International Journal of New Developments in Engineering and Society
ISSN 2522-3488 Vol. 3, Issue 3: 01-09, DOI: 10.25236/IJNDES.19301

Design and Implementation of Work Evaluation Monitoring System under Artificial Intelligence Condition

Yuejuan Jing[1],Jiangtao Wang[2]

1.Xi'an Aeronautical University,Xi'an, Shaanxi 710077, China
2. Xi'an Soft Union Information Technology Co., Ltd, Xi'an, Shaanxi 710086, China

ABSTRACT. *At this stage, the development of science and technology in China is extremely fast, and the research of computer artificial intelligence technology is the best interpretation of human wisdom. The algorithm research of artificial intelligence technology continues to penetrate into various aspects. Work evaluation is a kind of human resource management technology and method to determine the relative value of positions. It shows a certain degree of scientificity and objectivity in post evaluation and salary rating. It is widely used in enterprises, but there are also many problems in its use. This paper expounds the related concepts of artificial intelligence technology and job evaluation, and then analyzes the current situation and existing problems in the evaluation of enterprise work in the context of artificial intelligence, and proposes the design and implementation of the work evaluation monitoring system, which is more for the enterprise in practice. Provide a reference for good operational evaluation.*

KEYWORDS: *work evaluation; artificial intelligence; design and implementation of monitoring system*

1. Introduction

With the rapid development of computer technology, the improvement of Internet technology and the continuous development and use of advanced scientific information technology, the relationship between people and things, the environment, etc. formed by human beings in production and life has gradually emerged [1]. From the perspective of the practical application of the technology, the social value of integrating computer artificial intelligence technology with job evaluation is analyzed, in order to bring inspiration for the modern enterprise management research. The continuous improvement of the level of science and technology has also made intelligent management one of the future development directions of enterprises [2]. Through the design and implementation of the work evaluation monitoring system, not only can enterprises better manage their workforce, but also effectively improve their own. Modern enterprise management

level, while saving costs and increasing the output value of enterprises. The artificial intelligence algorithm has created favorable conditions for the scientific design of the work evaluation monitoring system, and realized the optimal selection of the design scheme of the work evaluation monitoring system, and improved the running performance of the system.

2.Overview of Artificial Intelligence and Job Evaluation Theory

2.1 The concept and basic content of artificial intelligence

Artificial intelligence, translated in English as Artificial Intelligence, referred to as AI, is the study of the laws of human intelligence activities, constructing artificial systems with certain intelligence, allowing computers to complete the work that required human intelligence in the past, that is, how to apply the softness of computers. Hardware to simulate the basic theories, methods, and techniques of certain intelligent behaviors of humans. From the perspective of discipline status and development level, artificial intelligence is the frontier subject of contemporary science and technology; it is also a new subject with new ideas, new theories, new technologies and new achievements [3]. The research of artificial intelligence is developed on the basis of multidisciplinary studies such as computer science, information theory, cybernetics, psychology, physiology, mathematics, physics, chemistry, biology, medicine, philosophy, linguistics, and sociology. It is also a comprehensive and marginal discipline.

In the basic theory and basic system of artificial intelligence, including machine learning and knowledge acquisition technology, there are mainly information transformation technology, knowledge information understanding technology, knowledge organization, regularization technology, machine perception, machine thinking, machine learning and growth. Technology, etc. There are also knowledge representation and processing techniques, including knowledge model creation and description techniques, representation techniques and machine behaviors, and various knowledge model processing techniques. Knowledge reasoning and search technology, especially including deductive reasoning calculation and intelligent search technology. The AI system constitutes a technology, and includes AI language, hardware systems, and intelligent application systems.

2.2Concept of job evaluation

Work evaluation, also known as job evaluation, job evaluation. It is a technical management method. Refers to the analysis of the post system, comparison and multi-factor survey to determine the relative value of the position, in order to scientifically establish a salary scale. At present, the basic methods of job evaluation generally have the following four types: permutation method, classification method, scoring method (salary point method) and factor comparison method. The operation process of the job evaluation method is based on two fundamental points:

comprehensive and detailed collection and collation of job information, and direct or indirect comparison of job information to determine the relative value of each job and their level in the organization.

