# Construction of University Students Innovation and Entrepreneurship Resource Database Based on Collaborative Big Data Analysis

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**Abstract.** In recent years, with the continuous promotion of teaching reform in our country, the society has higher and higher requirements for talents. Combined with collaborative big data, this paper analyzes the construction of university students' innovation and entrepreneurship resource database. According to the requirements of teaching reform, colleges and universities should strengthen their own work construction, attach great importance to the construction of university students' innovation and entrepreneurship resource database, and provide a large number of innovative talents for social development.

**Keywords:** Collaborative big data · College students · Innovation and entrepreneurship · Database construction

## 1 Introduction

Innovation and entrepreneurship education is to adapt to the current stage of economic transformation and upgrading, to cultivate talents with innovative spirit, innovative consciousness and creative ability as the goal, set knowledge, professional and innovation and entrepreneurship as one of the quality education. Since 1997, some domestic colleges and universities have carried out preliminary exploration on Entrepreneurship Education. In 2002, Tsinghua University, Renmin University of China and other nine universities were established as the first batch of Pilot Universities of entrepreneurship education by the Ministry of education. In 2010, the Ministry of Education formally adopted the concept of innovation and entrepreneurship education in "opinions on vigorously promoting innovation and entrepreneurship education in Colleges and universities and college students' independent entrepreneurship work", defined it clearly, established its development direction, and gradually entered the stage of diversified discussion. In 2015, the general office of the State Council issued the implementation opinions on deepening the reform of innovation and entrepreneurship education in Colleges and universities, which stressed that the comprehensive development of innovation and entrepreneurship education is a strong support for the construction of an innovative country and the realization of two centenary goals [1]. Deepening innovation and entrepreneurship education in

colleges and universities has become an important topic to promote the transformation and upgrading of national quality and teaching mode, the construction of database is shown in Fig. 1.
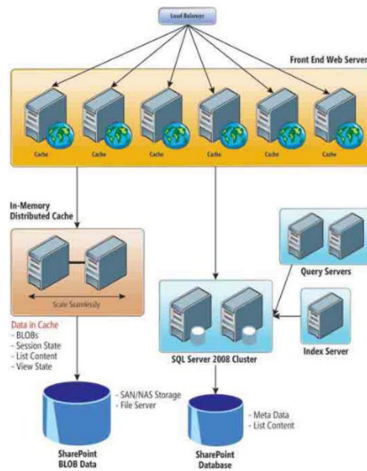


**Fig. 1.** Construction of database.

## 2   Collaborative Filtering Algorithm

As an effective technical means to deal with "information overload" in the context of big data, it has become one of the most widely used recommendation technologies. However, with the deepening of research, it is found that the traditional collaborative filtering algorithm still has many problems to be improved. data sparsity is one of the most significant problems. Therefore, many experts and scholars have put forward many methods to improve the algorithm, The correlation weight coefficient is introduced to improve the effectiveness of the algorithm. In literature 5, the Jaccard similarity coefficient is combined with the scoring correction formula to reduce the impact of item non correlation. it is proposed to mine the potential relationship between scoring users [2–5]. To make the recommendation results more reliable, literature introduces the item correlation coefficient to calculate the user similarity according to the item type and score. Uses the confidence function to map the user's implicit feedback to the confidence probability, and proposes a heterogeneous confidence optimization algorithm based on random gradient descent.

Definition1: Let u be a universe, and given a mapping relation $\mu_A : U \rightarrow [0, 1], x \rightarrow \mu_A \in [0, 1][0, 1]$, where the mapping $\mu A$ is called the membership function of fuzzy set a, represents the membership degree of $\kappa$ to fuzzy set a.Although the above algorithms have optimized the effectiveness of the algorithm, there are still some problems, such as the accuracy of the algorithm still needs to be improved in the case of data sparsity, the measurement factor of user similarity is relatively simple, and the mining of potential

relationship between users is not deep enough. In view of the above problems, this paper proposes a collaborative overcomputing method which integrates multi-layer similarity and trust mechanism. According to the result of neighbor recommendation, the algorithm is as follows:

