Research on the Application of Computer Intelligent Detection in Civil Engineering Technology

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Abstract. The traditional detection methods of civil engineering are mainly on account of the census detection with typical characteristics of scope, efficiency and cost. These conventional detection methods are mainly on account of voice diagnosis and visual inspection. There is a high demand for the number of samples, otherwise it is difficult to meet the requirements of working accuracy. The iterative maturity of computer intelligent detection technology, its application in the field of civil engineering, greatly promote the improvement of civil engineering detection. On account of this, this paper first analyses the application status of computer intelligent tech in civil engineering, then studies the utilization advantages of computer intelligent detection in civil engineering, and finally gives its specific utilization process.

Keywords: Computer Intelligent Detection, Civil Engineering, Technology, Utilization

1. Introduction

With the iterative progress and growth of social economy, the infrastructure construction has made more significant progress. The development of various types of civil engineering also makes civil engineering tech have a broader utilization prospect. On the other hand, with the iterative maturity of intelligent detection tech represented by computer, it has been widely and deeply popularized and studied in many fields, especially in the field of civil engineering, which greatly promotes the improvement of civil engineering tech [1]. In the specific civil engineering utilization practice, these projects often use concrete structure for construction, but this construction tech will be affected by many internal and external factors as shown in Figure 1 below, which makes its quality control more difficult. In this context, the detection of civil engineering put forward higher requirements.
The quality defects in civil engineering will have a great impact on the quality of the project, especially on the civil engineering components [2]. Therefore, it is necessary to carry out the quality inspection of civil engineering, so as to ensure the quality and safety of the project. At present, most of the detection methods used in civil engineering are census detection with typical characteristics of scope, efficiency and cost, such as ultrasonic, impact echo and other methods. These conventional detection methods are mainly sound diagnosis and visual inspection. Although conventional detection methods have their own typical utilization advantages in specific utilization scenarios, these conventional detection methods require a high number of samples, otherwise it is difficult to achieve the accuracy requirements.

Figure 1. Influencing factors of civil engineering construction tech

With the in-depth utilization of computer intelligent tech, its utilization in civil engineering detection greatly improves its information and intelligent level, and breaks the space-time limit of traditional detection methods [3]. Secondly, on account of the advantages of non-destructive, fast and low-cost, the dynamic design and information construction tech is suitable for a wide range of utilizations in civil engineering, so as to meet the actual needs of engineering construction. The advantages of high efficiency and intuition of computer intelligent detection tech make it have high utilization value in civil engineering monitoring.

In a word, the intelligent and structured method on account of computer can realize the collection and detection of monitoring engineering structure data, so as to effectively judge the construction quality of civil engineering, and lay a prerequisite for the development of civil engineering construction standards [4]. The collected information is back analyzed to obtain more practical parameters, and the design is constantly modified to guide the construction, so that the design and construction are iterated towards the direction of computer intelligent automation, and the construction level of civil engineering is continuously improved. Therefore, the research on the utilization of computer intelligent detection in civil engineering tech has important engineering practice value.

2. Utilization status of computer intelligence tech in civil engineering

2.1. The function of computer intelligence tech in civil engineering

Computer intelligence tech integrates the professional knowledge of computer science, information, geography and many other disciplines and fields, which can quickly and conveniently integrate the
civil engineering data. System engineering and information science have a great role in improving the scientific management and comprehensive analysis of civil engineering construction [5]. On the one hand, civil engineering construction planning, management, decision-making and research processes and links will produce a lot of data, the urgent need for computer digital analysis and processing; on the other hand, computer intelligent tech through digital processing, data format conversion and other operations, can quickly manage and analyze civil engineering data and information.

In addition, the utilization of computer intelligent detection in civil engineering tech has changed people's traditional detection methods, and will also bring new opportunities and challenges to civil engineering [6]. The utilization of computer intelligent detection in the design, construction and management of civil engineering greatly improves the detection efficiency and accuracy of large and complex civil engineering, not only saves manpower and material resources, but also reduces the time cost.

2.2. Specific utilization of computer intelligence tech in civil engineering

The specific utilization of computer intelligence tech in civil engineering includes CAD, visual mechanical analysis, civil engineering project management, construction of civil engineering database system, test system and information construction [7]. Among them, in the utilization level of CAD, CAD undertakes the important functions of establishment, modification, analysis or optimization in civil engineering design. At the level of visual mechanical analysis, the calculation software can analyze the mechanical characteristics of engineering structure and mechanical characterization of structural components. The computer project management software provides the necessary technical premise for the information and precision management of civil engineering project management [8]. The sharing software and hardware resources in the computer network establish a perfect and efficient use environment for users. Civil engineering database, graphics library system, combined with network tech, is helpful to realize the exchange and sharing of civil engineering data, and avoid the waste and error caused by repeated input.

