

# *Design Information Integration Platform of Intangible Cultural and Creative Art Products Based on Artificial Intelligence*

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**Abstract:** Under the background of the development of artificial intelligence, global cultural and creative products have gradually grown. China's cultural and creative industry has gradually developed into a new industry, and it has also provided a new development direction for intangible cultural and creative products. Traditional art is an important category of intangible cultural heritage. It is the embodiment of the spiritual value of the Chinese nation in a certain period and the reaction of life customs. Its inheritance and development are of great significance. This article aims to study the design information integration platform of intangible cultural and creative art products based on artificial intelligence. Based on the analysis of the attributes and functions of cultural and creative art products, we propose an artificial intelligence-based intangible cultural and creative art products. Design the information integration platform framework, discuss the system function goal, system performance goal and platform function design of this framework. Finally, the platform test shows that the process of the module meets the test requirements of this article, and the system is automatically updated regularly in cycles, and the updated data can be stored in the historical database for query.

## **1. Introduction**

The continuous improvement of national innovation capabilities, the rapid development of the Internet and high-tech industries, and the national "One Belt, One Road" cultural industry belt construction and development have all injected unlimited potential into the development of cultural industries [1-2]. With the rapid development of the cultural and creative industry, how to better meet the increasing consumer demand for cultural and creative products has become an important issue worth pondering" [3-4]. Intangible cultural heritage has always been a cultural and creative industry. One of the important sources of creativity, and with the help of modern and innovative means to integrate it with the traditional national spirit, it can also protect the endangered cultural heritage and realize the sustainable development of intangible cultural heritage [5-6].

At the same time, with the rapid development of modern technology, the market life of new products has been greatly shortened. The rapid response of enterprises to adapt to changes in customer needs has become an overwhelming competitive factor [7-8]. How to quickly respond to the design and development of intangible cultural and creative art products based on market, customer, procurement, sales and other information has become a key factor in whether the product can occupy the market [9-10].

Based on the analysis of the attributes of cultural and creative art products and the functions of cultural and creative art products, this paper proposes an artificial intelligence-based intangible cultural and creative art product design information integration platform framework, and discusses the system function goals and system performance goals of the framework and platform function design. Finally, the platform test shows that the process of the module meets the test requirements of this article, and the system is automatically updated regularly in cycles, and the updated data can be stored in the historical database for query.

## **2. Research on the Design Information Integration Platform of Intangible Cultural and Creative Art Products Based on Artificial Intelligence**

### **2.1 Attribute Analysis of Cultural, Creative and Art Products**

#### **(1) Spiritual and cultural attributes**

The unique spiritual and cultural value attributes of cultural and creative art products fundamentally promote cultural innovation. It has a certain cultural connotation, which enables traditional culture to be passed on lively, but also aims to arouse consumers' spiritual identity [11-12]. Culture is the knowledge, customs, beliefs, moral laws, values, artistic aesthetics, and ways of thinking obtained by human beings in social production and life practice. Its essence comes from the total material and spirit accumulated in the process of understanding and transforming the objective world. The inheritance and development of national culture is the fundamental source of this country's standing among all countries in the world. The essence of cultural and creative products promotes the innovation of knowledge and technology, but also includes two aspects of culture and creativity. The foundation of creativity comes from the individual's culture, life, environment, memory, etc. in society, and culture is the source of inspiration for creativity. The unique regional growth environment and cultural history bring the uniqueness and diversity of creativity; creativity not only transforms the conscious connotation of culture into material form, but also enables culture to be inherited and promoted in a modern environment of different regions. The focus of the design of cultural and creative art products is to determine and extract the "cultural elements" that can produce popular emotional resonance and have cultural connotations, so that they can be understood and loved by the public and promote the advancement and development of their human society.

#### **(2) Commodity attributes**

Cultural, creative and art products also have commodity attributes, that is, consumers are willing to buy commodities with cultural connotations and consume for them. The improvement of the economic efficiency of cultural and creative products is not only about the mechanical innovation of product technology, but also the cultural recognition function of its products. Only then can the product meet the emotional needs of its consumers and fundamentally enhance the commercial value of its cultural and creative products. Various countries vigorously support the cultural and creative industries, which has encouraged the cultural and creative industries to enrich the content of consumption, while changing people's consumption concepts and methods, promoting a virtuous

cycle of economic growth and consumer demand, and expanding their consumption fields. Products provide people with satisfying inner cultural spiritual needs and services, which are attributable to the creation of a new consumer market to stimulate domestic demand; and industrial innovation and structural optimization also contribute to the integration and development of other industries. This has accelerated the transformation of my country's economic development mode.

