

Design of E-HR Intelligent Management System in Higher Vocational Colleges Based on Big Data Analysis

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Abstract: In the intelligent management of Electronic human resource management (E-HR) in higher vocational colleges, it is necessary to set up an intelligent information management system to improve the ability of information query and data retrieval of E-HR intelligent management in higher vocational colleges. This paper puts forward the development technology of E-HR intelligent management system in higher vocational colleges based on big data analysis technology. The system is divided into two modules: E-HR intelligent management information retrieval and data mining algorithm design and software development of information management system. Big data fusion and feature clustering are used to design the intelligent information retrieval algorithm in the intelligent management of E-HR in higher vocational colleges, and then to construct the big data characteristic information flow of E-HR intelligent management in higher vocational colleges. The method of edge fusion and feature decomposition is used to reconstruct the feature vector of E-HR intelligent management in higher vocational colleges, and the E-HR intelligent management information fusion is processed in the reconstructed vector distribution subspace. Realize E-HR intelligent management data mining in higher vocational colleges. Under the embedded Linux kernel control model, the software of E-HR intelligent management system in higher vocational colleges is developed, and the E-HR intelligent management database is established, and the data cache is designed by My SQL. Combined with TCP/IP server and A / D conversion protocol, the intelligent management information of E-HR in higher vocational colleges can be read and receive in real time, and the system optimization design is completed. The simulation results show that the E-HR intelligent management system designed in higher vocational colleges has good capability of data mining and information retrieval, and has better performance indexes in data recall rate and precision rate.

Keywords: Big data; Higher vocational college; E-HR intelligent management; System development component; Formatting; Style; Styling; Insert

1. Introduction

Human resource management in higher vocational colleges is the core competitiveness of the development of higher vocational colleges and the most important part of the resources of higher vocational colleges. With the coming of knowledge economy, in the process of human resource management in higher vocational colleges, how to change the past management mode and development bottleneck, how to set up a high-quality teaching team and management team, it is necessary for the development of higher vocational colleges to fully arouse the enthusiasm and subjective initiative of the teaching staff and also to improve the educational level and social progress of our country. This paper analyzes the present situation of personnel management in higher vocational colleges and probes into the reform and development of personnel management in higher vocational colleges. Higher vocational colleges mostly follow Max Weber's

management mode to set up institutions. In the human resources management system, the human resources department highlights the management consciousness and strengthens the administrative power. In the management system construction, still according to the planned economy system under the personnel selection mechanism. Human resource development is not regarded as the basic point of the school development strategy, which runs through every system construction. The quantity, quality and structure of the school human resources are not scientifically planned and rationally allocated. In human resource management, there is no effective competitive incentive mechanism, scientific assessment mechanism and reasonable talent flow mechanism. Do not recognize that talent is the first productivity, not to mention the importance of human resource management to the development of higher vocational colleges [1].

With the development of E-HR intelligent management in digital higher vocational colleges, the scale of E-HR

intelligent management information in higher vocational colleges is increasing [2]. The retrieval and optimization of E-HR intelligent management information in higher vocational colleges has become an important content to improve the efficiency of E-HR intelligent management in higher vocational colleges. In order to improve the ability of information retrieval and resource sharing of E-HR intelligent management in higher vocational colleges, an intelligent E-HR intelligent management system for higher vocational colleges is established. The system is used to serve Multi-source Information Resource (MI-RaaS) to realize the intelligent information management of E-HR intelligent management in higher vocational colleges, to serve readers better, and to improve the utilization efficiency and sharing level of human resources of E-HR intelligent management library in higher vocational colleges [3]. It has great significance to study the E-HR intelligent management system in higher vocational colleges in the construction of digital E-HR intelligent management. At present, the design of E-HR intelligent management system in higher vocational colleges mainly adopts distributed resource allocation design method, combined with information retrieval and semantic feature analysis, to design the retrieval algorithm of E-HR intelligent management system in higher vocational colleges. Cloud resource storage technology is used to improve the intelligence and throughput of E-HR intelligent management system in higher vocational colleges. However, with the increase of E-HR intelligent management scale in higher vocational colleges, the traditional E-HR intelligent management system in higher vocational colleges cannot meet the needs of large-scale E-HR intelligent management in higher vocational colleges. In view of this, this paper puts forward the development technology of E-HR intelligent management system in higher vocational colleges based on big data analysis technology. The system development is divided into two modules of E-HR intelligent management information retrieval and data mining algorithm design and software development of information management system in higher vocational colleges. Big data fusion and feature clustering method are used to design the intelligent information retrieval algorithm in E-HR intelligent management in higher vocational colleges, and the software development and design of E-HR intelligent management system in higher vocational colleges are carried out under the embedded environment [4]. Finally, the experiment test and analysis are carried out to demonstrate the superior performance of this method in improving the intelligence and integration of E-HR intelligent management in higher vocational colleges.

