

## Design of Online Learning Resource Recommendation Platform Based on College Students' Career Planning

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### Abstract

Today is the information age, the development of information society has brought about the increase of knowledge data, making learners confused when choosing learning resources. This paper focuses on the research background, expounds the current status of college students' career planning research and the demand for college students' career planning learning resources recommendation platform. The advantages and disadvantages of existing recommendation algorithms are understood through a brief introduction of recommendation algorithms, and the preliminary design of online resource recommendation platform is analyzed, aiming to provide reference for later research.

### Keywords

College students; Career planning; Online Resource Recommendation.

### 1. Introduction

With the rapid rise of emerging computer technology and the wide application of online communication technology, people's life and learning style has changed a lot, ushering in the era of information education. In the traditional learning can't satisfy students need for personalized learning, online learning arises at the historic moment, however, as the growing number of online learning platform, learning resource is becoming more and more diversified, the education of big data size increasing, the learning resources of "information overload" problem, the learner is submerged in the ocean of "resource", It is difficult to choose the right resources from the mass of learning materials. Therefore, how to enable learners to quickly find valuable resources has become a major problem in online learning. Online resource recommendation can effectively alleviate problems such as resource overload. At the same time, as an important part of college students' learning activities, it is necessary to design and develop a recommendation platform for college students' career planning learning resources, which is also helpful to employment counselors to a certain extent.

The concept of recommendation system was first put forward by foreign researchers at the end of the 20th century. From March to August 1995, Marko Balabanovic and Carnegie, researchers in Stanford University laboratory, studied the recommendation system. Robert Armstrong of Mellon University (CMU) and Henry Lieberman of the Massachusetts Institute of Technology (MIT) laboratory have each developed a recommendation system: LIRA recommendation system, Web Watcher navigation System, and Letizia navigation Agent. The development of personalized recommendation research in foreign countries also started due to the emergence of these three systems [1]. However, domestic researchers began to study the recommendation technology in the early part of this century, nearly ten years later than foreign researchers. In 2000, Lu Haiming et al from Tsinghua University proposed the realization of personalized recommendation based on multi-agent hybrid intelligence, marking the official start of the research on personalized recommendation system in China [2]. Since then, with the

development of the Internet and e-commerce, recommendation system has attracted more and more attention. From the perspective of combining the current career planning of college students with the research on resource recommendation, this paper considers the selection of resource recommendation algorithm and the theoretical basis applied to it, and constructs the general framework of resource recommendation platform to prepare for the later research.

## 2. The Research Background

### 2.1. National Policy Support

In the information age, virtual learning, mobile learning, ubiquitous learning and other learning methods are derived, which all rely on the continuous development and evolution of online learning. Online learning has become an indispensable way for college students to learn. In the Outline of The National Medium - and Long-term Education Reform and Development Plan, it is proposed to "establish a guidance system for students' development and strengthen the guidance for students' ideals, psychology, studies and other aspects" [3]. At the same time, General Secretary Xi has repeatedly talked about the importance of human resources: "Talent is the first resources, is also the most active in innovation activity, the most active factor", must build the innovation vigorously in the whole society, encouraging success and good atmosphere of tolerance of failure, work for talent, talent to provide broader heaven and earth, and let them develop people, principles, with has become. "We will give priority to our career, choose people according to the situation, and make sure that we hire the people we need for our career development and the people who are most suitable for us." It can be seen that the cultivation of human resources needs the efforts of all colleges and universities. From the beginning of students' admission, they need to plan their career so that they can adjust their plans timely in the future study, get well prepared for the future employment and find jobs that match their career interests. At the same time, the personnel with reasonable career planning have the characteristics of man-post matching and personality matching, and these people have sufficient endogenous motive force of work, which is the main human resources for realizing the socialist modernization of China.

The report of the 19th National Congress of the Communist Party of China clearly points out that college graduates and other young people should be encouraged to find jobs and start businesses through multiple channels, adhere to the employment priority strategy and active employment policy, and achieve higher quality and fuller employment [4]. Colleges and universities are the main position and important channel for college students to receive employment guidance and education, and an important link for college students to carry out career planning. The CPC Central Committee and The State Council clearly put forward that the employment of college graduates should be the first place in the current employment work. General Secretary Xi Jinping pointed out in the report of the 19th National Congress that "employment is the biggest livelihood" [5]. The Ministry of Education issued a notice on printing and distributing the Teaching Requirements of Career Development and Employment Guidance course for College students, requiring that "career planning and employment guidance for college students" be included in the teaching plan, and set this course as a public compulsory course, open to all students. Career planning education should be differentiated according to college students' grades, majors, categories, etc., and individualized guidance should be carried out according to different types, which is a long-term, step-by-step and whole-process guidance throughout the whole stage of college life [6]. The Ministry of Education about to do a good job of 2021 session of the national ordinary university graduate employment entrepreneurial notice also emphasizes to strengthen college students' career development education, the organization carries out the "national college students' career development education activities month" activities, local universities should according to

different grade students career development and employment guidance activities, provide career development consultation and employment counseling service. Career planning in colleges and universities can help college students establish a correct view of employment, improve their rational planning ability, and find the most suitable field for their potential under the high intensity of market competition according to their own strengths, so as to create greater value.

