

Proceedings of 2010 International Symposium on Tourism Resources and Management

Editor: *Joseph Kam Hung, ZHAO Ruimei, ZHANG Wei*

Conference Sponsor:

- Urban Development Research Institute, University of Jinan
- Institute for Tourism Studies
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PREFACE

“2010 International Conference on Tourism Resources and Management” was held in Macau on Feb. 5-6 2010 by Institute for Tourism Studies, University of Jinan (Shandong) and M&D Forum. More than 30 experts, professors and doctors respectively come from People’s University of China, China University of Geosciences, Hainan University, Heilongjiang Agriculture University, Shandong Polytechnic University, Jiangnan University of Wuhan, Nanjing Agriculture University, Shanghai Institute of Business, Hebei University of Engineering, Beijing Union University, Beijing Institute of Petrochemical Technology, Henan Polytechnic University, University of Jinan, Institute for Tourism Studies, University of South Carolina (USA) participated in the meeting. And, we have specially invited Mr. Grant Bowie, President of MGM Grand Paradise Limited to enter in.

Dr. HUANG Zhujun, president of Institute for Tourism Studies, and Prof. ZHANG Wei from University of Jinan delivered an opening speech at the meeting. The special report about “The Competitiveness of Destination and Sustainable Development” from GUO Guoqing, People’s University of China, was delivered during the meeting time. Prof. LIU Xiao from Beijing Institute of Petrochemical Technology made a speech in the title of “Evaluation Model of QEPP on Tourism Resources” is like a breath of fresh air. Prof. KONG Rui of China University of Geosciences gave a lecture on “Preview and Analysis of Inbound Tourism Demand in Beijing” that applied the principle of neural network does a significant meaning. The 3S Theory was used in the report which named “Travel Features of Tourism in China Urban Residents Under the System of Current Vacation” from Prof. NING Zequn of Beijing Union University. Mr. Grant Bowie, President of MGM Grand Paradise Limited delivered a speech on “Current development and future challenges in Macao’s tourism, hospitality and gaming industry”. Dr. Baudouin Neiryck, IFT, also introduced IFT’s approach in educating hospitality and MICE students. All the reports from experts, professors commanded a fine reputation.

This conference collected 89 high quality pieces of papers that covered the planning and management of Tourism Resources, the status and opportunities of tourism industry, conservation of natural and cultural heritage in China Mainland and Macau, as well as challenges in sustainable development of tourism industry. We finally accepted 68%, totally 58 pieces of papers to publish the proceedings to meet the demands of readers.

For your reviewing, we grouped these call of papers in six categories as follows:

1. Planning, Development and Use of Tourism Resources
2. Prediction and Analysis of Tourism Development and Requirement
3. Control Engineering Management of Tourism Enterprises
4. Research on Tourism Environmental Engineering Management
5. Predictive Analysis on Tourism Theme Establishment
6. Others about Tourism

The authors applied QEPP Evaluation Model, 3S Theory and Model, Theory of Circular Economy to do a deep research of the planning and management, comprehensive utilization of tourism resources. To forecast the development and demand of tourism in the method of system engineering theory and model, Probability and Mathematical Statistics, theory and model of neural network, Boston matrix, etc.. To investigate Inner-control and Management of Travel Enterprises by the theory and model of Value Engineering, QFD and TOC. Meanwhile, some of authors newly used physical and chemical method to discuss the environmental impact of Tourism Development.

This conference gained close attention in the academic field through workers' efforts of Institute for Tourism Studies, University of Jinan (Shandong) and M&D Forum. In the meantime, we are most grateful for the contributions of M&D members and working team in Melbourne and Beijing. This conference and the publication of the proceedings contain your labor of taking indefinite pains.

Finally, we sincerely hope that this publication can give all of you a hint of future and meet every reader's satisfaction.

Chief Editor

Joseph Kam Hung

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Feb. 2010

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Chapter One

Planning, Development and Use of Tourism Resources

The Construction of Virtual Tourism Simulation Platform

XIE Qiuju, LIU Guiyang

Information Technology Institute of Heilongjiang Bayi Agricultural University, China, 163319

xqj197610@163.com

Abstract: The application of the WebGIS and virtual reality technology in the tourism industry was introduced and the problems in the tourism information system were analyzed. A way of constructing tourism simulation platform based on the combination of WebGIS and virtual reality technology was provided using the example of Daqing scenic spot. It was verified that the design ideas, methods and technique of virtual tourism system that provided in this paper was feasible. A set of specific, feasible and practical virtual tourism simulation platform was built. The fine development prospects of virtual tourism based on WebGIS and virtual reality technology was showed.