3.Current status and problems of research related to job evaluation

3.1 Work evaluation related research status at home and abroad

1) Work evaluation status of foreign research

The concept of job evaluation originated very early. As early as the 5th century BC, but until the beginning of the scientific management movement advocated by Taylor, it was only a systematic analysis of the work. In order to solve the general inefficiency of enterprise production at that time, from the 1880s to the beginning of the 21st century, the United States launched an “enhanced efficiency movement”, also known as the “scientific management movement.” On the basis of the research of Taylor et al., a work analysis and evaluation system was created, which shifted from the specific action research to the description of the job position in the enterprise and made a standardized record. This system was first widely used in industrial and commercial enterprises. From the end of the 19th century to the beginning of the 20th century, under the influence of industrial and commercial enterprises, government agencies at all levels in the United States began to actively adopt new concepts and methods such as job evaluation and job grading to reform the personnel management of administrative agencies [4]. With the continuous development of enterprise management, especially the introduction of human capital theory, the promotion of laws and anti-discrimination movements, job evaluation has become increasingly important and the scope of application has become wider and wider. After entering the 1970s, the research results of modern psychology and statistics were applied to work evaluation, forming a series of systematic work analysis methods, which greatly improved the validity, reliability and accuracy of work analysis. Tailor-made job descriptions and job analysis reports are available for all types of positions.

2) Development history of work evaluation research in China

The development of job evaluation research in Chinese enterprises is mainly reflected in the establishment and development of the post responsibility system. At the time of the founding of New China, the national economy was in a period of recovery. On the basis of democratic reforms, the reform of production management was carried out. In the research of jobs, the Soviet Union’s experience was mainly referred to. After 1958, the new enterprise management system during the “First Five-Year Plan” period was denied. From 1961 to 1965, under the guidance of the Party Central Committee's “adjustment, consolidation, enrichment, and improvement” eight-character policy, the “State-owned Industrial Enterprises Work Regulations” and “Interim Conditions for Enterprise Piece-based Wages” were promulgated and restored and improved. Strict job responsibility system, at the same time, has created and promoted many good experiences in corporate

management. The "Left" route of the Cultural Revolution destroyed the corporate management system. Since the reform and opening up, China's enterprise management has gradually been incorporated into the track of scientific, rationalization and standardization, and some advanced enterprises have created many advanced management methods. In the 1990s, the metallurgical industry began research on the establishment and evaluation system of professional and technical posts, and carried out pilot projects in Shanghai Baoshan Iron and Steel General Plant, Wuhan Design and Research Institute, Automation Research Institute and Beijing University of Science and Technology, and achieved a series of results. The post analysis and evaluation of the production posts of the company's factories and mines, the establishment of quota standards, a reasonable representation of the post differences, the establishment of a salary distribution system characterized by post value.

3.2 The Problems Existing in the Evaluation of Enterprise Work in China

Although after the founding of New China, Chinese companies have carried out some explorations in their work evaluation, and have achieved certain results and accumulated some experience, but there is still a big gap compared with European and American countries. In recent years, as human resource management has been valued by enterprises and society, job evaluation has also become a concern of enterprises.

1) Lack of internal needs for job evaluation

In practice, job evaluation is far less popular than imagined. Because everyone thinks that job evaluation is the most laborious, cumbersome, hardest to get support, and the least sense of accomplishment, one of the reasons is that the implementers of job analysis often lack knowledge of job evaluation or value of job evaluation. Unclear [5]. At the same time, China lacks a good, easy-to-operate work evaluation and analysis system that conforms to the actual situation of Chinese enterprises. In the long period of time, almost no research or innovation in the analysis and evaluation of work has caused people to lack practical interest. . The reason for the deeper step is that some people have questioned the value of job evaluation analysis in the selection of personnel, which has caused the Chinese enterprises to lack the inherent demand for job analysis. The current demand is mostly external, and China is joining. After the WTO, the pressure brought by market changes requires domestic enterprises to innovate in management, which is a passive demand, rather than an active demand for the implementation of corporate strategic plans.

