Inheritance and Protection of Temple Architectural Cultural Heritage by Using Digital Media Technology the Case of the Three-Mountain Kings Ancestral Temple in Jiexi Lintian

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Abstract. Temple architecture has always been an important part of Chinese cultural heritage. The records of Chaoshan ancestral temple and temple architectures are relatively few in the literature of past dynasties due to historical reasons, so that the protection and inheritance of its hidden historical and cultural values are in trouble at present. The Three-mountain Kings Ancestral Temple in Jiexi Lintian was taken as example in this paper. Nowadays, the expression form of traditional architectural art has been changed by the emergence of digital media art. In addition, the damaged Temple architectural cultural heritage can also be displayed in front of everyone by using the digital media art, which not only restores the appearance of architectural cultural heritage by using the digital media art, but also injects the interactive and interaction content of new media into it. As a result, the research on the relationship between original artistic design expression of architectural art, the use of digital art platform and architectural art become very important. The art and culture of The Three-mountain Kings Ancestral Temple in Jiexi Lintian can be better inherited and protected, and the digital art can also be better applied to the architectural art design of The Three-mountain Kings Ancestral Temple in Jiexi Lintian by using the digital art tools (3D digital scanning, 3D digital model, post-image restoration, etc.), implanting the information in various fields and historical periods of the architectural art of The Three-mountain Kings Ancestral Temple in Jiexi Lintian. The diversity of its art and culture will be better demonstrated by using the platform of high-quality and innovative digital art to inject the architectural art and culture of The Three-mountain Kings Ancestral Temple in Jiexi Lintian into it. Thereby, it can be proved that it is necessary and feasible to inject digital media art into architectural cultural heritage, which will play an important role in inheriting and protecting architectural cultural heritage.

Keywords: Digital Media · The Three-Mountain Kings Ancestral Temple In Jiexi Lintian · Temple Architecture · Architectural Cultural Heritage

1   Introduction

It was found during the investigation of the architecture of The Three-mountain Kings Ancestral Temple in Jiexi Lintian that due to the "neglect" of the cultural heritage of local temples by the past dynasties in China, and many institutions treat the craftsmanship of the temple architectural culture as a strictly artistic form at present, the architectural craftsmanship in the temple has become the "vulgar and indelicate" traditional techniques, so that which were rarely recorded in the literature of past dynasties and far from enough for later scholars to conduct systematic sorting and special research. The protection and inheritance of ancestral temples and temple cultural heritage in local village settlements need to face the similar questions. The contradiction between the process of modernization and the protection and inheritance of Chinese temple cultural heritage was also shown. [1] Therefore, It is worthy of in-depth deliberation and research on how to use modern and advanced technology to better protect and inherit Chinese architectural cultural heritage.

2   An Overview of the Temple Culture in the Three-Mountain Kings Ancestral Temple in Jiexi Lintian

2.1   The Historical Value of Temple Culture

The Three-mountain Kings Ancestral Temple is widely distributed in Chaoshan. Regardless of size, there was a Three-mountain Ancestral Temple in almost all villages. The worship of the Three- mountain God was one of the original worship customs in Chaoshan, which had a large sphere of influence. There was a custom of worshipping the Three-mountain Kings in the surrounding areas such as Meizhou and Huizhou, Taiwan and overseas Malaysia, Singapore, Thailand and other places. The Three-mountain Ancestral Temple in Lintian, Hepo Town, Jiexi County, had the longest history, which belonged to the capital of Lintian in Ming and Qing Dynasty. Therefore, it was called Lintian Ancestral Temple.

