

## *Retraction*

# **Retracted: Integrated Urban Design Methodology of “Planning-Construction-Management” and Intelligent Management and Control Based on Teaching Reproduction Robot**

### **Journal of Robotics**

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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) Manipulated or compromised peer review

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.

### **References**

- [1] H. Wang, “Integrated Urban Design Methodology of “Planning-Construction-Management” and Intelligent Management and Control Based on Teaching Reproduction Robot,” *Journal of Robotics*, vol. 2022, Article ID 4669792, 9 pages, 2022.

## Research Article

# Integrated Urban Design Methodology of “Planning-Construction-Management” and Intelligent Management and Control Based on Teaching Reproduction Robot

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With regard to the problems in the integrated urban construction based on “planning-construction-management,” the main issues that include the tight construction cycle, the high operation standards, the relatively extensive range of management data sources, the uneven information control, the relatively significant difficulty of management and control, and so on. In this paper, an integrated urban system of “planning-construction-management” based on the management level of the construction projects is established mainly through the application of the teaching reproduction robot (TRR), the engineering information, management and control procedures, and the system framework and performance. Among them, the management and control cover the design control, the quality supervision, the schedule control module, the safety control, the video monitoring, and the facility movement control. The digital technology is included to achieve an integrated management and control model for the engineering design, construction, and operation in its practical operational form. The introduction of the management and control described above has led to relatively good results for the project by operating on the road project with a public-private partnership (PPP) in the startup area of the Chengdu Tianfu International Airport New Town.

## 1. Introduction

With the rapid development of urban construction, breakthroughs have been made in traditional engineering construction management and control with new models and concepts, and the digital control model based on information technology has been adopted. In this way, the modern urban construction management and control can be more intelligent, humanized, and standardized; more planning and attention have been paid to the accuracy of details with regard to the concept of modern urban construction. Urban control and intelligent management and control are corresponding to each other, in which the intelligent management and control concern more about the cooperation and collaboration of multiple elements, which are also the requirements for effective urban construction and the completion of urban development. The intelligent management and control methods adopted in foreign

countries in the early stages are adopted in the development of urban construction. For example, the United States introduced participatory planning in the 1960s, which is an act that primarily involves all the users of the spaces. The release of this act represented a move from a monolithic approach to a multifactorial approach in the urban construction [1, 2]. The smart city management and control in China are typically observed in the construction of Guangzhou city. However, it is not effective in the intelligent management and control of the project with regard to the waste incineration power plant and the form of integrated management and control. Hence, in the new model of intelligent management and control, more attention is paid to the estimation of the interests of stakeholders in the integrated “planning-construction-management” urban construction. At the same time, this act is reflected in the whole process of urban construction. In 2003, the Her Majesty’s Treasury (HM Treasury) of the United Kingdom released three

processes required for the planning before construction, during construction, and after construction [3, 4]. As compared to its performance and results in foreign countries, China still focuses on the assessment of construction results and schemes, without taking the comparison between the various stakeholders in the urban construction process into consideration. The effective implementation of the integrated “planning-construction-management” urban construction management and control system has driven the rapid progress of the interactive network based on the Internet. The interactive network is still a rather effective way to develop educational information technology. At present, many colleges and universities have already carried out research on the urban construction methods and intelligent management and control in the interactive networks based on the Internet. Due to the packet loss, delay, and lag in the data transmission process of urban design and intelligent management and control, this situation has directly influenced the progress and quality of the integrated “planning-construction-management” urban construction. In addition, digital enhancement technology is applied in the process of planning, design, construction, and operation, except that their effects are all demonstrated in the current stages. The levels of the teaching reproduction robot and project information management and control are relatively low, and there is a lack of project management and control platforms, which can meet the requirements of intelligent management and control.