2) lack of innovation in job evaluation

The organizational design of modern enterprises has increasingly emphasized the ability and flexibility to respond to the external environment. Gradual organizational optimization and adjustment have gradually become a by-product of the daily management mode and operation mode of enterprises. Under such circumstances, the job analysis is required to remain flexible in stability, maintain flexibility in strictness, and require enterprises to conduct hierarchical analysis and evaluation

based on the impact and impact of organizational changes in different positions. Most companies ignore this point when conducting job evaluations. Regardless of the characteristics of the position itself, they emphasize the systemicity and stability of the job description, neglect the hierarchical classification and dynamic management of the job description, and thus it is difficult to meet the internal requirements of continuous organizational optimization. Needs and requirements, resulting in a disconnect between organizational change and job analysis and evaluation.

3) Job evaluation lacks strategic orientation

In the actual operation process, many companies put the cart before the horse, not following the logical sequence of determining the strategy, organization and process, and then carrying out the position analysis, and often taking the work analysis and evaluation as the leading step before the strategy, organization and process change. Therefore, what we often see is that after the enterprise has spent a lot of resources to complete the work analysis and evaluation, it only finds that it needs to carry out strategic adjustment, organizational restructuring and process reengineering, and then with the large-scale job change, it has been painstakingly formed. The job description has become a fake document. Therefore, on the one hand, job evaluation should be strategically oriented, emphasizing the value and contribution of the position to the strategy in the job analysis. On the other hand, it should also fully consider the current organizational management model and the history and status of the position [6]. Therefore, the establishment of a strategically oriented job analysis and job evaluation system that ideally interacts with reality, strategic requirements and positions will become the real needs of enterprises.

4) Lack of support from national laws, no uniform standard for job evaluation

Enterprise management has experienced many years of bumps in China. The state has also set national standards for some special positions such as high physical labor intensity, high temperature operation, and exposure to poisonous operations. However, there is still no systematic law on work evaluation, and there is no specific The evaluation criteria of the system only have the job evaluation criteria established in individual industries. The Ministry of Railways finally formulated the “Working Manual for Labor Evaluation in the Railway Industry” as a reference standard for future post research work.

4. Design of Work Evaluation Monitoring System under the Background of Artificial Intelligence

4.1Overall structure of the job evaluation monitoring system

The system adopts a hierarchical structure, and the main menu includes five functions, as shown in Figure 1. After the user logs in to the system, he can perform various evaluation work, query and count the past evaluation results, and maintain

the system. The system also provides help information such as development instructions and operation instructions.

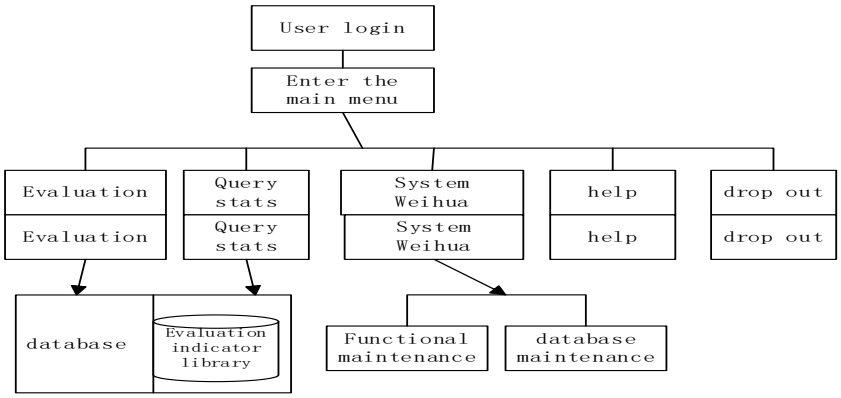

Figure. 1 Overall structure of the system

4.2 Design of work evaluation monitoring method model

In order to make full use of the various information given by enterprise workers and improve the accuracy and credibility of the work evaluation results, the system proposes an evaluation model based on fuzzy comprehensive evaluation and reasoning mechanism based on the principle of fuzzy mathematics and artificial intelligence.

