Hindawi
Advances in Multimedia
Volume 2023, Article ID 9816027, 1 page
https://doi.org/10.1155/2023/9816027

Retraction

Retracted: Artificial Intelligence Technology Based on Deep Learning in Building Construction Management System Modeling

Advances in Multimedia

Received 17 October 2023; Accepted 17 October 2023; Published 18 October 2023

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] H. Wang and Y. Hu, "Artificial Intelligence Technology Based on Deep Learning in Building Construction Management System Modeling," *Advances in Multimedia*, vol. 2022, Article ID 5602842, 9 pages, 2022.

Hindawi
Advances in Multimedia
Volume 2022, Article ID 5602842, 9 pages
https://doi.org/10.1155/2022/5602842

Research Article

Artificial Intelligence Technology Based on Deep Learning in Building Construction Management System Modeling

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Received 22 February 2022; Revised 12 April 2022; Accepted 20 April 2022; Published 9 May 2022

Academic Editor: Qiangyi Li

In order to explore the application of AI technology in construction management system modeling, the author proposed the application of a deep learning-based AI technology in construction management system modeling. The 3 *D* reconstruction deep learning model is first introduced, and then the model idea of the construction progress reliability control system is designed based on BIM (building information model). Second, the construction process of the 4dbim model is described, and the construction method is introduced. The construction of the model provides data information for the construction schedule reliability control system. Finally, the three functional modules of progress monitoring, progress reliability early warning, and progress prediction are realized by combining the S-curve comparison method, and the work of the system is described through case simulation. The early warning result is from June 7 to June 11, the progress deviation is between (−2%, 2%), and the progress is basically controlled. On June 13, the planned workload was 81.099%, and the actual cumulative workload was 7.099%, which was 4% less than the planned workload. The project progress was out of date, so it needs to be closely tracked. On June 15, the planned workload was 85.511%, and the actual cumulative workload was 80.899%, 4.5% less than the planned workload. The forecast result is the line forecast of the actual cumulative completion percentage on June 17. After calculation, the forecast result on June 17 is 84.311%. The progress deviation on June 17 was 5.21%. If no timely delay is taken on June 15, the delay will get worse. In addition, the system can predict the completion period of the project. When the actual percentage of cumulative completion is greater than or equal to 100%, it indicates that the project has been completed. Therefore, we can calculate the completion period of the three-storey project, and the construction period is about June 29 or 30. When the simulation can be carried out, the simulation number is set as 1000 times, the completion probability of the project is only 40%, and the completion probability is not too high. Artificial intelligence technology can realize progress monitoring, progress reliability early warning, and progress prediction. This system model prepares for software development and is conducive to improving the progress reliability control level of construction enterprises. Starting from the schedule planning subsystem and the schedule control subsystem, this paper studies the application of the artificial intelligence technology based on deep learning in the modeling of a building construction management system. The results show that this technology can effectively improve the efficiency of the building construction schedule management. Compared with the existing management methods, it shows great advantages in terms of operating costs and ease of use. It also promotes the application of artificial intelligence technology in the construction phase.

