Teaching Methods of Colleges and Universities Based on Intelligent Information Technology

Mingju Wang
(Liaoning Jianzhu Vocational College; Liaoning 111000,China)
qzd42d@iinmail.com

Abstract: In order to improve the intelligentized level of high efficiency teaching, a teaching optimization method based on intelligent information technology is proposed. The optimized intelligent information processing technology of college teaching includes the module of teaching resource information dispatching, the database module and the intelligent information processing module, and the design of the teaching resource information scheduling model of universities and colleges. The adaptive feedback equilibrium configuration method is used to optimize the allocation of teaching resources in Colleges and universities. Based on the fuzzy partition scheduling method, the intelligent processing of teaching information in Colleges and universities is carried out. The access model of the university teaching resources distributed large database is constructed, and the university teaching large database access and information retrieval are adopted by the driver configuration program. The intelligent information processing technology is used to optimize the teaching methods of colleges and universities. The test results show that this method is used to optimize the design of teaching methods in Colleges and universities, the ability to dispatch and balance the information of teaching resources in Colleges and universities is improved, the intelligent information management of College teaching is realized, it has the higher intelligence level of the teaching methods and the stronger ability of information processing than traditional method.

Key words: intelligent information technology; university teaching methods; database; resource balanced allocation.

1. Introduction

With the rapid development of information technology, Internet technology is becoming more and more mature, and the communication between countries, organizations, institutions and individuals will be more convenient. Intelligent information processing technology is used to optimize teaching methods in colleges and universities. To improve the level of intelligent management of teaching in colleges and universities, to promote the intelligent upgrading of teaching methods in colleges and universities, and to promote the informatization of teaching management, we must take the "idea guide" as the principle, take the modern educational management theory as the guidance, and innovate the teaching management idea. Further emancipate the mind, to change the traditional educational thought as the leading and driving force, to achieve management innovation. The innovation of information and scientific teaching management requires the main body of teaching management to objectively analyze and choose the traditional educational administration idea, management mode, management method and means. This paper fully absorbs the beneficial experience of educational administration management reform and practice at home and abroad, and it explores a new way of educational administration management adapted to the educational reform and development in the era of knowledge economy[1]. In the design of intelligent information management in colleges and universities, it is necessary to perfect the rules and regulations related to the informationization of teaching management. According to the reality of colleges and universities, the rules and regulations of teaching management should be studied and formulated systematically, which are strict, operable and adapt to the needs of informatization. Truly realize the standardization of teaching management, program. It has great significance to study the intelligent information processing technology of university teaching in order to promote the development of university teaching information[2].

In the development of intelligent information of teaching methods in colleges and universities, it is necessary to revise, perfect and enrich the rules and regulations timely according to the needs of the reform and development of colleges and universities, so as to ensure the unity of the reasonableness of the establishment of the system and the preciseness of the teaching information management system. We should make full use of existing resources to do a good job in the construction of data centers and application software, build a good hardware environment for education information, establish a teaching management system with the main management of faculties and departments, devolve the management power, and expand the autonomy of running schools and managing departments. To set up a teaching command center, a teaching information center, a registration center, a teaching quality evaluation center, and other institutions to introduce the corresponding educational administration teaching management system to strengthen the function of information feedback, To improve the ability of information monitoring and response to the daily teaching activities of educational affairs, and to realize the flow of information management. Through the reform of the system, the functions of teaching management can be transformed[3]. The functional departments of teaching management have changed from the original all-around, whole-course planning management to macro-control and

978-1-5386-8031-5/18/$31.00 ©2018 IEEE
DOI 10.1109/ICVRIS.2018.00084

strengthening services. In order to make the educational administration department have more time and energy to engage in teaching management information work[4].

The intelligent information processing model of university teaching method studied in this paper mainly includes resource allocation module, big data management module and software development module. Human-computer interaction design method is used to design human-computer interaction[5]. In order to improve the human-computer interaction of teaching methods, the general serial bus control technology is used to carry out the teaching information management system in colleges and universities, and the adaptive feedback balanced allocation method is used to optimize the allocation of teaching resources. Combined with the fuzzy partition scheduling method, the intelligent processing of university teaching information is carried out, and the access model of university teaching resources distributed large database is constructed, and the driving configuration program is used to access and retrieve the large teaching database in colleges and universities. To realize the optimization of college teaching method under intelligent information technology. Finally, the performance test is carried out through the simulation experiment, which shows the superiority of this method in improving the intelligence level of teaching in colleges and universities.

