Human Resource Management System Based on Artificial Intelligence

Yu Zhou, M.Sc
Yu Zhou, Lecturer, Chongqing College of Electronic Engineering, Chongqing, 401331, China.
Correspondence LecZhou;zb316122058@163.com

Objectives: In recent years, human resource management system (HRMS) has increasingly become an effective tool for enterprises to carry out modern human resource management.Methods: The human resource management system is studied based on artificial intelligence. A clustering algorithm based on human resource management is proposed. By comprehensively analyzing the influencing factors of the human resources assessment system, a human resource assessment system is constructed.Results:Aiming at the characteristics of human resource scheduling in software projects, the human resource scheduling model of software project is established. The practical application level of human resource scheduling model is improved by using artificial intelligence technology to introduce proficiency parameters.Conclusion: Then the performance evaluation of system core module is verified by case, which is the specific algorithm and implementation effect of the module.

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With the development of economic globalization, networking and digitalization, the era of knowledge economy has come, corporate competition. The focus of competition also shifts from the competition of material and material resources to the competition of intellectual resources, while the competition of intellectual resources is the competition of human resources. Therefore, human resource management (HRM) has become an important part of enterprise management [1]. With the popularity of computers, information technology has been widely used in management work, and management information has become an indispensable part of modern enterprise management. Management information systems have gradually become an important tool for business management and decision-making. Applying information technology to enterprise human resource development and management is the trend of human resource development and management, and how to effectively develop and apply human resource management information system is becoming a research hotspot [2]. It is believed that the construction of information systems should not only consider technical factors, but also conform to the development rules of management, and adapt to the current situation of enterprises and future development trends. Since China's accession to the WTO, the wave of the world economy has hit all domestic economic sectors. With the addition of foreign competitors, the competition for human resources has become more intense [3]. Therefore, how to use artificial intelligence technology to further improve the human resource management system has gradually become the main way for major enterprises to enhance their competitiveness [4].

Human resource management has been in existence for nearly a hundred years. Traditional personnel management is accompanied by the emergence of organizations. Personnel management in the modern sense is developed with the emergence of the industrial revolution. In the process of development, it continuously draws nutrients from various disciplines and self-

sublimates, thus nurturing today's modern human resource management theory system [5]. Modern human resource management distinguishes human resources from material resources, emphasizing human initiative, timeliness, intelligence and sociality whose production is marked by the creation of scientific management theory by Taylor and others in the early 20th century. According to Western scholars, the development of human resource management can be divided into four stages: the first stage (before the 1930s). At this stage, Taylor et al. created the theory of scientific management theory to study how to improve people's labor efficiency. This stage is still personnel management. The main content of the work is to recruit and hire workers and establish a wage payment system, addressing the division of labor and collaboration within the enterprise [6]. The second phase (from the 1930s to the 1960s). At this stage, behavioral science theory and industrial relations have had an important impact on human resource management theory. The focus of his work shifts from “things” to “people” and emphasizes the full use of human enthusiasm [7]. The third stage (from the 1960s to the 1980s). Labor economics during this period has had an important impact on the theory of human resource management. The fourth stage (from the 1980s to the present). At this stage, the role of human resource management in the enterprise has undergone qualitative changes. Human resources management departments shift from employee protectors and selectors to planners and changers of business development. At the same time, the maturity and application of artificial intelligence information technology has enabled managers to get rid of the constraints of daily trivial work and focus on the scientific and effective management decision-making [8].

METHODS

Clustering Algorithm Based on Human Resource Management

In the E era of knowledge, networking and globalization, the emergence of new markets, new products, and new ideas has led to new thinking on the core capabilities and business methods of enterprises. The human resource management of the enterprise has also undergone profound changes: knowledge requires knowledge and information sharing, and networkization makes it possible to flatten the organizational structure. The networked organization will gradually replace the traditional linear organization, and the human resource management of the enterprise should be established. On the organizational structure of enterprise networking, and breaking through the limitations of enterprise boundaries, knowledge and information sharing are achieved. Correspondingly, the enterprise's human resource management system should also adapt to this change, be able to dynamically adjust the human resource management business process, and have the function of external communication and cooperation through the network, which puts higher demands on HRMS's integration, reconfigurability, distribution autonomy, intelligence, openness, and agility. The autonomy, responsiveness, autonomy, and social characteristics of artificial intelligence make the system based on this technology have a series of characteristics such as distribution, openness, intelligence, and flexibility, which are suitable for the needs of intelligent human resource management systems under the network environment. Based on the analysis of the characteristics and system model of human resources management in the software industry under the networked environment, a human resource management system structure model is proposed based on artificial intelligence, and the structural model of general intelligent human resource management artificial intelligence are studied.