Keywords: Virtual tourism, WebGIS, Virtual reality, Interactive control

1 Introduction

With the development of tourism, the publicity form of the tour attractions is improved constantly, the traditional tour attractions publicity is based on the form of two-dimensional graphic or image, this form gives a single description of the scenic spots. Yet the development of WebGIS and virtual reality technology gives a tremendous impact on the description method of the scene.

WebGIS is the GIS based on the Web, which releases spatial data through the Internet to provide users with the functions of spatial data browsing, query and analysis. The tourism geographic information system based on WebGIS can help tourism departments to manage efficiently, analyze and evaluate accurately on tourism resources. It supports the tourism department to establish a scientific and rational scheme of developing tourism resources, and to provide the tourist with the information querying services. At present, many geographic information systems based on WebGIS of attractions have been developed, such as, the System of Digital Wuyi in China. However, most of these systems like the System of Digital Wuyi are 2D description to the scene and can not generate the realistic 3D landscape.

Virtual reality technology has the features of immersion, interaction, imagination, etc. You can build a real-time, 3D virtual environments with these features, thus the user can enter the virtual environment to watch and manipulate the virtual world generated by computer, listen to the vivid sound, when he interacts with virtual environment as if does in a real world. The application of virtual reality technology in tourism industry mainly concentrated in the three-dimensional visualization of city landscape. University of California at Los Angeles achieved a virtual Los Angeles in 1994. In 1996 the United States Bnetiye company began to build a virtual model of Philadelphia^[1]. Many virtual models of monuments in the country also produced, and realized the virtual tourism. For example, Virtual Tour of Forbidden City, Virtual Tour of Huangshan, Virtual Tour of Taishan. But these tourism resources have been given above are build in the way of 360-degree panoramic images technology to express their 3D visualization^{[2][3][4]}, which are not the simulation to the real object and can not observe the object from any angle, so they can not be called the real "virtual".

There is not any a mature scheme for building virtual tour system, especially 3D visualization methods at present. Therefore, it is necessary to combine WebGIS with virtual reality technology to develop a virtual simulation platform for tourism according to the geographical characteristics of tourist areas for the purpose of rational use of resources, advocacy, development and planning of the tourist area. The platform uses 2D geographic data to generate 3D scenic spots, and provide users with dynamic scene through the Internet or other carrier, so that the tour enthusiasts will choose the tour route, speed and viewpoint based on their willingness. The platform will help them to query, browse and analyze the objects in the virtual environment, such as topography, resources, environment and so on. Managers of tour sites will analyze, track, plan and make decision according to the virtual tour situation.

2 Virtual Tour Simulation Platform Architecture

The goal of this paper is to build a tourism-oriented 3D visualization platform which provides geographic information query, simulates the tourist attractions with a full range of 3D way, realizes virtual tourism beyond time and space constraints and attracts more tourists. Overall, the construction of the virtual simulation platform is mainly divided into three parts: 3D modeling subsystem, 3D scene generation subsystem, interactive control subsystem. The function of 3D modeling sub-system in fact is a graphics editing systems, mainly edits on the accessed 2D data, and converses 2D object model into 3D object model. The function of 3D scene generation subsystem is responsible for rebuilding of spatial objects, management, visualization, property queries, 3D object editing, etc. The function of interactive control subsystem is to achieve the real time and interactive control, dynamic display, navigation, positioning and loading and so on in 3D scene.

2.1 3D modeling sub-system needs analysis

Objects in 2D plane are expressed by the form of (x, y) coordinates, objects in 3D scene are expressed by (x, y, z) coordinates, which compared with 2D data there is a z value. So to generate 3D model, 3D modeling subsystem will increase the appropriate z value to the data imported into system. 3D modeling sub-system need to have the following functions.

- (1) Data import. The system can import a variety of data formats, support for the popular data formats of GIS system.
- (2) 3D modeling. Generating 3D model of the object through editing 2D graphics data.
- (3) View operations. Zooming and panning graphic; modifying layer scale; coordinate translation and so on.