2. Optimization measures of intelligent information technology teaching methods in Colleges and Universities

2.1. Problems existing in informatization construction of teaching in Colleges and Universities

With the informationization of teaching management in colleges and universities has been carried out for many years, many colleges and universities put their main energy into the construction of hardware and platform, while ignoring the modernization, high efficiency and intelligentization of the concept of teaching management, in the process of concrete implementation, many colleges and universities put their main energy into the construction of hardware and platform[6]. The teachers' understanding of the teaching management function is also seriously lagging behind, and they are still used to the traditional management concepts, theories and methods, and stay in the experiential teaching management mode and method. The decision-making departments of colleges and universities do not attach importance to the construction and perfection of the information organization structure and management system of the school, and neither establish the information leading group nor the information supervisor system[7]. Therefore, it is necessary to optimize the design of teaching methods in colleges and universities. The foundation of information management is the construction of information resources, but the construction of information resources in colleges and universities in our country is seriously lagging behind at present. The first is the lack of strong guidance and coordination in the macro-education administration. Second, the information resources construction lacks the relative unified standard, each university lacks the coordination and the cooperation. Third, there is a lack of communication and coordination between the various departments within the school. All the management positions are isolated from each other and do not realize the full sharing of teaching management data, which results in a large amount of unnecessary duplication of work, but also reduces the accuracy of the data. Each department has developed the corresponding management information system from its own point of view. The repeatability of data acquisition is increased, and the working efficiency of the school is not improved obviously.

2.2. Optimization measures of teaching methods

The informatization construction of teaching management in colleges and universities is a comprehensive, systematic and innovative system engineering. Only by designing the teaching management information system suitable for its own characteristics can it be better applied to the teaching management and improve the management level. In the process of developing the information system, we must have the professional teaching management personnel to be responsible for a long time, strengthen the vocational training, improve the professional skills, can skillfully use the teaching management information system, at the same time, must have the specialized personnel to carry on the monitoring and the debugging to the system, Improve the system according to the teaching demand, and provide the practicability and convenience of the system. The objectivity of teaching management involves all aspects of the college, all departments and departments of the whole institute of data sources. Therefore, a set of standardized operating rules and management system of teaching management should be established to "have rules to follow", to restrain the user's operation behavior, to manage the personnel, Teachers, students and other users must strengthen the ability of risk identification and responsibility to avoid human error[8].

The planning and design of the teaching management information system should be done to ensure the scientific nature of the teaching management information system. The construction of teaching management information system involves two aspects: information technology and information resources. It is an organic combination of information technology and information resources. When planning the whole information system, we should not only study and study the achievements of domestic universities, but also learn from the successful experiences of foreign universities. Under the guidance of modern educational thought, reasonable planning, overall arrangement, development of management software and collection of teaching information should be done. This paper gives full play to the advantages of knowledge and technical resources in colleges and universities, combines with the enterprise development platform, organizes specialized management technicians to cooperate with the enterprises, and develops the individualized teaching management system software of the university. The application of software

must be convenient, fast, efficient, with good interaction and operability.

3. Teaching Information processing and resource optimization

3.1. Intelligent treatment of teaching information in Colleges and Universities

An optimized intelligent information processing system for colleges and universities is designed in this paper[8]. The information scheduling module, database module and intelligent information processing module of enveloping information processing system are designed to calculate the characteristic space of the distribution of teaching resources in colleges and universities under the block mode, expressed as *M*, the data link distance of the block length of optimized intelligent information for teaching in colleges and universities is calculated, as follows:

$$\chi^2_{New}(obs) = 4M\left[\sum_{i=1}^{N}(\pi_i - ½)^2 + \sum_{i=1}^{m}(\pi_{rdi} - ½)^2\right] \tag{1}$$

Where, the block length $\chi^2_{New}(obs)$ of the maximum distribution of college teaching resources is $(N+m)/2$ distribution of χ^2 from the degree of freedom, and the data link characteristic expression of calculating the distribution data of teaching resources in colleges and universities is expressed as follows:

$$\begin{bmatrix} X \\ P_i \end{bmatrix} = \begin{bmatrix} 0 & \frac{1}{M} & \cdots & 1 \\ p_{i1} & p_{i2} & \cdots & p_{i(M+1)} \end{bmatrix} \tag{2}$$

