Application of Virtual Reality Technology and Intelligent Robot in Architectural Heritage Protection

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In this context, this article through the contemporary construction of multi-dimensional analysis, exploration and research, reference data, comparison, and analysis of different types of digital preservation methods, pointed out that the use of intelligent robot technology to save modern buildings, can not only reduce the man-made damage of existing buildings, and can effectively relieve damaged architectural heritage protection. VR technology can collect relevant information and maintain it, greatly reducing the damage caused by frequent visitors, while also allowing more viewers to watch without affecting residents. The audience can experience the difference between the virtual way and the personal experience, by thinking about the traditional digital expression way. Until today, some modern buildings still retain the breath of people's lives, those precious buildings are constantly seen by tourists, tourists touch, step on, and take photos of the footprints will have an impact on themselves. In this paper, virtual reality technical data of indoor, outdoor, and aerial photography are collected on-site to show the dimensions, original appearance, and details of architectural heritage as much as possible in the form of the reverse model, which has relatively important historical significance and practical value.

Povzetek: Raziskana je tehnologija virtualne resničnosti in inteligentnih robotov za zaščito arhitekturne dediščine. Rešitve zmanjšujejo poškodbe, omogočajo boljšo dostopnost in ohranjajo zgodovinsko pomembne zgradbe.

1 Introduction

The implementation of this topic provides a new idea for the inheritance and preservation of the modern architectural heritage of our country.Avoiding positive contact between the audience and the cultural relics can not only increase the repair and replacement of cultural relics but also use intelligent robot technology to save all the information about cultural relics, which can not only ensure the preservation of cultural relics but also bring visitors a variety of aspects of the tour experience. The preservation of architectural relics and the combination of modern intelligent robots, combined with a variety of software, make full use of various functions and make the construction of virtual buildings more efficient. The immersive and interactive nature of virtual reality (VR) immerses users in a computer-generated, three-dimensional world. It is possible to explore and engage with this world in a way that appears real or tangible, frequently by using motion tracking equipment, VR headsets, and gloves. The extremely engaging experience is intended to stimulate several senses, including hearing, sight, and touch, giving users a sensation of presence and engagement that is unmatched by traditional interfaces.

1.1 Development and innovation of architectural heritage protection

The term "architectural heritage" originated in 1970. In the 1880s, the protection concept of cultural traditions gradually became mature. In the early 20th century, specific protection strategies began to enter the mainstream of practice. In 1933, the ancient buildings of historical value recorded in the Charter of Athens should be preserved, whether individual buildings or urban areas. More than a decade after the Charter of Barra was promulgated, modern people began to realize that the protection and maintenance of culture must be supported by institutions." Nara conference" in 1994, 28 countries 45 participants put forward: "the diversity of world heritage, it is cannot replace the human mind and intelligence sources, we should vigorously promote, all, culture and society are in concrete, non-food ways and forms as the foundation, and the expression way and form, is the traditional, worthy of respect.

In today's information technology, intelligent robots have penetrated human life. Historical architecture is the most historical and civilized carrier, and its value is constantly generated and accumulated with the development of history, so it must be preserved.

Preservation is to slow down the damage and the rate of damage to the target being protected, to leave more material and cultural wealth for future generations. Especially compared with modern buildings, these new buildings often need more maintenance and replacement due to new materials and highly practical functions.

Due to the rapid development of the tourism industry, the preservation and maintenance, operation, and promotion of historical and cultural heritage of modern architectural heritage have become two major problems faced by its development. Based on consulting domestic and foreign literature and documents about architectural cultural heritage, some existing digital technologies are summarized and concluded, and finally "virtual reality" technology is selected to promote the transmission of architectural information, to achieve the preservation, protection, management, and publicity functions. The function of residence is life, and in virtual reality, remote access to buildings can be realized. However, in the process of remote access, the user's feelings, the restoration of modern architecture, the perception of the virtual environment, and so on are all problems that need to be solved urgently [1-4].