## 2.2. The Inevitable Demand of Education Informationization Development

According to the 46th Statistical Report on Internet Development in China released by China Internet Network Information Center (CNNIC) in September 2020 [7], as of June 2020, the scale of Internet users in China was 940 million, 36.25 million more than that in March 2020, and the Internet penetration rate reached 67.0%. An increase of 2.5 percentage points from March 2020. Meanwhile, from June 2017 to June 2020, the number of online education users in China has been growing. By June 2020, the number of online education users reached 381 million, accounting for 40.5% of the total Internet users. In July, the National Development and Reform Commission, the central net letter office, the Ministry of Industry and Information Technology such as 13 departments jointly issued by the on the healthy development of the new model to support the new formats and activate the consumer market to drive's opinions on expanding employment, made it clear to develop the integration of online education, build online education normalized integration development mechanism, form the benign interaction pattern [8]. It can be seen that online education is becoming more and more important, while college students' career planning needs to start from entering school and run through the whole teaching process. Offline education is limited by time and space, so the development of online courses of college students' career planning education is becoming more and more important.

## 2.3. The Practical Needs of College Students in Career Planning

With the rapid development of science and technology in contemporary society, the employment situation of college students is becoming increasingly severe, and the competition in the talent market is becoming more and more fierce. The number of college graduates in 2021 has reached a record high. Although the government has introduced a series of policies to promote the employment of college students, such as the "three support and one support" plan and the "Special post teacher" plan and a series of safeguard measures, the number of jobs needed by the huge employment population increasing every year is far from enough. Especially in 2020, under the influence of the epidemic, market demand has decreased, and the employment situation has become worse. The epidemic has changed the employment concept of college students. With the increase of employment pressure, some college students can only lower their standards to seek employment opportunities. However, due to the lack of career planning, they still face many problems after employment. Therefore, it is very advantageous for college students to make good career planning in the face of the rapidly changing job market. Sun Tzu's Art of War says, "Only by knowing yourself and your enemy can you overcome the danger of a hundred battles." College students through the career planning self-understanding, to explore yourself, through the understanding of professional, exploration and understanding of environment and exploration to determine the suitable for their own career, have a clear goal, as the goal, at the same time, according to the surrounding environment and the social development need to evaluate the decision-making, target and the behavior, constantly amended in order to achieve the most suitable for their own development path.

## 3. Recommendation Algorithm

As the core of resource recommendation system, recommendation algorithm is mainly divided into content-based recommendation, collaborative filtering recommendation and mixed

recommendation according to the statistics of existing literatures. Content-based recommendation is recommended, the principle of intuitive, easy to explain, recommended the results more accurate, obtain tallies with the characteristics and the needs of users and there is no cold start problems, etc., but there is a new user is difficult to obtain, unable to mining the user's interests, potential for some complex attribute is difficult to deal with, The amount of data also needs to be large enough to support its performance. Content-based recommendations are more suitable for text-based recommendations.

Collaborative filtering recommendation algorithm is the most widely used and most studied personalized recommendation technology, its main idea is based on the current existent history score information to calculate the similarity between user or project, according to the similarity search for a user or similar group of the project, through the grading for recommended list of similar groups recommended [9]. Collaborative filtering recommendation algorithm can find interest, with the passage of time in a timely manner recommended by the automation and personalized effect is good, can be a good treatment for complex object, but easily affected by cold start problem, at the same time there are data sparseness problem, recommend early effect is not obvious, the accuracy of recommendation is affected by the historical data. The advantages and disadvantages of different recommendation algorithms are analyzed by comparative analysis method. Combined with the requirements of the career planning resource recommendation platform, the hybrid recommendation method is adopted to recommend resources, and the collaborative filtering recommendation algorithm is combined with content-based recommendation algorithm.

## **4. Preliminary Design of Learning Resource Recommendation Platform**

### **4.1. The Construction of Learner Characteristic Model and Learning Resource Model**

The target users of this resource recommendation platform are teachers in the employment department of colleges and universities, employment counselors and college students, who have strong independent learning ability and clear learning goals, and are suitable for online self-learning of a complete whole course. Based on the questionnaire survey of employment department teachers, employment counselors and students, combined with the characteristics of college students' career planning education, the demand analysis of learning resource recommendation platform is carried out, and the learner characteristic model and learning resource model are constructed.