The definition of clustering is the process of dividing a collection of physical or abstract objects into similar object classes. Cluster is an important concept in clustering, which is a collection of data objects. Objects divided into the same cluster are similar to each other, while objects in different clusters are different from each other. Cluster analysis is an important activity of human beings. Automated clustering can distinguish dense and sparse regions in object space, and can find the correlation between global distribution patterns and data attributes. Cluster analysis has been

applied in many fields, including data analysis, pattern recognition, image processing and market research. For example, in a business activity, a market analyst can use a clustering method to discover different customer groups from a customer base according to a purchase pattern, and to characterize the customer group. Data clustering is booming, and contributing research areas include data mining, statistics, machine learning, spatial database technology, biology, and marketing. Due to the accumulation of previous research, a large amount of data has been collected and a database has been established. Therefore, cluster analysis has become a hot research topic in the field of data mining research. In the partitioning method, given a database containing n objects or tuples, the partitioning method constructs k partitions of data, each partitioning represents a cluster, and $k \ll n$. The data is divided into k groups, and at the same time meet the following requirements: each group contains at least one object. Each object can only belong to one group. Typical partitioning algorithms are k-means algorithm, k-center point algorithm (such as PAM algorithm, CLARA algorithm and CLARANS algorithm).

The clustering algorithm used in this paper is a partition-based K-means clustering algorithm, which has the characteristics of high computational efficiency and is suitable for clustering large sample data. The algorithm is described as follows: the algorithm is K-means clustering algorithm. The algorithm is based on the average of the objects in the cluster. The number of clusters k, a database of n objects is entered. Then k clusters are output, which satisfies the minimum square error criterion. For the data set $\{x_1, x_2, x_3, \mathrm{K}\ x_n\}$, k initialization centers $\{y_1, y_2, y_3, \mathrm{K}\ y_k\}$ are selected as the center of the initial data cluster; the above process is repeated; the distance of each sample to the cluster center is calculated, and $\{y_i\}$ exists for any point $\{x_i\}$, if it satisfies the formula (1), then the point belongs to the class $\{C_i\}$;

$$\left\| x_i - y_j \right\| \le \left\| x_i - y_p \right\| \quad (1)$$

It is calculated as follows:

$$m_j = \frac{1}{n}\sum_{j=1}^{n_j} x_j \quad (2)$$

Then, according to the average of the objects in the cluster, each object is reassigned to the most similar cluster; then the average of the cluster is updated, that is, the average value of the objects in each cluster is calculated; the calculation criterion function is:

$$J_c = \sum_{j=1}^{c}\sum_{k=1}^{n_j}\left\| x_k^{(j)} - m_j \right\|^2 \quad (3)$$

Repeat the above steps until they no longer change.

Optimizing Ant Colony Algorithm

First the weight is determined. Similar to the ant colony algorithm, the ant completes a match and compares it with the last best match to find the one with the highest weight among all the edges with weights. Followed by pheromone selection, the pheromone is the degree of influence of the students who have completed the course on the new classmates taking a course teacher. The volatilization characteristics of pheromones mainly include: the mood and state of the teacher on the day, as well as other factors, and should also include the student's learning status on the day. There is the effective use of algorithm positive feedback and negative feedback. In order to prevent the algorithm from prematurely converging and the operation time is too long, the pheromone strategy in the MMAS algorithm is selected. In order to satisfy the randomness requirement of the algorithm, the probability selection is applied in the algorithm.

$$P_{ij}^k(t) = \begin{cases} \dfrac{[\tau_{ij}(t)]^\alpha [\eta_{ij}]^\beta}{\sum_{s \in allowed} [\tau_{is}(t)]^\alpha [\eta_{is}]^\beta} & j \in allowed_k \\ 0 \end{cases} \quad (4)$$

$tabu_k (k = 1,2,3,\ldots n)$ represents a collection of all nodes that ant k has currently traveled, and $allowed_k$ represents a collection of points where ants have not passed.

