# Construction and implementation of Zhaoqing cultural tourism industry system based on intelligent media development under artificial intelligence technology

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*Abstract: Cultural tourism is an important part of the tertiary industry, and cultural tourism is known as the most promising way of tourism. Zhaoqing is rich in cultural tourism resources, but its cultural tourism development is still in its primary stage. In this paper, for the purpose of integrating and sharing tourism resources in Zhaoqing, a system model of cultural tourism industry based on Web services is proposed by using artificial intelligence (AI) and intelligent media technology, which can effectively realize information exchange, data sharing and online transaction of tourism products, and proposes to combine them to form a comprehensive service platform, so that tourism consumers can really enjoy one-stop service. The realization of this system is of great significance to the development of regional tourism.*

*Keywords: AI; Intelligent media; Zhaoqing; Cultural tourism industry system*

## 1. Introduction

In recent years, the tertiary industry has developed rapidly in the development of the world economy, and cultural tourism, as an important part of the tertiary industry, has become a new economic growth point, which plays a very important role and significance in the future development of tourism [1]. Making full and rational use of tourism resources is the strategic goal of the long-term development of tourism industry. The concept of cultural tourism industry system is put forward against this background. With the development of information technology, it is very important for the next development of tourism industry to infiltrate mature information processing technology into the tourism industry and use the media of Internet to form informationization and digitalization of tourism resources.

As a challenging industry, tourism marketing involves many factors, such as culture, brand, etc. How to provide accurate services according to customers' preferences is the core of whether tourism companies can occupy the market [2]. Using computer information technology and artificial intelligence (AI), an information management system is established to provide marketers with accurate answers to marketing decision-making questions. Based on the above considerations, previous studies and related theories, this paper proposes a cultural tourism industry system based on AI and using intelligent media to develop Zhaoqing.

## 2. Innovation system of cultural tourism industry

According to the complexity and law of cultural innovation, the basic framework of cultural tourism industry innovation system is constructed. As shown in Figure 1, according to the functional characteristics and action forms of the constituent elements, the innovation elements can be divided into three parts: the main elements of innovation, the elements of innovation environment and the elements of cultural tourism resources.
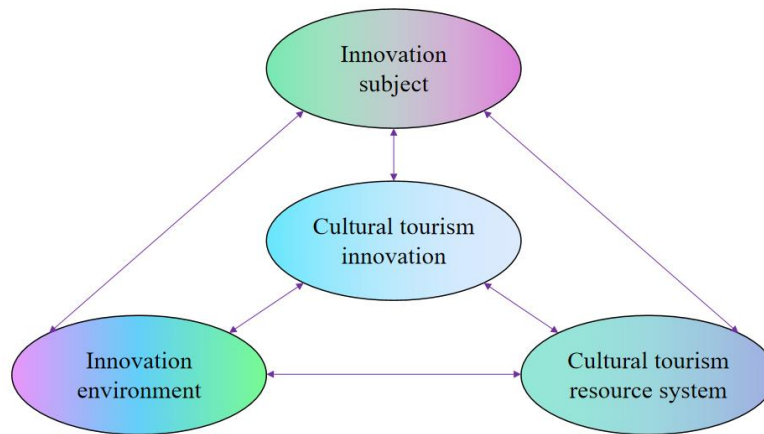
*Figure 1 Basic framework of cultural tourism industry innovation system*

## 2.1. Main elements of innovation

The main body of cultural tourism industry innovation refers to the entity innovation elements with social entity structure and directly undertaking innovation function, including five elements: cultural tourism enterprises, people, government, intermediary organizations, tourism colleges and scientific research institutions.

## 2.2. Elements of innovation environment

Innovation environment refers to the organic whole formed by the interweaving and interaction of various political, economic, natural, social and supporting industries and institutions in which the innovation activities of cultural tourism industry are located. It is the sum of all external conditions for the innovation subject to innovate, and can be divided into hard environment and soft environment [3-4].

Hard environment refers to the substantive innovation elements that have social entity structure and support innovation activities without direct innovation function; Soft environment refers to the non-entity environmental elements which have no social entity structure, exist invisibly, support innovation activities and have no direct innovation function. Innovation environment itself cannot innovate cultural tourism products, but it is difficult to carry out innovation activities without the support of environment. Therefore, the innovation environment is an essential factor for the operation of the innovation system of cultural tourism industry. Innovation environment serves and supports innovation subjects and activities.

## 2.3. Cultural tourism resource system

Cultural tourism resources, which are attractive to cultural tourists and have tourism value, include natural existence, historical and cultural heritage, modern landscape, intangible culture and tourism service conditions.