2. Big Data's Analysis of E-HR Intelligent Management in Higher Vocational Colleges

In order to optimize the development and design of E-HR intelligent management system in higher vocational colleges, big data analysis technology is used to analyze the intelligence management of E-HR in higher vocational colleges [5]. In the cloud computing environment, this paper analyzes the resource distribution characteristics of E-HR intelligent management in higher vocational colleges, mainly including the information features of associated knowledge base, computing resources, physical resources and logical resources. Big data resource distribution of E-HR intelligent management in higher vocational colleges is shown in figure 1.

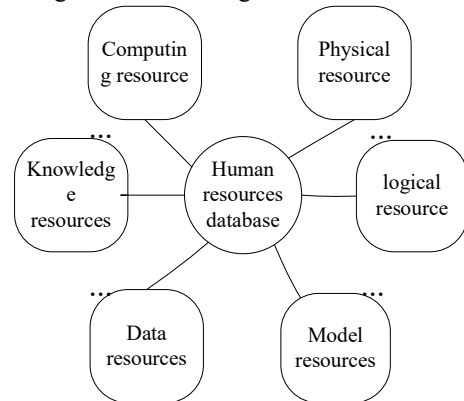


Figure 1. Distribution of big data resources in E-HR intelligent management in higher vocational colleges

According to big data's resource distribution model of E-HR intelligent management in higher vocational colleges shown in figure 1, the resource distribution attribute set $i \in S_s$ of E-HR intelligent management information retrieval in higher vocational colleges is established. The relational mapping relation of E-HR intelligent management in higher vocational colleges satisfies:

$$\alpha^T Q \alpha = \sum_{i=1}^n \sum_{j=1}^n \alpha_i \alpha_j Q_{ij} \geq 0 \quad (1)$$

According to the attribute difference of E-HR intelligent management resources distribution in higher vocational colleges, the sample classification is carried out. It is assumed that there are n samples in the distribution of E-HR intelligent management resources in higher vocational colleges, in which $x_i, i = 1, 2, \dots, n$, the autocorrelation statistics of sample E-HR are expressed as follows:

$$s(t) = \sum_{m=-\infty}^{\infty} \sum_{n=-\infty}^{\infty} a_{mn} g_{mn}(t) + n(t) \quad (2)$$

Where, a_{mn} is the distributed sample set of E-HR intelligent management resource retrieval in higher vocational colleges, $g_{mn}(t)$ is the statistical average value of data, $n(t)$ is the feature interference item of E-HR intelligent management in higher vocational colleges, and semantic ontology fusion method is adopted. For data mining,

when the association mapping of E-HR intelligent management information retrieval exists in higher vocational colleges, $\Phi : M \rightarrow R^{2d+1}$, indicates that there is an optimal solution in $\Phi(z) = (h(z), h(\varphi_1(z)), \dots, h(\varphi_{2d}(z)))^T$ so that the output feature quantity can meet the information classification set of E-HR intelligent management in higher vocational colleges:

$$F_j = \sum_{k=1}^n X_{kj}, Q_j = \sum_{k=1}^n (X_{kj})^2 \quad (3)$$

The big data feature information flow of E-HR intelligent management in higher vocational colleges is constructed, edge fusion and feature decomposition methods are used to reconstruct feature vector of E-HR intelligent management in higher vocational colleges [6]. The iterative formula of reconstruction is obtained as follows:

$$x_i^{(k+1)} = (1-\omega)x_i^{(k)} + \frac{\omega}{a_{ni}} \left(b_i - \sum_{j=1}^{i-1} a_{ij}x_j^{(k+1)} - \sum_{j=i+1}^n a_{ij}x_j^{(k)} \right) \quad (4)$$

$i = 1, 2, \dots, n$
 $k = 1, 2, \dots, n$

According to the directory difference of E-HR intelligent management retrieval in higher vocational colleges, the dispersion matrix of information management is established as:

$$S_b = \sum_{i=1}^c p_i (\bar{m}_i - \bar{m})(\bar{m}_i - \bar{m})^T \quad (5)$$

According to the semantic feature matching method, the distributed mining of E-HR intelligent management information resources in higher vocational colleges is carried out [7].

