# Construction and Application of Employment Platform for Intelligent Poor College Students Under Information-Based Education

Peng Zhang(✉)

Harbin Finance University Heilongjiang, Harbin 150030, China

**Abstract.** The wide application of artificial intelligence and big data has given birth to a new employment mode and a new ecology of vocational education. In order to solve the problems of lagging behind and slow employment, asymmetric employment informatization and lack of individualized employment guidance, this paper, based on the thinking and technology of big data, constructs a model with student training as the guidance and accurate employment as the core, The University intelligent employment service mode and employment platform, which integrates employment, recruitment, education, evaluation, monitoring, research and judgment, realizes online vocational course learning, accurate job recommendation, career planning guidance, student difference analysis, student career portrait, employer job portrait, enterprise recruitment, Graduate portrait and other services, and helps to upgrade and reform the employment mode, Improve the quality of personnel training and employment competitiveness of college students.

**Keywords:** Information education · Poor college students · Platform construction

## 1 Introduction

Employment is an eternal topic in the world, and the employment of college graduates is the most special one. By 2019, there are 2956 colleges and universities in China. The total number of students in higher education is more than 38.3 million. In 2020, there will be about 8.74 million college graduates, an increase of 400000 over the previous year [1]. At the same time, the complex and severe situation is prominent. The employment of college graduates is not only related to the personal development and quality of life of graduates, but also related to the quality of higher education reform and development, and even the reform and development of the whole national education. At present, there are some problems in college graduates, such as lack of professional consciousness, inaccurate job-hunting orientation, improper methods and so on, which lead to poor job-hunting results. The imbalance between the supply of talents in Colleges and universities and the demand of talents in the market, and the imbalance between the supply of labor market and the demand of graduates' employment create three major difficulties: the difficulty of graduates' employment, the difficulty of employers' recruitment, and the


M. A. Jan and F. Khan (Eds.): BigIoT-EDU 2021, LNICST 392, pp. 530–539, 2021.
https://doi.org/10.1007/978-3-030-87903-7_65

difficulty of school education. In recent years, Internet plus employment has become one of the key measures to improve the quality of employment for graduates. The widespread application of AI and big data has created new employment patterns and new ecological education for occupation, which helps to meet the quality expectations and effective docking of graduates' occupation expectations and jobs [2]. At present, how to use big data technology to promote precision employment, improve the employment competitiveness of college students, reduce the difficulty of employment, improve the efficiency of employer recruitment, and improve the quality of school personnel training need to be solved.

## 2 General Detail Feature Extraction Algorithm

As shown in Fig. 1, set point P as a target pixel (image point to be processed):

$$T_{Sum}(P) = \sum_{i=1}^{8} P_i \tag{1}$$

$$T_{Sub}(P) = \sum_{i=1}^{8} |P_{i+1} - P_i| \tag{2}$$

| | | |
|---|---|---|
| $P_1$ | $P_2$ | $P_3$ |
| $P_8$ | $P$ | $P_4$ |
| $P_7$ | $P_6$ | $P_5$ |

**Fig. 1.** Definition of 8 adjacent pixels.

The conventional detail feature extraction algorithm is to refine the image first, then repair the ridge, and finally extract the detail feature points by using formula (1) or formula (2).

Among them, formula (1) can work correctly only when the fingerprint ridge is strictly refined to a single pixel width, while formula (2) can correctly extract the detail feature information for the fingerprint image that is not fully refined, But when the quality of fingerprint image is bad and the noise is serious, it is very difficult to repair the fingerprint lines, and the feature effect of conventional algorithms will be seriously affected.

## 3 Improved Algorithm

There are a lot of noises such as burr, ridge discontinuity and ridge cross before repairing the thinned fingerprint image. The detail features extracted directly from this image by using formula (1) or formula (2) often contain a lot of pseudo feature information [3]. However, if the characteristics of various kinds of noises in fingerprint image are analyzed in depth, the formation causes and distribution rules of pseudo feature points are summarized. We can design the corresponding algorithm to eliminate the false and retain the true, and screen out the real feature point set.