2.2 3D scene generation subsystem needs analysis

3D scene generation subsystem is responsible for importing 3D model into 3D scene, initializing 3D scene, generating and viewing 3D landscape, managing the whole scene and so on. 3D scene generation sub-system need to have the following functions:

- (1) 3D terrain reconstruction. To provide the functions of importing digital elevation model, rapid establishment of 3D terrain, and to support for importing into the data of remote sensing surface image to achieve a wide range of terrain reconstruction.
- (2) Creating and editing the landscape buildings. The buildings can be deleted and moved; its structure, shape, height and other parameters can be modified at any time.
- (3) Rapid integration of 3D objects space information and surface texture. Surface texture data can enhance detail description of the tourism landscape, so that it will be more vivid simulation of the tourist attractions.
- (4) 3D rendering. Real time shade transformation, color matching, light rotation.

2.3 3D scene interactive control subsystem needs analysis

The function of 3D scene interactive control subsystem is to realize the operations of objects in 3D scene such as real-time and interactive controlling, dynamic display and loading, etc.

- (1) Scene Navigation. Users can choose automatic navigation or manual browsing.
- (2) Interaction with objects in scene. Selecting any objects in the scene to observe at any angle, to change parameters and obtain different effects.

3 Design and Implementation Virtual Tour of Simulation Platform

This paper explained how to achieve a simulation platform of virtual tourism using Daqing Oil Field scene as an example. The simulation platform consists of three parts: 3D modeling subsystem, 3D scene

subsystems and 3D scene interactive control subsystem.

3D modeling subsystem imports data of Daqing scenic such as DME data, roads, rivers, lakes, forest and so on. These data will be processed according to their layers, set every layer coordinates, made coordinates of each layer the same and generated 3D model file. 3D scene generate subsystem reads 3D model file to generate 3D scene. Interactive control subsystem can realize navigation, locating and other interactive operations. The simulation platform of virtual tourism flowchart is shown in Figure 1.

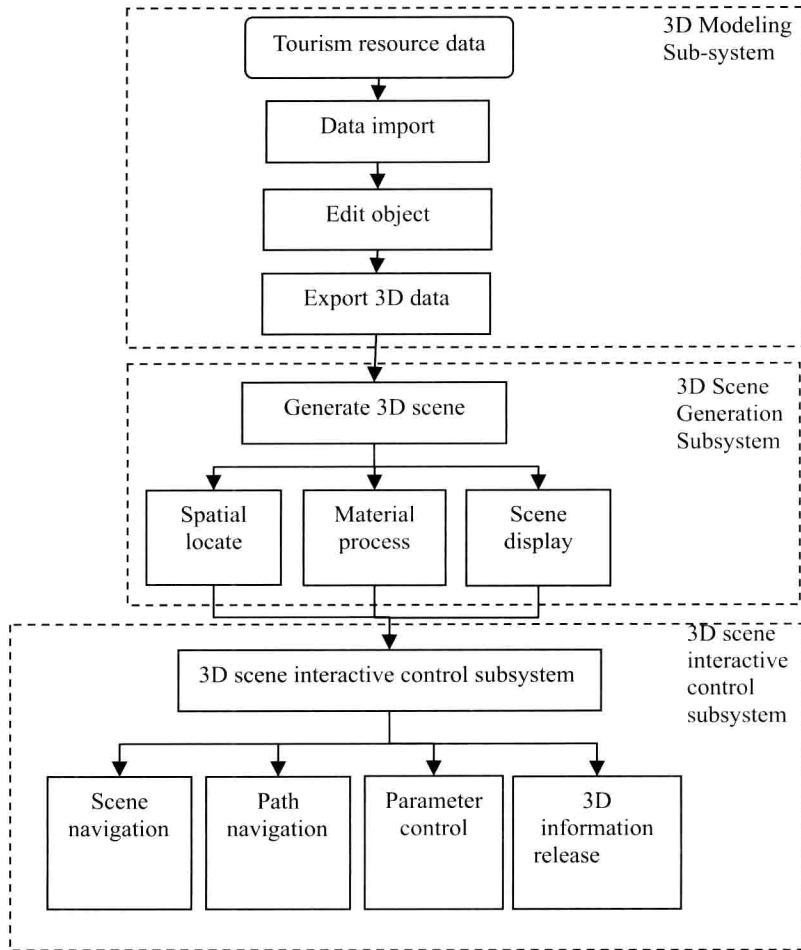


Figure 1 the Simulation Platform of Virtual Tourism Flowchart

3.1 The realization of 3D modeling subsystem

3D modeling subsystem is responsible for importing the basic data of Daqing scenic area into the system, change the 2D data into 3D model data through data reorganization. Daqing tour areas WebGIS interface configuration is shown in Figure 2.