In addition, the combination of database and multimedia tech for information storage and management can effectively manage a large number of documents, design schemes, drawings and other data in the field of civil engineering. For example, it has been widely used in several fields as shown in Figure 2, and achieved remarkable results. The test system on account of computer tech simulation has established effective guidance for complex civil engineering test, and become an important support means for engineering design, construction and scientific research. With the help of measuring elements and instruments, as well as the corresponding analysis and prediction models and methods, the analysis and prediction in the information construction can monitor the construction process in real time, process the relevant data quickly, and guide the monitoring management of the construction project in time [9].

3. **Utilization process of computer intelligent detection in civil engineering**

3.1. **Typical characteristics of computer intelligent monitoring**

Civil engineering structure monitoring system has important utilization value, especially in engineering, there are many materials and structures need timely maintenance and monitoring, using the traditional monitoring method is time-consuming, laborious, and expensive, and the use of structural health monitoring tech can make these shortcomings improved [10]. Computer intelligent monitoring can monitor and evaluate the security on line in real time, which can save the maintenance cost. Secondly, relying on the advanced test system can reduce the labor force and manual misjudgment. In addition, the system can be combined with the latest tech in time, and has the function of self-healing. Through the improvement of automation, the security and reliability can be greatly improved. The main research contents of computer intelligent monitoring include sensing tech, signal processing tech and integration tech.

3.2. **Utilization stage of computer intelligent detection in civil engineering**

First of all, in the daily detection level on account of the civil engineering observation value, the computer is used to collect the deformation, internal force and other data of the engineering structure in real time, compare the observation value and the management value, and monitor the safety of the project and whether there is too much difference with the management value. Secondly, in the current situation analysis and the prediction of the next stage, the design parameters are calculated by using the observation results. According to the calculation and analysis of the design parameters, the safety of the engineering structure in the current construction stage is judged, and the deformation and internal force of the structure in the future construction stage are predicted. In addition, at the level of adjusting the design scheme, the civil engineering design scheme is adjusted according to the prediction results, and the construction scheme is changed and redesigned when necessary.

3.3. **Utilization advantages of computer intelligent detection in civil engineering**

The utilization of computer intelligent detection in structural test of civil engineering can optimize the structural design of civil engineering and promote the reliability and feasibility of test data. For civil
structures with special shape and complex stress system, the structural model test is needed to verify and test the feasibility of the design. In addition, with the help of computer intelligent detection, the state of civil engineering structure and the deformation under long-term load can be detected, and the failure process of structure under high-speed load can be detected, so that the structural test has its unique advantages. The load structure of civil engineering can effectively detect the load deformation relationship in the loading process, and analyze the failure process of components, which provides the necessary test data basis for the comparison of structural schemes, the evaluation of structural performance, repair and reinforcement.

3.4. Computer intelligent security monitoring process

The computer intelligent safety monitoring system can monitor the health status of the structure online. In the process of structural health monitoring in civil engineering, the dynamic response measurement values of the system are obtained by using sensors. The damage sensitive characteristic factors are extracted from these measurement values, and the statistical analysis of these characteristic factors is carried out, so as to obtain the current status of the structure. Computer intelligent safety monitoring can accurately detect damage at the initial stage of damage, locate and determine the degree of damage, and then provide structural safety assessment, and predict the residual life of damaged civil engineering structure. The flow of computer intelligent security monitoring is shown in Figure 3 below.

![Figure 3. Computer intelligent security monitoring process](image)

4. Conclusion

In summary, the utilization of computer intelligent tech in civil engineering detection greatly improves its information and intelligent level, breaks the space-time limit of traditional detection methods, and with its advantages of non-destructive, fast and low cost, it is very suitable for large-scale utilization in complex civil engineering, so as to meet the actual needs of engineering construction. This paper analyzes the function and specific utilization of computer intelligence tech in civil engineering by studying the utilization status of computer intelligence tech in civil engineering. Through the analysis of the utilization process of computer intelligent detection in civil engineering, this paper studies the typical characteristics of computer intelligent monitoring and its utilization advantages in civil engineering, as well as the utilization stage and specific utilization process of computer intelligent detection in civil engineering.
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