 'fuzzy search' method to 'personalised recommendation' method of the major transformation. In the establishment and development of personalised recommendation system, its prominent features are massive data processing and more intelligent data mining. This type of system can simulate the work of human resource consultants in the job market, that is, to provide job information and advice to each user, to provide more complete personalised decision-making support for each job seeker, and to provide the corresponding information services. In summary, it can be seen that the advantages and disadvantages of the design of the recommendation system can directly determine its functional ceiling, excellent recommendation system, can effectively promote the solution to the problem of students 'difficult to find employment', and for the website enterprise to bring considerable benefits.

The personalised recommendation system is mainly divided into: (1) user-system interaction interface module composed of user management terminal and Web server interaction; (2) data mining and analysis preprocessing engine module composed of data mining and preprocessing engine, database, data warehouse, Web information mining and analysis; (3) personalised recommendation and data processing module composed of basic information recommendation model library, personalised recommendation engine and data processing module. (3) Personalised recommendation and data processing module composed of basic information recommendation model library and personalised recommendation engine.

References

[1] Li Tao. On the Construction of College Students' Career Development and Employment Guidance Service System [J]. Education and Career, 2019, (12).

[2] Zhao Aiqin. Practical Exploration of Constructing the Employment Service Platform for University-Enterprise-Linkage College Students[J]. Education and Career, 2019, (14).

[3] Sun Wenbo, Yan Guxi. Research on the Path of Improving the Quality of Employment Service in China's Colleges and Universities-Based on the Inspiration of Employment Service Work in Foreign Colleges and Universities[J]. Journal of National College of Education Administration, 2016, (9): 84-88.

[4] Pan Y. Design and implementation of employment management system based on data mining technology[D]. University of Electronic Science and Technology. (2012).

[5] Song Jiajia, Wang Liyan. Experience and reference of employment and entrepreneurship education in Japanese universities[C]. Liaoning Higher Education Society 2015 Annual Academic Conference and the Sixth Forum of Young and Middle-aged Scholars. 2015.

[6] Wang Fan. Analysis and Inspiration of German College Graduates' Employment Service System[J]. Modern Enterprise Education, 2012, (23): 94-95.

[7] Li Jian, Yang Xing, Li Juncheng et al. Design of employment information management platform based on big data technology and feature recommendation[J]. Computer and Modernisation. 2018, 06: 103-107.

[8] Konstan J A. Introduction to Recommender Systems: Algorithms and evaluation [J]. ACM Transactions on Information Systems. 2004, 22(1): 1-4.

[9] Goldberg D, Nichols D A, Oki B M, et al. Using collaborative filtering to weave an information TAPESTRY[J]. Communications of the ACM, 1992, 35(12): 61-70.

[10] Michael D. Resnick, Peter S. Bearman, Robert Wm. Blum, 等. Protecting Adolescents From Harm: Findings From the National Longitudinal Study on Adolescent Health[J]. 1997, 278(10): 823-832.

[11] Tang W. Design and implementation of personalised video recommendation system based on Web mining[J]. Electronic Design Engineering. 2018, 26(18), 102-106.

[12] YANGYONG ZHU, JING SUN. Research progress of recommender system[J]. Computer Science and Exploration, 2015, 9(5): 513-525.

[13] Peng T, Wang W, Gong X Y, et al. A Graph Indexing Approach for Content-Based Recommendation System[C]. IEEE International Conference on Multimedia and Information Technology. 2010.

[14] Wu Di. Design and development of employment recommendation system for school leavers [D]. Dalian University of Technology. 2010.

[15] Cao Hongjiao. Design and implementation of employment recommendation system for college students based on situational awareness [D]. Central China Normal University. 2014.

[16] Pan Lifang, Zhang Dalong, Li Hui. Research on user-based collaborative filtering (UserCF) news recommendation algorithm[J]. Journal of Shanxi Normal University (Natural Science Edition). 2018, 32(04): 26-30.