According to the records of the "Jieyang County Chronicle" in the Qing Dynasty, the Lintian Ancestral Temple "founded in the Sui Dynasty", which had a history of 1,400 years. However, the Three- mountain Ancestral Temple in Lintian was rebuilt in 1984 on the original site of the ancestral temple. Due to the widespread existence and rich content of the worship of the Three-mountain Ancestral Temple in Lintian, the origin of the Three-mountain Kings has always been the paid close attention by the academic circles. Some people think that the Three-mountain Kings was a Han people moving south living in seclusion in Chaoshan, which compared mountains to people and people to mountains. The stone inscription of the "Ming Kuang Temple" in the ancestral temple of Lintian recorded that "the three immortals were instructed by heaven to come to guard these three mountains. They entrusted their souls in Yufeng Mountain." it could be speculated that the Three-mountain Kings was three hermits, each guarding a mountain, which made people merge with the mountain. However, it remains to be verified whether the "Ming Kuang Temple" is true or not. There was a saying that there are three mountains around Hepo Town in Jiexi, namely Du-mountain, Ming-mountain

Fig. 1. The statue of the king of Sanshan at the Sanshan Ancestral Temple in Lintian, Jiexi, Rebuilt in 1984

Fig. 2. Elevation of Jiexi Lintian Sanshan Ancestral Temple rebuilt in 1984.

and Jin-mountain, which made people reminiscent of the Three-mountain Kings to sprout nostalgia for the home village and given rise to a feeling of reverence. There was another saying that the Three-mountain Kings comes from the Taihu God. Taihu God, Sanshan God, Three-mountain Kings God were different titles in different historical periods. The Three-mountain Kings God was called Three-mountain God or Taihu God in Sui, Tang and Song Dynasties, Ming Kuang God in Yuan Dynasty, and Three-mountain Kings God in Ming and Qing Dynasties. The Taihu God was worshipped as the Taihu God in the south of the Yangtze River before, and then with the immigrants from the south of the Yangtze River to Hushan, so the custom was brought. Han Yu in the Tang Dynasty was banished to Huzhou for about eight months and offered sacrifices to the Taihu God three times, which showed that the worship of the Taihu God existed widely in Hushan at that time. (Figs. 1 and 2).

2.2 Cultural and Artistic Value of Temple Architecture

The Three-mountain Kings Ancestral Temple in Jiexi Lintian is a building complex with three bays and three depths and a mixed structure of wood and stone. It was followed by Jinshui Bridge, Shanmen, Baiting, Dayin, Houban and Hucuo Huoxiang forming a

group of buildings according to the central axis. Building stone carving components such as stone beam frame, stone column, stone hall and stone railing of Jinshui Bridge were closely combined with the building body. The content and carving method of building stone carving were determined according to different positions and different building components. The stone beams and stone braces in the main hall were mostly carved by using the methods of "low relief" and "plain" to protect the structural stress of the stone beams and braces. All kinds of auspicious animals were carved on the stone sparrow, the stone column cap and girder beam head, the patterns of flowers and plants were carved on the stone plinth, stone column and stone railing board, which has injected a sense of vitality into the ancestral temple with more delicate carving techniques, changeable shapes. A pair of stone lions with multi-hair, curly-hair, thin-body and ingenious shape were placed in front of the hall, most of the stone lions in Chaoshan temple were in this shape, which was more spiritual. The head of lion looks up, the tail and abdomen of lion face inward, the body was bent into a curve, the limbs become the fulcrum, and the inclined body was in the shape of "$", which played the role of gravity support and bearing. The lion was more spiritual and full of vitality by combining structural function and aesthetics.

The stone archway, framed stone column and stone beams in front of the Three-mountain Ancestral Temple in Lintian were mainly polished with clear carving lines and simple modeling, all kinds of auspicious animals were carved on the stone sparrow, stone pier, two lion-shaped dragons bent into a arch were carved on the stone beam of the middle gate with an outward tension, there were flowers in the mouth of the lion-turned dragon, which was a little ride high increased the breath of life and shown the aura and harmonious atmosphere of the dragon. The stories of Chaoshan folk characters were carved on the middle gate stone braces by using hollow carving techniques, the character and plot of the characters were displayed in the character carving, which paid attention to the expression of smooth lines of clothing grains and relatively fine carving, the buildings, flowers and trees in the background of the character carving were relatively simple. The carved stone brace with the hollow carving technique was in contrast to the stone columns and stone beams with rough carving technique, and the primary and secondary are prominent.