3. Data Mining of E-HR Intelligent Management in Vocational Colleges

Using big data fusion and feature clustering method to design the intelligent information retrieval algorithm in E-HR intelligent management in higher vocational colleges, the semantic concept set features of E-HR intelligent management in higher vocational colleges are obtained as:

$$J(\bar{X}_j) = \frac{y_j^T S_b y_j}{\lambda_j}, j = 1, 2, \dots, l \quad (6)$$

The distance of two cluster centers in the E-HR intelligent management information distribution area of higher vocational colleges is $y_j, j = 1, 2, \dots, d$. Thus, the cluster resource distribution vector of E-HR intelligent management in higher vocational colleges is obtained:

$$W = [y_1, y_2, \dots, y_d] \quad (7)$$

Edge fusion and feature decomposition are used to reduce the E-HR intelligent management information resource output from m dimension to d dimension, and an optimized feature vector reconstruction model is obtained as:

$$\begin{aligned} \max F(X) &= (F_1(X), F_2(X), \dots, F_n(X)) \\ \text{s.t. } g_j(X) &\leq 0 \quad (j=1, 2, \dots, p) \\ h_k(X) &= 0 \quad (k=1, 2, \dots, p) \end{aligned} \quad (8)$$

The short time Fourier transform method is used to deal with the information fusion of E-HR intelligent management in the reconstructed vector distribution subspace, and the data mining of E-HR intelligent management in higher vocational colleges is realized. On the basis of this, the precision rate is obtained [8]. The recall rate and time cost of human resources information are the constraint cost, and the optimized E-HR intelligent management in higher vocational colleges is realized. The calculation expressions of each cost index are as follows:

$$Recall(X, Y) = \frac{P(X \cap Y)}{P(X) + P(Y) - P(X \cap Y)} \quad (9)$$

$$Overload(X, Y) = \frac{P(X \cap Y)}{\min(P(X), P(Y))} \quad (10)$$

$$Time(X, Y) = \frac{2P(X \cap Y)}{P(X) + P(Y)} \quad (11)$$

Where, $P(X), P(Y)$ represent the fusion probability density function of feature clustering, X, Y are the quantity of feature vector set of E-HR intelligent management in higher vocational colleges, and $P(X \cap Y)$ is the cross-distributed concept set of information fusion.

4. Software Development and Implementation of E-HR Intelligent Management System in Higher Vocational Colleges

4.1. General design description and principle analysis of the system

On the basis of the design of intelligent information retrieval and data mining algorithm in E-HR intelligent management in higher vocational colleges, the software development and design of E-HR intelligent management system in higher vocational colleges are carried out. Based on the embedded Linux kernel control model, this paper develops the software of E-HR intelligent management system in higher vocational colleges, in order to realize the design of E-HR intelligent management system in higher vocational colleges and the optimal scheduling of energy and resource information in colleges and universities [9]. Firstly, the overall design framework of the system is analyzed. In the intelligent management of E-HR in higher vocational colleges, the design method of three-layer network system is adopted. In the perceptual layer of human resource information, the technology of radio frequency tag identification and information scanning is used to collect human resources information. The collected human resource information is input into the middle layer for adaptive processing. The E-HR intelligent management information resource mining algo-

rithm designed above is used to optimize and integrate the resources [10]. Adaptive transceiver conversion control is performed in the network layer [11]. The network transmission of E-HR intelligent management information resources in higher vocational colleges is carried out by using VXI bus technology, and the MYSQL database is established to store the data resources of E-HR intelli-

gent management in higher vocational colleges, and the man-machine interaction is carried out in the application layer [12]. The E-HR intelligent management resource retrieval and access control are realized in higher vocational colleges. According to the above design principle, the overall structure of the E-HR intelligent management system designed in this paper is shown in figure 2.