$$\mu_{good}(x) = (x-1)/4; 1 \le x \le 5 \tag{1}$$

$$\mu_{good}(x) = (5-x)/4; 1 \le x \le 5 \tag{2}$$

## 3   Sample Sources and Research Methods of Database Construction

### 3.1   Basic Principle of Ant Colony Algorithm

To improve the innovation and entrepreneurship resource platform, colleges and universities should improve the existing network platform for college students' innovation and entrepreneurship, introduce corresponding policies for college students' innovation and entrepreneurship, break professional barriers, realize interdisciplinary integration, expand the scope of innovation and entrepreneurship, integrate innovation and entrepreneurship education into all aspects of Cultivating College students, and strive to provide a platform for college students' innovation and entrepreneurship [6, 7]. Stimulate college students' interest in innovation and entrepreneurship, promote college students to cultivate enough ability and confidence, and make college students change from passive employment mode to "independent entrepreneurship" mode. Innovation and entrepreneurship platform can provide relevant policy guidance for college students, provide business registration and start-up fund support for innovative projects, and promote projects with good market prospects, so as to promote the successful incubation of excellent project achievements.

### 3.2   Reform of Talent Training Mode

Colleges and universities should further carry out the reform of College Students' teaching and student status system, implement flexible education system, support students' innovation and entrepreneurship, further improve the professional curriculum, increase innovation and entrepreneurship practice credits, and realize the conversion of professional curriculum credits, stimulate college students' innovation and entrepreneurship power, and cultivate students' innovation and entrepreneurship ability [8]. The establishment of a relatively complete network course, teachers will put the course on the Internet, students can be flexible elective, get the corresponding credit. Professional curriculum should be combined with the needs of social development, adding new industry related courses such as Internet and Internet of things, and increasing entrepreneurship quality education and entrepreneurship training courses for college students. In addition, we encourage college students to take an active part in Internet plus college students' innovation and entrepreneurship related competition, so that their ability in "double innovation" can be improved, and the reform of talent training mode in universities and colleges will also be promoted.

## 4   Optimize the Teaching Staff of Innovation and Entrepreneurship

The construction of the teaching staff of innovation and entrepreneurship education needs time, and colleges and universities can optimize it based on their own training and introduction. On the one hand, colleges and universities should strengthen the construction of innovation and entrepreneurship discipline, grasp the mainstream development direction of social economy, seize the opportunity, actively guide their teachers to carry out frontier research, promote the transformation of outstanding innovation and entrepreneurship project achievements, and provide talent reserves for innovation and entrepreneurship education [9–11]. On the other hand, with the help of industry university research platform, colleges and universities play the role of school enterprise joint academic tutor, cooperate with outside institutions, undertake various innovation and entrepreneurship activities, and actively invite experts in various fields, entrepreneurial elites, entrepreneurs and other outstanding talents to serve as part-time instructors of innovation and Entrepreneurship education, so as to create a diversified structure of teaching staff [12]. Furthermore, colleges and universities should actively invite elites with rich entrepreneurial experience at home and abroad to give lectures on innovation and entrepreneurship for college students by using their own experience. In the process of close contact with college students, colleges and universities should stimulate college students' innovation and entrepreneurship inspiration and find partners for innovation and entrepreneurship projects (see the Fig. 2).
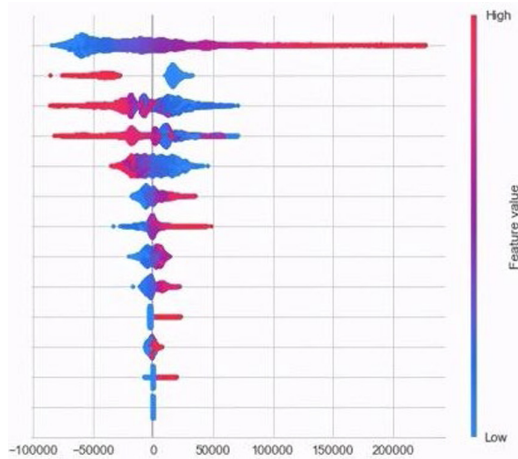