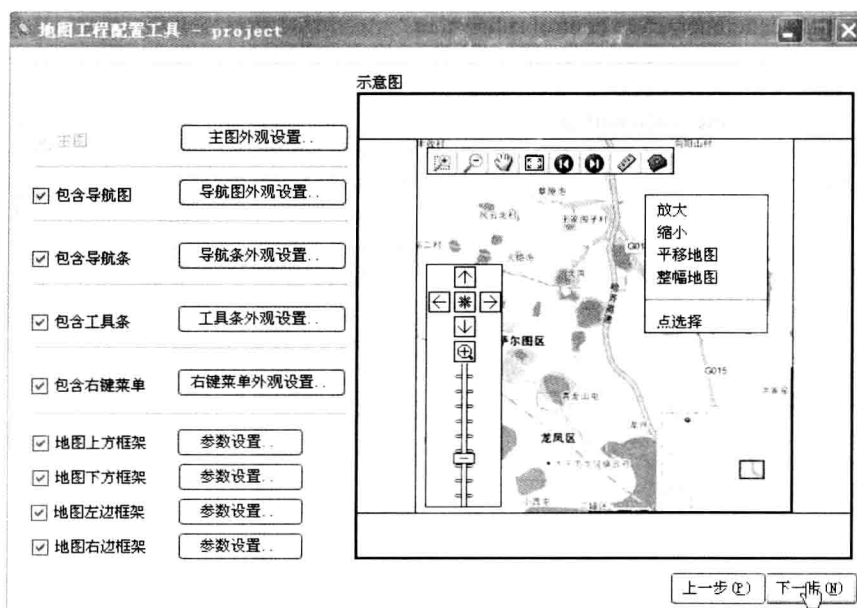


Figure 2 Daqing Tour Areas WebGIS Interface Configuration

- (1) Data import. Data of roads, rivers, lakes and forests are imported into the system. The system can import a variety types of data, such as the types of *. mxl, *. gml, *. Shp, *. tba, *. gz and so on.
- (2) Layer setting and management. Different types of data layers imported into system were assembled on a group; each layer will be unified management.
- (3) The characteristic properties of 3D model configuration. Among the imported data only terrain data have the 3D characteristics. Other data are simply have 2D data such as point, line or surface. It is necessary that these 2D data must be configured in order to generate 3D model in 3D scene.

3.2 The realization of three-dimensional scene is generated subsystem

3D scene generation sub-system using the data generated by 3D modeling subsystem to generate 3D scene model including topography, roads, scenic spots, water and other space objects to realize 3D visualization of Daqing scene.

(1) Terrain modeling

Terrain model is mainly expressed by the DEM data that consisted of regular grid or triangle TIN. Regular Grid model structure is suitable for the application of spatial analysis, but the sampling points distributed regularly, which results in a large amount of redundancy of DEM data, so the terrain distortion will be caused. TIN model can retain terrain features, which can prevent data losing as data simplified. So TIN model is more suitable for real-time terrain display than DEM data.

Using DEM data of Daqing scenic to generate 3D visual terrain, displaying scenic undulating terrain, as well as, the distribution of scene, lakes, mountains.

(2) Building Modeling

Building is an important part of the landscape, especially in the city landscape and cultural landscape. The building model data is geometry data of building model. The building data such as height, housing vertex coordinates are obtained by space measuring or the aerial mapping extracting^[5]. There are two ways to build tourism resources into buildings in 3D visualization system. One is automatically generate 3D building models based on 2D contours of buildings and building height, this method is more suitable for regular shape buildings; The second way is building special modeling through professional modeling software, and then the system will import the 3D into scene, this method is suitable for dealing with