(1) The design of the basic model of fuzzy inference operation.

Let two fuzzy sets A and B, whose elements are $UA(x)$ and $UB(x)$ respectively, then the functions of algebraic set $A \otimes B$ and bounded $A \oplus B$ are:

Algebra set: $\mathrm{U}A \otimes B(x) = UA(x) \otimes UB(x)$ (1)

Bounded and: $\mathrm{UA} \oplus \mathrm{B}(x) = 1 \wedge (UA(x) + UB(x))$ (2)

Let X be a certain object of investigation, then Y is a fuzzy set based on the comprehensive weighting operation of all $\mathrm{R}_j \mathrm{s}(1 \le j \le m)$. $\mathrm{Y} = \{y_1, y_2, ..., y_m\}$,

Where the membership function of y_j is $(1 \le j \le m)$:

$$y_j = W \otimes R_j = (w_1, w_2, ..., w_n) \otimes \begin{bmatrix} r_{1j} \\ r_{2j} \\ ... \\ r_{nj} \end{bmatrix}$$

$$= w_1 \bullet r_{1j} \oplus w_2 \bullet r_{2j} \oplus ... \oplus w_n \bullet r_{nj} \quad (3)$$

Therefore, as long as the weighting factor W and the fuzzy relation matrix R of each influencing factor are determined, the fuzzy inference operation model is also determined.

(2) Design of fuzzy inference algorithm.

$$R_1^{(1)} = \begin{bmatrix} 0.1 & 0.8 & 0.1 & 0 \\ 0.25 & 0.7 & 0.05 & 0 \\ 0.25 & 0.75 & 0 & 0 \\ 0.25 & 0.8 & 0.05 & 0 \end{bmatrix} \quad (4)$$

The whole reasoning uses bottom-up layer-by-layer reasoning. The first level of reasoning is from the subclass factor to the major factors ,$U_i(1 \le i \le n)$ and the reasoning result is calculated by $Y_i(1))$or $R_i(1)$. Wi(1) is the weight vector of each subclass of U_i, and its value is read from the "evaluation index library"; $R_i(1)$ is calculated from the data in the data entry interface, such as "position distribution", which includes input. The first three indicators in the interface first calculate the degree of membership of each indicator evaluation level, and the value is equal to the number of judges except the scores of each level in the table, according to which:

The reasoning result of all the big factors of the layer is the row vector, and the fuzzy relation matrix of the second layer is formed as the fuzzy operation rule, and the form is:

$$Y^{(k)} = W^{(k)} \otimes R^{(k)} \quad (5)$$

4.3 Solution of Work Evaluation Monitoring Process Model

When designing and optimizing the work evaluation and monitoring system, firstly, the design problem of the system needs to be ABSTRACTed, the total function of the intelligent system is determined, and the total function is decomposed into corresponding sub-functions [7]. According to the logical relationship and physical relationship between each function, the functional structure

of the system is established, and the mapping of the functional domain and the demand domain of the intelligent system is completed. After establishing the functional structure of the work evaluation monitoring system, it is necessary to explore the various sub-functions in the functional structure to find out the corresponding functional carrier, and optimize the intelligent system according to the mapping relationship between the function and the functional carrier. The functional carrier knowledge base is also pre-set.