The data chain distribution model of teaching information management in colleges and universities is expressed as follows:

$$\eta = \chi^2(obs) = 4M\sum_{i=1}^{N}(\pi_i - ½)^2 + \frac{E[M_A] + E[M_B]}{E[V_A] + E[V_B]} \tag{3}$$

The behavior information of the distributed data chain of teaching resources in colleges and universities at *t* time is expressed in the upper form x_t. $E[M_A]$ is the characteristic statistic. The information fusion center in the database is expressed as $A = \{A_1, A_2, \cdots, A_m\}$. The subspace of the distribution of teaching resources in colleges and universities is constructed by the reorganization of feature space:

$$\begin{bmatrix} X \\ P \end{bmatrix} = \begin{bmatrix} 0 & \frac{1}{M} & \cdots & 1 \\ p_0 & p_1 & \cdots & p_M \end{bmatrix} \tag{4}$$

In the cloud data information dispatching, combining the intelligent information processing technology to optimize the teaching information of the university[9], the statistical threshold value is obtained as follows:

$$x_{\min,j} = \max\left\{x_{\min,j}, x_{g,j} - \rho(x_{\max,j} - x_{\min,j})\right\} \tag{5}$$

$$x_{\max,j} = \min\left\{x_{\max,j}, x_{g,j} + \rho(x_{\max,j} - x_{\min,j})\right\} \tag{6}$$

In the interval $[x_{\min,j}, x_{\max,j}]$ the phase spectrum characteristic statistics of teaching resources distribution in colleges and universities are constructed, and the multi-source data are obtained as follows:

$$\rho = \frac{\sum_{o \in N_k - dist(p)} \frac{lrd_k(o)}{lrd_k(p)}}{\left|N_{k-dist}(p)\right|} \tag{7}$$

If a and n are integers of mutual prime and $n > 0$, in the multi-dimensional characteristic phase space, when $ord_n^a = \phi(n)$, called r is the primitive root of module N, hereinafter is referred to as primitive root), the adaptive feedback equilibrium allocation method is used to optimize the allocation of teaching resources in colleges and universities[10,11]. To improve the ability of optimizing allocation and intelligent control of teaching resources in colleges and universities.

3.2. Optimal allocation of Teaching Resources in Colleges and Universities

The intelligent processing of teaching information in colleges and universities is carried out by using the method of fuzzy partition scheduling, and the information flow model of the distributed database of teaching resources in colleges and universities is constructed as:

$$\tilde{s}(t) = \sqrt{E_t}\int_{-\infty}^{+\infty}\tilde{f}(t-\lambda)\tilde{b}_R(\lambda)d\lambda + n(t) \tag{8}$$

Where, $n(t)$ is the information interference vector in the process of accessing the distributed database of teaching resources in colleges and universities, and the characteristic interference of the interference information of the access of teaching resources in colleges and universities is set up[12], and the access model of the distributed large database of teaching resources in colleges and universities is constructed. $\theta_0, \theta_1, \ldots, \theta_P$ are the input values, the database of teaching information resources in colleges and universities is accessed, and the statistical characteristic quantity of access to the database is extracted. The variance and mean value of the characteristic distribution of teaching resources in colleges and universities are described as Gaussian normal distribution.

$$\begin{cases} H_0 : \tilde{x}(t) = \tilde{w}(t) \\ H_1 : \tilde{x}(t) = \sqrt{E_t}\int_{-\infty}^{+\infty}\tilde{f}(t-\lambda)\tilde{b}_R(\lambda)d\lambda + \tilde{w}(t) \end{cases} \tag{9}$$

The driving configuration program is used to access and retrieve the large teaching database in colleges and universities. The phase spectrum information of the distributed database of teaching resources in colleges and universities is extracted as follows:

$$\tilde{s}(t) = \sqrt{E_t}\int_{-\infty}^{+\infty}\tilde{f}(t-\lambda)\tilde{b}_R(\lambda)d\lambda \tag{10}$$

$$s(t) = \sqrt{2}\,\mathrm{Re}\left[\sqrt{E_t}\tilde{s}(t)e^{j\omega_c t}\right] \tag{11}$$