The integrated “planning-construction-management” urban design has gradually become popular among massive users. It is mainly implemented on the basis of the ratio of different green areas in the integrated “planning-construction-management” urban design. The integrated urban design based on “planning-construction-management” can not only provide a warm, comfortable, and environment-friendly living experience but also offer flexibility and economy. With the continuous advancement of science and technology, it is necessary to apply the teaching reproduction robot to the process of integrated urban “planning-construction-management.” In this way, the relevant technology can be better used to implement integrated urban construction. At the same time, it is also of important significance for the measurement and control of the engineering cost of urban buildings [5–7]. It is a challenge to apply the mathematical model to the process of integrated urban design, and there are significant problems in the traditional design methods during the process of integrated “planning-construction-management” urban construction on a large scale. In combination with the urban construction process at present, domestic and foreign research scholars have applied the existing OpenGL software in the 3D virtual environment to assist and simulate the cost modeling and the construction project based on the data used in practice. However, there are two major defects in the two levels of communication and tool convenience because the memory required for the relevant technology is relatively large and the transmission efficiency fails to achieve the expected result. The analysis algorithm for the integrated urban design and intelligent management and control of “planning-

construction-management” is put forward through an in-depth study of building construction in all aspects. Through the application of the teaching reproduction robot, the construction schedule of a building project is consolidated and numbered in a certain order by using an objective function from the perspectives of construction cycle, labor cost, material cost, and safety input, so as to achieve the purpose of saving the cost and reducing the design input of the project. With the advantages of integrated “planning-construction-management” urban design in the aspects of energy saving and environmental protection, production cost reduction, acceleration of construction speed, and so on, to fully comply with the standard of the principle “four savings and one environmental protection,” it is necessary to carry out proper management and control of the construction quality during the integrated urban construction period. The management and control of construction quality has become a key issue in integrated urban construction [8–10]. Hence, in the integrated urban design process of “planning-construction-management,” it is required to assess the construction quality of the system in all aspects accordingly. In the integrated “planning-construction-management” urban quality assessment model, the teaching reproduction robot should be combined to make full use of its technical advantages more effectively. At the same time, effective evaluation can be carried out in accordance with the urban design assessment index system established. In particular, the application of the teaching reproduction robot can facilitate the robust development of construction projects, and the simulation model established needs to be visualized in three dimensions.

With regard to the analysis of the teaching reproduction robot, through the integration of the Internet of Things (IoT), cloud data, and other big data technologies, on the basis of the practical demand of engineering, a municipal engineering planning-construction-management construction software based on the teaching reproduction robot has been developed. It is a collection of the design control module, the quality supervision module, the progress development module, the safety control module, the monitoring video module, and the operation module for the comprehensive and detailed understanding of the situation in each stage of the project and the full presentation of all relevant data. The research and development of this software has offered strong support for urban construction and can accelerate the progress and improve the quality of urban construction.

## 2. Algorithm Related to the Teaching Reproduction Robot

The TRR software is designed for the management and control of urban projects in a general direction as well as for cases with more specific management and control. In general, the TRR technology is applied in relatively niche areas, mainly in the construction work, and it cannot operate on a larger scale. At the same time, it is not very effective in coping with the geographical environment [11, 12]. The teaching reproduction robot can make up for the

insufficiency of processing in this relatively small aspect, and TRR plays a significant role in the GIS refinement of the construction model details. However, the teaching reproduction robot can enhance the integrity of information by understanding the surrounding geography and presenting the micro and macro information while, at the same time, it can also carry out consolidation, analysis, and processing on the basis of the spatial geographic information.

The reason is that the computation method of the teaching reproduction robot has reduced the computation time and improved the task efficiency as compared to the conventional computation methods. It is assumed that the function of each point in the teaching reproduction robot is an S-shaped function. At the same time, the input of the first node  $i$  in the teaching reproduction robot is  $net_i$ , the output is denoted as  $o_i$ , and the output of the  $k$ -th node in the output layer is  $\hat{y}_k$ , then the input of the  $j$ -th node in the middle is shown in the following equations:

$$net_j = \sum_j w_{ji} o_i, \quad (1)$$

$$o_j = f(net_j), \quad (2)$$

$$net_k = \sum_j w_{kj} o_j, \quad (3)$$

$$\begin{aligned} \hat{y}_k &= o_k \\ &= f(net_k). \end{aligned} \quad (4)$$

It is assumed that the deviation of the teaching reproduction robot  $e_k = y_k - \hat{y}_k$  is the difference between the expected value and the practical value. If there are  $i$  neurons in the output layer obtained through calculation, then the squared deviation for the true output and the expected outputs can be obtained as follows:

$$E = \frac{1}{2} \sum_{n=1}^i (y_k - \hat{y}_k)^2. \quad (5)$$

The numerical calculation and the planning results of the teaching reproduction robot in the integrated planning-construction-management urban construction and the WiFi/geomagnetic coupling protection results are used to establish a thinking matrix, and the target output is the coordinates of the real location. The formula for the final results is shown in the equation as follows:

$$\left\{ \begin{array}{l} \text{InputData} = \begin{bmatrix} x_{pi} \\ y_{pi} \\ x_{ci} \\ y_{ci} \end{bmatrix}, \quad i = 1, 2, \dots, n, \\ \text{TargetData} = \begin{bmatrix} x_{ri} \\ y_{ri} \end{bmatrix}. \end{array} \right. \quad (6)$$

In the above equation, InputData stands for the input result;  $(x_{pi}, y_{pi})$  and  $(x_{ci}, y_{ci})$  are the coordinates of digital protection and development and the coordinates of WiFi/geomagnetic combination protection at the  $i$ -th point to be protected based on the integrated urban design of "planning-construction-management," respectively; TargetData stands for the target output sample, and  $(x_{ri}, y_{ri})$  stands for the real location coordinates of the  $i$ -th point to be protected.

The digital calculation in the integrated "planning-construction-management" urban construction has become more and more sophisticated through the application of the teaching reproduction robot, which has played a more significant role in the performance of mutual calculation. In this paper, the calculation method and intelligent management and control of the design concept in the teaching reproduction robot are used [13, 14]. As the symbols and constraints in the model (1) lack clear meaning due to the presence of the technical parameter  $\eta$  for virtual reality (VR) and augmented reality (AR) and the random parameter  $\xi$ , the symbols in model (1) and the constraint conditions lack clear meaning. Thus, the equation can be obtained as follows:

$$\left\{ \begin{array}{l} \max_x f(x, \xi, \eta), \\ \text{s.t. } g_j(x, \xi, \eta) \leq 0, \quad j = 1, 2, \dots, m. \end{array} \right. \quad (7)$$

In the above formula,  $x$  stands for the decision vector,  $\xi$  stands for the random vector parameter,  $\eta$  stands for the virtual reality and augmented reality technology vector parameter,  $f(x, \xi, \eta)$  stands for the objective function, and  $g_j(x, \xi, \eta)$  stands for the constraint function.

The stochastic data are summarized based on the computational theory of the teaching reproduction robot, and the constraint conditions are included in the teaching reproduction robot. The stochastic control of the teaching reproduction robot can be used to deal with the issues of stochastic parameters and technical parameters. The integrated technology of planning-construction-management is applied to the whole life cycle of construction projects. In this way, the information in each stage of the project can be shared and interoperated, while at the same time the big data related to the cloud computing and Internet of Things (IoT) can provide intelligent solutions. Among them, the contents include the fusion of heterogeneous data of the teaching reproduction robot from multiple sources; the integrated indoor and outdoor integration and positioning; the monitoring and early warning of engineering on all fronts; the data interaction; the data storage; the intelligent research and scheme development for engineering construction and management; and so on. The integrated system is used to carry out visualized management and control by using multidimensional information and data, and the processes are interconnected to complete the spatial management and control of the design, planning, and operation in municipal engineering, so as to implement the modernized integrated management and control of urban construction.