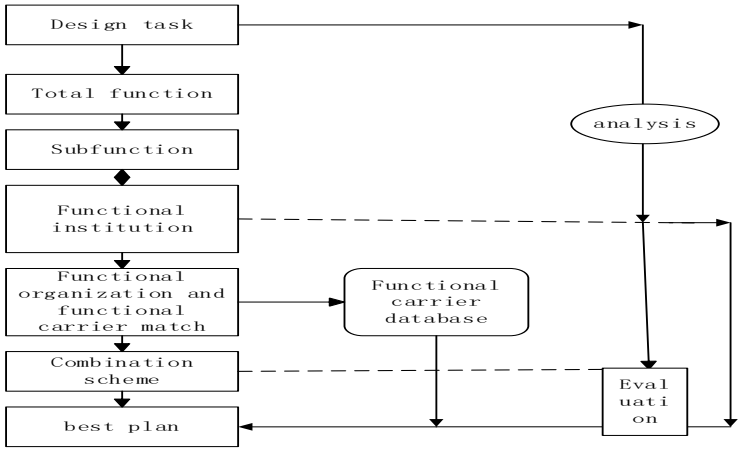

Figure. 2 Process evaluation and monitoring method model of job evaluation monitoring system

4.4 Implementation of the work evaluation monitoring system

In the process evaluation monitoring system process model, the functional carrier database contains a large number of technical parameters corresponding to the worker's work number [8]. Therefore, when establishing the functional carrier database, it is necessary to ensure that the functional carrier is as complete as possible, so as to ensure. In addition, from the perspective of the genetic algorithm of the artificial intelligence algorithm, it is necessary to make a moderate evaluation of each solution solution in each chromosome, and to genetically manipulate these solutions to evolve. When evaluating the solutions of each chromosome, it is mainly carried out through economic evaluation and technical evaluation, and then the corresponding methods are used to synthesize these programs, so as to make a scientific work evaluation of workers' work efficiency.

5. Conclusion

Through the research progress of computer artificial intelligence technology and the analysis of the practical application of this technology in practice, it can be found that artificial intelligence provides strong technical support for the

development of many industries in modern society. At present, many enterprise leaders and managers in China have realized the importance of job analysis and job evaluation, but they lack understanding of job analysis theory and technology, making job analysis and job evaluation work difficult to implement. In the context of artificial intelligence, this paper constructs the model design and implementation process of the work evaluation monitoring system, and actively combines the work analysis and work evaluation theory and methods with the specific situation of the enterprise to help solve our problems in human resource management. Relevant issues provide some reference for realizing the modern management of enterprises**.**

Acknowledgements

The authors acknowledge the School-level research fund project (Grant:2017KY0206),Shaanxi Provincial Key Research and Development Project (Grant: 2018GY-028).

References

[1] Zheng J, Ha C, Zhang Z(2017). Design and evaluation of a ubiquitous chest-worn cardiopulmonary monitoring system for healthcare application: a pilot study. Medical & Biological Engineering & Computing, vol. 55, no.2, pp.1-12.
[2] Rakhra A K, Mann D D(2013). Evaluation of implement monitoring systems. Journal of Agricultural Safety & Health, vol.19, no.1, pp.51.
[3] Sousa V, Matos J P, Matias N(2014). Evaluation of artificial intelligence tool performance and uncertainty for predicting sewer structural condition. Automation in Construction, vol.44, no.8, pp.84-91.
[4] Grimes J, Leng S, Zhang Y, (2016). Implementation and evaluation of a protocol management system for automated review of CT protocols. Journal of Applied Clinical Medical Physics, vol.17, no.5, pp.1-11.
[5] Mesa E, Velasquez J D, Jaramillo P(2015). Evaluation and implementation of heuristic algorithms for non-restricted global optimization. IEEE Latin America Transactions, vol.13, no.5, pp.1542-1549.
[6] Wang Y, Liu Z, Yang J(2017). Design and implementation of a BSN-based system for plantar health evaluation with exercise load quantification:. Biomedical Engineering Online, vol.16, no.1, pp.98.
[7] Liou W K, Bhagat K K, Chang C Y(2018). The design, implementation, and evaluation of a digital interactive globe system integrated into an Earth Science course. Educational Technology Research & Development, vol.66, no.2, pp.545-561.
[8] Kastens K A, Manduca C A(2017). Using Systems Thinking in the Design, Implementation, and Evaluation of Complex Educational Innovations, With Examples From the InTeGrate Project. Journal of Geoscience Education, vol.65, no. 3, pp.219-230.