1. Introduction

The rapid development of computer technology and information technology has realized the transmission of graphics and massive data, and profoundly changed people's real life. Information technology is also continuously infiltrating into manufacturing, design, construction, and other industries and has made profound changes in traditional industries [1]. Especially in the construction industry, the application of information technology is still at a relatively low level, which is the key factor restricting the development of the construction industry. At present, the construction engineering information technology characterized by BIM (building information modeling) deeply affects the development of the construction industry [2]. The concept and technology of BIM are of great significance for the safety, efficiency, and economy of the whole process management of construction engineering [3]. The overall architecture of intelligent building based on the combination of BIM and artificial intelligence technology is shown in Figure 1, which is divided into information acquisition layer, network transmission layer, management platform layer, application platform layer, and AI operation layer. The data association and integration of all intelligent subsystems can be realized by building an intelligent building comprehensive management platform based on the combination of BIM and artificial intelligence technology and deeply integrate operation and maintenance and operation data through big data analysis [4]. The emergence of the BIM technology breaks the existing situation and creates a platform for construction project management. The BIM technology stores the information of the whole life cycle of the project on the model to provide the project staff with the convenience of data management. At the same time, the BIM has visualization, simulation to analyze the impact of the surrounding environment and construction scheme, make the whole construction process in a visual state, improve the project management efficiency, significantly reduce errors, reduce risk, shorten the construction period, reduce costs, and bring strong application values to the development of the enterprise. The application of BIM technology in the field of engineering can change the thinking mode of project-related personnel in design, management, and construction to a certain extent, which will surely become a development trend. In view of the shortcomings of project management software technology, information technology needs to make up for it, and the combination of BIM technology and reliability control of project progress management system. This paper proposes the application of deep learning-based AI technology in construction management system modeling, establishes a BIM based progress reliability control system model which provides data information for construction progress reliability control system, and finally combines S-curve comparison method to realize progress monitoring, progress reliability warning and progress prediction.

2. Literature Review

For this research problem, Fischer A. et al. proposed an automatically generated texture as the construction model and studied the continuous processing method of data acquisition and geometric thermal imaging data, which showed good results [5]. Chen S. and others studied the modeling and simulation 4D (3D and schedule) of BIM and its impact on engineering project safety and logistics application [6]. Saito H. and others proposed a modeling framework, considering three indicators of economic, environmental sustainability, and design scheme sustainability evaluation and studied how to extract specific information of the product model for sustainability analysis based on the principle of the feature model [7]. Hitomi and others studied the application of the building information model in urban railway track planning and developed a cooperation platform. By collecting geographic information and web services, integrating, and transforming software information, the dynamic management of planning process is realized under the collaborative platform [7]. El BAnna M. and others studied the application scope of BIM data, explored the concept of design security, and studied the relationship of physical entity capture and the connection method between node and link in the form of BIM legend, so as to provide static and dynamic analysis of the BIM environment [8]. Martinez Rojas M. and others proposed a dynamic project heuristic scheduling algorithm based on the partial task network method. The algorithm requires time constraints and resource constraints, especially considering changing the state of task execution [9]. Jaya T. and others studied BIM technology in path planning and proposed three main steps for BIM data exchange: extracting geometric and semantic information and defining IFC files in the component. The model is discretized, and the extracted information is mapped to the plane grid. Finally, the shortest path and fast travel path planning was found [10]. Krol A. and others studied the modification of spatial layout by using a traversal spatial network graph algorithm based on cyberspace relations and studied the operational feasibility of the BIM modeling system, which depends on geometric modeling, graphic library representative layout and process operation, and multiple spatial view layout of modeling [11]. Campos F. H. and others studied the complexity of construction planning tasks, proposed the flexibility of construction schedule based on information model, developed construction decision support system, and gave the evaluation method of relevant factors of construction scheme [12]. Bruno S. and others studied a BIM-based structural framework, optimization and simulation system management, construction planning, and scheduling method [13].

On the basis of this research study, this paper proposes an application of artificial intelligence technology based on deep learning in building construction management system modeling. By reading a large number of literature and books, the research status of construction reliability, artificial intelligence technology, and project management was analyzed, and the general direction of current research was understood. This paper analyzes the problems existing in the reliability control of the construction schedule management system and summarizes the applicability of artificial intelligence technology in the reliability control of the construction schedule management system. An artificial intelligence-based progress reliability control system model was designed in the construction process, this model was used to control the reliability of the progress management in the construction process, the convenience of data management was realized, and helped relevant personnel to visually track and monitor the construction progress plan. The adjustment makes the final analysis result more convincing and helps to improve the reliability control level of the construction enterprise's progress.