Chaoshan belonged to Baiyue in ancient times, was a branch of Fujian and Yue people, which had the custom of worshiping snakes, and worshiping the totem of dragons later. The image of dragons came from snakes, the dragon has become the mascot of the common worship of the Chinese nation under the great integration of nationalities. Therefore, the people who worshiped snakes before worshiped dragons even more. The dragons were carved by using the openwork carving technique on the door covers of Chaoshan ancestral halls and temples, and were carved on the walls. Therefore, the dragons have become the favorite theme of Chaoshan people. In addition, the themes of "auspicious", "rich" and "longevity" were second only to the dragon in the status of architectural stone carving decoration; Carved patterns with symbolic significance were also popular with tide people.

The carving method of hollow was favored by the architectural stone carvings in Chaoshan ancestral temple and temple, the multi-level decorative effects was pursued, which had a finer carving and a little fancy. The content of architectural stone carvings

in ancestral temple focused on showing off the honor that that was once owned and the hope for a better future, which reflected a cultural concept of Chaoshan people. In terms of shape and content, the architectural stone carvings of Chaoshan ancestral temples and temples were little cumbersome, burdensome and even carved excessively. The meanings of "sound", "shape" and "meaning" were emphasized, which was a fiery and superstitious sentiment the people of Chaoshan.

3   Protection and Inheritance of Digital Architectural Art

There are all kinds of ancient architectural everywhere in our life, they are the precious cultural heritage of human and have witnessed the history of human development. Nowadays, the countries all over the world attach great importance to the protection and inheritance of cultural heritage. At present, the protection and inheritance of human cultural heritage has been paid attention to by more and more countries. However, as has been damaged a lot, more and more cultural heritages have gradually disappeared. At this moment in time, human began to think that the protection, restoration and inheritance of these cultural heritage were described by using the some measures and new technologies. Some departments or units in China have begun to use teacher technology to restore some historic building with historical value these days.

3.1   Development of Digital Architectural Art

With the intensification of urbanization in China, the comprehensive upgrading and reconstruction have been experienced by many cities. There is a contradiction between the old city reconstruction and the protection of historical buildings in urban construction. A large number of historical buildings have been damaged, and part of the preserved old buildings have also lost their original appearance due to the failure to protect it well. It is become an important topic of current research that how to better protect and inherit these historical buildings. Different from the traditional means of protection and inheritance, the digitalization of architectural cultural heritage is a brand-new option, which mainly expresses the form of new media by using the digital images and digital animations, as well as new media platforms and networks. [2].

At the moment, the digital protection project of architectural cultural heritage in China has achieved some successes. For example, the virtual architectural representation of the Yellow Crane Tower produced by the Animation Major of Wuhan University of technology, the virtual architectural representation of the Qinhuai Pedestrian Street produced by Suzhou Research Institute of Southeast University, the digital animation of the Terracotta Army produced by MSRA. With the rapid development of digitalization of foreign architectural cultural heritage, digital technology has played a prominent role in the digital teaching of architectural cultural heritage. The course "Digital.

Technology of Historic Preservation" has been listed as a compulsory core course by some European and American universities. At present, although the majors related to the protection of historical buildings have not been offered in Chinese colleges and universities, the courses related to the protection of architectural cultural heritage have appeared in Chinese colleges and universities in the current environment. Many popular

majors related to virtual reality performance have been offered in Art colleges and universities, such as Digital Media Art and Animation. However, the content of the courses is mainly based on professional directions such as games, interaction, animation, etc., while the teaching of architectural cultural heritage protection is relatively few. [3].