1.2 Architectural heritage protection combined with virtual reality technology

Through the discussion of the digital preservation means of traditional architecture, through the discussion of the traditional digital preservation means, and finally the use of network technology to achieve the protection of traditional architecture. First, Wright's modern architectural heritage as the experimental sample, and compared with the competent department of the United States Institute of Technology, Lawrence Contact, obtained first-hand data from the building and site collected a large number of materials, using the VR technology and the size of the building, the original details are shown in front of an audience as possible, to ensure the fluency of travel. Secondly, through the use of VR technology for interaction, we can experience the changes of the four seasons around the residence with alternating seasons. The living room decoration of modern and previous styles is restored, and the public's concept of Wright is strengthened by comparing the existing living room with the previous living room. Create an automatic fountain under a "light well" in the living room to mimic a small river passing under the house in summer.

1.3 Various applications of intelligent robots

This paper uses a kind of intelligent robot technology that is different from the traditional button interaction method. With the four seasons' interaction, you can feel the difference between the four seasons outside; In addition, the modern and 1941-bedroom decor was restored. The “light well" offers a view of the natural fountain, which can only be seen when it rains, and now, we can enjoy this beautiful view in our home, which gives us more insight into Wright's design [5-8].

Through the analysis of its digital protection methods, the 3D digital walkthrough is constructed, and virtual reality technology is used to realize the reproduction of the scene. It can prevent its destruction and extinction and has the function of cultural inheritance, resource integration, and promoting industrial development. When visitors watch the modern architectural heritage, they can show people the humanistic knowledge of the house without the limitation of time and space [9].

The advantages of using VR technology for tourism are: that tourists do not need to make direct contact with the cultural relics, and will not cause any damage to the cultural relics, which can improve the maintenance and replacement cycle of cultural relics. This project can use virtual reality technology for the preservation of modern historical and cultural heritage. The development and upgrading of science and technology have greatly impacted the protection and inheritance of tradition, giving people the form of expression and experience. This article uses the virtual reality technology of "virtual roaming" based on modern architectural heritage, which provides a new way for our country's traditional architectural heritage inheritance and preservation.

2 Related works

Table 1 shows the literature survey.

Table 1: Literature survey

Reference	Methods	Findings	Limitation
[10]	It created immersive virtual reality (VR) settings for the protection of cultural heritage by integrating computer graphics, artificial intelligence, network technology, and sensors.	VR technology was more effective than previous approaches for digitizing cultural material, providing a precise and captivating means of conserving and experiencing historical locations and items.	Accessibility was restricted by high maintenance and development expenses, and continuous technical assistance was needed to guarantee system performance.
[11]	The study investigated how 360° VR movies affect user immersion in the preservation of intangible cultural assets.	According to the study's subjective assessment, intangible cultural assets could be effectively preserved and communicated using the VR approach. High degrees of involvement and immersion with the subject matter were reported by the participants.	The lack of information on the sample size and ethnic variety of the participants could have an impact on how broadly applicable the results appear.
[12]	To depict a variety of cultural heritage (CH) artifacts, with an emphasis on locations in Bulgaria, they created an online platform that combines high-resolution spherical panoramas, different maps, GNSS information, noise, video content, and textual content.	Their findings showed that the method efficiently, quickly, and properly described and displayed CH items.	Among the drawbacks was the presented emphasis on the particular object's visual, mathematical, and textural qualities rather than a thorough integration with historical and geographic information.
[13]	It aimed to investigate creative ideas that could lessen difficulties experienced by traditional villages by concentrating on AI's potential in cultural heritage preservation.	The study revealed notable obstacles and losses in the conventional village cultural environment, even with the economic prosperity.	Effective conservation initiatives have been hampered by local people's opposition, which was a result of cultural beliefs and economic pressures.
[14]	It investigated how pre-industrial architectural legacy could include renewable energy sources (RES), particularly photovoltaic (PV) systems.	The findings showed that preserving building sustainability and preserving cultural heritage required a cautious, context-sensitive approach.	Constraints encompass the possibility of permanent modifications to architectural integrity despite sustainability benefits, hence requiring careful assessment in restoration initiatives.

3 Research methods

3.1 VR reverse modeling of intelligent robot

The process of creating digital copies of architectural historic buildings with modern computer tools is known as virtual reality (VR) reverse modeling. These models could be gradually and precisely rebuilt by using intelligent robots that are outfitted with sensors and AI algorithms. This procedure improves accessibility for study, instruction, and public participation while simultaneously protecting cultural heritage. An innovative method for preserving and marketing historical places in a digitally immersive way is the use of intelligent robots to perform a VR reverse model of architectural heritage. Replicating the characteristics and actions of intelligent robots in the real world using virtual reality simulations is known as VR reverse modeling. The technical features of the robots, including their sensors, controls, and control systems, are meticulously modeled throughout this step.