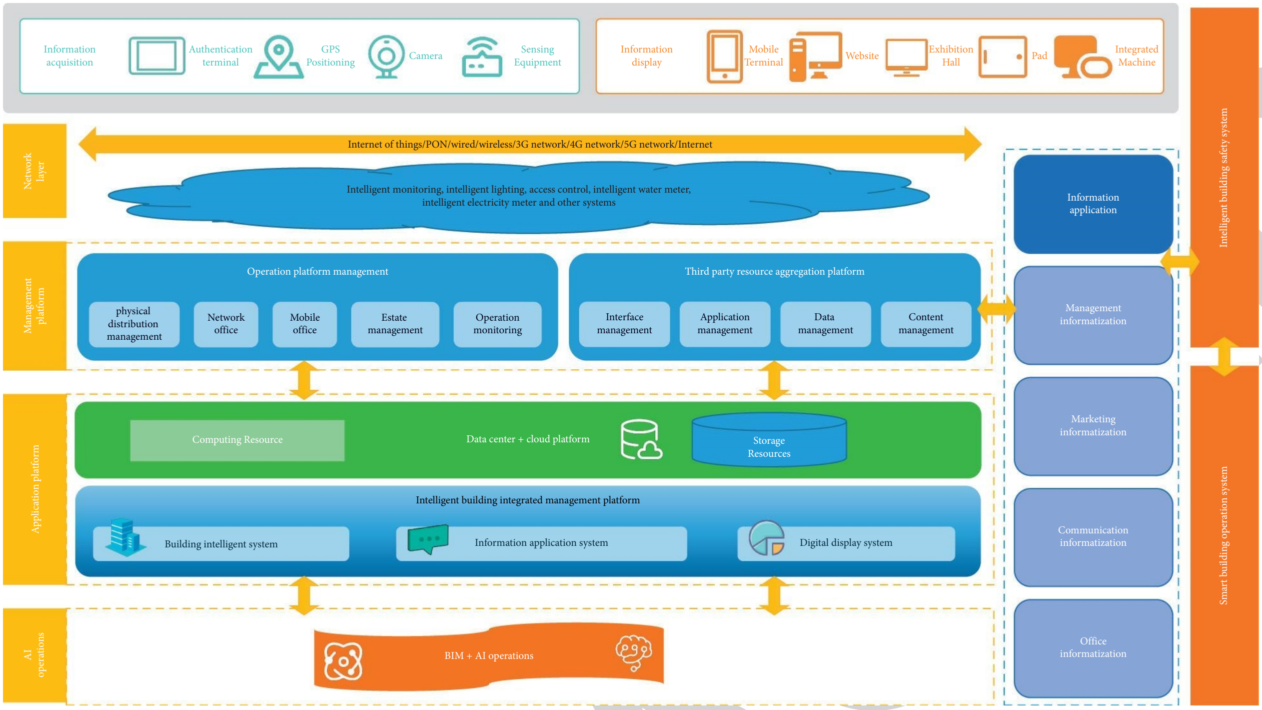

Figure 1: Overall architecture of intelligent building based on the combination of BIM and artificial intelligence technologies.

3. Method

3.1. 3D Reconstruction Depth Learning Model. The three-dimensional reconstruction depth learning model is the core part of the system. This method is a classical three-dimensional reconstruction method proposed in recent years. While achieving good reconstruction results, it is also used as an extension of the basic model to develop a series of deep learning models. Model principle: MVSNet is a supervised learning method. It takes one reference image and multiple original images as the input to obtain an end-to-end depth learning framework for a reference image depth map [14]. The network first extracts the depth feature of the image, then constructs the 3D cost volume through the differentiable projection transformation, then outputs a 3D probability volume through regularization, and then obtains the depth expectation along the depth direction to obtain the depth map of the reference image [15]. Finally, the depth information of different spatial positions is fused to construct the surface 3D model information of the object [16]. Model structure: according to its functions, the MVSNet model structure mainly includes three parts: feature extraction, construction matching cost, depth estimation, and optimization. Among them, feature extraction refers to the image features extracted by the neural network. After viewing angle selection, several paired images, i.e., reference images and candidate sets, are input into the network model, an 8-layer two-dimensional convolutional neural network is used to extract the depth features of stereo pairs, and the 32 channel feature map is the output [17]. In order to prevent the loss of semantic information after the input image is downsampled, the semantic information between adjacent pixels of pixels has been encoded into this 32-channel feature, and the network of each image extraction process is shared. Construction matching cost: the model uses the plane scanning algorithm to construct the matching cost of the reference image [18]. After the feature extraction process, each image can obtain a corresponding feature map. According to the prior empirical depth range, the reference image is scanned in the direction of its main optical axis, and the reference image is mapped from the minimum depth to the maximum depth according to a certain depth interval to obtain a camera cone at different depth intervals. The feature map in the candidate set is mapped into the camera cone. Through projection transformation, several images can form a corresponding number of feature bodies, which are the representation of matching cost. Finally, the cost accumulation of MVSNet is realized by constructing a three-dimensional structure connected in the depth direction by a cost map with the same length and width as the reference shadow image.