### 3. Integrated Urban Design Method of “Planning-Construction-Management” and Intelligent Management and Control

In general, the design link in urban construction is a comparison between the urban design measures and the practical operation and maintenance issues, which usually indicates the comparison of the relationship between the “current situation” and the “urban design planning” as well as the evaluation of the results obtained from the specific control plan. The so-called “current situation” refers to the actual situation at the time the current urban design is estimated, while the “urban design plan” refers to the design solution for the urban construction in accordance with the governmental standards [15, 16]. At the same time, the “implementation results” mentioned in this paper refer to the results of the implementation of urban planning on the basis of the urban design, instead of the results of construction on the basis of the urban design deliverables. In this way, a series of information and suggestions for the improvement of the urban design scheme and the content of the results can be presented. There are a lot of factors influencing the price of the integrated “planning-construction-management” urban design projects, including the top design elements in the integrated “planning-construction-management” urban design projects and the skill level of the construction personnel in the integrated “planning-construction-management” urban design project. The top design elements of the integrated “planning-construction-management” urban design project and the skill level of the construction personnel in the integrated “planning-construction-management” urban design project are the human factors that can influence the price of the integrated “planning-construction-management” urban design projects. The changes in the project, the national policy control, and the natural factors are objective factors that can influence the price of the integrated “planning-construction-management” urban design project. Since there are many factors that can affect the price of the integrated “planning-construction-management” urban design project, it is necessary to avoid the leakage of any element in the design process. During the process of price design and intelligent management and control, the overall price of the integrated “planning-construction-management” urban design project can be influenced, and the estimation accuracy will be reduced without obtaining the influencing factors through calculation. In the process of building construction, any increase in the number of floors and building area can affect the cost of the integrated “planning-construction-management” urban design project. In addition, any change in the supplies procured in the construction process and the change in the construction personnel expenses can affect the accuracy of the integrated “planning-construction-management” urban design and the intelligent management and control. Hence, during the process of the integrated “planning-construction-management” urban design project cost estimation and reasonable cost control, it is necessary to take the potential influencing factors into full consideration

and include labor cost and material cost in the design of the project and in the estimation of the project cost so as to enhance the stability of the construction project more effectively. The cost estimation in the integrated “planning-construction-management” urban design project is set out in the intelligent management and control center. In general, the subjective factors, objective factors, and dynamic factors of the construction project cost are deemed as the input values for the system parameters, and it is necessary to ensure that the cost estimation and management and control of the integrated “planning-construction-management” urban design projects are more accurate in accordance with the requirements.

There are relatively few studies conducted by domestic researchers at present with regard to the concept of urban construction, and there are mainly two methodological approaches. One of the methodological approaches is the evaluation of the project being carried out, the criteria of the urban design, and the presentation of the implementation results; the other methodological approach is the comparison of the two values for the operation of the results and the results of implementation. In case that only one of these two methods is adopted, the practical urban design and construction is essentially a model of four parties, that is, designers, users, development operators, and controllers. The methods of evaluation and calculation at present focus on the comparison of the gaps between the results of the operation and the concept of the design [17, 18]. In this way, no attention is paid to the response of the controllers or the other users, and the studies on the stakeholders of the construction project can also be ignored. Hence, the urban design concept should be applied to the process of urban construction design while taking feedback from controllers and other participants into consideration to finally form the urban design plan through the “consolidation of the planning process-analysis of the urban design control elements and the fit of implementation-the evaluation of the control process-the evaluation by the users” (the details are shown in Figures 1 and 2).

The development process is consolidated in a chronological manner by comparing the results and feedback between the urban design schemes and the planning solutions. Through the comparison of the urban design management and control situation with the detailed urban standardized planning, the urban planning and design can be assessed for the timely accomplishment of the planning requirements. The implementation of the design requirements is compared on the basis of the urban design control elements and the results of the operation. The significance of urban design in the construction and operation of the city is used to select different elements at different levels through various tasks.

Through the top-level design framework of “three software, one support, and N applications,” the main planning functions of the planning and construction management platform are shown in Figure 3. At the same time, it is further expanded based on the relevant engineering standards.