Where, $\tilde{w}(t)$ is a statistically independent zero mean random distribution vector, the multi-source feature quantity of the statistical feature database of teaching method is calculated[13], and the quantization feature compensation coefficient is obtained as follows:

$$l = \frac{1}{N_0} \int_{-\infty}^{+\infty} \int_{-\infty}^{+\infty} \tilde{x}(t) \tilde{h}(t,u) \tilde{x}(u) du dt \tag{12}$$

The data structure distribution is considered and the phase spectrum is assumed to be accessed by two segments, and the multi-dimensional characteristic phase space distribution model is established, in which the $\tilde{x}(t)$ is the scale parameters, N_0 is the index of the database, the data structure distribution $\tilde{x}(u)$ is considered. The attribute weights of teaching methods in colleges and universities are as follows:

$$T_{i,j}(t) = \frac{\left| p_{i,j}(t) - \Delta p(t) \right|}{p_{i,j}(t)} \tag{13}$$

Wherein, the phase spectrum of the attributes $x_1(t)$ and $x_2(t)$ of different teaching methods in colleges and universities is independent and autocorrelation, the driving configuration program is used to access the large university teaching database and to retrieve the information, which can be expressed as:

$$\begin{cases} \dot{m}_i(t) = -a_i m_i(t) + b_i(p_i(t-\sigma), p_2(t-\sigma), \cdots, p_n(t-\sigma)) \\ \dot{p}_i(t) = -c_i p_i(t) + d_i m_i(t-\tau) \end{cases} \tag{14}$$

Combined with the fuzzy partition scheduling method, the intelligent processing of university teaching information is carried out, and the access model of university teaching resources distributed large database is constructed, and the driving configuration program is used to access and retrieve the large teaching database in colleges and universities. Improve the accuracy of teaching resources allocation in colleges and universities.

4. Design of intelligent information system for teaching in Colleges and Universities

This article carries on the cross-region design of the university teaching information management system. Firstly, it analyzes the function of the university teaching information management system design and the technical index of the design parameters. The teaching information management system of colleges and universities is based on the multi-function teaching experiment. The teaching information management system designed in this paper has the functions of experiment, network teaching and on-site instruction, etc. The network transmission system based on TCP/IP protocol and C/S model is adopted to carry out long-distance teaching information transmission and cross-area teaching instruction. The cross-regional design of university teaching information management system needs to choose network communication protocol[14]. The TCP/IP protocol and UDP protocol are adopted to design the network. The communication protocol has the advantages of data confirmation and data retransmission, reliability, unlimited size of transmission and so on. It is suitable for the need of large amount of data and information transmission in colleges and universities. In the design of service program and client / server request response of the university teaching information management system, the socket is used to establish the network communication, which can provide the users of the university teaching information management system with an immediate visual environment[15]. To meet the needs of network experimental teaching, the process communication mechanism of the C/S of the university teaching information management system is described in figure 1.

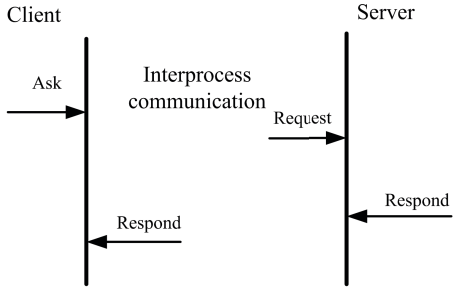

Figure 1. Process communication mechanism of client / server in university teaching information management system

The hardware module is designed with Microsoft Visual Studio development component, and the input and output ports of all kinds of equipments under the university teaching information management system can be regularized and integrated, and the remote switch on and off of the university teaching information management system can be realized. The main control unit is the core module to realize the program control of the teaching information management system in colleges and universities, such as the starting of the teaching electric curtain, the control of the projector, the display of the teaching devices in colleges and universities, and the teaching steps of the experiment. The main control module is designed by EMB3803 main control DSP chip, and programmed amplification is carried out by Mux101 switch. The software design of university teaching information management system includes serial port receiving control program design. Drive configuration program design and university teaching information management system monitoring software design. The integrated design of hardware and software of teaching information management system in colleges and universities is carried out by using universal serial bus control method. The network structure of the teaching information management system in colleges and universities is composed of two main structures. The first layer is composed of central centralized control unit and QT / embedded as the GUI to develop the universal serial bus control module of the university teaching information management system. Each unit and subsystem of each multimedia teaching equipment is controlled by computer microprocessor, and the software is debugged and developed in Visual DP + 4.5, so as to realize the intelligent design of teaching system in colleges and

universities. The software development process is shown in figure 2.