3.2. Design Idea of the BIM-Based Schedule Reliability Control System Model. This paper designs three functional modules in the construction schedule reliability control system: schedule monitoring, schedule reliability early warning, and schedule prediction. In order to obtain data support, a 4dbim model is constructed, and the database used in the model is the BIM database.

3.3. Construction Method of the 4Dbim Model. According to the different forms of design schemes, the construction methods of 4dbim model are divided into two kinds as shown in Figure 2.

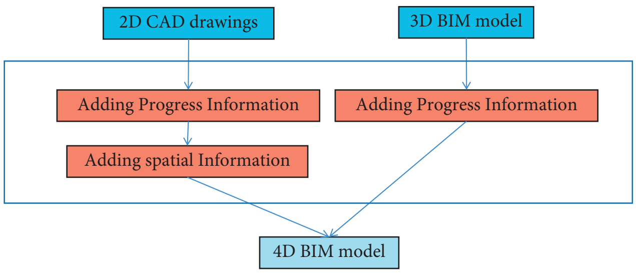

Figure 2: Construction method from design scheme to a four-dimensional model.

The first method is more efficient and relatively advanced, that is, in the early stage of building model creation, the three-dimensional design method is used to design, and the corresponding three-dimensional coordinate information and material information are created for each component. In the construction stage, the progress information of components can be added to the components designed by the three-dimensional design method for progress control. This method does not need the two-dimensional drawings of secondary processing and can also eliminate the man-made errors in the new formwork, so as to facilitate the communication between the construction party and the designer. Instead of two-dimensional drawings, this working mode also needs some time to adapt. Only when these two participants adapt to this approach can construction efficiency be greatly improved [19].

3.4. Functional Module Design of the Schedule Management Reliability Control System. Reliability concept: in order to ensure the construction reliability, with the design stage set by the design stage as the goal, with the goal of the construction stage, through processing and coordination between each stage and project participants, the construction is made smoothly, the requirements of all aspects of construction are met, the owner and customer satisfactory building is built. Generally, due to the characteristics of the construction project, the construction project should complete the credibility of the construction period, the possibility of safe construction, the controllable degree of cost, and the quality of the degree required in the specification. Therefore, construction reliability is a general term covering the feasible, possible, safe, and controllable process in the construction process.

Factors affecting the reliability of the construction progress management system: With the increasingly fierce competition in the construction industry, the complexity of the construction environment, and the occurrence of force majeure events, the reliability of the construction progress management system is higher. Therefore, the factors affecting the construction progress management system must be studied. There are many factors affecting the construction progress, and the main factors are as follows: the construction environment, the construction design change, the construction technology, the quality of the relevant personnel, the coordination of the project participating parties, and the influence of materials and capital supply.

Since the implementation of the 4D information model and S-curve comparison method is based on the WBS work breakdown structure, the combination of the 4D information model and S-curve comparison method is feasible. According to the construction time sequence, 4D model can be divided into a planning model and actual model. The planning model is mainly established before construction to count the planned workload, while the actual model is created step by step with the construction progress during the construction process to count the actually completed workload. According to the abovementioned statistical workload, the deviation of quantities in the S-curve comparison method can be calculated. According to the project progress deviation index, the functions of three modules in the construction progress reliability control system are completed (progress monitoring, progress reliability early warning, and progress prediction) [20].