At present, the new media related to the artistic expression in the field of architectural design are mainly virtual reality technology and architectural animation technology. Digital art is a platform with open and diverse, which includes many digital art styles, such as digital scene, digital characters, digital film and television, digital interaction and so on. Digital media is a new form and a means and medium of communication with digital network communication platform as a tool, which includes the diversified manifestations of various new media. At present, with the rapid development of new media, the application of 3D model has become normalized in terms of architectural art expression, and the architectural animation art and virtual reality performance technology that can be seen at any time have made people appreciate the infinite charm of new media digitization. The traditional creative methods such as watercolor and ink have been replaced by the surreal effects of digital media art these days. Digital means are used by many architectural design units to produce architectural and design effects to present them to business customers. [4] The digital media representation does show a convincing effect whether in terms of spatial expression or design concept, which breaks the communication barriers between non-professional and professional, and the digital communication platform has also brought good cross-cutting collaboration for multi-specialty and multi-discipline.

3.2   The Role of Digitization in Architectural Heritage Protection

The new media digital technology includes digital acquisition, digital storage, digital image, digital post-production and other multimedia application technologies, which has derived slowly other surrounding industries, includes the field of cultural digital restoration. With the development of digital technology, these technical means and artistic expression, architectural art elements and digital artistic expression means began to be slowly used by the protection and inheritance of architectural cultural heritage to realize its unique historical and cultural precipitation.

The architectural representation of 3D digital mainly refers to the equipment and instruments were used to scan and collect near and far 3D digital, to grasp the actual information of the building by using the existing images or real-time captured images, the 3D digital tools were used to perform virtual restoration, and the real data can be used to build 3D models, then virtual lights and virtual materials can be used to restore real architectural effects. The 3D of the building was constructed to touch the real existence of the building. Modern digital art can feel the real existence of architectural space and can achieve the exchange and sharing of non-regional resources through the interaction of touch and vision. At the moment, errors and losses often occur when traditional production methods and means are applied to the restoration and protection of architectural cultural heritage. [5] However, the use of advanced digital technology can better improve the protection and inheritance of architectural heritage.

In order to achieve permanent preservation and dynamic display, various elements of the temple architecture, such as art, humanities, history and so on through video screen,

image and other media were better protected and inherited the Three-mountain Kings Ancestral Temple in Jiexi Lintian by using the digital media technology. The application of digital media technology can not only virtual reconstruct the Three-mountain Kings Ancestral Temple in Jiexi Lintian, but also have a new plan for the future development direction of the existing the Three-mountain Kings Ancestral Temple, which shows the scientific power of digital media technology in physical protection and is a deep integration of science, the Three-mountain Kings Ancestral Temple and art. [6] The digital media was used to restore digitally the temple buildings, so that the Three-mountain Kings Ancestral Temple can be restored without damage and accurately in front of us. Meanwhile, more people can understand and spread the knowledge of the Three-mountain Kings Ancestral Temple in Jiexi Lintian to improve the protection awareness of local temples.

4   Implementation Methods and Steps of Building Digital Protection and Inheritance of the Three-Mountain Kings Ancestral Temple in Jiexi Lintian

4.1   3D Data Collection Scheme of the Three-Mountain Kings Ancestral Temple in Jiexi Lintian

The digital protection was used to study the Three-mountain Kings Ancestral Temple in Jiexi Lintian in this paper, the specific implementation steps and methods were used for data collection by using the 3D data scanning and shooting method. The collected data was used to scan and analyze the building.

as a whole, and efficiently establish a 3D digital model.(Fig. 3) At the same time, combined with the UAV oblique photography technology, it is convenient for the digital archiving of ancient temples,

which provides data support for the architectural inheritance and protection of the Three-mountain Kings Ancestral Temple in Jiexi Lintian.

The instruments used include the DJI FPV MAVIC-2-PRO, iPhone11, Trimble-SX10 scanning total station, the Trimble-SX10 scanning total station was used to capture the data of the facade in the 3D data collection of ancient buildings, and through the use of the oblique photography, the part above the cornice (including the roof) was captured by UAV. The UAV was used to capture the architectural data of the part above the cornice
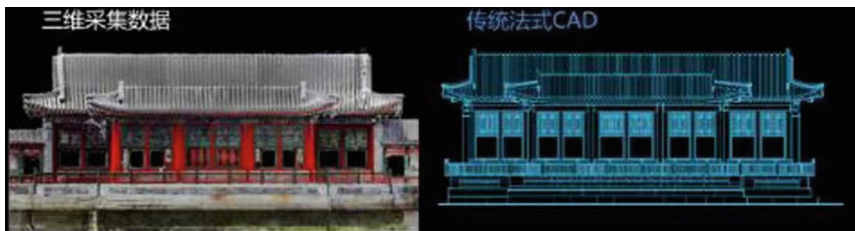

Fig. 3. 3D data and structure comparison.

of the ancient building (including the roof), the iPhone11 was used to capture the facade data of buildings in the collection of temple models.