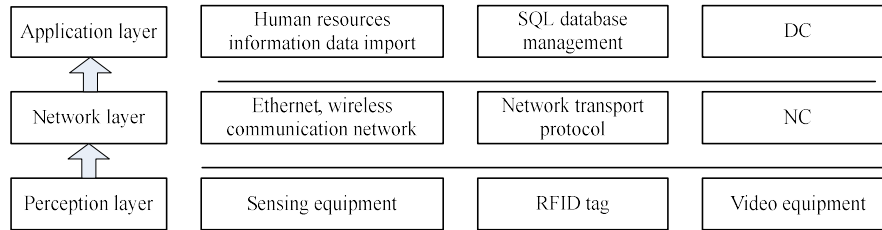


Figure 2. Overall structure of E-HR intelligent management system in higher vocational colleges

4.2. Software modular design

The software design of E-HR intelligent management system in higher vocational colleges mainly includes program compiling module and bus driver module. The data cache is designed with My SQL. Combined with TCP/IP server and A/D conversion protocol, the intelligent management information of E-HR in higher vocational colleges can be read and received in real time, and the cross-compiling of E-HR intelligent management program in higher vocational colleges can be realized by calling freeirq () function. The information fusion and scheduling algorithm is loaded into the system control terminal and information processing center through the program loading module. The program loading module is the key module to realize the core program processing of E-HR intelligent management system in higher vocational colleges [13]. The program loading module adopts the embedded Web service design method, can realize the university educational administration information collection, the self-adaptive processing, the code, the data output test and so on function. The output terminal of E-HR intelligent management system in higher vocational colleges adopts on-line automatic monitoring mode. The process management of E-HR intelligent management system in higher vocational colleges mainly completes the establishment of process, suspension and database access functions. ROMFS file system is built in physical storage medium, device driver scheduling, Socket programming, etc. The software design flow is shown in figure 3.

5. Simulation Experiment and Performance Analysis

In order to test the application performance of this method in E-HR intelligent management and big data analysis in higher vocational colleges, the simulation experiment is carried out. Set the output mode of GPIO in

multi-mode output mode and set the PWM-dependent buffer.

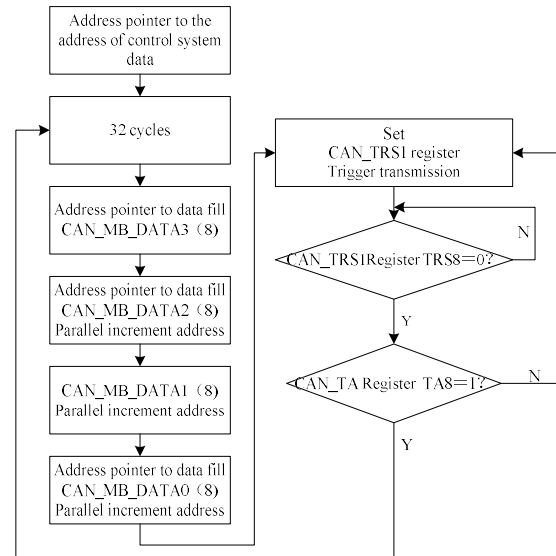


Figure 3. Software design flow

In the experiment, the data mining algorithm is designed with Mat lab 2010b software, and the platform design and performance test of the information management system are carried out on the Visual C platform, and the data recall performance and the human resource retrieval performance of the E-HR intelligent management in higher vocational colleges are tested. The sample set of original data acquisition is 1000, the priori sample training set of E-HR intelligent management resource in higher vocational colleges is 200, the embedded dimension of subspace feature distribution is $m=4$, correlation coefficient $\varphi=0.21$. According to the above simulation parameters, the E-HR intelligent management and data min-

ing simulation are carried out, the mining E-HR intelligent management information data is shown in figure 3.

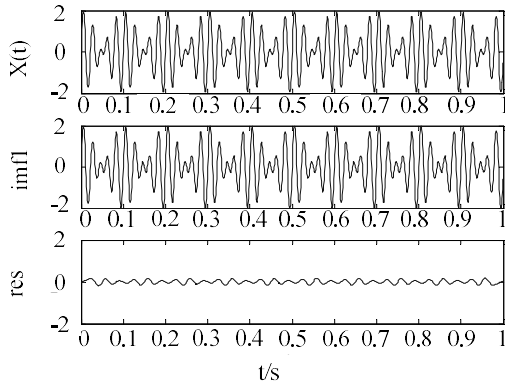


Figure 3. Data mining output of E-HR intelligent management in higher vocational colleges

Based on the data mined in figure 3, the information clustering and feature fusion are carried out, and the information retrieval of E-HR intelligent management in higher vocational colleges is realized. The result of information fusion is shown in figure 4.