3.4.1. Progress Reliability Early Warning Module. It is very necessary to set up a progress reliability early warning function module, which can quantify the degree of progress deviation. If the progress deviation exceeds the reliability early warning interval, an early warning signal will be sent, so that the staff can understand the specific situation of the actual progress of the current project, so as to take targeted measures [21].

In this paper, combined with the magnitude of progress deviation in the S-curve comparison method, the deviation level is quantified, and the system progress reliability early warning function module is set up. According to the abovementioned description of progress deviation and actual progress, the quantification level is divided into four levels, and the specific early warning interval is set according to the interval determined by the progress deviation value. In the process of progress control, if the progress deviation is within the early warning interval, the system will send an early warning signal. See Table 1 for details of construction progress reliability control early warning interval.

3.4.2. Case Retrieval. In order to complete the retrieval process quickly and effectively, this paper uses the hybrid retrieval strategy of primary retrieval and advanced retrieval. First, the primary retrieval method is adopted for operation. Combined with the qualitative and quantitative characteristics in the project case representation and the actual situation, the structural type is the first retrieval condition and the building area is the second retrieval condition. The case retrieval machine is allowed to query the corresponding project case framework according to the structural hierarchy. All relevant records meeting the abovementioned retrieval conditions will appear in the database table to form an alternative project case set. After the primary search is completed, the cases retrieved above shall be further searched. Therefore, advanced retrieval is needed. Advanced retrieval is based on N feature attributes of the project. Advanced retrieval in the M cases retrieved at the primary level, we should first obtain the similarity between the project under construction and the project retrieved at the

Table 1: Construction schedule reliability control early warning interval.

Progress deviation value ∇t	−2% ~ 2%	2% ~ 3% or −3% ~ 2%	3% ~ 4% or −4% ~ 3%	∇ > 4% or ∇ < 4%
Deviation level	Low deviation	Lower deviation	Moderate deviation	High deviation
Reliable state	High	Higher	Commonly	Low
Early warning signal	Green	Yellow	Orange	Red

primary level on a certain feature vector, that is, the local similarity, and then obtain the overall global similarity between the project under construction and the project retrieved at the primary level in combination with the corresponding impact of other features on the similarity [22]. The construction in progress is represented by x_0, and previous projects are represented by x_1. Before retrieval, dimensionless data processing is required, that is, as shown in formula (1):

$$r_{ij} = \frac{x_{ij}}{\sum_{i=0}^{m} x_{ij}}, \quad (1)$$

where $i = 0, 1, \ldots, m$, $j = 1, 2, \ldots, n$.

x_{ij} represents the value of case I in feature attribute J and r_{ij} represents the value of case I in feature attribute J after data processing.

Local similarity calculation formula as follows:

$$\gamma_{ij} = \frac{\min_i \min_j \left|r_{0j} - r_{ij}\right| + \xi \max_i \max_j \left|r_{0j} - r_{ij}\right|}{\left|r_{0j} - r_{ij}\right| + \xi \max_i \max_j \left|r_{0j} - r_{ij}\right|}, \quad (2)$$

where: $i = 0, 1, \ldots, m$, $j = 1, 2, \ldots, n$.

ξ is the resolution coefficient, $\xi \in [0, 1]$, which is used to adjust the size of the comparison environment and can be set manually. r_{0j} represents the value of construction in progress x_0 on characteristic attribute v_j after initialization, and $|r_{0j} - r_{ij}|$ is the measure of the distance between r_{0j} and r_{ij}.

Hamming distance method is used for global similarity. Its weighted distance formula as follows:

$$d_{oi} = \left\{ \sum_{j=1}^{n} \left[w_j \left(1 - \gamma_{ij}\right) \right] \right\}, \quad (3)$$

where w_j is the weight of each attribute.