All in all, the development of the cultural, creative and art industry has promoted the cultural and service consumption of products in the market, and has improved people's living consumption habits, quality cultivation, aesthetic appeal and quality of life in all aspects, and has accelerated the accumulation of personal and social wealth. Promoting the rapid development of the economy, and the diversity of culture and the inclusiveness of society, the cultural consumption in the economic and social fields has been further improved, making it an increasingly necessary form of consumption for people.

## 2.2 Functions of Cultural, Creative and Art Products

(1) Cultural and creative art products are different from ordinary products. They contain cultural added value and have multiple functions. First of all, the most important cultural connotation. This allows cultural and creative art products to meet some of the cultural needs of users. This is also cultural and creative art. The biggest difference between the product and other products. The functionality is also indispensable. Under the premise of cultural connotation, audiences are more inclined to buy a practical product rather than a simple decoration. In addition, the creativity of art products is also very important. This is not just a product related to culture. It is necessary to add ingenuity and creativity on the basis of culture, so that culture and commodity are integrated. In an idealized state, designers design cultural, creative and art products for their feelings, and consumers consume cultural, creative and art products because of their feelings.

(2) Cultural and creative art products carry the functions of aesthetic education and education, and can guide the audience to immerse themselves in the cultural atmosphere when using the product. Some cultural and creative art products are purchased by the audience after the on-site visit, tour, and study, so they are an extension of the audience after the on-site visit. After the exhibition or study is over, the audience can extend this atmosphere to their families and life, and convey it to relatives and friends. It is worth mentioning that some of the audiences of cultural and creative art products are children. Whether the purchaser is an adult or a child, the aesthetic education and education functions of the cultural and creative products will be presented to the teenagers. This has more important and far-reaching effects. Some cultural, creative and art products are also designed as "material packages" to guide the audience to follow the tutorials attached to the products and make them by themselves on the basis of raw materials or semi-finished products, which is different from regular textbooks, but also embodies the "entertainment and fun".

(3) Cultural and creative art products have strong social effects and economic benefits. They have certain cultural genes as intangible cultural heritage, which also promotes cultural awareness and national pride. For some companies and industries that are in trouble, as well as some types of crafts that are on the verge of extinction, excellent cultural and creative planning and design often have the effect of sending charcoal in the snow and bringing back the dead.

(4) Cultural and creative art products embodies "culture + creativity". The combination of the two also has a special role in promoting economic development. It can radiate to multiple industries and promote the development of regional economy with its typical characteristics. The transformation of the industry has key enlightenment, which can also enable consumers to produce

cultural consumption behaviors, thereby enhancing the awareness of local culture. Its function is far more than what people can see now. Its high added value and high knowledge are more embodied in the new functions possessed by the integration of culture and high technology. Accurate and appropriate entry points and design planning will make the added value of cultural and creative products in all aspects beyond traditional industries and traditions. The product achieves the effect of "one plus one is greater than two".

### 2.3 Algorithm Analysis

As shown in formulas (1) and (2), the power function type piecewise adaptive function representing the artificial fish career and the step size, respectively. Set  $k_s = k_v, b_s = b_v$ , the function coefficients of the field of view and the step length are the same, and the value range is defined as  $[min\_y, max\_y]$ , that is, the initial value of the function coefficient in the first iteration is  $max\_y$ , and the minimum value of the function coefficient in the last iteration is  $min\_y$ , and the maximum number of iterations is  $max\_gen$ .

$$f_v(\text{iter}) = K_v * \text{iter} \wedge b_v \quad (1)$$

$$f_s(\text{iter}) = K_s * \text{iter} \wedge b_s \quad (2)$$

Let the value range of the piecewise adaptive function be  $[0.1, 2]$ , and the maximum number of iterations is 20 times, then the change trend of the adaptive coefficients of the power function artificial fish visual field and step length is shown in Figure 1.