Due to the mastery of the use method of the DJI UAV MAVIC 2 PRO and the basic technology of oblique photogrammetry, the point cloud data from five angles were obtained through research. Because the Trimble-SX10 scanner is not resistant to high temperature, it is necessary to cool down the instrument regularly or work at night. UAVs and mobile phones were used to conduct photogrammetry of the temple, and enough three-dimensional data of the temple were collected, which laid the foundation for the later construction of 3D map data drawings and model reconstruction.

4.2 Design Scheme of the Three-Mountain Kings Ancestral Temple in Jiexi Lintian

Collection and sorting of digital model data: After the 3D data scanning in the early stage, the complete 3D scanning data and information were sorted out according to the data information collected currently, such as building characteristics, building complex layout, building size and so on. In order to understand the architectural style and humanity history background of the Three-mountain Kings Ancestral Temple in Jiexi Lintian, it is necessary to search for relevant historical knowledge. The architectural characteristics, architectural layout, architectural dimensions and other information were recorded in more detail in order to ensure the accuracy of the data, and the architectural details of the Three-mountain Kings Ancestral Temple in Jiexi Lintian were also photographed in order to cut out the real map. In 3ds max, (Figs. 4 and 5).

the building in the creation panel was used to establish the basic geometric model of the temple, and the temple model was made by adjusting the number of parameters. The complex temple structure model was simplified to reduce the workload for subsequent texture mapping. Some windows, doors and walls need to be extruded to make the outline

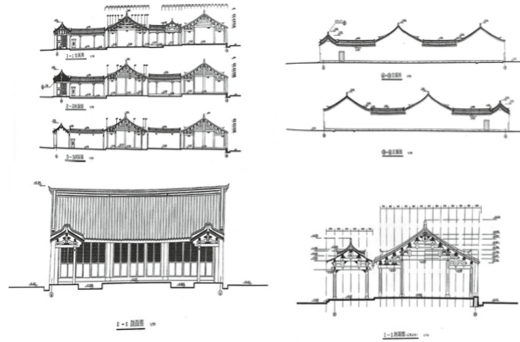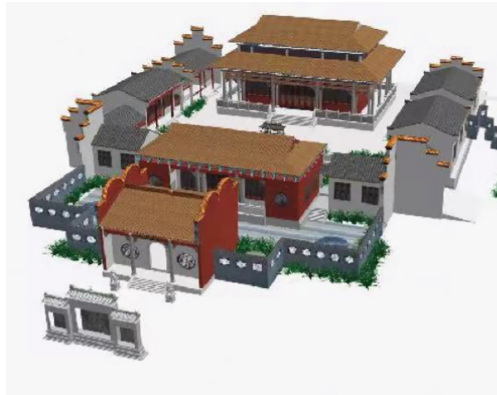**Fig. 4.** Three mountain Kings Ancestral Temple in Jiexi Lintian building exterior.

Fig. 5. Section and elevation of Three mountain Kings Ancestral Temple in Jiexi Lintian.

of the shape; while some wood carvings or stone carvings with extreme workmanship were used to capture the shape of the fixed point by using the graphics to create the panels. The PLOY was converted to extrude the plane and sew the contour, so that the temple model established will be consistent with the real facade shape, and the established model will be more accurate, simple and fast.