Figure 4 shows that the method of this paper is used to carry out intelligent management of E-HR in higher vocational colleges, to realize the optimization of data mining and feature clustering, and to improve the ability of data retrieval and access. On this basis, the human resource recommendation accuracy of different methods

for E-HR intelligent management in higher vocational colleges is tested, and the results are shown in figure 5. Figure 5 shows that this method can improve the accuracy of human resources recommendation, it has superior performance in improving the data mining accuracy by 12.5%.

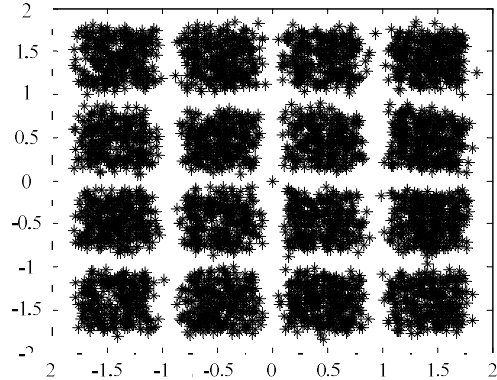


Figure 4. Output of E-HR intelligent management information fusion in higher vocational colleges

The response time of the test system is compared in Table 1. The result of the analysis in Table 1 shows that the system designed in this paper has shorter execution time and better real-time processing.

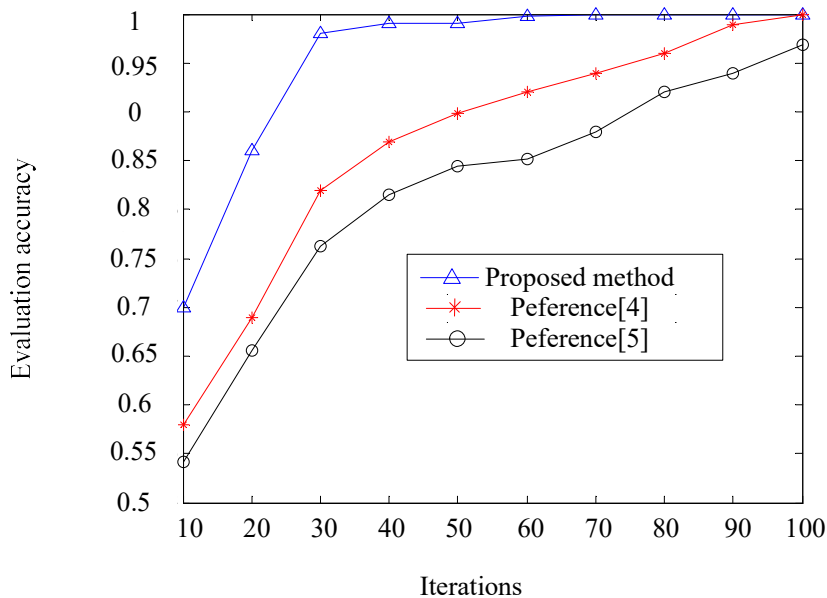


Figure 5. Comparison of E-HR intelligent management information retrieval in higher vocational colleges

Table 1. Comparison of response time (Unit: s)

Iterative step number	Proposed method	PID method	BP method
100	0.24	1.26	2.15
200	0.36	2.27	3.08
300	0.48	3.09	4.88
400	0.52	4.08	5.67

6. Conclusions

Aiming to improve the ability of information retrieval and resource sharing of E-HR intelligent management in higher vocational colleges, an intelligent E-HR intelligent management system in higher vocational colleges is established. This paper puts forward the development technology of E-HR intelligent management system in higher vocational colleges based on big data analysis technology. The system is divided into two modules: E-HR intelligent management information retrieval and data mining algorithm design and software development of information management system. Big data fusion and feature clustering are used to design the intelligent information retrieval algorithm in E-HR intelligent management of higher vocational colleges, and the database of E-HR intelligent management in higher vocational colleges is established. The software development and design of E-HR intelligent management system in higher vocational colleges are carried out under the embedded environment. Finally, the experimental test and analysis are carried out, and the results show that the method in this paper can effectively realize the intelligent management of E-HR in higher vocational colleges. Big data analysis result accuracy is higher, execution time is shorter.

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