**Fig. 2.** Optimize the teaching staff of innovation and Entrepreneurship

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## 6   Demand Analysis of Teaching Resource Database Platform

In the development of a project system, the primary task is to master the target function of the project system, that is to clarify the user's requirements for the function of the project system. That is to say, we should make clear what the purpose of project system development is, what problems to solve for users, and what the project system should do. Before the development of the project system, we need to do a very good demand analysis of the project system [14]. Only by doing a good demand analysis and making clear the functional objectives of the project system, can we lay a good foundation for the later design and development work, and the later work can be orderly progress.

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### 6.1   Feasibility Analysis

Feasibility of system development and implementation system related developers have certain software system development ability, and have obtained professional and technical qualifications (titles) of computer software level qualification examination series: information system project manager, software designer, etc., which provides human resource guarantee for the development of the system [15]. The technical feasibility platform is based on J2EE architecture and is developed with B/S mode, At present, it is rich in mainstream development technology, mature web application systems based on J2EE architecture, and various references provide effective technical support for the platform. The construction of economically feasible teaching resource library platform is one of the sub projects of "backbone colleges" construction project of Guangxi Vocational and technical college, The core function of the platform is to effectively manage and integrate teaching resources [16]. The platform includes portal function, identity verification module, shared resource library sub module, excellent course release management sub module, network teaching management sub module and system management sub module.

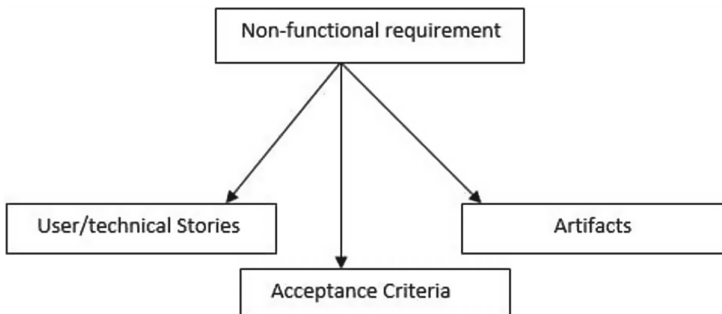## 6.2   System Non Functional Requirement Analysis

The non functional requirements of the system, that is, the requirements other than the functions realized by the software system, including the operating environment, reliability and security of the system. The teaching resource library platform is a teaching information system supported by computer network technology and modern education technology [17]. It should also have the following characteristics: reliability. For any information system, reliability is the most important, Teaching resource database platform is no exception. If there are frequent hardware or software failures in the process of using, the teaching resource database platform will lose the significance of serving teaching.

The advanced technology platform adopts the current mainstream technology framework and applies advanced technology solutions to ensure the application cycle of the platform.

Normative, according to the international and national standards of educational resources construction, realize the sharing and mutual use of resources. [18–19] Security, we should fully consider the security of the system, so as to ensure the security mechanism and data security of the system, including reliable software and software development technology architecture, developing and writing code to avoid common loopholes and defect functions; hardware, using redundant data storage technology and backup disaster recovery technology.

Portability, using J2EE development architecture and three-tier B / s system structure, the system program and database can run on Linux platform, can also run on Windows platform, at the same time in the event of conventional or catastrophic failure can be quickly transplanted and enabled.

Scalability: in terms of hardware, the storage device supports the flexible configuration and expansion of the system to ensure the user's demand for data storage in the use process; in terms of software, As shown in Fig. 3 the use process should be able to find and repair bugs in time, and provide secondary development interface to facilitate docking with other application systems.