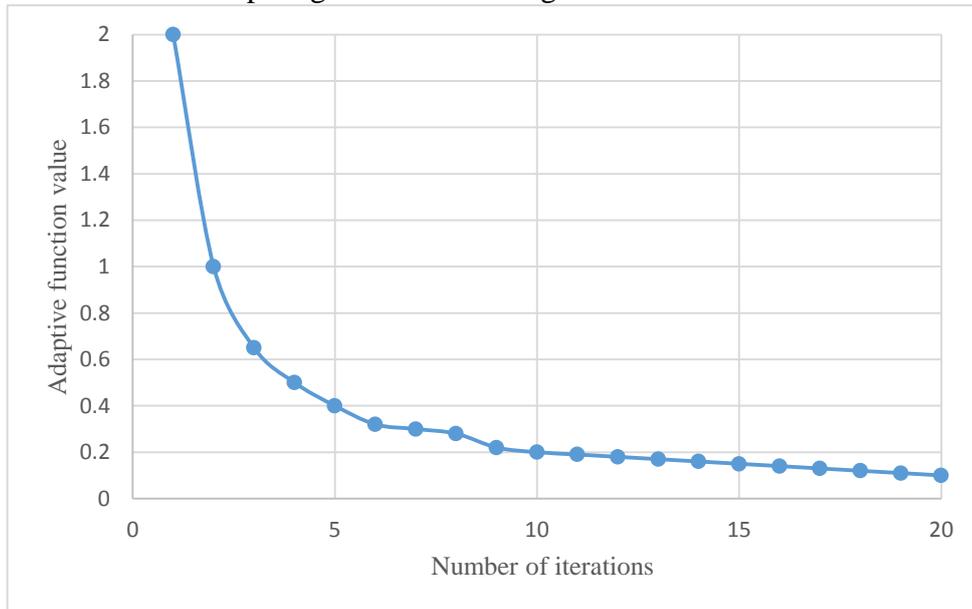


Figure 1: Decay Trends of Power Function

## 3. Platform Analysis

### 3.1 System Function Goals

The overall goal of this platform system is to build a comprehensive information sorting platform that is easy to expand and distributed to share large amounts of data from each subsystem,

so as to fully meet the needs of our company's design units and departments for timely and accurate information acquisition. The functions and objectives of the system mainly include the following aspects:

1) Establish a complete database, quickly and efficiently process the data in the system, increase the speed of information processing, accurately provide all kinds of information required by the system users, and assist the designer to arrive at a plan in a timely and correct manner.

2) Self-developed a set of database interface, incorporating all relevant information in the main systems we have into this platform, and has built a set of on-site information collection networked system that meets the technical standards of safety and protection.

3) Develop a comprehensive data integration platform to realize information exchange between databases of different systems, integrate data useful for product design in various system databases, and establish corresponding data warehouses.

4) Establish a product design information integration system that meets management requirements, meet the different needs of designers, provide rich data information, and meet product designers' needs for various aspects of information.

### 3.2 System Performance Goals

1) Practicality: Functional practicality is what a system needs to consider before deciding. The system must have a management model and operating mechanism that fully conforms to the company's own management model, and can well realize the existing work management mode within the company. In its software design, it is convenient for users to use it as a design standard, and the coding rules are unified.

2) Scalability: Considering the company's future business expansion, new requirements for the system may be proposed in the future. The system should be able to smoothly accept this expansion without changing the existing system architecture, and seamlessly integrate It is integrated into the existing system.

3) Interactivity: The system should be able to integrate some of the application systems originally developed into the new system, and interactively utilize existing resources to prevent repeated development and waste of resources.

4) Maintainability and manageability: Provide management measures such as system maintenance and data maintenance.

5) Confidentiality: The platform will keep the user's registration information confidential and encrypt the user's password.

### 3.3 Platform Function Design

The functions of the data management system of this platform mainly include: real-time data collection and storage, graphical display of real-time data information, analysis of real-time data information, data warehouse and information mining where multiple systems are integrated, and overall data information display of multiple systems wait. The design of the functional frame structure diagram of the system is shown in Figure 2.