By using the method of intelligent robot reverse VR modeling, collecting vast amounts of data from different perspectives, reverse modeling, quickly build a 3-d model, gathering data, quickly get the size of the building, and then input to the map as a reference, to accurately calculate the size of the house, then measured buildings, construction of 3 d software.

A polyhedron containing a finite set of points can be expressed as follows.

$$\{x_1, \cdots\cdots, x_n\} = \{\sum_{i=1}^{m} \eta_i \chi_i \mid \chi_i \in s, \eta_i \geq 0, i = 1, \cdots\cdots, \mathrm{m}; \sum_{i=1}^{m} \eta_i = 1, m \in N_+\} \quad (1)$$

N_+Is the set of all positive integers.

Suppose that the short distance between two polyhedral models is Mind and is any point on the two polyhedral models respectively, then: $\mathrm{A}, \mathrm{B}_{A,B}, x, y\mathrm{A}, \mathrm{B}$

$$\mathrm{Mind}_{A,B} = \left\| \sum_{i=1}^{m} \lambda_i x_i - \sum_{j=1}^{n} \sigma_j y_j \right\| \quad (2)$$

3.2 Application of intelligent machine regulation in a virtual environment

Using VR technology, people can enjoy the natural fountain in the "light well", which can only be enjoyed when it rains, and now, with the help of intelligent machine adjustment of virtual reality technology, people can sit at home and enjoy the beauty of nature. Here, the water can be seen running under the house, which helps a lot in cooling the house in summer. Among them,

$$\sum_{i=1}^{m} \lambda_i = 1, \sum_{j=1}^{n} \sigma_j = 1,\ \lambda_i \geq 0,\ \sigma_j \geq 0 (i, j = 1, \cdots\cdots, n) \quad (3)$$

$\sum_{i=1}^{m} \lambda_i x_i$ Is a point on the model is a point on the model and satisfies the following conditions, respectively:

$$\mathrm{A}x, \sum_{j=1}^{n} \sigma_j y_j \mathrm{B}^{y}, \lambda_i \sigma_j \quad (4)$$

$$st \sum_{i=1}^{m} \lambda_i = 1, \lambda_i \geq 0, i = 1,2 \cdots, m; \quad st \sum_{j=1}^{n} \sigma_j = 1, \sigma_j \geq 0, j = 1,2 \cdots, n; \quad (5)$$

In this method, the solution of the minimum distance problem is abstracted as a nonlinear problem with restrictions. When Mind>0, there is no conflict in this problem. This pattern causes a conflict when the Mind value is less than or equal to 0. Through the established mathematical model, it can be known that the coordinates of the two patterns are limited, so in this method, the time complexity of the optimal solution is an important issue [15-19].

3.3 3D modeling of architectural heritage protection

Way such as via the Internet, library, collecting a large number of designs, use of computer processing to data collected on the spot, the outdoor construction of backward simulation, obtaining the accurate size, and then in the 3-d virtual reconstruction, and the internal construction, is according to drawings and/or physical, reduction.

As shown in Figure 1 below, in the process of building a 3D virtual building, the specific steps are as follows: First, as to understand the 3D reconstruction modeling software using conditions of photos, taken a photo is consistent with the standard, and then use 3D reconstruction modeling software will be collected by the 2D image reconstruction, and then reconstruct the 3D, 3D reconstruction image for rapid reduction of software, and then draw in the 3D software as small as possible in the plane, And give the image.

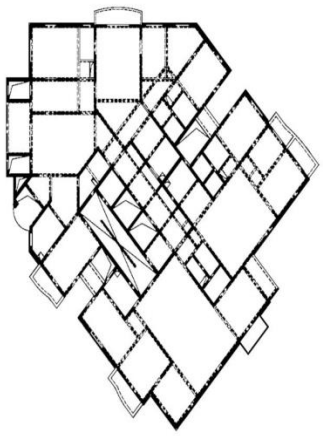

Figure 1: 3D model of VR technology in heritage protection

After a long period of vicisitudes of life, many valuable modern architectural complexes with the significance of The Times have been endangered. Therefore, to take rescue rescue and inheritance work, it becomes very urgent and urgent. Nowadays, the protection of the world's architectural heritage is generally recognized by the international architectural heritage protection community because of its great significance in the fields of research, protection, and exhibition. Reverse modeling can not only reduce the number of model faces, but also make the details more clear, clearer, and more real, save the model area, reduce the workload of model rendering, and reduce the hardware requirements of the computer. As shown in Table 2 below, the interactive area of the house allows visitors to walk through the old-style living room, experience the influence of the changes of the seasons on the house, and experience the coolness from the self-flowing spring, which helps us to have a deeper understanding of Wright's design ideas.