**Fig. 3.**  System non functional requirements.

### 6.3   User Role Analysis

Select courses. After logging in, students can choose the courses of their department. For courses of other departments, as long as you submit an application and the instructor who created the course sets the permission to access the course, you can access it. For example, users of computer network technology major in computer department can choose all courses offered by computer network technology major by default. For courses offered by culture and communication department, students of computer network technology major can also visit courses offered by culture and communication department as long as the teacher who created the course allows students of computer network technology major to visit [20]. This function can well adapt to the situation of setting up public elective courses in the whole hospital. After entering the course, students can browse the course introduction, syllabus, teaching plan, etc., and download courseware, training guide, etc. Course learning and discussion is the process of learning the course, and students can learn the course content online. After studying and discussing, students should complete their homework according to the relevant requirements of the course and submit the electronic documents and other attachment materials. Interaction and discussion: after students submit their homework, they can use chat room online group discussion, or use the forum created by teachers to discuss related problems offline, and ask teachers questions about difficult learning points. Check the teacher's comments. Students can check the teacher's comments on the homework in time after the teacher corrects the homework. Course evaluation, the teacher's course content, teaching plan, courseware, training guide, flash animation, etc. are scored and evaluated.

## 7   The Fourth Chapter is the Overall Design of Teaching Resource Database Platform

### 7.1   Design of Teaching Resource Database Platform

Based on the idea of teaching centered design, the platform of ideological teaching resource library is developed with full consideration of the actual teaching situation of students and teachers. Compared with the traditional shared teaching resource database, it integrates the network teaching function and the excellent course release and evaluation function, fully arouses the enthusiasm of students and teachers, and has positive significance to change the traditional teaching methods and promote the construction of education informatization. The teaching resource database project system follows the development standards in the field of software engineering [21]. UML not only supports object-oriented analysis and design, but also supports the whole process from requirement analysis to software development. In the design phase, UML is used to draw the sequence diagram and interaction diagram, which makes the development and design process more simple and clear.

### 7.2   General Design Principles of Teaching Resource Database Platform

The teaching resource base platform is a teaching service system for teachers and students in the whole school. In order to better serve teaching, improve teaching quality and the

quality of talent training in the school, in the overall design of teaching resource base, we should grasp the following principles and practical principles, which is the basic principle of the design and development of any information system. The main users of teaching resource database platform are teachers and students. How to make users find resources conveniently and quickly and use teaching platform is a problem that must be considered in system design. The function of the platform must be close to the actual needs of teachers and students [22, 23]. At the same time to meet the needs of personalized. User participation principle the information system of user participation management is regarded as man-machine interface, and the management information system that users need to use is directly involved in the work, and becomes a part of the construction system work in each stage. The use case in the teaching resource database platform describes the process of teachers and students' online teaching and uploading resources. Therefore, in the design process, we must take the user as the principle and take the use case of user role as the object to design.

## 8   Concluding Remarks

Colleges and universities should actively establish long-term cooperative relations with state-owned enterprises, joint ventures and other large companies to build bridges for college students' innovation and entrepreneurship. Colleges and universities can make full use of educational resources to form a multi campus school enterprise cooperative education mechanism by combining with advantageous colleges and universities in the same region or other regions. According to the needs of enterprise talents, colleges and universities invite enterprise management and technical talents to participate in entrepreneurship curriculum, such as entrepreneurship preparation, enterprise operation management and other courses, and formulate corresponding talent training programs. By using the school enterprise cooperation mechanism, we can provide college students with internship opportunities in winter, summer and weekend, so that more college students can increase their practical experience, stimulate their innovation potential, and use the school enterprise platform to realize the transformation of achievements and put into entrepreneurial action.

