

MULTIMEDIA TRAINING SOFTWARE OF DIGITAL PHOTOGRAMMETRY SYSTEM (VIRTUOZO NT)

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ABSTRACT

Design the multimedia training software of the digital photogrammetry system (Virtuozo NT) after studying the system. This paper introduced the structure of the training software, how to operate the training software, how to implement the functions of the training software and how to produce the material of the training software, such as video, audio and animation. Especially, it described some skills in using the software Authorware. Then combine the training software with the digital photogrammetry system to make it into a multimedia assistant system of the digital photogrammetry system. This training software has much room to improve in the field of real-time operation.

1. INTRODUCTION

1.1 The Digital Photogrammetry System Vituozo NT

Digital photogrammetry workstation (DPW) or digital photogrammetry system (DPS) is more popular in practical photogrammetry production. Virtuozo NT is one of them. It is a full digital photogrammetry system, which is developed based on the research project of full digital auto-mapping system, proposed by professor Wang Zhi-zhuo (Wuhan Technical University Of Surveying and Mapping, China) in 1978. The workstation version of Virtuozo NT based on the platform of UNIX was born in Sep. 1994. The microcomputer version of Virtuozo NT 2.0 based on the platform of WIN95/NT produced by the Supresoft Company appeared in Apr. 1998, in China. Now the version of Virtuozo NT 4.0 has been presented.

1.2 Advantages of the Multimedia Training Software

The digital photogrammetry system has been better and better. Users should be trained technically in order to operate this system conveniently and exactly. It would cost much manpower and money. But if there is a suit of multimedia training software for this system something will be changed. The multimedia training software has such advantages.

Firstly, it can leave out the repeated manual training. When a new user comes to use the digital photogrammetry system, he can learn from the multimedia training software and be acquainted with it himself.

Secondly, being a suit of multimedia training software, it is distinguished from common helping system and descriptive manual. Commonly, helping and descriptive manual consist of texts and pictures. During the processing of introducing the steps of operation and the workflows, those methods have some shortcoming. For example, if the length of the explanation is too long, reading will be inconvenient, and the user is easy to feel tired. But the multimedia training software is different from them. It contains various expression way, such as texts, images,

audios, animations, videos. Abundant carriers can make explanation sufficient and make it easy to understand for users. Now there are many kinds of training software in market, but there is little training software for the special platform such as the full digital photogrammetry system.

2. THE DESIGN OF THE MULTIMEDIA TRAINING SOFTWARE

2.1 The Structure of the Multimedia Training Software

The structure of the multimedia training software is relative to the system, for this software is designed for Virtuozo NT especially. The training software is organized by connecting the menu of the Virtuozo NT system with the working flow of the system. It teaches users to operate the system steps by steps. The figure 1 is the mainframe of the software.

The software is divided into two parts, the system introduction and how to operate the system. In the module of system introduction it presents the background knowledge of Virtuozo NT and how to set up it. In the other module, it recommends the typical working flow, then chooses an example and explains the running of the system according to the working flow. Such contents are included as opening blocks and models, setting parameter files, triangulation, processing the single model, product, viewing results. When the running of the example finished, users will be acquainted with the operation of the system.

2.2 How to Operate the Training Software

The multimedia training software has friendly interface and can be operated easily. In the main interface, the user chooses one button, then he can enter the chapter he wants to learn. In every chapter, it has a pause/continue button, which controls the playing of the content to pause or continue, it has a button for next and a button for previous, which is used for adjusting the content at close range, it has a button for navigation, which is used for realizing the jumping between the chapters or in the

chapters, and it also has a button for quit, which is used for stopping the study.

The space of the whole page of the training software is as figure 2.

2.3 Function Realization

The main developing tool of the training software is Authorware, which is a suit of multimedia editing software developed by Macromedia Company. Authorware uses a kind of developing flow based on icons. It can get a playing sequence by arranging the display icons, motion icons, erase icons, sound icons, and video icons, according to the need of introduction. Adding framework icons, map icons, interaction icons, navigation icons, calculation icons, it can establish kinds of man-machine interaction.