Table 2: Different architectural heritage conservation methods

Algebra.	200		400		800	
	Convergence time	The shortest distance	Convergence time	The shortest distance	Convergence time	The shortest distance
General VR Algorithm	3.0514	0.9122	11.2403	0.9569	19.6679	0.9907
Traditional VR algorithm	3.1281	0.9213	11.4658	1.0131	19.9436	0.9574
Immune VR Algorithm	3.0217	0.8451	11.20273	0.9774	19.5981	0.9631

This article uses the virtual reality technology of "virtual roaming" based on modern architectural heritage, which provides a new way for our country's traditional architectural heritage inheritance and preservation.

3.4 Lighting application of intelligent robot

Using the method of intelligent robots, the original form and details of the building are shown as much as possible. While fully showing the details of the building, it can also ensure the fluency of tourists in the tour process.To ensure realistic and realistic buildings, a large amount of 3D modeling must be established.When 3D modeling, the details of the model, the number of model faces, the accuracy of mapping, and other factors should be added so that the number of documents of the 3D scene is greatly improved.It is difficult to build a large scene in a conventional way and store the data of the 3D model to achieve real-time interactive walkthrough, and it requires more computer configuration.Therefore, the reverse operation of intelligent robots can ensure the reproduction of virtual buildings and the fluency of feeling.

Modern architectural heritage with its profound history and humanistic spirit, the use of intelligent robots, discussed how to preserve and inherit modern architecture and explore the precious wealth of modern architectural heritage.Through the discussion and collation of the historical background, process method, indoor and outdoor pattern characteristics, design style, functional structure layout, landscape characteristics, and other aspects of modern architectural heritage, the historical significance is excavated, and the point of view of protecting and paying attention to modern and contemporary architectural heritage is put forward.

The symbol table represents the density of illumination flux received in units of one hour per square inch of area. If an element's area and illumination flows are bothknown at any given location on the unit surface, then:

$$E = \frac{d\phi}{dA} \tag{6}$$

Luminous intensity: Denoted by the symbol I, with the

unit candela and the symbol cd, it is the fraction of the luminous flux produced by the light source at each location in all directions in the solid Angle component and the solid Angle component [20].

$$I = \frac{d\phi}{d\Omega} \tag{7}$$

The quantity of radiant energy (also known as radiated power) that is visible to the human eye is referred to as luminary flux. Lumens are the unit of measurement and are represented by the symbol.

$$\phi = K_m \int \phi_{e,\lambda} V(\lambda) d(\lambda) \tag{8}$$

Where is the maximal spectral optical effectiveness, which will be determined by the International Metrology Commission, and relates to the monochromatic radiation flux of wavelength and the visual spectrum optical effectiveness of the CIE standard photographic observer.

$$\phi_{e,\lambda}\lambda(\mathrm{W}), V(\lambda)K_m(\mathrm{lm/W}), 1976K_m 6831\mathrm{m/W} \tag{9}$$

Due to the increasingly clear division of key buildings, as well as the legislative revision of various countries, the increasing strength of protection. It was not until the 1990s that the idea of modern historic buildings being considered significant monuments became widely accepted.

In our country, the protection concept of architectural culture changes gradually in the change of the overall social concept. Speaking of values, every repair, protection, demolition, and reconstruction is to ensure the continuation and stability of the nation. When formulating legal norms, they must be based on reasonable methods and ethical principles. If the question "why protect" is the question of value rationality, then instrumental rationality focuses on "how to protect", which is inseparable from each other, and at the same time explains the same question from multiple levels.