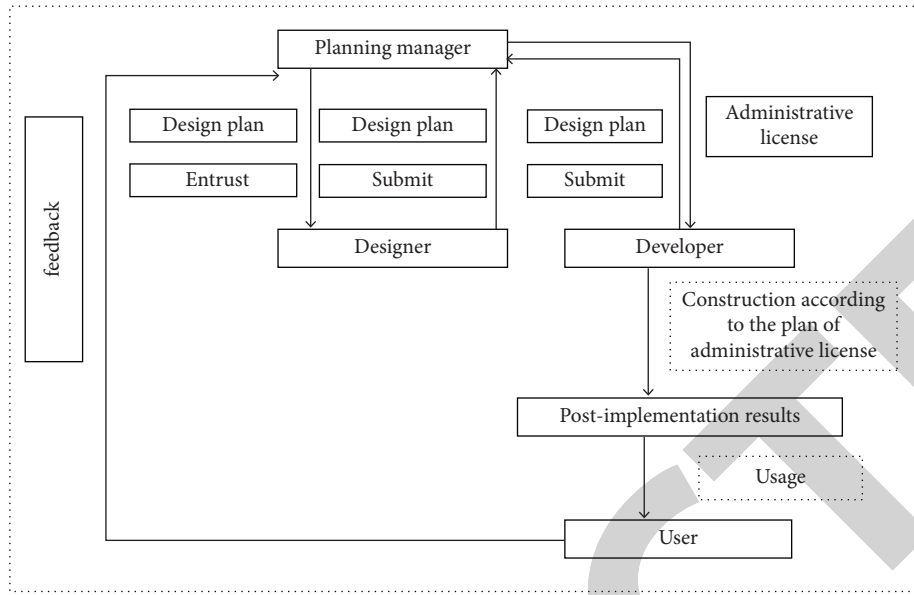


FIGURE 1: Schematic diagram of the relationship among urban design participants.

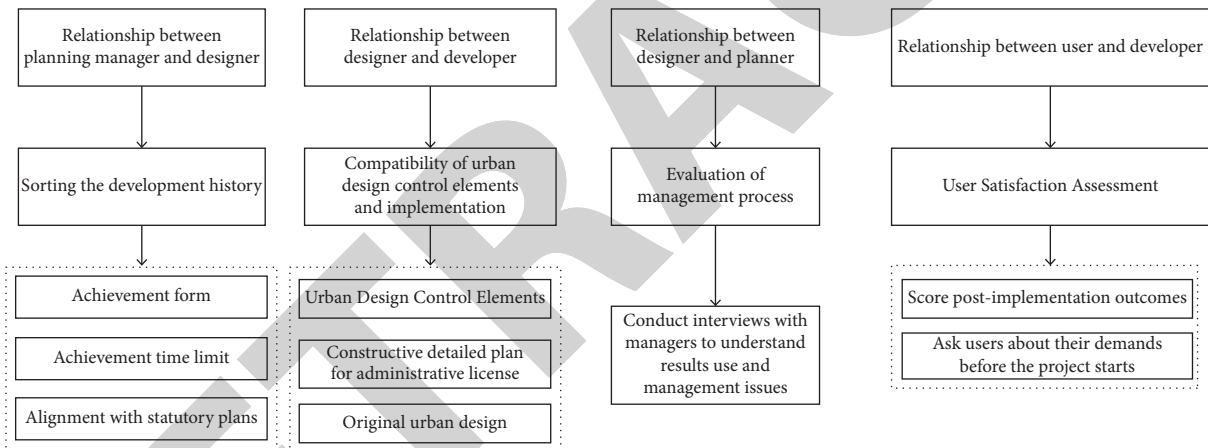


FIGURE 2: Schematic diagram of the urban design method.

In the platform for the analysis of the business information and the presentation of the application results as indicated in the above diagram, the information from the business management and control software is used to integrate the digital technology module of the municipal engineering, quality situation analysis chart, safety management and control chart, personnel allocation form, and image progress chart to present the total situation of the success case. The main modules include the design module, the construction control submodule, and the operation submodule. With regard to the lightweight digital technology, the design values, documents, schemes, and contents obtained through calculation in the standard and design are organized by planning in an organized manner. At the same time, model planning management and control, information design, progress control, and even information change control, are implemented accordingly. The details of the design planning diagram for the submodules are shown in Table 1.

**3.1. Construction Submodule.** Through the process and demand for the quality, schedule, safety, personnel, supplies, and other management and control concerns in the construction process and at the same time, the management and control of the visualized construction process are carried out by using the teaching reproduction robot. The planning of the construction submodule functions is shown in Table 2.

**3.2. Operation and Maintenance Submodule.** It mainly includes facility management and control, the emergency management and control, the video surveillance and analysis, and other functions. The planning of the business functions of the operation and maintenance submodule is shown in Table 3.