### 3.1 Classification and Characteristic Analysis of Noise in Thinning Fingerprint Image

(1) When the finger is relatively dry, the fingerprint image collected often has a large number of ridge discontinuities. Where the ridge is discontinuous, the detail feature extraction algorithm will detect two ridge endpoints, which belong to pseudo feature points. The characteristic of this kind of pseudo feature points is that the distance between two points is very small, and there is no ridge along the local ridge direction.
(2) When the finger is wet or dirty, the collected fingerprint image will often have more crossed lines, that is, the lines that should not be connected are glued together. In this position, the detail feature extraction algorithm will extract two points, which belong to pseudo feature points. The distance between two points is approximately equal to the average ridge distance, and the line between two points is approximately perpendicular to the ridge direction of its local neighborhood.
(3) Short line when the fingerprint is dirty, the collected fingerprint image is prone to appear more short lines, which are mainly caused by random noise. In this position, two ridge endpoints are extracted, which belong to pseudo feature points. The characteristic of this kind of pseudo feature points is that the distance between two points is very small, and the two points are connected by a ridge.
(4) The appearance of very small hole like structure is mainly due to the influence of random noise. This position can detect two ridge bifurcation points, which belong to pseudo feature points. The characteristic of this pseudo feature point is that the distance between two points is very small, and the direction of the connecting line between two points and its local neighborhood ridge is approximately parallel.
(5) The appearance of burr is also due to the influence of random noise. This position can detect a ridge endpoint and a ridge bifurcation point, which belongs to the pseudo feature point. The feature of this pseudo feature point is that a pair of endpoints and the bifurcation point are connected by ridges, and the distance between the two points is relatively close.

### 3.2 Analysis of the Inherent Distribution Law of the Detail Feature Points of the Motif

According to the relevant data and experimental observation, the fingerprint lines and detail feature points have the following characteristics: (1) the change trend of fingerprint

lines is gentle except for individual areas such as pattern area, and the width between two adjacent lines is roughly equal. (2) at the resolution of 500 dpi, Generally, there are no detail feature points whose distance is less than 8 pixels in the fingerprint image. (3) there is basically no burr line crossing structure with mutation property in the fingerprint image, such as the structure of two lines with very close ends and two lines sense points or burr line sense connection (see Fig. 2).

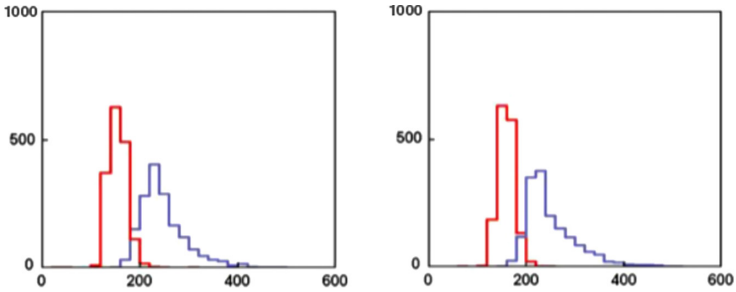


**Fig. 2.** Distribution law of the detail feature points of the motif.

## 4 Construction of Intelligent Employment Service Mode in Colleges and Universities Based on Big Data

Big data, artificial intelligence and blockchain technology are triggering a new round of educational informatization reform, providing important support for improving the quality of educational decision-making and educational governance ability, and promoting education to be precise, personalized and intelligent. As a driving force for the development and transformation of education in the era of Internet plus, its thinking and technology have been promoting the scientific decision-making of education, the intellectualization of management and the individualization of teaching [4–7]. Big data technology will reconstruct the education ecosystem, provide scientific support for education decision-making, provide innovation and Practice for education management and evaluation, and provide accurate support for personalized teaching. The application of big data in college employment will break through the limit of employment recommendation method and bring new opportunities for college students' employment reform.

The intelligent employment service in Colleges and Universities Based on big data will fully realize and deeply integrate the employment information services such as online employment market demand survey, students' online counseling and vocational ability evaluation, paperless online recruitment, etc., so as to meet the needs of college students for employment information and personalized counseling, realize the accuracy of employment education, and solve the problems of insufficient teachers and weak pertinence. At the same time, we use big data technology to analyze and process the collected massive employment and entrepreneurship information data, excavate the hidden correlation and regularity between the data, obtain the application value, and strive

to improve the school teaching methods, improve the employment competitiveness of graduates, so as to solve the structural contradiction between talent training and market employment demand.

