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Digital protection and reflection on Tibetan ghee sculpture art of intangible cultural heritage in China

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Abstract. China's Tibetan ghee sculpture art is the first batch of works of art approved by the state council to be included in the national intangible cultural heritage list. This paper mainly studies the origin, digitalization and intelligent protection of the Tibetan butter sculpture art in China, and also explores and attempts to effectively protect the intangible cultural heritage with modern science and technology. We hope that more people will understand, inherit and protect the fine traditional culture of the Chinese nation, and that our cultural confidence will continue to advance to new levels.

1. Introduction

Traditional culture is representative of China's intangible cultural heritage, which carries the unique way of thinking of the Chinese nation, and is the fundamental basis for safeguarding national cultural sovereignty and maintaining national cultural identity. Reasonable protection and utilization of intangible cultural heritage are of great significance to the cultivation of Chinese national spirit, the construction of advanced culture and the promotion of human civilization and progress. China is a multi-ethnic country, and the culture of ethnic minorities is an important part of the Chinese national culture. The Tibetan ghee sculpture art is the first batch of works of art approved by the state council to be included in the national intangible cultural heritage list. This paper is focused on the digital and intelligent protection of the Tibetan ghee sculpture art combined with modern scientific and technological research, hoping that more people will understand, inherit and protect the excellent traditional culture of the Chinese nation, so that cultural confidence will constantly enter a new realm.

2. The origin of Chinese Tibetan ghee sculpture art

Ghee sculpture art is one of the main Tibetan art varieties in China, it has a history of more than 230 years, some people call it soft sculpture, some people give ghee three-dimensional comic strip of the name, known as "in full bloom at the freezing point of the strange flower."^[1] During the creation, the monks add different plants or mineral pigments into the ghee and shape the images of Buddha, god, animals and flowers with their hands, and combine them into the pictures of buddhist sutra stories or major historical legends. Because of the low melting point ghee, more than 15 °C will be out of shape, 25 °C or so it melts, so making and display need to be finished below freezing in winter. A piece of work takes two or three months to create, but only one or two months to show and keep, and the life cycle is very short. Exhibitions can only be held in fixed monasteries, and many buddhist believers and art lovers cannot appreciate new works in time. The creation of ghee sculpture requires a high level of artistic accomplishment of the artists, and the damage to the body is relatively large. As a result, many art monks suffer from different degrees of joint disease and intestinal disease, and some even lose their fingers, so there are fewer and fewer successors. It can be said that the production time,



display time, display place, life cycle and security maintenance of Tibetan ghee sculpture have great limitations, which is not conducive to the inheritance and protection of this intangible cultural heritage. Therefore, combined with modern science and technology, it is of great practical significance to digitize and intelligentize the protection of ghee sculpture.^[2]

3. Research on the digital protection of ghee sculpture

3.1. The idea of digital protection of ghee sculpture art

On the basis of studying and learning the same technology at home and abroad, combined with the Internet digital technology, wireless sensor network + GPRS network + smart phone monitoring terminal + network server mode is adopted to realize the all-round monitoring and digital management of ghee artwork^[3]. Mainly from the environment monitoring terminal system, smart phone monitoring terminal, network service platform design. Environmental monitoring terminal system is the core part, USES the Zigbee technology, GPRS technology and digital sensor technology, to realize the collection data of many nodes, wireless, short, and then collect data through the GPRS network to send SMS, MMS way intelligent mobile terminal, and USES the GPRS network TCP/IP protocol will collect data to monitor network service platform, As shown in Figure 1. By means of modern science and technology, this unique Tibetan art in China has not only maintained its original beauty, but also adapted to the modern cultural needs. I hope that through the network platform, smart phone terminal propaganda and electronic explanation, can let more people to appreciate the unique Tibetan culture and art, realize the importance of protecting the intangible cultural heritage.