Through the platform of the data acquisition and the operation process, the APP related to the mobile items can be used to carry out the project development and operation at any time, so that the process can be understood and

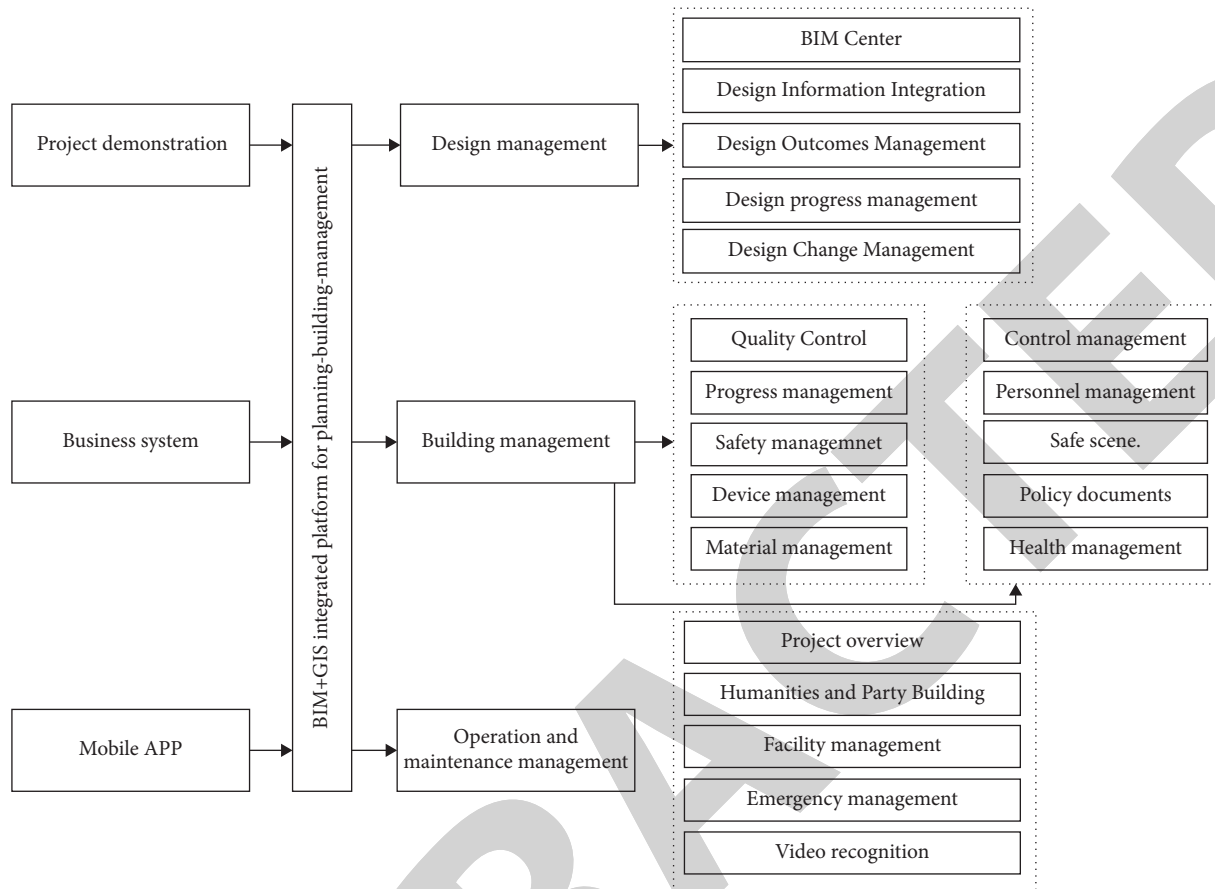


FIGURE 3: Planning of the platform functions.

TABLE 1: Planning of the design submodule functions.

Serial number	Business module	Business function
1	TRR center	(1) Scheme comparison and review (2) Browse, query, data conversion, and intergration
2	Design management and control	(1) Integration of the design information (2) Management and control of the design data

handled in a timely manner, which allows for more convenient and intelligent management and control of the project. The system is implemented through multiple levels of engineering design, operation, and management and control. The three levels of project control, task completion, and practical operation are integrated, and the submodule development and operation are used to develop a comprehensive interpretation of the system platform. The TRR modules can be used to combine the model and the engineering information while enabling visual management control in the reengineering system at the same time.

With the system of three inspections as the center, the quality control module uses the final inspection results to verify the process of the three inspections, and each process can be implemented via the cell phone APP on the mobile phone. In addition, the cell phone operation process of the three inspections and the operation process at the web terminal can also be mutually browsed on the platform.