$$\tau_{ij}(t+n) = (1-\rho)\cdot\tau_{ij}(t) + \Delta\tau_{ij} \quad (5)$$

$$\Delta\tau_{ij} = \sum_{k=1}^{m}\Delta\tau_{ij}^k \quad (6)$$

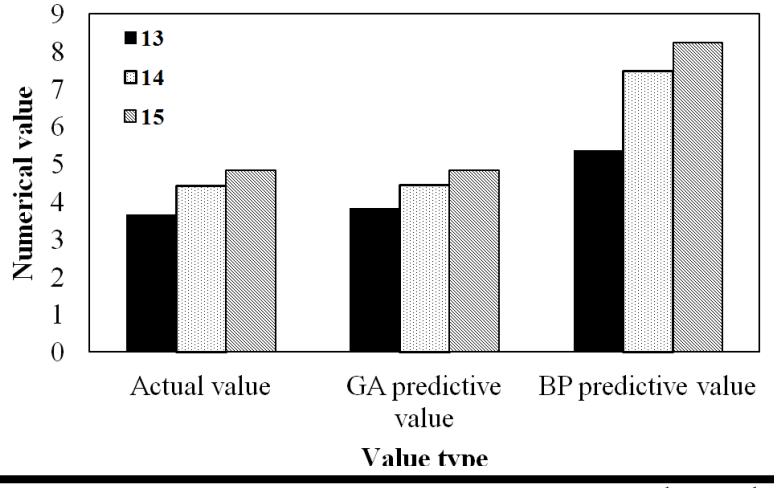
ρ indicates that the pheromone volatilization

coefficient i indicates $(1-\rho)$ indicates a pheromone residual factor, and $\Delta\tau_{ij}$ indicates a pheromone increment on the path in the current cycle, indicating the amount of information remaining by the kth ant in the path in the current cycle. Then it is the design of the fitness function, which is represented by the ant colony algorithm as a chromosomal bit string space. In order to implement the principle of survival of the fittest, the adaptability of the individual bit string must be evaluated. Therefore, the fitness function constitutes the living environment of the individual. According to the individual's fitness, it can determine its survivability in this environment. In general, a good chromosomal bit string has a relatively high fitness function value, that is, a higher evaluation can be obtained, and a strong survivability is obtained. Since fitness is the only certain indicator of individual survival opportunities in a group, the form of the fitness function directly determines the evolutionary behavior of the group. The ant colony algorithm basically does not use external information in the evolutionary search, and only uses the fitness value of the population to search based on the fitness function. Therefore, the selection of fitness function is very important, which directly affects the convergence speed of ant colony algorithm and whether it can find the optimal solution.

RESULTS

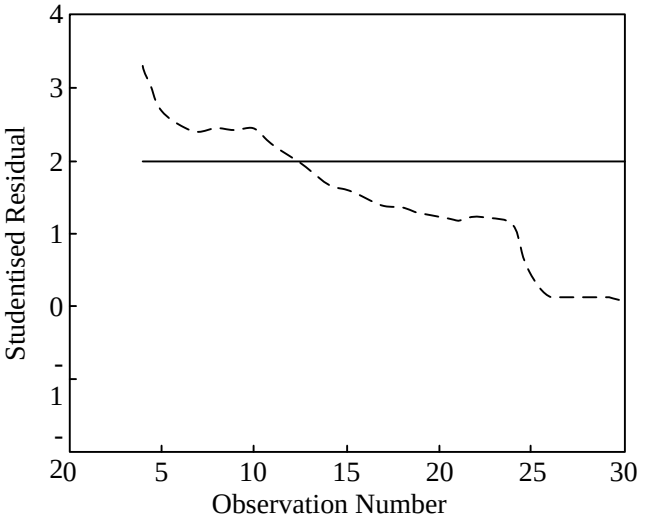
Based on the optimized ant colony algorithm, the composite talent matching is evaluated. The main idea is to use BP optimization ant colony algorithm to obtain the obtained data based on the optimized generalized regression ant colony algorithm. The data is trained and learned, and the results are compared with the training results based on ant colony algorithm. The feasibility and advantages of using the generalized regression optimization ant colony algorithm to train employees' ability matching are obtained. The evaluation results of the comprehensive evaluation method based on BP artificial optimization ant colony algorithm are as follows: For the above 100 samples, BP network model is used for training, and another 55 sample data is brought into the previously trained model, and 55 results are obtained. Based on BP's optimized ant colony algorithm, 15 results are taken as examples. It can be seen from the verification results that taking 15 sample data as an example, the actual output of the sample data of 9 tests is inconsistent with the target output, and only the difference between the 6 test sample data and the actual output is small, and the BP is used. The accuracy of the model is not high. Secondly, then the composite talent matching calculation is compared and analyzed based on ant colony algorithm and optimized ant colony algorithm. The method of BP algorithm and ant colony algorithm based on ant colony algorithm is used to optimize the ant colony algorithm. The analysis of the results of the matching of teachers in the university in Wuhan has the following results:

Figure 1



From the simulation results, it can be observed that the accuracy of the generalized regression optimization ant colony algorithm based on ant colony algorithm is much higher than that of the traditional BP algorithm. The difference between the actual value and the actual value is also Smaller, especially due to the introduction of ant colony algorithm, the method of generalized regression optimization ant colony algorithm can find the global optimal solution. Human resource management is the key to aviation high-tech enterprise management. The ant colony algorithm based generalized regression optimization ant colony algorithm is used to measure the matching problem of enterprise human resource management. The comparison of the group algorithm model and the generalized regression optimization ant colony algorithm model proposed in this paper shows that the method mentioned in this paper cannot only find the global optimal solution, but also can pass fewer training steps than the traditional BP algorithm prediction method. The more accurate predictions are obtained, which proves the feasibility of the proposed method in the study of the matching calculation (Figure 1).\

Figure2
22th Obserbation Studentised Residual Figure



The n, some employee information of the enterprise

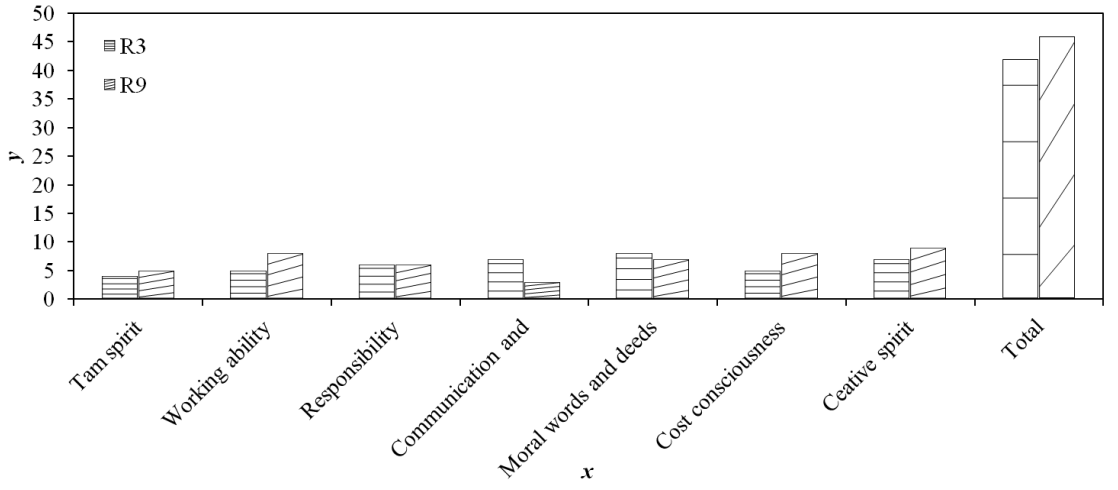
unit is input into the human resource assessment management system for analysis, and 12 groups of employees are selected as research objects. The clustering method and the scoring method are used to conduct the assessment and classification, and then the results are compared and analyzed. A number of meaningful conclusions have been drawn in order to provide a new perspective for the study of human resource assessment issues. The objects R1-R12 are selected as research needs. The real names are omitted here. The seven aspects of the 12 objects are scored and then clustered by K-means method. The final classification results are defined as four categories: excellent, competent, basic and incompetent. The scoring principle adopts the expert scoring method, which is to select the expert group to score the employees in the unit. Each score is 10 points and the lowest score is 0. The scores are shown in Table 1 below:

Table1
The Results of the Employee Index System

Full name	Index system						
	Tam spirit	Working ability	Responsibility	Communication and coordination	Moral words and deeds	Cost consciousness	Ceative spirit
R1	7	6	7	5	6	7	9
R2	6	4	5	9	7	6	7
R3	4	5	6	7	7	5	7
R4	5	7	6	3	7	7	9
R5	4	5	6	7	9	4	2
R6	7	7	9	5	4	5	5
R7	7	5	9	5	3	4	6