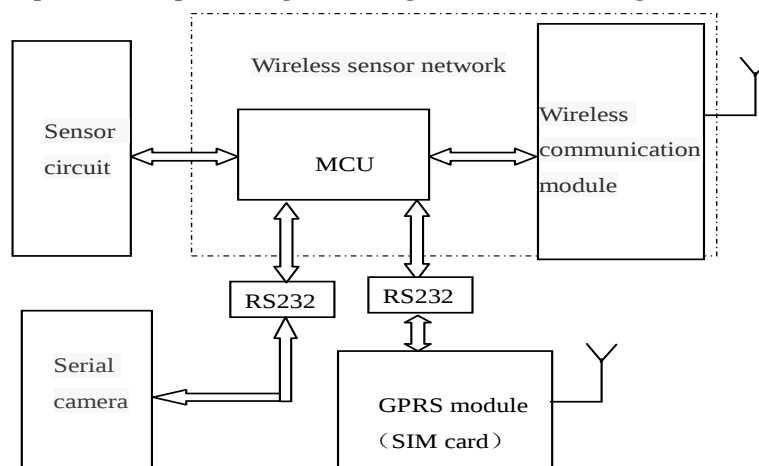


Fig 1 main node composition of remote monitoring system

3.2. Digital construction in the process of making ghee sculptures

The production procedure of Tibetan ghee sculpture mainly includes four steps^[4]: first, the bone-tying. According to the content of the performance, with hemp rope grass bundle into a variety of skeletons; The second step is to "do the embryo". The previous year's old ghee flowers were added with appropriate amount of plant ash and repeatedly beaten to make the initial embryo with good toughness and elasticity. This process directly relates to the overall quality of ghee flowers. The third step is to apply plastic. Yak milk was used to make pure white butter, which was mixed with various mineral pigments according to the corresponding proportion. The yak milk was mixed into dozens of shapes of different color shades and then pasted on the initial embryo. The fourth step is installation. After the completion of each unit, according to the overall requirements, they will be fixed on the board with a thin iron bar, high and low scattered, suspended processing, and maintain a certain degree of inclination, so that the viewer has an optimal viewing Angle. After a long period of time, the ghee sculpture production technology has reached an unprecedented level.

The digital construction of the art production process of ghee sculpture is mainly aimed at the melting characteristics of "ghee". The transparent and closed space is designed with new materials, and the

temperature, humidity and light are controlled to avoid shortening the life cycle of artworks due to the change of display time, place and environment, so as to realize the possibility of remote exhibition. This is mainly the application of short-distance wireless communication technology, which avoids the tedious construction process of integrated wiring in the internal multi-point environmental monitoring, and realizes the remote data monitoring and monitoring without the limitation of space distance. In addition, the sensor can be installed in the interior of the ghee artwork during the bone-tying stage to achieve a perfect combination with the artwork. This step is also the biggest technical difficulty, mainly because in the process of artwork shaping, the thickness of ghee is different, and the calculation of the balance point between heat conduction and refrigeration is complicated, which needs to be further studied as a subject.

3.3 Ghee sculpture art digital, network platform construction

The important way to publicize the art of ghee sculpture in China is the construction of digital and network platforms. All the information of art works should be digitalized and integrated, and the network service platform and mobile APP should be used for publicity and marketing. Through local or remote access to the network service platform, the staff can achieve abnormal conditions, data statistics, scene image display and historical data query. Visitors can visit the Internet service platform and mobile phone electronic explanation to understand the various information of each work of art in detail, and can also be made into the form of animation, so that more people can understand and appreciate this unique intangible cultural heritage. For example, through the Internet, people can appreciate the representative work of labrang temple ghee sculpture art, "princess wencheng into Tibet", and can query different scenes, details and background. This work vividly depicts the marriage between princess wencheng and songtsan gampo, a historical event witnessed by the friendship between the Tibetan and han nationalities. It can be divided into six different scenes: "five difficult marriages", "betrowed gifts", "saying goodbye to chang 'an", "crossing the riyueshan", "bohaiyuanying" and "getting married"^[4]. The figures in the painting are vivid, which not only shows princess wencheng's intelligence and beauty, but also highlights songtsen ganbu's cunning and deep thoughts. This information can be found on Internet service platforms and mobile apps.

3.4 The protection system construction of Ghee sculpture art works

The hidden danger of ghee sculpture in the exhibition is also a problem that needs special attention. Inside the ghee sculpture, various kinds of monitoring data are collected in real time and summarized to the master node in a wireless manner by setting up multiple wireless monitoring nodes, As shown in Figure 2. Then, the data of the master node are sent to the mobile phones of multiple workers by SMS and MMS through GPRS module, and uploaded to the network server by TCP/IP protocol. In the smart phone terminal of the staff, real-time monitoring and remote control can be realized through the program interface developed by android. Meanwhile, defense deployment and defense removal can be realized automatically through GPS positioning. On the network SERVER side, the C# platform in the VS.NET environment was used to develop the network service platform. The method of AJAX+HTML was used to realize the interface design and data display. SQL SERVER 2005 was used to manage the background data.

