

Research on the Application of Artificial Intelligence Technology in Engineering Cost

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Abstract: With the rapid development of computer science and technology, artificial intelligence technology has penetrated into various disciplines and industries, and the theory, method and application research of artificial intelligence is a very hot topic at present. For engineering projects, the final quality and economic benefits have a direct relationship with the project cost. Under the background of the continuous development of artificial intelligence technology, it has become an inevitable trend to apply it to the project cost. Based on the discussion of the characteristics of engineering cost and the necessity of applying artificial intelligence technology, this paper focuses on the application and development of artificial intelligence technology in engineering cost, and looks forward to the future development of artificial intelligence in the field of cost, providing a reference for the development of the industry.

1. Introduction

Artificial Intelligence (AI) is a comprehensive discipline, which aims to study how to use modern tools such as computers to design systems that simulate human intelligent behavior. With the development of computer science and technology, artificial intelligence technology has penetrated into various disciplines and industries, including the change of project cost. The use of this technology has greatly improved the quality and efficiency of project cost control, so it is very necessary to explore the application of artificial intelligence technology in project cost.

2. Characteristics of project cost And the necessity of intelligent technology application

The construction procedure of a construction project, from decision-making to completion and delivery, generally includes four stages: pre-decision-making, project development, project implementation, completion acceptance and post-evaluation.

2.1. Characteristics of project cost

In order to adapt to the establishment of economic relations between all parties in the process of project construction and to meet the requirements of project management and project cost control, it is necessary to calculate the price many times according to the construction stage: in the early decision-making stage, the project investment estimation is compiled, in the project development stage, the design budget, construction drawing budget and contract price are compiled, and in the project implementation stage, the settlement price is determined. The final accounts for completion shall be prepared at the stage of completion acceptance. The whole pricing process is from coarse to fine, from shallow to deep, interlocking, the former restricts the latter, and the latter supplements the former. For this reason, the project cost work has four prominent characteristics, namely: ① The total cost of the project is relatively large. (2) The project cost has strong dynamic and variability. The construction period of engineering projects is generally long, and in the process, it is easy to cause the fluctuation of various costs due to sudden factors, so the work of engineering cost has a strong dynamic nature. The variability of this work is mainly due to the fact that there are many kinds of projects in each part of the project, and the methods and processes adopted are quite different, which leads to the variability of the project cost work. (3) The project cost work has a strong complexity. Because the engineering project has many sub-projects, and each part is closely

connected, problems in one link will affect several links.

2.2. The necessity of intelligent technology application

With the continuous improvement of science and technology, artificial intelligence technology, cloud computing technology and Internet of Things technology have been developed and applied unprecedentedly, especially artificial intelligence technology, whose intelligent data acquisition, analysis and processing can greatly improve the quality and efficiency of project cost work, and ensure the economic benefits of relevant enterprises and units. So as to provide a good guarantee for the improvement of the core competitiveness of enterprises. Therefore, we should actively use artificial intelligence technology in the project cost work, so as to promote the healthy development of related enterprises. Its necessity is embodied in the following aspects: First, through the use of artificial intelligence technology in the project cost, it can effectively improve the core competitiveness of enterprises. Artificial intelligence technology, cloud computing technology and Internet of Things technology have been unprecedented development and application, especially artificial intelligence technology, its intelligent data collection, analysis and processing can greatly improve the quality and efficiency of project cost work, ensure the economic benefits of related enterprises and units, so as to provide a good guarantee for the improvement of the core competitiveness of enterprises. Secondly, the application of artificial intelligence technology in project cost is the main development trend and need of the current society. Under the background of the continuous improvement of science and technology in China, the state calls for the vigorous development of safe and intelligent information technology, and all industries should actively integrate information technology. From this point of view, the application of information technology has become the main development trend in the field of engineering construction. Therefore, it is very necessary to apply artificial intelligence technology in project cost.

3. Explore the application of artificial intelligence technology in engineering cost

3.1. Application of BIM technology

Compared with the traditional methods and processes of project cost, BIM technology in artificial intelligence technology effectively avoids the errors caused by manual control, and greatly improves the quality and efficiency of project cost control. In the actual use of BIM technology, its main basis is computer technology, and based on this technology, the relevant information of project cost is analyzed, processed and processed intelligently and automatically, so as to estimate and control the project cost scientifically and reasonably, and avoid the occurrence of project changes. In the practical application of BIM technology in engineering cost, it mainly realizes the intelligent calculation of engineering project, improves the calculation speed of engineering cost by directly identifying the project based on CAD drawing platform, and then checks the calculation results by visual model. In this process, the relevant staff can retrieve a certain part of the calculation draft without comprehensive verification, which greatly improves the verification rate and calculation accuracy of the project quantity. In addition, through BIM technology for engineering modeling, staff can check and correct the collision and non-closure of related parts in engineering drawings at any time, further reducing the probability of visa changes.