The quality of personnel training will directly affect the quality of graduates' employment, and the quality of employment will directly reflect the quality of personnel training [8]. Based on big data, the intelligent employment service in Colleges and universities needs to contact all departments of the University, build an intelligent employment service mode in Colleges and universities with student training as the guidance, accurate employment as the core, and integration of recruitment, education, evaluation, monitoring, research and judgment on the basis of big data thinking and technology (see Fig. 3).

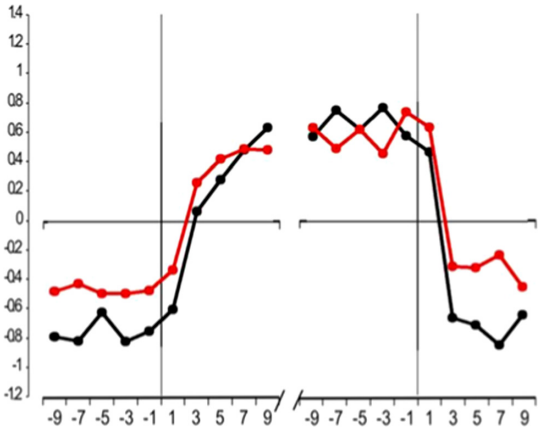


**Fig. 3.** Simulation with employment service mode in Universities Based on big data

## 5 Research Background

With the development of computer technology and application, the demand for software engineering professionals at home and abroad is increasing. How to effectively cultivate high-quality software engineering talents and how to meet the requirements of new engineering construction. Strengthening the ability training of software engineering talents is an important challenge for the current computer professional education. Software engineering is a highly comprehensive and practical discipline, and one of the fastest developing branches in the information field. It requires mastering the basic theory of software engineering, software development technology and software engineering testing and management technology; it cultivates engineering high-quality practical talents with the ability of computer software research and development, software engineering management, and the ability to engage in demand analysis, design, development, testing, implementation and management. Software engineering course group includes a series of courses, such as introduction to software engineering, system analysis and design,

software architecture, design pattern, unified modeling language and tools, unified software process, software quality assurance and testing, software project management and software engineering case analysis and practice, It plays an important role in improving the comprehensive ability of students [9–12]. At the beginning of its establishment, the National Model Software Institute set up a software engineering course group. From the teaching situation for many years, there are many problems, such as more theoretical knowledge, insufficient practical ability, limited innovation ability, and learning content lagging behind the latest international research and application hot spots, The training objectives are out of line with the actual needs of enterprises.

## 6 Problems of Software Engineering Course Group

### 6.1 Unreasonable Curriculum System

The courses in the software engineering curriculum group are relatively independent and have complicated relationships [13]. The existing curriculum system does not consider the connection and correlation between these courses. Although most colleges and universities will set up an introduction to software engineering, but the content of the course is too much scattered, lack of systematicness, and does not really play the role of connecting other courses in the course group. There are three situations in the software engineering curriculum group: ① the knowledge points are not completely covered, many courses mistakenly think that they have been taught in other courses and ignore them for a specific knowledge point, which eventually leads to the omission of knowledge points; ② the order of courses is not reasonable, and the semester of courses with application relationship is reversed; ③ knowledge points are repeatedly taught by multiple courses, Due to the redundancy of knowledge points in each course, students need to repeat the knowledge points they have mastered in valuable classroom time.

### 6.2 The Teaching Content is Out of Date

Nowadays, with the rapid development of software industry, new concepts, technologies and knowledge continue to emerge, which increases the difficulty of education [14–16]. With the development of big data, cloud computing and artificial intelligence, higher requirements are put forward for software engineering. The teaching content of the school is relatively old and backward, mainly teaching life cycle methodology and object-oriented methodology. Although some teaching materials briefly introduce the agile process such as scion, which is widely used in Internet applications, However, JRA, GitHub and other development methods based on cloud and services, which are widely used in engineering practice at home and abroad, are rarely mentioned in textbooks at home and abroad, and professional education has lagged behind engineering practice.

### 6.3 The Combination of Curriculum Group Teaching and Industrial Demand Is Not Close

With the continuous progress of computer science and technology, important changes have taken place in the form of information industry, the application of new computing systems is deepening day by day, and the training of computer professionals must

keep pace with the times. However, it is difficult for school teachers to grasp the latest development information, popular methods and tools of enterprises, as well as the latest requirements of enterprises for talent training in time, and the teaching is out of line with the actual social needs, It limits the effective connection between the talents trained by the school and the market demand.