The menu in the training software is created by interaction icons, navigation icons and calculation icons. Interaction icons can set hot area response, button response, etc. It can implement interaction by setting a serial of interaction branches, setting different interaction types for the branches, and adding corresponding interaction results. For example, the menu in the training software used hot area response, but at the same area, it sets two hot area responses which have different response type. One responds when the cursor is in the area, which realizes the menu's change as soon as when the cursor in the area. The other responds when the mouse clicks in the area.

Jumping next and jumping previous in the training software are realized by framework icons. In the framework icon many icons are made into a group. Each group is one page in the framework. Then it can realize the jumping between the pages by navigation icons. How to make groups is depended on the content of the icons. Generally the icons describing the same subject is made into a group as one page. But if the icons about the same subject are too many, those icons can be divided into more than one group. Anyway the containment of the page cannot be too much, in order to avoid jumping over too many contents one time, which will be inconvenient to users.

The pause/continue buttons in the training software are controlled by calculation icons. Sometimes waiting icons are used. The software controls the working flow by controlling the sound. Since there are two kinds of sound, MIDI and WAVE, the corresponding controlling functions are different. Authorware has no functions to control the MIDI files itself. But the Macromedia Company has provided the outer functions library A3wmm.u32. Loading this functions library before using, then the functions such as MIDIPlay(), MIDIPause(), MIDIStop() can be used to control the MIDI sound. For WAVE sound, the functions MediaPlay(), MediaPause() can be used directly. At the mean time, these functions can control the video. The figure 3 is one page during the running of training system. It is at pausing state and the user will use the navigation menu to realize jumping.

