Research on Digital Campus Landscape Modeling of East China Jiaotong University*

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Abstract. In this paper we chose East China Jiaotong University as a case to study the digital campus 3D landscape modeling technology. Using the GIS and virtual reality technology and the Google SketchUp, we build 3D digital campus landscape model and design attributes database. This study laid the foundation for further research of the East Jiaotong University digital campus.

Keywords: Digital campus, 3D modeling, Google SketchUp.

1 Introduction

Virtual reality is a new developed field of computer technology, with integrated computer graphics technology, multimedia technology, sensor technology, human-computer interaction technology, network technology, stereo vision technology, simulation technology and other technologies [1-3]. Digital Campus is an important application of virtual reality technology to enable the school's topography and the real landscape reproduced in the computer. Digital Campus can build a vivid real campus environment to provide real intuitive experience to the users [4-5]. Integrated with the attributes database, the system can satisfy real-time interactive queries for a variety of related information. So for the users who want to know the campus environment or to plot the campus planning, this is more convenient and intuitive.

East China Jiaotong University covers an area of nearly 3,000 acres and construction area is about 70 million square meters. As one of "The national sector afforestation 300 good units", the university lies near the great river and fills with hills and lake in the yard. Yet the construction of digital campus has not undertaken. In the geomatics undergraduate practical teaching project we completed the main building landscape modeling and attributes database design for the Southern District of the campus. This has laid a foundation for the future work.

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2 Data Preparation

We apply the Google SketchUp software to build 3D models. For attribute data table, we chose the Microsoft Office Access. The interactive query application program is designed under SkyLine Series software. In the process, the data related includes:

- Geomorphological data: precision DEM of the campus from photogrammetry course, as the basis of terrain
- The primary building data: building data from digital mapping course, to model the campus building and major roads, as well as the relevant information: number of floors, story height, the appearance texture images, road type…
- Other surface features data: vegetation types, street lightings, signage and other related surface features’ shape information
- Attribute data: all related attribute data information, in order to design and build the property database

3 Construction of 3d Model

By analyzing the data, the DEM data of the campus shows the area covers only near Maan mountain with low accuracy. So in this stage we conduct modeling without any terrain information, only build a three-dimensional landscape models.

Digital Mapping teaching focused on the Southern District of campus, we generate the map of the primary buildings and roads in CAD.

For teaching buildings, office buildings, dormitories and faculty apartments, they have simple structure and regular shape. So the modeling of these buildings, we import CAD data directly into Google SketchUp using polygonal modeling techniques to finish three-dimensional model. We add photos to the buildings as their texture to make it more real in appearance.

For those buildings have more complex structure, such as libraries, cafeterias and some office buildings, we divide the building into many simple blocks. We work on...