#### **4.1.1. Learner Characteristic Model**

According to the standard of learner information data exchange in China, namely Learner Model Specification CELTS-11, learner information is divided into eight types: personal information, academic information, management information, relationship information, safety information, preference information, performance information and portfolio information. According to the needs of this paper, the learner characteristic model will be constructed by combining the learner's personal information and preference information. Before learners begin to learn, Holland Vocational Interest Scale and MBTI Vocational Personality Test scale are used to test, and learners' behavioral data (including browsing resources, feedback, learning diagnosis, etc.) are acquired during the learning process, and learners' characteristics are analyzed in detail to establish learners' characteristic model.

#### **4.1.2. Learning Resource Model**

The construction of learning resource model is mainly based on the types of learning resources. The learning resource library is shown in Figure 1:

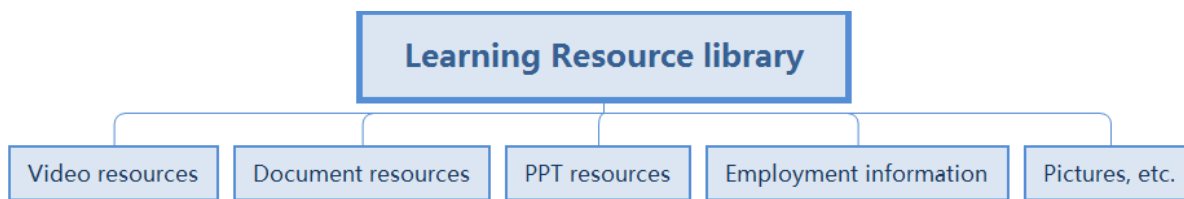


Figure 1. Learning Resource library

In resource recommendation, learners can study the whole module of career planning education (including video resources, PPT resources, document resources, etc.), and recommend employment information and career planning information to learners through their majors and relevant browsing records.

#### 4.2. Preliminary Design of Learning Resource Recommendation Platform

According to the actual needs of college employment counselors and college students for the recommendation platform of career planning education resources, wechat small program is developed with PHP language, JavaScript language and ThinkPHP architecture. Among them, the preset function of the recommendation platform is shown in Figure 2.

On the resource recommendation platform, learners can study the whole course of career planning education, ask questions, and accurately push employment information according to each student's major and other information. The publishers of employment information are mainly college employment counselors and employment department teachers, who can publish resource information or modify resources. The administrator is mainly responsible for platform maintenance, database management and so on.

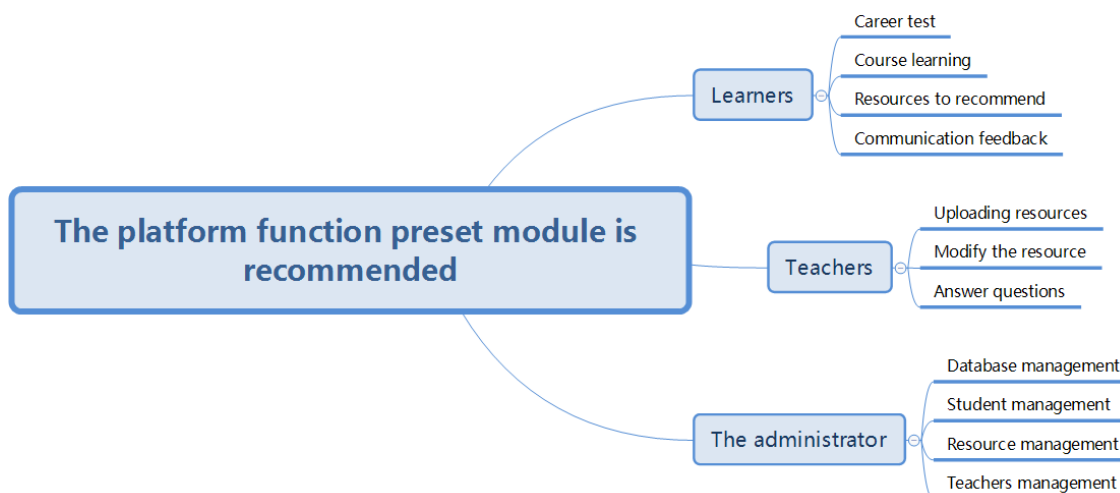


Figure 2. Learning Resource library

### 5. Conclusion

The development of online education, based on China's national conditions, conforms to the needs of The Times, especially after the occurrence of "COVID-19", it is to promote the development of online education. The development of recommendation system has been involved in various industries and has broad prospects for development and application. Although it started late in China, more and more researchers have begun to study recommendation technology in the field of educational resources. As a young generation, college students have a long way to go. Their learning career affects their employment, so they should make a good plan at the beginning of their college life. This paper mainly discusses the

reasons for the topic selection and the algorithms involved in the design from the theoretical point of view to prepare for the later development.

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