Similarity distance formula as follows:

$$\text{sim}_{0i} = 1 - d_{oi} = 1 - \left\{ \sum_{j=1}^{n} \left[w_j \left(1 - \gamma_{ij}\right) \right] \right\}. \quad (4)$$

According to the physical meaning of the formula, the larger the sim_{0i}, the greater the similarity between the project under construction u_0 and the previous project u_1; On the contrary, the degree of similarity is small. After the abovementioned calculation process is completed, some cases that meet the above conditions are selected from the previous project set, and the similarity degree of these cases will be clear. The case set with the comprehensive similarity of cases higher than a specific value (determined by the project manager) will be used as an alternative.

3.4.3. Progress Prediction Module. In the reliability control of construction progress, when the actual progress is inconsistent with the plan, it is necessary to correct it. In order to make corresponding adjustment to the construction progress plan in time, it is necessary to predict the situation that will happen according to the actual situation. Therefore, the construction progress reliability control system based on BIM shall include the prediction function.

The reliability analysis of the construction progress management system is to combine the characteristics of the project, find out various elements affecting the system, construct the reliability analysis model of the construction progress management system, and calculate the reliability of the progress management system to provide theoretical basis for the construction stage. The evaluation of the reliability of the construction progress management system is to analyze the connection and influencing factors between the constituent units in the system, and then to provide a basis for the overall functional objectives of the system to achieve the optimal and effective management and control. Reasonably dividing the evaluation interval of the reliability of the construction progress management system of construction projects can make a more reasonable and more detailed evaluation of the implementation in the construction process. This paper has determined the construction reliability evaluation interval, but to facilitate the evaluation, the reliability evaluation level of the construction schedule management system is set, as shown in Table 2.

4. Results and Analysis

4.1. Overview of Case Simulation. The project is an office building with three floors and frame structure. The design outdoor floor elevation is −0.45 m, the design indoor elevation is ±0.000 m, the floor height is 3.600 m, and the building area is 6470 m^2.

4.2. Schedule. According to the characteristics of the created project, the corresponding characteristic attributes are determined in order to find similar projects in the project case base created by the enterprise. The feature attributes selected here are as follows: type, structure, building area, and number of floors. Table 2 shows the engineering case base created by a simplified enterprise.

(1) Through primary search, the candidate engineering cases are obtained as case 1, case 2, case 3, case 5, case 6, and case 10, respectively.

(2) Advanced retrieval, including the value of characteristic attributes, dimensionless processing of data, calculation of local similarity, and calculation of

Table 2: Reliability evaluation rating of the construction progress management system.

Reliability of the schedule management system	More than 0.80	0.6–0.80	0.6–0.4	0.4 The following
Grade	Very reliable	Reliable	More reliable	Unsoundness

global similarity. First, according to the project overview and Table 3, we can know the original data (1, 16470, 3) of the project under construction and the original data X of the alternative project. Second, the dimensionless processing of data. The value of the characteristic attribute of construction in progress (0.1, 0.111, 0.134, and 0.083), and the value of characteristic attribute of previous engineering cases is r. Third, the resolution coefficient ξ is 0.5, and the local similarity γ is calculated. Finally, AHP is used to set the index weight to obtain $w_j = (0.3, 0.3, 0.3, 0.1)$, and the similarity between the proposed project and each case is calculated, as shown in Table 4.

If the set threshold is 0.80, the selected cases are case 1, case 3, case 6, and case 10.

In view of the resource constraints in the project and the impact of the proposed project environment, the progress schemes of these project cases are adjusted accordingly, and virtual simulation is carried out to find problems in time and make them more in line with the actual needs. Third, the reliability of these adjusted schemes is analyzed. This case 1 is simulated by MATLAB software. Therefore, the total construction period of the project follows the normal distribution n (30, 5.362). According to the specified requirements, the construction period is 35 d. Based on the probability distribution of the total construction period, make $z = t - u/\sigma$, and standardize the variables to obey the standard normal distribution $z = 35 - 30/5.36 = 0.93$. The value table of normal distribution is checked to obtain the probability value $\varphi(0.93) = 0.8238$. Therefore, the probability of completion within the specified construction period of 35 d is 82.38%, and the reliability of construction period is 0.8238. Similarly, the reliability of case 3, case 6, and case 10 can be calculated as 0.5789, 0.7639, and 0.5520, respectively. In view of the conservative management style of the project manager and the limited resources of the project, the scheme adjusted in case 6 is finally selected as the scheme of the project, as shown in Figure 3.