### 6.4 The Evaluation Method of Curriculum Group Is Not Scientific Enough

The close correlation of courses in the course group will be reflected in the students' scores of each course to a certain extent. However, teachers usually evaluate students' performance independently, and do not consider the relevance of courses in the curriculum group, and then do not refer to students' performance evaluation results in other related courses [17]. Therefore, in the course evaluation, especially in the performance evaluation of subjective problems, it is likely to give contradictory scores, which can not truly reflect the ability of students to solve complex engineering problems. In addition, for the practical courses related to software engineering, teachers usually evaluate them at the end of the practice session according to the project documents and system demonstrations submitted by the student project team. Although this method can comprehensively investigate the quality of software process (project documents) and software product (system demonstrations), it often lacks objective standards and has strong subjectivity, Without the support of effective tools, instructors are usually unable to effectively supervise and control the individual work situation in the multi person collaborative project team, and thus cannot objectively evaluate the students' individual course performance.

## 7 Construction and Teaching of Industry University Research Platform for Software Engineering Course Group

### 7.1 Promoting Education

In order to promote the engineering education and improve the teaching effect of software engineering curriculum group, the construction plan of production, learning and research platform for software engineering curriculum group includes two meanings: ① defining a set of training mechanism combining production, learning and research oriented to software engineering curriculum group, teachers can complete teaching and research and development demonstration based on this mechanism, and students can obtain basic theory based on this mechanism, Master basic skills and train its practical and innovative ability in software engineering discipline; ② an operational system integrating Tencent tapd and other tools can be accessed through PC and mobile phone, and it has the functions of automatic support for knowledge point synchronization, coverage calculation, scientific and technological literature reading recommendation, case base use monitoring and so on.

### 7.2 Analysis of Logical Relationship of Software Engineering Curriculum Group

The upper and lower edges of the course indicate the process flow involved in the course, and the left and right edges restrict the semester of the course. As shown in Fig. 4. The scheme divides the software engineering course group into three levels: the basic level, the detailed level and the application level (correspondingly, the courses in these three levels are represented by dotted lines, thin solid lines and thick solid lines respectively) [18, 19]. Three core courses are set in each level. Basic layer: introduction to software engineering (SE), unified modeling language and tools (UML and software analysis and design (SAD); refinement layer: unified software development process (RUP), design pattern (DP) and software architecture (SA); application layer: Software Project Management (PM), software quality assurance and testing (SQA) and software engineering case analysis and Practice (SECs). Both SA and DP courses cover the workflow of analysis and design, which can be taught in parallel with different emphasis on software design technology [20–24]. Because testing is the most important means of SQA, SQA covers the testing workflow.

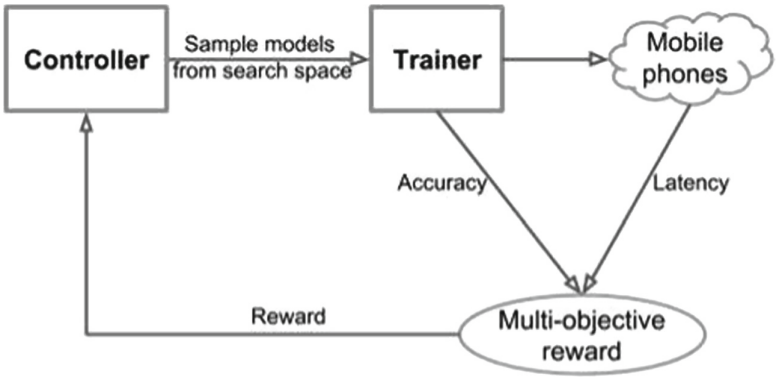


**Fig. 4.** Analysis of logical relationship of software engineering course group

## 8 Conclusion

On the basis of the conventional minutiae feature extraction method, the fingerprint minutiae feature extraction algorithm is improved, that is, all minutiae feature points are directly extracted from the thinning fingerprint image without repairing the lines. Then, the pseudo feature points are deleted by using the distribution law of pseudo feature points in mathematical morphology, The algorithm greatly improves the speed of feature extraction, and the accuracy of feature extraction can basically meet the needs of practical application.