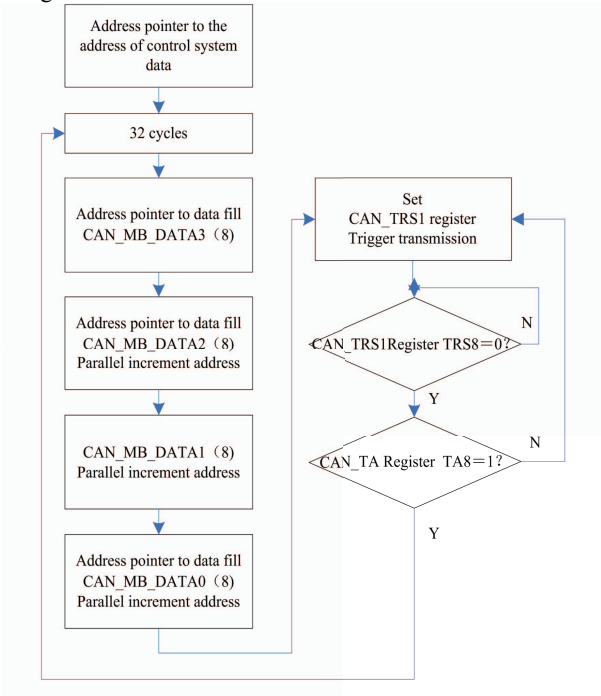

Figure 2. Process of software realization of teaching system in colleges and universities

5. Simulation experiment and performance analysis

In order to test the performance of the intelligent information processing and optimization control of college teaching methods, the simulation experiment is carried out. The operating system: Windows 10, the development environment set the step factor $\alpha = 0.37$ for the search of teaching resources for Matlab R2010a., the adaptive forwarding coefficient $\beta = 2.5 \times 10^{-5}$, the number of classes of teaching methods of colleges and universities is 12, and the scale of the teaching information database is 1200Mbit, and the software is debugged and developed in Visual DSP++. The trigger pulse of the program control module is 2.4dB. According to the simulation parameters set above, the optimized information processing of the teaching methods of university is processed, and the output of information processing is shown as Figure 3.

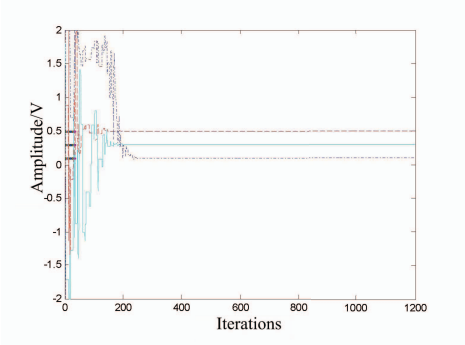

Figure 3. Intelligent information processing output of teaching methods in colleges and universities

Figure 3 shows that the intelligent information processing of the teaching method in colleges and universities has a good integration. In order to compare the performance, different methods are used to process the intelligent information of the teaching methods in colleges and universities, and the output BER is obtained. The comparison results are shown in figure 4, and the analysis figure 4 shows that the BER of intelligent information processing in colleges and universities using this method is low.

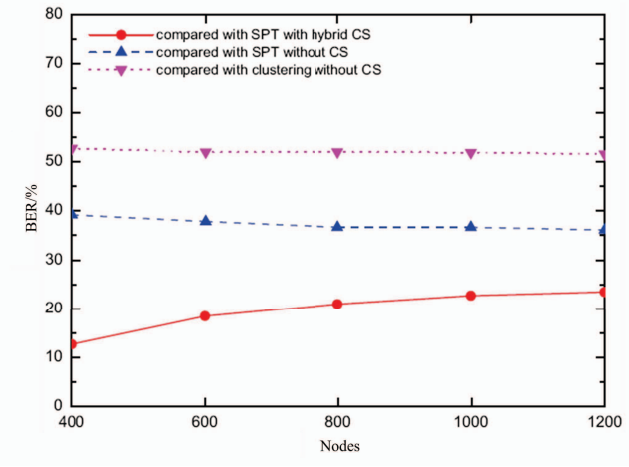

Figure 4. Comparison of bit error rate in optimizing intelligent information processing in Colleges and Universities