In short, the innovation subject is an entity that directly undertakes the innovation function, is the core innovation environment of cultural tourism industry innovation system, and is the external space formed by the innovation system of cultural tourism industry. In the innovation environment, the innovation subject continuously produces innovative products of cultural tourism to realize cultural tourism innovation [5]. These three parts penetrate, interact and influence each other, which constitute the basic framework of the innovation system of cultural tourism industry.

## 3. Study on the system construction of cultural tourism industry in Zhaoqing

### 3.1. Overall architecture design

As a typical Web application, the overall architecture of the system will also follow the standard three-tier architecture of Web system. As shown in Figure 2.
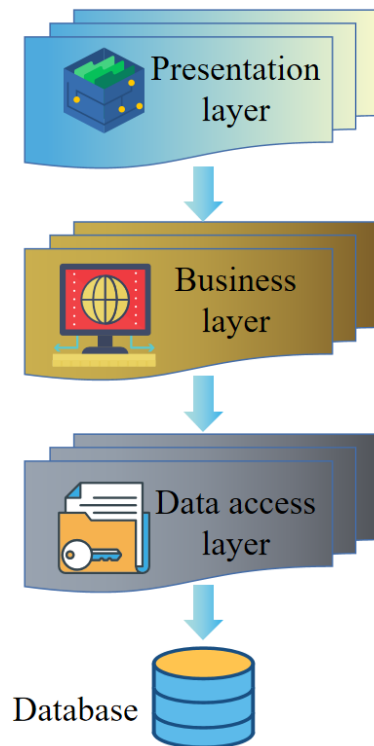
*Figure 2 Three-tier architecture of standard Web application*

Based on MVC design idea, the whole application system can be divided into three layers, which are presentation layer, business logic layer and data access layer from top to bottom. By layering, the separation between levels is realized, the system functions are clearly distinguished, and the coupling degree of the system is reduced. In today's increasingly complex system business, even if developers have clearer business logic and clearer division of labor, and pay more attention to the realization of business logic, product maintenance becomes simpler. The division of labor of each layer is as follows [6]:

(1) Presentation layer

That is to say, it is used to display the interface of the system, and this layer is only used to interact with users, and user input and result display are completed in the presentation layer.

(2) Business logic layer

The service layer is the bridge between the data layer and the presentation layer, so the business layer is also called the middle layer, which is also the core layer of the whole system. After receiving the user's request, the presentation layer returns the result to the presentation layer after being processed by the logic layer and finally presents it to the user. At the same time, the business layer also depends on the data layer.

(3) Data access layer

Also known as persistence layer, this layer is mainly used to interact with databases or other data saving methods. The data layer does not pay much attention to business logic, and the business layer calls the methods of the data layer to complete the operations of adding, deleting, modifying and checking data.

### 3.2. Functional module division

Conceptually, this system is mainly divided into two subsystems, namely, information interaction system and e-commerce system. In fact, it can only be distinguished logically, but in the actual development process, there is no deliberate distinction. Combined with Web service technology, any provider of tourism resources and information can publish the resources of the platform through the platform, so as to achieve the purposes of resource sharing, information exchange and online transaction. Division of platform functional modules is shown in Figure 3:

*Figure 3 Division of platform functional modules*

(1)User management

It includes the functions of adding, deleting, modifying and querying administrators and users at all levels of the platform, as well as the functions of verifying system users and managing the increase and decrease of permissions. In the platform management module, the proxy design pattern is mainly adopted to provide different levels of access rights for different levels of objects.

(2)Tourism e-commerce

Sub-modules such as ticket booking of scenic spots, hotel and restaurant booking, travel agency booking, travel route and transportation booking, purchase of tourism commodity accessories, and tourism e-commerce forum.

(3)Resource publishing

The users in this part are the owners of various resources, corresponding to each module of tourism e-commerce, and can publish and update tourism product resources, hotel resources, scenic spot ticketing resources, transportation resources, travel agency resources, etc.

(4)Public information

The public information module mainly includes tourism news, online survey, online consultation, online forum, supervision complaint information, tourism demand information, etc.

(5)User login

The user login registration module is used for the unified classification registration of platform users. Users are divided into three categories, namely, system users, resource publishers and tourists. System users are qualified as system administrators, and their usernames and passwords are assigned by platform administrators in the background, so they cannot register at the foreground. Resource publishers include all kinds of tradeable tourism resource owners, whose registration needs to provide relevant information, carry out real-name registration system certification registration, or be directly authorized by the platform.

(6)Resource search

The main function of the resource search subsystem is to help users quickly query the information and resources provided by the platform, so as to facilitate and simplify the user's operation. Users can search the information of scenic spots, tourist routes, tourist traffic information, hotel catering and entertainment information, tourism product accessories information, tourism festival information and so on through the search tools provided by the platform.