In the Photoshop drawing software, the polygonal lasso tool is used to cut the needed parts and put them on a new layer; "Bevel"-"Distort"- "Deform" in the transformation command of the editing window was used to adjust the image with severe deformation; "Brightness/Contrast" in image window adjustment or automatic contrast was used to adjust the some dark images; The brush tools were used to make some defective parts of the image. Small images were centrally formatted to reduce the dispersion of images and reduce shaders for the use of materials. The finished image was assigned to the shader for multiple images map, and the UVs are pasted on the corresponding map to adjust the nodes. And then in the material editor, the bump map was selected to adjust the appropriate parameters to reveal the strength of the bump. Due to the reasonable use of material maps, the quaint and historical flavor of the building were all displayed. In the later design and protection scheme of the digital model of the Three-mountain Kings Ancestral Temple in Jiexi Lintian, the overall layout of the building, the adjustment of the lens, and the lens in Lumion are rendered and generated through post-production synthesis. Through the video editing of Adobe Premiere Pro, the special effects produced in After Effects special effects software and the video in Adobe Premiere Pro were edited to add the music,which can better highlight the historical and cultural atmosphere of the building. The modification of the digital model in the later stage mainly depends on the modeling in the early stage and the materials in the middle stage, and then the refinement of the scene, the simulation of light sense and the production of special effects in the later stage. In addition to the special effects and light.

sense in the later stage, most of them were simulated in 3ds Max. After the post production of light sense (fill light) and special effects (including sound) was exported to the sequence frame in Max, and then rendered in PR to output the effect of the finished product. After the establishment of the digital information of the Three-mountain Kings Ancestral Temple in Jiexi Lintian, the produced 3D digital models were classified and archived according to the categories and attributes to generate the image and image

Fig. 6. Three mountain Kings Ancestral Temple in Jiexi Lintian 3D digital model effect.

databases. The digital information was integrated into a unified database system for wider use and sharing of data information, and can also be uploaded to cloud data to realize Internet- connected storage and protection. [7].

The problems and solutions in the digital model design of the Three-mountain Kings Ancestral Temple in Jiexi Lintian: The all materials were assigned maps, during the reopening of the software material editor, the shader becomes the original material, and then, the maps were missing. However, the map of the rendered material still exists. Because there are no paths for the material map, the shader can only be re-assigned to the map for solving this problem and then repeatedly assigned to the model, which can solve this problem. The unfolded UV map model was copied multiple times, when the software is opened again, the copied model was restored to the one before the unwrapped UV, if the model was copied many times, the problem is still the same. It is necessary to visit the diffuse editing interface in the material editor through the map window, to find the bitmap parameters, reload the image, return to the material editing panel, once the map appears, the shader was assigned to the specified model, which can solve the problem. (Fig. 6).

During the process of importing the model into Lumion, the entire model and material disappears in individual widgets, which is because the lines in the creation of panel graphics to draw the model frame during the process of 3ds Max modeling, the PLOY was converted to extrude. However, the invisible effect of the model appears in Lumion after extruding the non-stitched side, and the problematic side was exposed after mirroring. The same method was reused to build the model, the side that has no problem was extruded, stitched and then unfold the map, which can solve the problem. The problems existing in the software cannot be changed and can only be solved in the simplest way.

5   Conclusion

Through the use of digital media, the digital media technology and the architectural culture of the Three-mountain Kings Ancestral Temple in Jiexi Lintian can be better

integrated, the architectural art can be inherited better, which also enables better promotion and better contribution to its conservation and heritage. The architectural art and culture can be better inherited and protected by using the digital art tools (cloud scanning, 3D model, post restoration, etc.) and research on the various fields and historical periods of the architectural art of the Three-mountain Kings Ancestral Temple in Jiexi Lintian. In order to better apply the digital technology to the art and cultural design of the Three-mountain Kings Ancestral Temple in Jiexi Lintian, the platform of innovative digital technology was used with high quality to inject the architectural art and culture of the Three-mountain Kings Ancestral Temple in Jiexi Lintian into it, which can better expresses its own characteristics such as diversity, comprehensiveness, and artistry. Therefore, this proves that it is necessary and feasible to inject digital media technology into architectural cultural heritage, which plays an important role in inheriting and protecting architectural cultural heritage.

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