**Acknowledgements.** A New Characteristics of the Ideological Development of Poverty University Students in Universities and Colleges by the Provincial Basic Business Fee Project of Harbin Institute of Finance (2018-KYWF-E017).

## References


1. Wang, T.: Analysis of the current situation of employment and entrepreneurship of college graduates and countermeasures. Educ. Occup. **21**, 74–76 (2015)
2. Mo, Y.: The implementation of career guidance in the employment of college graduates. Adult Educ. China **9**, 73–75 (2015)
3. Yang, X., Guo, L., Jin, X., et al.: Big data help the reform of the new college entrance examination: framework design and implementation path. Res. Audio Vis. Educ.(2), 30–37 (2019)
4. Li, Z., Zhou, D., Liu, N., et al.: Modern educational technology (1), 100–106 (2018)
5. Qiao, J., Zhang, B., Yang, Y.: Research on construction mode and application of production dispatching command platform of engineering company. Project Manag. Technol. **19**(03), 127–131 (2021)
6. Zhao, R., Li, J.: Construction and application of power grid visual intelligent management platform. Electr. Era (03), 19–21 + 27 (2021)
7. Fu, Q., Ren, F., Zhao, Z., Liu, Q., Wei, Z.: Exploration on construction mode of Navigation Engineering Laboratory. J. High. Educ. (09), 50–53 + 57 (2021)
8. Jinli, H.: Practice points of urban gas Internet of things. Urban Manag. Technol. **22**(02), 60–63 (2021)
9. Lei, Y., Yao, J., Liu, J.: Support system for information platform construction of innovation and entrepreneurship under the background of "Internet plus". Sci. Technol. Econ. Guide **29**(07), 35–36 (2021)
10. Ning, W., Zhang, J., Wei, S., Hou, X., Zhu, H.: A wireless individual video system integrated into enterprise platform. China Constr. Inf. **04**, 71–73 (2021)
11. Peng, Q., Liu, L., Duan, X.: Construction and application of digital horse academy. Beijing Educ. (Moral Educ.) **01**, 13–15 (2021)
12. Li, M.: Application of BIM technology in intelligent building construction. Jushe **06**, 32–33 (2021)
13. Xu, Q., Liu, C., Su, P., Huang, Y., Xie, H.: Analysis on the construction practice of "multi planning integration" application platform under the goal of sharing and collaboration. Geospatial Inf. **19**(02), 125–130 + 8 (2021)
14. The application of information technology in reservoir engineering in Shanxi Province [J, 198,47]
15. Xu, N.: Construction and application of real estate management platform based on GIS. J. Changchun Normal University **40**(02), 132–136 (2021)
16. Ouyang, S., et al.: Construction and application of 3D virtual simulation experiment platform for waste tire thermal conversion to biofuel process. Internet of Things Technol. **11**(02), 106–109 (2021)
17. Li, C., Guo, W., Wang, S.: Research on the construction and application of HRP based economic management data platform for public hospitals. Chinese General Accountant (02), 26–28 (2021)
18. Teng, J.: Application of cloud computing in information construction of secondary vocational colleges. China Arab Sci. Technol. Forum (Chin. Engl.) **02**, 130–132 (2021)
19. Feng, T., Che, H., Kang, H., Mei, F.: Construction and application of industry university research platform for software engineering curriculum group. Comput. Educ. (02), 144–148 (2021)
20. Wang, L.: Application of big data technology in smart city. Comput. Inf. Technol. **29**(01), 64–67 (2021)
21. Ma, H., Wang, Y., Yang, J.: Online teaching course construction and practice exploration based on Intelligent vocational education cloud platform – taking "Engineering Mechanics" course as an example. Sci. Technol. Wind **04**, 95–96 (2021)

22. Wu, Z., Zhang, X., Ma, W., Wang, X.: Research on the construction of practical teaching platform in and out of application-oriented colleges and universities – building a practical platform for the cultivation of innovative talents. J. Sci. Technol. Econ. **29**(04), 127–128 (2021)
23. Shan, K., Yuan, S., Xu, F., Zhang, H., Wang, J.: Research on the application of blockchain in university informatization construction. China Educ. Inf. (03), 36–39 (2021)
24. Zhang, J., Zhang, T.: Research on platform construction of mechanical engineering training center for applied talents training. Fortune Today **04**, 190–191 (2021)