6. Conclusions

In this paper, a teaching optimization method is proposed based on intelligent information technology. The optimized intelligent information processing technology of college teaching includes the module of teaching resource information dispatching, the database module and the intelligent information processing module, and the design of the teaching resource information scheduling model of universities and colleges. The adaptive feedback equilibrium configuration method is used to optimize the allocation of teaching resources in Colleges and universities. Based on the fuzzy partition scheduling method, the intelligent processing of teaching information in Colleges and universities is carried out. The access model of the university teaching resources distributed large database is constructed, and the university teaching large database access and information retrieval are adopted by the driver configuration program. The intelligent information processing technology is used to optimize the teaching methods of colleges and universities. The test results show that this method is used to optimize the design of teaching methods in Colleges and universities, the ability to dispatch and balance the information of teaching resources in Colleges and universities is improved, the intelligent information management of College teaching is realized, it has the higher intelligence level of the teaching methods and the

stronger ability of information processing than traditional method. This method has good application value in the reform of teaching methods in colleges and universities.

References

[1] XIONG Xinglong, YANG Lixiang, MA Yuzhao, ZHUANG Zibo, (2018). Alerting algorithm of low-level wind shear based on fuzzy C-means. Journal of Computer Applications, 38(3), pp.655-660.

[2] ZHENG J F, ZHANG J, ZHU K Y, et al, (2014). Gust front statistical characteristics and automatic identification algorithm for CINRAD. Acta Meteorologica Sinica, 28(4), pp.607-623.

[3] HWANG Y, YU T Y, LAKSHMANAN V, et al, (2017). Neuro-fuzzy gust front detection algorithm with S-band polarimetric radar. IEEE Transactions on Geoscience and Remote Sensing, 55(3), pp.1618-1628.

[4] SHI En, LI Qian, GU Daquan, ZHAO Zhangming, (2018). Weather radar echo extrapolation method based on convolutional neural networks. Journal of Computer Applications, 38(3), pp. 661-665.

[5] FLETCHER T D, ANDRIEU H, HAMEL P, (2013). Understanding, management and modelling of urban hydrology and its consequences for receiving waters, a state of the art. Advances in Water Resources, 51(1), pp.261-279.

[6] MA Bin and XIE Xianzhong. PSHO-HF-PM, (2014). An efficient proactive spectrum handover mechanism in cognitive radio networks. Wireless Personal Communications, 79(3), pp. 1-23.

[7] JI Yugang, LI Yitong, SHI Chuan, (2017). Aspect rating prediction based on heterogeneous network and topic model. Journal of Computer Applications, 37(11), pp. 3201-3206.

[8] Xue Jingying, Ni Xiaoyong, (2015). On the Reform of College English Teaching under the trend of Educational Informatization. Integration of Information Technology and Teaching practice, 45(12), pp. 43-45.

[9] Zheng Bifang, Gu Xufei. Walk through the "Cloud" end of practical Education Information--On the Application of Cloud platform in English Teaching. Education and Teaching Forum 2016(03), pp.263-265.

[10] SHEN Wei,WYNTER L., (2012). A New One-level Convex Optimization Approach for Estimating Origin–destination Demand .Transportation Research Part B: Methodological, 46(10), pp.1535–1555.

[11] RAO C S,REDDY K C K,RAO D S., (2012). Power control technique for efficient call admission control in advanced Wireless Networks.International Journal on Computer Science and Engineering, 4(6):962-973.

[12] Shi Hai-yan,Wang Wan-liang,KWOK N M,et al., (2012). Game theory for Wireless Sensor Networks: a survey.Sensors, 12(7):9055-9097.

[13] Zhang Guo-peng,Liu Peng,Ding En-jie, (2011).Energy efficient resource allocation in non-cooperative multi-cell OFDMA systems.Journal of Systems Engineering and Electronics,22(1):175-182.

[14] SUN Huijun,ZHANG Hui,WU Jianjun, (2012).Correlated scale-free network with community: modeling and transportation dynamics .Nonlinear Dynamics,69(4), pp.2097-2104.

[15] BI Anqi, WANG Shitong, (2016). Transfer Affinity Propagation Clustering Algorithm Based on Kullback-Leiber Distance. JEIT, 38(8), pp. 2076-2084.