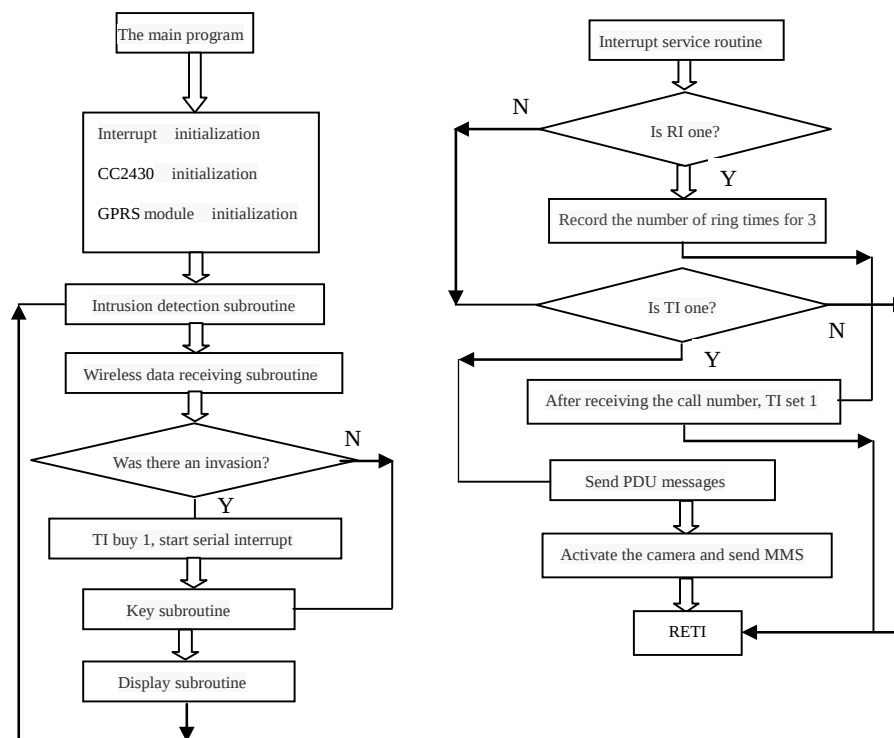


Fig 2 software flow chart of the main node of the system

Create a real time monitor various states of intelligent mobile terminal, the main features include: implement temperature - $55 \sim 125 + / - 0.1^{\circ}\text{C}$, humidity $0\% \sim 100\%$, light and other real time data collection and upload, by default, the lower the limit so as to realize the various parameters of SMS/network alarm; Mobile phone monitoring interface can real-time state of each parameter, can also add and delete the number and name and set its switch state; Using the serial camera can achieve the real-time display of illegal intrusion screen server and MMS upload; Based on data mining technology, research and development including multi-factor historical data query, intrusion screen and image recording and processing analysis of the background decision-making function; By using android mobile development technology to develop smart phone monitoring terminal, it can realize the switch of automatic defense deployment/defense withdrawal of cross-border early warning by monitoring the GPS positioning of the phone, and improve the convenience and real-time operation of the system's cross-border alarm function.

4. Prospect analysis of digital protection of Tibetan butter sculpture art in China

First, due to the special properties of ghee, the ghee sculpture takes a long time to make, but only one or two months to display and preserve, and the life cycle is very short, so the exhibition can only be held in fixed temples. The application of digital technology can extend the life cycle of artworks, and also realize the traveling exhibition in different places. To enable many distant buddhist believers and art lovers can appreciate the creation of new works. Traveling exhibition in different places can also generate economic benefits and realize its economic value. Tibetan monasteries in Tibet, Qinghai and Gansu create ghee sculptures every year, which requires a large amount of equipment. Secondly, all the information of ghee sculpture works should be digitalized and integrated, and the network service platform and mobile APP should be used for publicity and market promotion. Tibetan Buddhism believers and art lovers can learn about the relevant information of artworks through the network service platform and mobile APP. To enable more people to understand and appreciate this unique intangible cultural heritage. Using wireless sensor network technology, the butter sculpture art

protection area for multipoint sampling various state information, wireless connections, centralized processing, on this basis, further the wireless sensor network, and the combination of mobile communication network and the Internet, can realize remote art status information, multicast, real-time intelligent monitoring, avoid the happening of the illegal invasion, abnormal alarm, and so on and so forth, can effectively protect ghee sculpture works of art.

Thirdly, the creation of ghee sculpture requires artists to have high artistic quality, but it does great harm to the body. Therefore, it is necessary to strengthen the cultivation and education of the inheritors, and increase the artists' sense of national pride and self-realization through religious belief. Through art education, artists can improve their artistic accomplishment, thus improving the quality of their works. They can also be encouraged to make some small works and let Tibetan Buddhism believers and art lovers buy the artworks back for sacrifice through market promotion. The whole set of electronic equipment also expands the market accordingly. This can not only expand the scope of art appreciation, but also increase the economic income of artists and improve their working and living conditions, so that more people are willing to inherit this art.

In a word, the intangible cultural heritage records the history of the Chinese nation, embodies the spirit of the Chinese nation, and is the core and crystallization of China's cultural heritage. At present, we should use modern science and technology to effectively protect the intangible cultural heritage. All the more, we must carry forward the fine tradition of cultural confidence of the Chinese nation and bring it into a new realm.

5. Acknowledgments

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