#### 4. Practical Cases and Analysis of the Results

The “planning-construction-management” integrated urban design approach and the intelligent management and control method designed in this paper are analyzed in a PPP project of urban road construction in a certain city. The construction period of this project in the city is three years, which can mainly be divided into 7 subprojects, involving 44 roads, 4 bridges made of steel, and 10 small bridges made of steel, with a total construction length of 46 km. However, the difficulty factor of the project design, construction requirements, supervision units, construction cycle, and maintenance control in the later stage is relatively high, which has put forward higher requirements for the construction quality and the project control level of the urban project engineering.

In the design process of the engineering submodules, the construction projects are named in a uniform manner

TABLE 2: Planning of the construction submodule functions.

Serial number	Business module	Business function
1	Management and control of the schedule	(1) Display of the project progress image (2) Progress management and control associated with three quality inspections
2	Management and control of the quality	(1) Internal quality control system of the three inspections by the construction party (2) Construction quality supervision, inspection, and rectification (3) Quality inspection and control of the raw supplies
3	Management and control of the contract	(1) Contract information control and inquiry for various tender sections (2) Control and approval of contract payment and receipt information
4	Management and control of the safety	(1) Major safety risk source control of the project (2) Project safety supervision, inspection, and rectification
5	Management and control of the equipment	(1) All-round management and control of the entry and exit of supplies (2) Certification of operators for the operation of large construction machinery on-site and management and control of the maintenance records
6	Management and control of the personnel	(1) On-site personnel management and control (2) Real name system for labor services
7	Safety on-site	(1) Remote video monitoring (2) Safety education and training

TABLE 3: Planning of the operation and maintenance submodule functions.

Serial number	Business module	Business function
1	Management and control of the facility	(1) Management and control of the 3D visualization facility (2) Quick location of the facilities (3) Maintenance of the facility information (4) Training of the facility control personnel
2	Management and control of the emergency	(1) Drill of the emergency plan (2) Response to the emergencies
3	Video surveillance	(1) Monitoring area information query and display (2) Diagnostic information upload feedback

according to the TRR working standards for urban construction. In combination with seven subprojects of the project and a total of five design units, the model for urban roads, bridges, and pipe corridors is established by using a variety of design tools. The established model has effectively integrated more than 5,000 engineering design drawings related to the urban construction project and includes design drawings, design reports, change instructions, and other relevant documents related to the urban integrated construction. It can be mainly divided into the minimal control module that is in line with the accurate urban construction management and control. The construction projects for 24 roads and 2 bridges with steel structure landscape under construction are imported into the design platform to establish a basic database of urban integrated construction. This allows for the dynamic data update and the online data query of engineering construction, which can lay a sound foundation for the implementation of intelligent management and control of urban construction effectively.

The “planning-construction-management” integrated urban design approach and the intelligent management and control function module are implemented mainly based on the three inspections, where the mobile data collection system can be used to carry out the urban integrated design statistics and analysis in the business management and control module. Through the quality control of the urban integrated design, engineering project control data can be used to achieve management and control in real time. The application of the teaching reproduction robots can reduce the labor cost spent on the “planning-construction-management” and improve the level of intelligent management and control in an effective manner. The compliance rate in the three inspections of engineering projects can be significantly improved, and the processing efficiency of all engineering construction quality issues as well as the process of the three inspections can also be greatly enhanced. In this paper, an actual project is selected as a practical analysis case to explore and compare the integrated urban design method



TABLE 4: Implementation situation of the urban design control elements.

Hierarchy	Level	Element	Implementation	
Required urban design control elements	Plan layout	Natural elements	The river chute is retained, which is in line with the requirements of the urban design control	
		Public space	Public space inside the plot is reserved in accordance with the urban design requirements. Public space is reserved at the TCL site in the form of elevated space, which has increased the total area of the public space and has a high level of compliance	
		Urban traffic	The structure of the traffic road network is essentially in line with the urban design plan in the implementation process, and the construction progress of the road system is about 70% completed at present; the unfinished part is mainly located in the northeast area of the feeder roads in the city	
	Building form	Location of the podium tower	990% of the plots comply with the urban design requirements; only the plots of tencent have a staggered building form that is beyond the control range of the podium tower	
		Building corridor	About 9% of the sky corridors are inconsistent with the design scheme, which is mainly because the elevation of the building corridor is inconsistent with the urban design scheme	
		Building interface	About 5% of the retail commercial interface in the building fails to meet the management and control requirements	
		Underground space	Boundary of the underground space	Essentially conform to the urban design plan requirements
	Underground traffic		Essentially conform to the urban design plan requirements	
	Optional urban design control elements	—	Building overhang space	The width and location of the building overhang are adjusted for about 17% of the plots

with practical engineering construction. From the process of the engineering construction that has been completed, the implementation situation of the key elements in the “planning-construction-management” urban design can be obtained. The details are shown in Table 4.