3.5 User experience in VR

In virtual reality (VR), user experience (UX) is all about building a natural and immersive environment where users can interact with digital components in a way that feels natural to them. Assuring a high level of realism in VR UX is essential. This includes having realistic images, spatial audio, and responsive functions. To avoid problems like motion sickness, the design should take human concerns like comfort and aesthetics into consideration. Achieving a balance between directed interactions and freedom of movement is crucial for creating effective virtual reality experiences that enable users to explore and engage with the virtual world without becoming disoriented or confused. Furthermore, additional sensory inputs and tactile feedback improve the immersive experience by adding to its realism and engagement.

Usability, or how simple it is for users to navigate and complete activities in the virtual world, is another important component of VR UX. To prevent annoyance and guarantee a seamless experience, intuitive interfaces, clear visual clues, and user-friendly controls are crucial. It is imperative for designers to consider the diverse range of user proficiency with virtual reality technology, offering new users' courses or onboarding procedures to ease their transition. To make sure that users with a range of physical abilities can participate in the VR experience, accessibility is also crucial. Refinement of the VR experience, problem-solving, and overall user happiness is contingent upon ongoing user testing and feedback.

4 Result analysis

According to the calculation principle of the AHP method, it can be seen that when evaluating the historical and cultural heritage of industrial buildings, it is mainly through scoring the factors at the indicator level, and then according to the different indicators, the corresponding evaluation score is obtained, and it is iterated to obtain the final evaluation conclusion. To improve the scientificity and credibility of the evaluation process and reduce the error caused by the misunderstanding of the index, it is necessary to define the connotation of each index.

The performance of the root mean square error (RMSE) after several iterations is shown in Figure 2. An improvement in the predicted accuracy of the model is indicated by an apparent decrease in the RMSE value as the number of iterations increases.

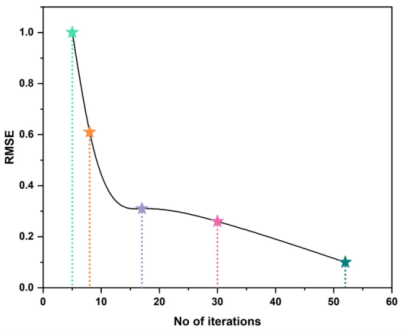

Figure 2: RMSE performance

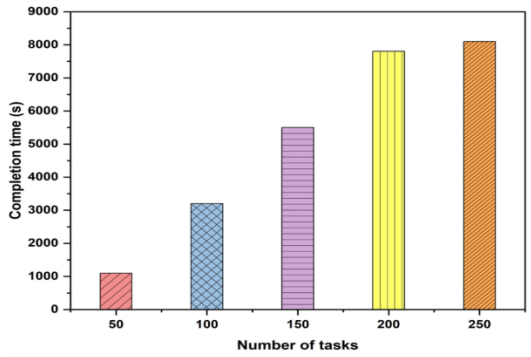

Figure 3: Task completion time performance

The relationship between the number of tasks and the duration that it takes to complete them is shown in Figure 3. The amount of time needed to complete an activity rises in proportion to its quantity. The completion time specifically experiences 8100s at the 250-task processing level.

4.1 The historicity of architectural heritage protection combined

The birth and development of industrial technology is the historical witness of industrial architecture.Industrial equipment, technological processes, and industrial products produced by industry are all processes of technological innovation and development.The value of technology is determined by two factors: technological progress and the pioneering nature of industrial development.The advanced construction technology is reflected in the materials and construction technology;Industrial innovation, that is, the advanced performance of industrial technology in production equipment, production process, and other aspects. In the case of non-productive industrial buildings, the technical value is mainly reflected in the latter. As the internal process of industrial buildings, the production process is not unique in technology but also advanced in technology, which is also a major symbol of it and other historical sites.

At present, in science and technology and people's lives, virtual reality technology has gradually become the focus of attention.Due to the continuous development of technology and innovation, to some degree, people can produce a kind of "immersive" experience, while in the traditional computer design, the function of the computer is stationary and motion, and "virtual" is the "vision", "smell", "taste" and "hearing" and "touch" and "touch" dynamic", In the "design", "construction", "decoration", "repair", "protection" and other aspects.

We explore this technique using the modern architectural legacy of contemporary architect Frank Lauder Wright as an example. Modern Architectural Heritage began teaching the faculty and students of the Lawrence Institute of Technology (USA) School of Architecture and Design in 1978.

The daylighting pattern is the basis for deciding the design and daylighting of the daylighting port, and there are usually three methods: top daylighting, side daylighting, and mixed daylighting. Only the roof and lateral illumination factors are required, which can be resolved and solved.