## 4. System realization of cultural tourism industry

### 4.1. Query implementation

Although there are query languages for semantic Web, such as DQL [7], these languages are for semantic Web developers, which are difficult for ordinary users to use. This system provides a simple data query interface, fetch on to data (< property >, < key >). < key > specifies the keywords to be matched by rdfs:label of the target object, < property > specifies the attributes of the target object to be returned. If the property is empty, the system returns

The user first wraps the query request in a SOAP message, and then submits the information to the HTTP server. The HTTP server parses the query request from the message and forwards it to the knowledge base server. The knowledge base server calls the parser and inference engine to search the information in T-Box and A-Box. The knowledge base server submits the query results to the HTTP server, and then the HTTP server packages the results into SOAP messages and sends them to users. At the same time of semantic query, the system submits keywords to Google search engine, and displays the results of semantic query and Google query simultaneously.

### 4.2. Data storage design

In this paper, the object-oriented technology based on relational database is used to construct the database system of service-oriented cultural tourism industry system. Therefore, two problems need to be solved. First, how to store large objects in relational databases; Second, solve the problem of how to store XML documents in relational database.

In this paper, the third way is to use BLOB type field to store large number of objects. BLOB is a data type used to store and retrieve complex object fields, which belongs to binary or serialized objects. the size of this type of field can reach more than 2GB, and the storage space can be dynamically adjusted with the different sizes of stored objects In this way, the file data management function can be realized based on the database system as the storage layer. By saving the whole file in a BLOB field of a database in the form of binary data stream, the file data can be completely managed through the database, and the problems of data integrity and security can be well solved [8].

XML documents can be divided into data-centered and document-centered categories according to their different composition contents. XML documents of different organization types are stored in different ways in the database. There are many ways to store XML data in SQLServer2005, including XML scattered in tables, large non-XML data types and native XML data types. If the data has a known architecture and is highly structured, then the data storage relational model is the most effective model. For data whose structure is semi-structured and unstructured or unknown, it is necessary to consider how to properly model such data. It's best to use a platform-independent model, which can ensure the portability of data marked with structure and semantics. Choosing XML is very suitable.

### 4.3. Network VR technology

Compared with ordinary graphics systems, the immersion and interactivity of network virtual reality (VR) system make it more advantageous in human-computer interaction:

(1)Vivid computer graphic image scene

On the basis of real world data modeling, virtual scenes use 3D graphics to represent the virtual world, which requires high drawing speed, fidelity and resolution. Because the optimized algorithm is adopted to obtain the smallest file capacity as possible, it can facilitate long-distance transmission on the Internet. The depth of this object and the observation parallax produce a real three-dimensional observation effect, thus achieving the immersive effect.

(2)Natural human-computer interaction mode

The world in 3D VR is dynamic and controllable. We can manipulate the objects in the virtual world in a natural way with the help of special external devices, and the virtual world can respond to this manipulation. Nowadays, the commonly used external control devices are mouse, touch screen, pressure sensitive pen and so on.

VR technology, with its characteristics of combination of virtual and real, real-time interaction and three-dimensional immersion, adds more possibilities to the digital protection and dissemination of

cultural heritage. Combining VR technology with cultural heritage protection will not harm cultural relics, but it can further assist in restoring and displaying "disappeared" cultural relics, and make cultural heritage glow with new vitality. The advantage of VR technology is to enhance images and project various images according to the needs of visitors. Therefore, the audience can break the space restrictions and use VR equipment to watch the collections in the museum more stereoscopically and intuitively. Visitors can use wearable devices (such as gloves, etc.) to make close contact with collectibles, interact with cultural relics and improve immersion. On this basis, we can draw more creative inspiration and apply it to the development of museum derivatives and cultural and creative products.

## 5. Conclusions

Zhaoqing has superior tourism resources and environmental conditions, giving full play to the advantages of location and cultural resources, speeding up the innovation of cultural tourism system and mechanism, digging deep into Zhaoqing's local cultural resources, injecting cultural soft power into Zhaoqing's tourism development, and promoting the transformation and upgrading of tourism cultural products. The development of cultural tourism industry system is of great significance to the development of regional tourism economy. The AI-based comprehensive tourism service platform combines the advantages that intelligent media can communicate across platforms and networks, and code and data can be reused, so that the platform can provide services for all local tourism-related industries and enable them to freely exchange information and resources. Owners and demanders of various tourism resources who log on to this service platform can conveniently interact and conclude transactions, improve the efficiency of economic operation of the whole industry, save the cost of various tourism-related enterprises, and better promote the economic development of regional tourism industry.

## Acknowledgements

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