In the practical process of the urban “planning-construction-management” integrated design, part of the construction is relatively difficult; in the design process of urban building corridors and the detailed planning scheme review and construction process, it is necessary to submit the solutions for the connection of modules with different ownership for approval in accordance with the relevant design scheme. At the same time, due to the uncertainty of the audit objectives, the integrated design process of urban “planning-construction-management” may include coordination between urban projects before and after construction, and the construction units often have problems in the coordination process, which can make the integrated urban construction process even more difficult. The key issue in the effective integrated design management and control of urban “planning-construction-management” is the separation of construction goals from the planning contents and the inability of urban construction planning departments to manage and control the crucial factors. For example, in accordance with the design concept of a low-carbon green lifestyle, design rationality and compliance, as well as many other standards, it is necessary to carry out design and management and control in accordance with energy saving, emission reduction, and other related standards in combination with the comprehensive coefficient of the urban design sites, the engineering construction of water permeability, and so on, effectively. In addition, the volume of the urban “planning-construction-management” integrated

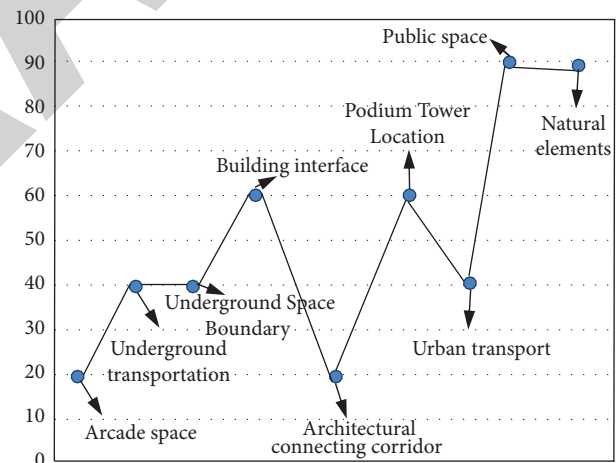


FIGURE 4: Evaluation score for the implementation.

design is relatively huge, and the lack of effective management control of the integrated urban design scheme can make it very difficult for designers to carry out design for the practical project in an effective manner. In this paper, the standard response to urban design is adopted. After the completion of the urban project, a study of the users was carried out, and the results suggest that about 80% of the users did not have good feedback with regard to the building corridors in the city. At the same time, it can also be observed that the use of the connecting corridors in the city is not sufficient. The main problem is that the corridors are outside the office buildings and fail to serve the purpose of facilitating connectivity when the office buildings are closed. On the other hand, about eighty percent of the users gave a

relatively high appraisal of the public places in the city. However, the situation of equipment and facilities in the parks is relatively special, and there are issues such as the necessity to further improve the lighting conditions and the lack of garbage cans. The details are shown in Figure 4.

## 5. Conclusion

From the perspective of the teaching reproduction robot (TRR) combined with the “planning-construction-management” integrated urban construction management and control, the three dimensions of “planning-construction-management” integrated urban design and control, business processing, and project implementation are taken as the breakthrough points to establish a “planning-construction-management” integrated urban system structure, functional modules, and design process in this paper. The modular design approach is used to design a “planning-construction-management” integrated urban design model at various levels by using the teaching reproduction robot. At the same time, the proposed method is applied to practical urban integration construction. In the integrated urban design stage of “planning-construction-management,” the research and design of the urbanization design platform is continuously promoted in-depth in accordance with the engineering design. The design links can mainly be divided into urban visualization management and control, emergency management control, intelligent warning, and other links of the “planning-construction-management” integrated urban design management and control. Finally, through the analysis of the practical cases, it can be known that the “planning-construction-management” integrated urban design method and the intelligent management and control approach put forward in this paper can provide timely feedback to the urban design management and control, as well as effective support and guarantee for the urban control.

## Data Availability

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

## Conflicts of Interest

The author declares that there are no conflicts of interest.

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