3.2. Establishment of artificial intelligence computing model BP neural network

Artificial neural network is a kind of operation model, which is composed of a large number of nodes (or called input layer/output layer) connected with each other. The rapid estimation models of construction cost based on artificial neural network mainly include BP model, RBF model and fuzzy neural network model. Based on BP model, the project cost can be quickly estimated, and the radial basis function neural network, as a breakthrough in the analysis method, makes the inference, prediction and decision-making very clear. In the traditional project cost estimation and control work, it is easy to cause calculation deviation only by computer and manual work, but through the application of BP neural network in artificial intelligence technology in the project cost work, the

comprehensive calculation of the project can be carried out, and then the calculation efficiency is improved while the calculation quality is ensured. Specifically, BP neural network intelligent software requires the relevant staff to input information parameters, and then calculate the various parts of the nerve, especially the hidden layer, so as to get the most accurate and optimal results. Through the application of BP neural network software, the project cost can be calculated repeatedly, and the error can be reduced continuously, thus laying a good foundation for the follow-up work.

3.3. Combination of genetic algorithm and artificial neural network

When the advantages of genetic algorithm and artificial neural network are effectively combined, the genetic algorithm has the advantage of global search, which is the remarkable characteristic of genetic algorithm. Using genetic algorithm to optimize the neural network, the most important thing is the design of the structure. Under the combination of genetic algorithm and artificial neural network, an automatic design method is bred, which has high efficiency and can effectively optimize the neural network and reduce the negative factors of the neural network. When using automatic design method in project cost, it is mainly based on genetic algorithm, using neural network weights as an algorithm tool to design, which improves the quality of project cost work and changes the convergence of genetic algorithm. The genetic algorithm can optimize the neural network connection weights, so that the two technologies can be smoothly integrated, at the same time, when the relevant staff want to optimize the neural network connection weights, only through the function, they can adjust the analysis of the project information data, and realize the reasonable estimation and control of the project cost. Therefore, when optimizing the neural network connection weights, the relevant staff should reasonably use the genetic algorithm to ensure that the neural network connection weights and weights are in the corresponding state, enhance the accuracy of the weights, reduce the sample function error, and lay a good foundation for the project cost estimation and later control work.

3.4. Fusion of related algorithms and data information

With the development of society, all kinds of information and data are being digitized, and the era of big data has come. At present, some industries and enterprises have gradually established their own databases. Big data drives the continuous development of artificial intelligence, and establishes intelligent computing platforms and methods that drive data and knowledge guidance, which can calculate relevant data more intelligently. The integration of data information and artificial intelligence related algorithms will also become the development trend of the project cost industry in the future. Through the integration of big data, the weight of various influencing factors in the cost process can be judged more quickly and accurately, and then the operation efficiency and accuracy of the project cost can be improved through the elimination and avoidance of computers. The work of project cost involves many aspects, such as quantity calculation, price calculation, budget preparation, cost limit and so on, and no matter which aspect is directly related to the data, the accuracy of the data can effectively improve the quality of the work of project cost estimation. Therefore, in order to effectively improve the quality of data, a number of industry databases have been constructed in the field of engineering construction, and artificial intelligence technology has been applied, which greatly improves the speed and quality of information data acquisition in the database. The existing industry databases in the field of engineering construction include Huixun Network, Guanglianda Company, various indicators issued by Shanghai Quota Management Station and Yicai Network. In the practical application process of artificial intelligence technology, it is mainly to create a cost ERP system, through which the data are associated and processed, so as to provide a cost big data platform for land acquisition calculation and quota design.

4. Prospect of the application of artificial intelligence technology in engineering cost

With the rapid development of information technology, the application of artificial intelligence technology in the field of construction engineering is the inevitable trend of the development of

construction engineering. In artificial intelligence technology, computer technology as an important technical support, based on artificial intelligence technology in the construction project cost estimation research application has very important significance, artificial intelligence technology can ensure the accuracy of data estimation, improve the economic benefits of construction projects. From the current application status of artificial intelligence technology in project cost, the technology is gradually developing towards the development of multi-expert collaborative system and tools, and providing good technical conditions for project cost work by building a large-scale distributed artificial intelligence development environment.

5. Conclusion

To sum up, with the gradual and rapid development of China's economy, many artificial intelligence technologies have been paid more and more attention by people. Through the adjustment of industrial structure, due to the improvement of personnel technology, the deepening of understanding of artificial intelligence technology and the rapid development of technical means, it has gradually been widely used in the field of production and has gradually become one of the mainstream technologies in contemporary society. It has also gradually become the focus of attention. Due to the rapid development of computer technology and information technology, the application of artificial intelligence technology in construction engineering is the general trend of the development of construction engineering. Computer technology is an important technical support in artificial intelligence technology, so we should spare no effort to develop computer technology. On the basis of cost estimation of construction projects, the promotion of artificial intelligence technology has immeasurable application value. Artificial intelligence technology is of great help to improve the accuracy and rationality of data estimation, and improve the economic benefits of construction projects.

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