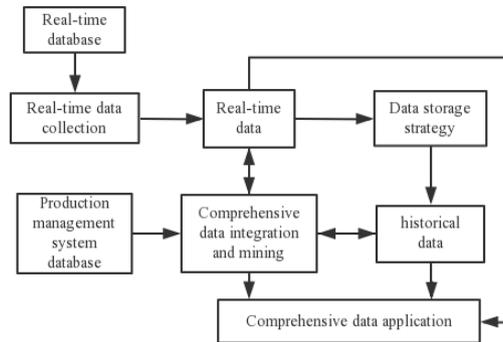


Figure 2: System function structure diagram

After real-time data is collected from real-time data sources, it is first stored in a temporary table. At this time, we need to process the data in two steps: one is to display the data directly from the temporary table by the real-time data display program. The second is to store all the real-time data in the temporary table and send it to the historical database in accordance with this storage method by the real-time historical data storage program. The comprehensive data integration and analysis mining program extracts and sorts out the useful data in various real-time databases in various databases, historical databases and temporary tables in the enterprise production and operation management system through digital extraction and digital conversion to facilitate storage and added to the database, established a data warehouse and various subject databases that can meet the needs of enterprise production and operation management, and conduct data mining based on the data warehouse. After the above processing, real-time information and multi-system integrated information and mining information need to be displayed to users through a comprehensive data application system.

## 4. Platform Test

### 4.1 The Purpose and Requirements of Platform Testing

In the process of development and implementation of the platform, every step has been thoroughly tested. The purpose is to ensure the normal and good operation of the platform and provide a more user-friendly user experience for each user. In addition, it is more important to ensure the information security of the platform, which includes the security of user information in the platform and the security of the platform database.

In addition, there are some more sensitive details in the system, such as the security of user information. While the system is required to achieve integrity, it is also required to achieve a certain degree of safety. The consistency and convenience required by ordinary systems are naturally included.

### 4.2 Encryption Method Test

The MD5 encryption method is used in the design and implementation of this platform to encrypt the user's password. MD5 encryption is widely used so far, and it is also a widely recognized encryption technology for encryption security, and it is also irreversible. Even if the

password is obtained by malicious means, it still takes a lot of effort to crack. Perhaps by the time it is cracked, the user has already used the new password. As far as this feature is concerned, it is relatively safe for the platform to use this encryption technology.

Table 1 is a module test for this encryption process.

*Table 1: Test case table of MD5 encryption process*

Test module	Test case description	Test process data	Test expected results
User registration module	Enter different password data and submit the form, and finally check the password result in the background	Enter empty data, including entering a space in the data box	Unable to submit, and the user is prompted to not enter empty data
		Enter different password data	It can be submitted as long as the password rules, and different original passwords correspond to different coded unique strings
User login module	Enter different password data and submit the form, and finally check the password result in the background	Enter empty data, including entering a space in the data box	The form cannot be submitted, and the user is prompted to enter the password inconsistent
		Enter the correct original password to submit	The background program obtains the password encrypted by the source code, and then compares it. If the password is the same, the login is successful

Obtained from multiple test data results, the process of this module meets the test requirements expected in this article.

## 4.2 Implement Data Storage and Maintenance Functions

Dispatching real-time information is characterized by large amount of data, fast update speed, and high requirements for real-time. According to the basic situation of scheduling real-time information among non-heritage cultural, creative and art product manufacturers, the real-time application of real-time data and the storage of historical data are processed step by step. For the display of real-time information with high real-time requirements, the data in the data table in the real-time data server can be directly quoted; the historical data storage is based on the storage strategy, storage planning and application requirements of the historical data, and the real-time data is sorted and standardized. Then store it in the historical database. In this process, the system automatically updates periodically in units of cycles, and the updated data is stored in the historical database for query.

## 5. Conclusions

Intangible cultural heritage the intangible cultural heritage of mankind is an epochal manifestation of regional culture and spiritual wealth. With the development of the cultural and tourism industry and the increasing support for non-traditional culture in order to attract national policies, the cultural, creative and art industry has increasingly become the focus of attention. With the continuous deepening of informatization, the network platform, as an effective informatization practice platform, is receiving more and more attention and attention. Establishing a product design information integration platform featuring intangible cultural and creative art products can promote the development of intangible cultural and creative art products, and make cultural, creative and art products go further.

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