Page lighting is:

$$\tilde{C} = C_d K_\tau K_\rho K_g \ (\%) \qquad (10)$$

Side lighting:$C_{\min} = C_d{}' K_\tau K_\rho{}' K_w K_c \ (\%)$(11)

Where, is the daylighting coefficient of the skylight, 'is the daylighting coefficient of the side window is the indoor reflection increment coefficient of the top daylighting, is the indoor reflection increment coefficient of the side daylighting, is the height ratio correction coefficient, is the light blocking reduction coefficient of the outdoor building with the side daylighting, is the correction coefficient of the width of the side daylighting window, the total building length, total transmission system number, and window width on each given wall in a given direction are all equal. Where is the light block reduction mechanism and the transfer coefficient of sunlight material of window structure, is the pollution reduction coefficient of window glass, and is the light blocking reduction coefficient of indoor structure.

$$C_d C_d K_\rho K_\rho' K_g K_w K_c K_c = \frac{\sum b_c}{L} \sum b_c \mathrm{L} K_\tau K_\tau = \tau\tau_c\tau_w\tau_j\tau\tau_c\tau_w\tau_j \qquad (12)$$

The two parts of individuals are linearly combined according to the crossover probability with a certain pairing mechanism to generate new individuals, and the crossover probability value is generally 0.4 0.8.P_cLet a total of M pairs of individuals be successfully paired after clonal selection, denoted as, where any pair of individuals satisfies the following linearity condition

$$U_{oc}(j,i)\left(U_{oc}(j,i_1), U_{oc}(j,i_2)\right) \qquad (13)$$

$$U_c(j,i) = \begin{cases} u_{x1}{}^{*}u_{oc}(j,i_1) + (1-u_{x1})u_{cc}(j,j_2) & u_x < 0.5 \\ u_{x2}{}^{2}u_{ac}(j,j_1) + (1-u_{x2})u_{oc}(j,j_2) & u_x \geq 0.5 \end{cases} \qquad (14)$$

If the new population is too small, it will lead to local

shrinkage, and if the population is too small, it will destroy the population pattern, so the algorithm becomes a random search algorithm.$U_c(j,i)\mathrm{P_m P_m P_m}$Generally, it is set as, and the resulting mutation individual is, and the operation is as follows:

$$U_P(j,i) = \begin{cases} u(j) & u_x < p_m \\ u_c(j,i) & u_x \geq p_m \end{cases} \quad (15)$$

4.2 Architectural heritage protection and intelligent robot functions

Industrial pioneering refers to the pioneering of a specific type of industrial technology or product in the region, country, or even the world.The so-called "technological progress" refers to the modern level of production technology, production process, and equipment in the past industrial buildings.For example, the rotary production equipment of zn-floss gas acid plant of Zhuzhou Chemical Enterprise, whose output of SO2 is the first in Central South China, is one of the few projects that attach importance to environmental protection, and its technology is in a leading position at that time.

Table 3: Evaluation grid for the building criteria layer's protection value $\mathrm{A_1 - B}$

$\mathrm{A_1}$	$\mathrm{B_1}$	$\mathrm{B_2}$	$\mathrm{B_3}$	$\mathrm{B_4}$	$\mathrm{w_i}$
$\mathrm{B_1}$	1	3	2	2	0.4091
$\mathrm{B_2}$	1/3	1	1/2	1/3	0.1038
$\mathrm{B_3}$	1/2	2	1	1/3	0.1653
$\mathrm{B_4}$	1/2	3	3	1	0.3219

Table 4: Historical value matrix protection of architectural heritage

$\mathrm{B_1}$	$\mathrm{C_1}$	$\mathrm{C_2}$	$\mathrm{C_3}$	$\mathrm{w_i}$
$\mathrm{C_1}$	1	1/3	1/3	0.1396
$\mathrm{C_2}$	3	1	1/2	0.3325
$\mathrm{C_3}$	3	2	1	0.5278

As shown in Table 3 above, in the industrialization period, factories had close contact with the people around them. It was an impact of enterprises on society in a historical period, which had both material significance and huge social significance. The social and cultural history of Zhuzhou City is inseparable from the development of industry and commerce. It is the place where workers work, work, and live, and an important bridge between workers and enterprises for social identification and belonging. The preservation and recycling of industrial buildings can both make the general public aware of their production and residential patterns and give special emotional significance to the workers who have worked there for decades. The preservation and reuse of industrial buildings, it can solve the attachment and missing of workers to the past.