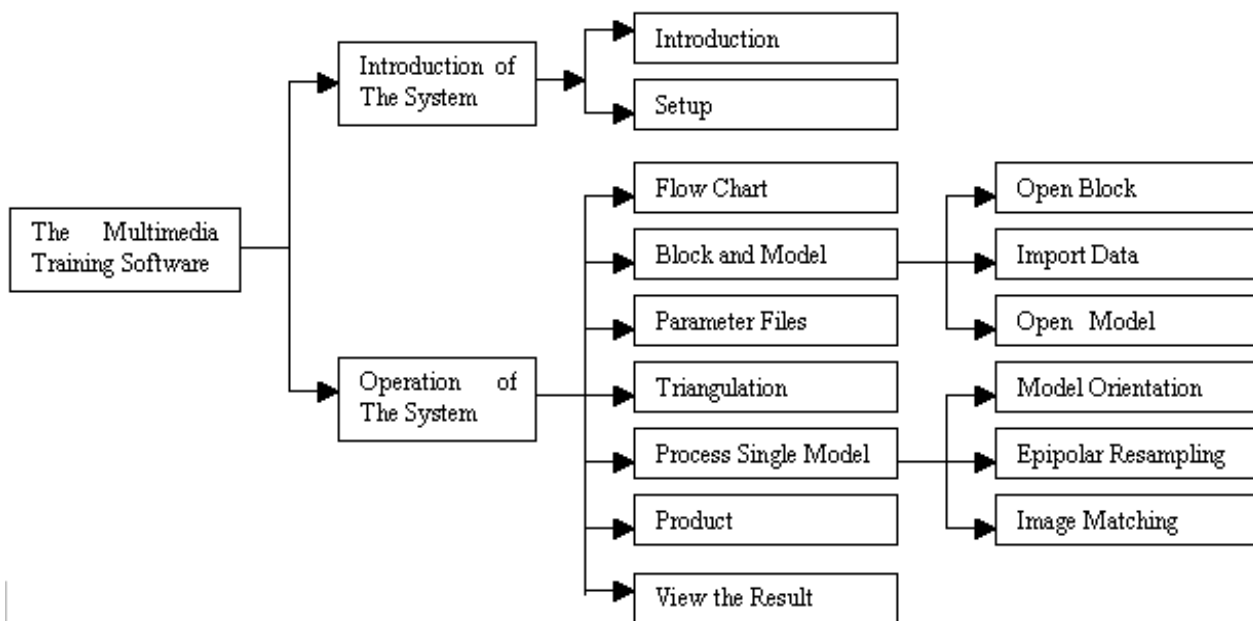


Figure 1. The Mainframe of the Training Software

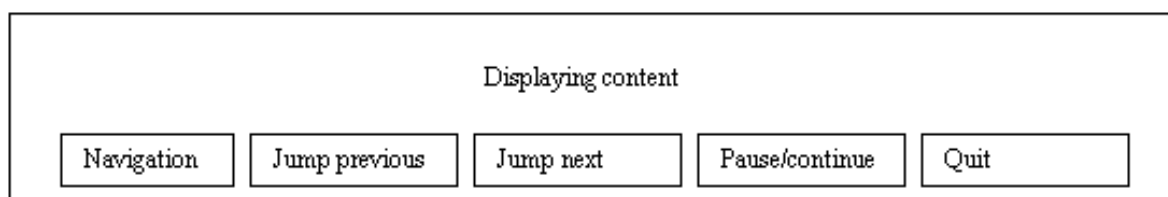


Figure 2. The Space of the page

2.4 Production of the Training Software Materials

Main materials of the training software include:

Texts: There are lots of explanatory texts in the multimedia training software. Some of them are introductions of the concepts and some are descriptions of the operation processes. These texts must be concise and lucid. The font, size, color and background should be properly arranged.

Images: It is impossible to fully illustrate the operation processes without images. These images are snapped from the system execution progress and reproduce the execution progress in the multimedia assistance.

Audio: The training software provides audio narration along with the texts. There is also background music to offer the user a better study circumstance. The playing of narration and background music can be controlled separately. The user can select to shut down the background music and pause or resume the narration. The background music is MIDI format and controlled through MIDI functions. The production and playback of the WAV format narrative audio is relatively simple.

Animations: The training software contains not only static images and texts, but also a great deal of animations. Some of these animations are combined with the narration so as to remind the trainee for attention. Through the applying of different display modes and erasure modes, some of the animations are used to represent the change of scene and to enhance visual effect. The animations could be implemented through using the motion icons or setting the text and image display modes in Authorware. In addition, GIF animation and FLASH are imported in certain circumstances. The animation makes the training software more lively and comfortable for the user.

Video: Videos are employed when introducing the sophisticated operation process such as matching edit process. The videos are produced either by filming the process demonstration with a digital camera or by using proper software to snap the operation processes in computer. Specific videos, along with narration, can be enough to explain the intended content.

2.5 Multimedia Assistance System

Although the multimedia training software of the Full Digital Photogrammetry System can teach the users to operate the system in a visualized and lively manner, the software is independent from the digital photogrammetry system. A better way is to combine the two, which means doing some proper improvement on the training software and embedding the software into the full digital photogrammetry system. The training software of the full digital photogrammetry system then becomes a assistant system which not only has the functions of the former text help system but also takes a multimedia format with images, audios, videos and so on. Thus, the user can enter the corresponding assistant course by click help when operating the full digital photogrammetry system. Such multimedia assistant system has been implemented on a system similar to the full digital photogrammetry system by experimentation. Two methods have been examined for the improvement of the multimedia training software in the experimentation: integral transplant and segment transplant.

2.5.1 The Integral Transplant

As for the integral transplant, there is no need for much modification of the multimedia training software. Just pack the whole software into an executable file and the build a new member in the help menu of the system to invoke the executable file. In this method, the usage of assistance in the system has little difference with the usage of the original training software.

2.5.2 The Segment Transplant

The segment transplant needs to split the original training software and pack every chapter into separate executable files, then build corresponding members in the menus of the system to invoke each file. Thus the user can get the needed training content simply by click the respective menu member. This is much more convenient than the system using integral transplant. Since the organization of the training software corresponds with the menu structure of the original system, shortcuts of the assistant system can be build in the original system menu for the user's convenience.