4.3. Construction Progress Control

4.3.1. Comparison between the Planned Progress and Actual Progress. According to the actual progress of the construction site and the corresponding data collected, and according to the actual progress of the construction site, BIM software can make corresponding statistics on the completed quantities, then export them, and compare and analyze the prepared plan with the actual progress according to the statistical value [23]. According to the statistical values, then the basic parameters in the S-shaped curve comparison method is calculated. The calculated values are shown in Table 5, and the generated S-shaped curve is shown in Figure 4. By setting any specified time point as the inspection period, the above data can be analyzed to monitor the progress and correct the deviation in time. This case takes June 15 as the inspection date.

4.3.2. Early Warning. According to the above S-shaped curve, the progress deviation value is 0 from May 28 to June 5. According to Table 5, it can be carried out as usual according to the original plan. From June 7 to June 11, the progress deviation is between (- 2%, 2%), and the progress is basically controlled. On June 13, the planned workload was 81.099%, and the actual cumulative workload was 7.099%, which was 4% less than the planned workload. The project progress was out of date, so it needs to be closely tracked; On June 15, the planned workload was 85.511%, and the cumulative workload actually completed was 80.899%, 4.5% less than the planned workload. The project progress delay is relatively bad. We should pay more attention to it and take countermeasures in time. According to the abovementioned progress deviation, the BIM progress control system gives orange early warning on June 13 and red early warning on June 15. The corresponding early warning dialog box appears in the system interface to remind the manager of the current construction progress. The BIM progress control system can analyze the specific construction conditions of components according to the abovementioned early warning conditions, and the color reflection is consistent with that shown in Table 1.

4.3.3. Forecast. Based on the comparison between the above schedule and the actual situation and the completion of early warning, the BIM schedule control system can predict the future according to the current situation. The actual cumulative completion percentage on June 15 is 80.899%. According to the implementation of the current project schedule, the actual cumulative completion percentage on June 17 is predicted. After calculation, the forecast result on June 17 is 84.311%. The progress deviation on June 17 was 5.21%. If measures are not taken in time on June 15, the delay of construction period will be worse. In addition, the system can predict the completion period of the project. When the value of the actual cumulative completion percentage is greater than or equal to 100%, it indicates that the project has been completed. Therefore, the construction period of the three-tier project at the time of completion can be calculated. The construction period is about June 29 or 30. Simulation can be carried out for the construction period. When the number of simulations is 1000, it can be obtained that the completion probability of the project is only 40%, and the completion probability is not too high. This reliability gives the project manager quantitative and intuitive data to show how the delay of construction period will become if no measures are taken. Therefore, in view of the situation on June 15, the project leader shall timely analyze the causes and take measures.

Table 3: Sample data of project case base.

Case	Engineering characteristics					
	Type	Value of type	Structure	Value of structure	Built-up area	Number of layers
x_1	Office building	1	Frame	1	6230	6
x_2	Market	4	Frame	1	6696	7
x_3	Office building	1	Frame	1	12340	5
x_4	Residential building	2	Frame	1	7230	13
x_5	Office building	1	Frame shear	3	6846	4
x_6	Office building	1	Frame	1	8400	3
x_7	Complex building	3	Frame shear	3	10200	6
x_8	Complex building	3	Brick	2	7632	12
x_9	Residential building	2	Brick	2	7890	8
x_{10}	Office building	1	Frame	1	6230	5

Table 4: Similarity between the proposed project and each case.

sim_{01}	sim_{02}	sim_{03}	sim_{05}	sim_{06}	sim_{10}
0.9645	0.4797	0.9174	0.6777	0.9171	0.8133