As shown in Table 4 above, due to the research scope and working background of industrial heritage, scholars of various majors have a certain degree of divergence in their understanding of its value orientation. Therefore, it is normal that the conclusions of experts' assessment have certain deviations in the appraisal process. To improve the credibility of the calculation, the questionnaires answered by all experts are summarized, summarized, and counted to obtain the final conclusions of each evaluation matrix, and then the weights of each level are calculated according to the AHP method. Table 5 shows the preservation methods.

Table 5: Preservation methods

Preservation methods	Pros	Cons
Photogrammetry	**High precision**: Photogrammetry captures fine details of architectural components in images to produce precise 3D models. **Non-invasive:** The reduced possibility of harm results from its lack of direct touch with the structure.	**Lightning dependency**: The environment and weather could have an impact on the output's quality. **Skill intensive:** Requires knowledge of geometric concepts, processing software, and photographic experience.

Laser scanning	**High accuracy:** captures especially the smallest features and provides extremely precise point cloud data. **Versatility:** Ideal for usage in indoor and outdoor contexts.	**Cost:** Equipment and installation costs at the beginning could be substantial. **Limited accessibility:** It could be difficult to utilize in small or blocked areas.
Traditional preservation methods	**Cultural sensitivity**: Preserves and honors cultural legacy and authenticity. **Local materials:** Promotes sustainability by using materials that are frequently obtained locally.	**Potential for damage**: Inadvertent structural damage could result from using incorrect tools or materials. **Limited documentation**: Conventional techniques could fail to create comprehensive digital recordings for consumption afterward.

5 Discussion

The development of advanced monitoring and management systems was brought about by the incorporation of the Internet of Things (IoT) into cultural heritage conservation. These systems use sensor-based technologies to collect large amounts of data, enriching databases to improve analytical skills and allow new services [21]. The process was verified in both VR and Augmented reality (AR) apps and evaluated using an example at the Mastic Museum of Chios. An investigation provides guidance for emulating the process and the findings validate the basic hypothesis, indicating notable progress in the creation and application of virtual people in cultural heritage settings [22]. It investigates the detection and mapping of declines at the Gümüşler archeological site and monastery using the Mask Region with Convolutional neural network (R-CNN) technique, a computer-vision technique. To train the representation, a total of 1740 images were gathered and annotated. The model was then tested on a variety of interior and outdoor perspectives. These findings suggest that the Mask R-CNN method provides a dependable way to get beyond the drawbacks of conventional techniques by swiftly and correctly detecting and mapping degradation in huge monuments [23].

6 Conclusion

To sum up, this paper discusses how to better preserve the modern architectural heritage, the current situation, and the existing problems. Through the use of virtual reality technology, the building itself security is maintained. In this paper, based on consulting the literature and literature about architectural cultural heritage at home and abroad, some existing digital technologies are summarized and summarized. Finally, the "virtual reality" technology is selected to promote the transmission of architectural information, to achieve the preservation, protection, management publicity, and other functions. The role of housing is life, and in virtual reality, it can realize the remote access to buildings, but in the process of remote access, the user's feelings, the restoration of modern buildings, the perception of the virtual environment, and so on, are urgent problems to be solved. At the same time, this paper provides an intelligent robot using virtual reality technology to preserve the heritage, so that the audience can enter the modern architectural heritage without going out, which is of great help to the future exploration. 3D software was used to construct and reverse modeling software was used to generate realistic scenes. Finally, through the optimization of the scheme, the operation is more efficient. Using the actual modeling software of 3D reconstruction, the method of reverse modeling is used to generate outdoor models and maps, which increases the means of displaying buildings.

Future scope

The potential for protecting architectural history through the use of intelligent robotics and virtual reality technologies is enormous. It could anticipate increasingly realistic and accurate reproductions of historical locations as VR and robotics continue to progress, opening up new opportunities for virtual tourism and improved learning environments. More and more intelligent robots will do delicate and thorough repair work, eliminating human mistakes and maintaining fine details. Moreover, predictive maintenance will be possible with the integration of AI, recognizing and resolving possible problems before they do harm. The preservation, investigation, and enjoyment of architectural history will be completely transformed by the combination of VR and robots.

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