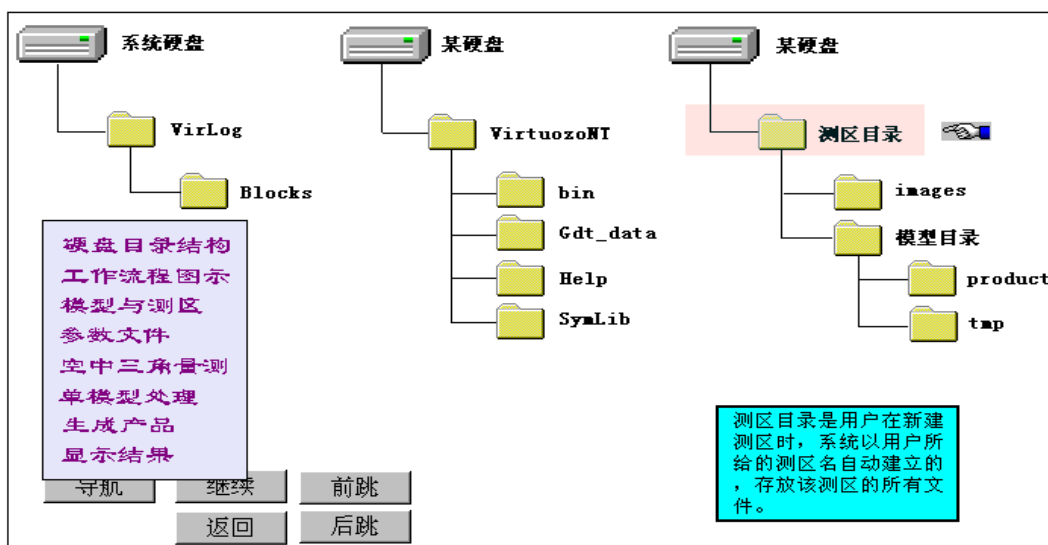


Figure 3. One Page in Running

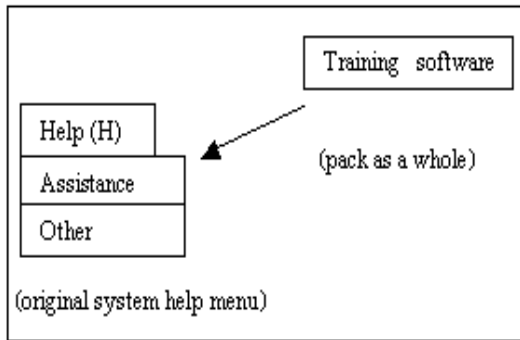


Figure 4. The Integral Transplant

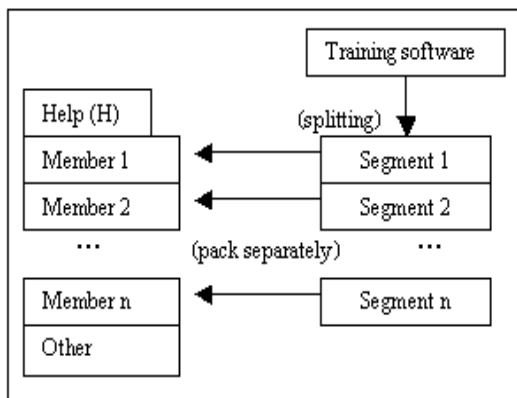


Figure 5. The Segment Transplant

3. CONCLUSIONS

The training software of the full digital photogrammetry system was first developed as an independent system. Then it was improved and embedded into the digital photogrammetry system and became a multimedia assistant system which stands the test of practice. It provides the user with lively and effective assistance in the forms of text, image, audio, video and so on. On the other hand, there still is room for its improvements such as add a real-time audio and video network assistance which allows the user to get help technical support through network. Further experimentation and practice are under way.

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