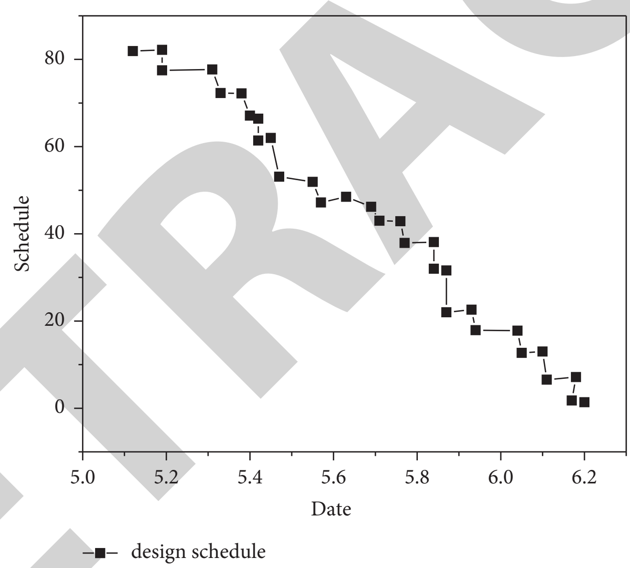

Figure 3: Schedule.

Table 5: Data statistics.

Time	Plan complete	Actual completion	Progress deviation	Time	Plan complete	Actual completion	Progress deviation
5.28	2.41	2.41	0	6.13	81.099	7.099	−4
5.30	5.0	5.0	0	6.15	85.511	80.899	−4.5
6.01	8.180	8.180	0	6.17	89.490		
6.03	13.140	13.140	0	6.19	91.490		
6.05	20.090	20.090	0	6.21	93.740		
6.07	28.410	27.360	−1.04	6.23	96.380		
6.09	41.650	39.630	−1.99	6.25	98.360		
6.11	62.510	60.392	−1.79	6.27	99.999		

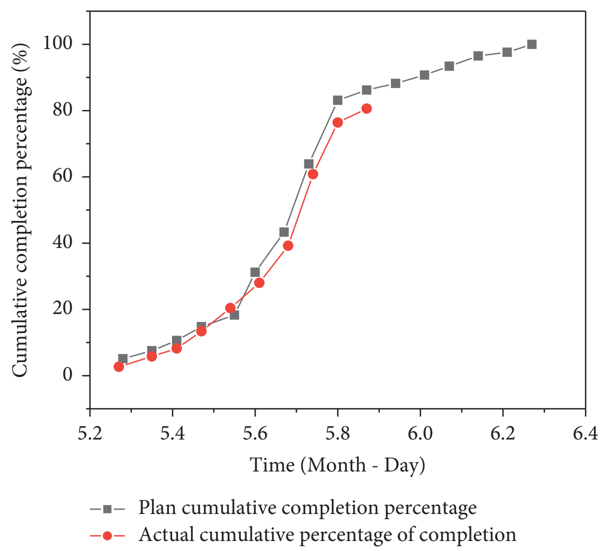

FIGURE 4: S-shaped curve.

5. Conclusion

This paper puts forward the application of artificial intelligence technology based on deep learning in the modeling of building construction management system and establishes the progress reliability control system model based on BIM. The system completes the analysis and processing of data and provides more accurate progress related information, so as to provide basis for project managers in decision-making. It can automatically complete the analysis and processing of data, reduce the workload of staff, and improve the work efficiency of staff when analyzing the progress. It can show the actual progress in a three-dimensional space and compare it with the plan, which makes it easier for staff to understand it and solve the problem of abstract expression of schedule in traditional. It can complete the statistical work of workload, complete the analysis and treatment of construction progress deviation based on the S-curve comparison method, give an alarm according to the size of progress deviation value, and predict the future construction period, so as to take measures for problems in the project as soon as possible to avoid future problems. The effective management of detailed small-scale scenes in the future needs to be studied.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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