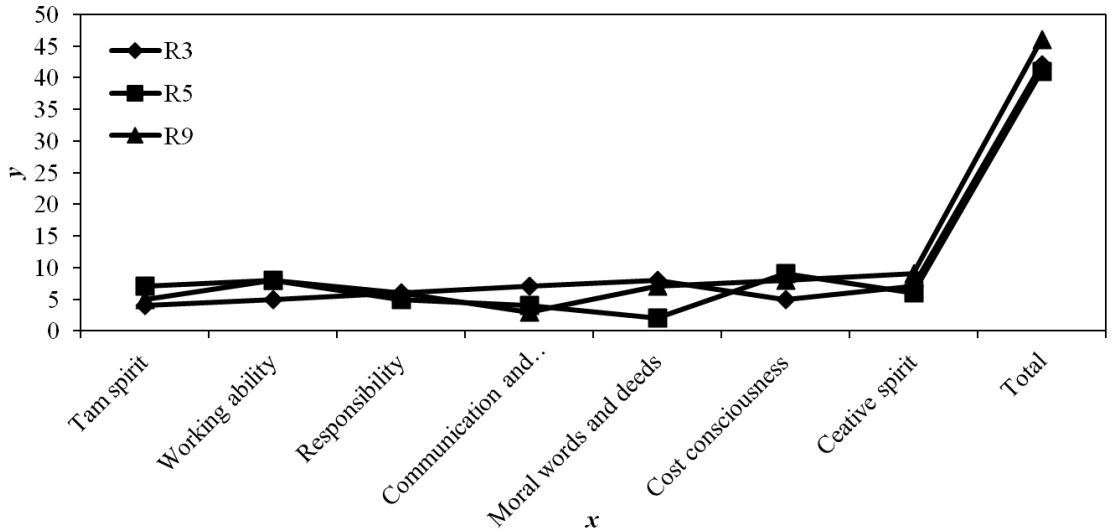
From the results of the classification, the difference is large. Only the third basic competent one has the same classification result, and the other three classification results are different. The first category, the excellent individual is four, and the excellent one in the clustering method is R1, R2, R3, R8; the excellent method of scoring method is R1, R2, R8, R9, the common objects are R1, R2, R8, and the difference objects are R3 and R9, see Table 6-10. From the raw data, R9 is scores 46 points, while R3 scores 42 points. On the surface, it seems that R9 is better, but the analysis data can see the following phenomenon as shown in Figure 3:

Figure3
R3 and R9 Score Analysis



In the second category, the competent subjects are: R9, R11, R12, and R3, R5, R11, R12. It is known in the first type of analysis that R3 is classified as an excellent grade, and comparing R9 and R5, see Figure 4, it can be seen that the overall score of R9 has a clear advantage over R5, and R9 is in the classification of the scoring method itself. Better than R5, the result of the clustering method is derived from the abnormal data of R5. R5's morality and deeds scored only 2 points, which has a greater impact on the overall indicator, while R9's overall score is much better than R5.

Figure4
R3, R5 and R9 Score Analysis



The third category, basically competent, the result of

the division is: clustering method is R4, R10, and the scoring method is R4, R10, and the two are completely consistent, so they will not be described here. The principle of objective fairness and fairness is pursued for the characteristics of the system, and the mathematical model evaluation method of clustering algorithm is adopted to minimize the influence of human factors to achieve fair treatment for all employees. The clustering method is an unsupervised classification method. For the classification and classification problem in the employee assessment, it can be classified by itself without human supervision. The results show that the scheduling obtained according to the human resource scheduling model significantly shortens the project cycle, shortening the cycle of each project by an average of 24.3%, and thus reducing the project cost, and the overall direct cost is reduced by 24.6%. At the same time, the application of human resources redistribution among various project teams is also applied. The application results show that the model can realize the automatic redistribution of human resources quickly, improve the utilization rate of personnel, and improve the utilization rate of personnel from 75%. Up to 90%, it helps reduce project costs, shorten project cycles, and bring economic benefits to the company.

DISCUSSION

The overall design framework of the human resources assessment management system is given, and each specific module in detail is introduced and the process design is implemented. The characteristics and system model of human resources management in software industry are analyzed, and the overall structure of human resource management system is proposed based on multiple artificial intelligence. According to the requirements of system characteristics, a general artificial intelligence structure is adopted for artificial. The intelligent system's demand for domain ontology puts forward the development method of human resource ontology, and establishes the HRMS domain ontology model of software industry. The application of ontology in human resources skill knowledge management of software industry is studied. The structure of skill management artificial intelligence proposes a method of using human resources to match human resources skills. Finally, an example is used to verify. Using the K-means algorithm for clustering, the clustering results are compared with the traditional scoring method. It is found that the results obtained by the clustering method can better balance the development of each object and the fairness of employee assessment with strong persuasive power.

Human Subjects Approval Statement

This paper did not include human subjects.

Conflict of Interest Disclosure Statement

None declared.

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