## References

1. Deng, Y., Wu, M., Pan, J.: Improved collaborative filtering algorithm based on articles and its application. Comput. Syst. Appl. **28**(1), 182–187 (2019)
2. Zhang, C., Zhu, Y.: Item based collaborative filtering recommendation algorithm based on user age perception. Comput. Technol. Dev. **29**(6), 95–99 (2019)
3. Li, K., Wan, P., Zhang, D.: Collaborative filtering recommendation algorithm based on improved user similarity measure and score prediction. Mini Comput. Syst. **39**(3), 567–571 (2018)

4. Jing, T., Zichun, C., Xiaoqiang, Z.: Hesitant fuzzy multiple attribute decision making method for triangular fuzzy numbers. J. Yibin Univ. **19**(6), 81–85 (2019)
5. Si, L., Liu, Y., Zhou, J., One belt, one road, the national economic management database resource classification system construction. Libr. Forum, 1–8 (2021). http://kns.cnki.net/kcms/detail/44.1306.G2.20210402.0854.002.html
6. Chen, H., Qian, Q., Wan, X.: Research on the development strategy and path of Anti Japanese War archives resources from the perspective of digital humanities. Shanxi Arch. 1–10 (2021). http://kns.cnki.net/kcms/detail/14.1162.G2.20210309.1027.002.html
7. Han, C.: Human resource management system and its active database construction. Mod. Electron. Technol. **44**(05), 161–165 (2021)
8. Liu, N.: Research on the construction of Tianjin traditional music resources database. Fujian provincial business association. Collection of papers of South China education informatization research experience exchange meeting 2021. Fujian provincial business association: Fujian provincial business association, pp. 851–854 (2021)
9. Li, X., Zhu, P., Kong, W., Liu, L., Liu, W.: Construction and service release of multiple information database of uranium resources in Erlian Basin. World Nucl. Geol. Sci. 37(04), 257–262 (2020)
10. Li, X.: Strategies for building ceramic cultural resources database. Dig. World **12**, 83–84 (2020)
11. Wang, R., Zheng, Y.: Research on the construction mode of cultural heritage information network of Yongding River Cultural belt in Xishan. Beijing Cultural Museum **01**, 115–122 (2020)
12. Wang, Z., Chen, L., Cheng, A., Jiang, H., Bao, J.: Analysis on the construction of forest resources and infrastructure investigation technology in state owned forest farms of Zhejiang Province. East China Forest Manager **34**(04), 58–61 (2020)
13. Zhang, Z., Zhu, P.: The construction of Library Digital Resource Service Mode under the background of "Internet plus". Anal. Mod. Contemp. Lit. (39), 90–91 (2020)
14. Huang, Y., Zhang, X., Liu, C., Yang, Z.: Construction of standardization of agricultural resources information database in Guizhou Province. Guizhou Agric. Sci. **48**(08), 132–139 (2020)
15. Ma, J., Sun, X., Nie, J., Yang, T., He, W., Wang, S.: Construction and application of spatial database technology application teaching resource database. J. Kunming Metallurgy Coll. **36**(04), 45–49 (2020)
16. Liu, L.: Database construction. Application of Arc GIS in the construction of mineral resources planning database. China Metal Bull. (07), 67–68 (2020)
17. Feng, X., Li, X., Yan, Y., Li, J., Liu, M., Wu, Y.: Research on the construction of public health emergency data platform based on knowledge entity. Knowl. Manage. Forum, 5(03), 175–190 (2020)
18. Yang, T.: Database construction of science and technology information video resources based on streaming media technology. Softw. Guide **19**(05), 181–185 (2020)
19. Yu, Z., Wang, J.: Construction and implementation of Zhuhai geographic information public platform. Surv. Mapp. **42**(06), 253–259 (2019)
20. Shi, Y., Yang, L.: Research on construction and application of relational data model of Humanities and Social Sciences Database. Mod. Intell. **39**(12), 19–27 (2019)
21. Lin, F.: Exploring the construction of "aggregation, management and utilization" system of natural resources big data. Land Resour. Intell. **11**, 13–18 (2019)
22. Wang, Y., Liang, H., Cheng, W., Li, E.: Research on the construction of characteristic database of Confucian Literature – Taking the library of Qufu Normal University as an example. Res. Pract. Innov. entrepreneurship Theory **2**(21), 168–170 (2019)
23. Liu, Z.: Constructing the judicial regulation mode in the era of algorithm. Procuratorial Situation **21**, 18–19 (2019)