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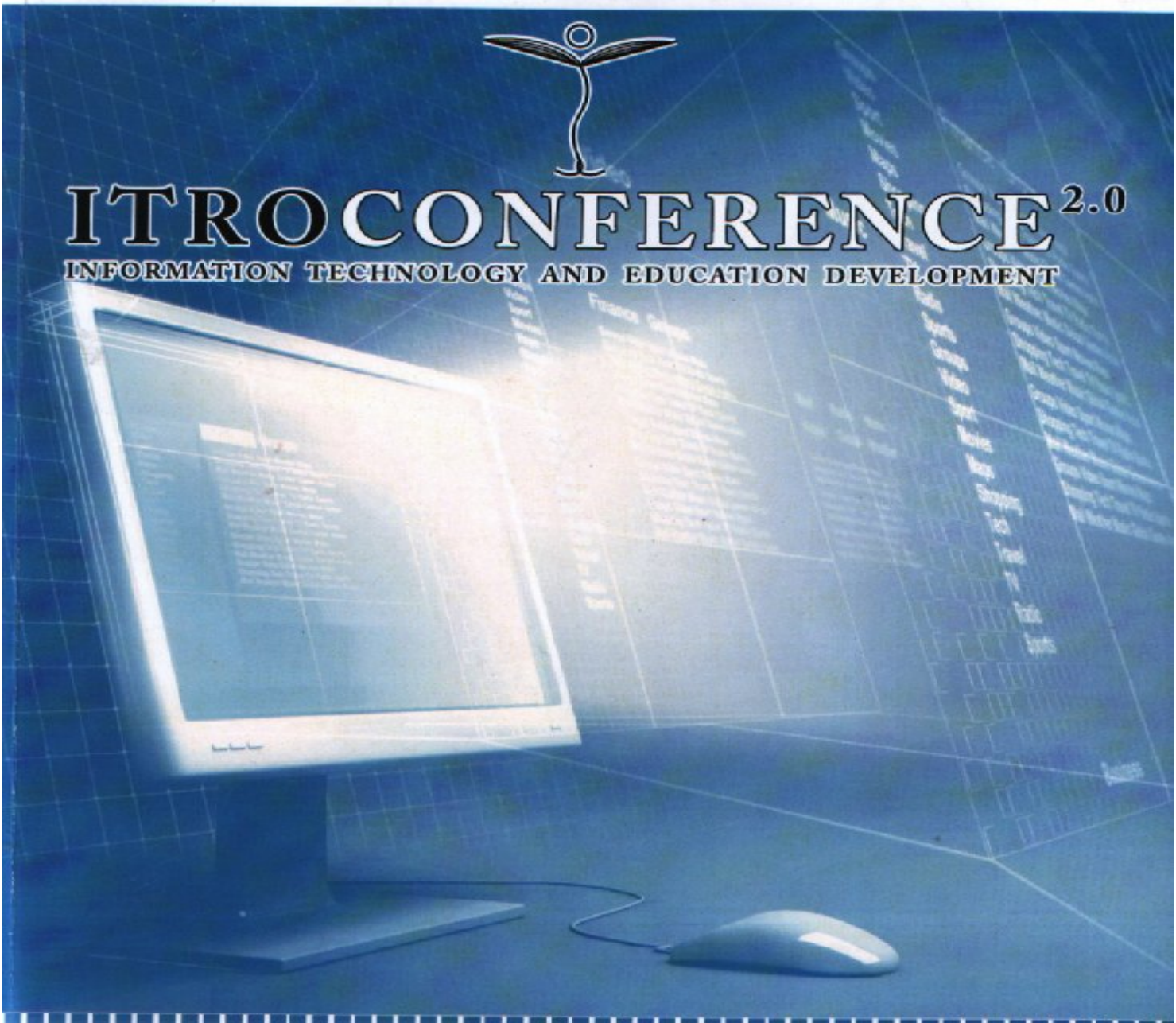
"MIHAJLO PUPIN"
ZRENJANIN
UNIVERSITY OF NOVI SAD

ITROCONFERENCE 2.0

INFORMATION TECHNOLOGY AND EDUCATION DEVELOPMENT



ZRENJANIN, June 2012

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ASSEMBLING INTERACTIVE PANORAMA PICTURES FOR EDUCATIONAL PURPOSES INSTEAD OF STATIC PICTURES

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Abstract - The need for interactive educational materials impacts strongly and changes many parts of the entire educational process. The traditional way of presenting static pictures (individually or embedded in presentations) will develop to multimedia and interactive clips. This paper presents a method of assembling interactive panorama pictures from static pictures. It discusses many aspects from photography techniques, through software support, to the possibility of implementing these panorama pictures into education.

I. INTRODUCTION

The demonstration of pictures is present in education from the beginning. This method has become more intensively used since the influence of John Amos Comenius. During visual presentations, from all the senses, sight makes 83% of the information's impact on the brain. The sense of taste makes 1%, hearing 11%, smelling 3% and touch 2% (Pease B., Pease A., 2004).

Demonstration of pictures in education was facilitated by widespread use of printers and overhead projectors. With these tools teachers achieved low-cost interactivity in classroom. By the end of 20th century, multimedia projectors, document cameras and interactive whiteboards replaced overhead projectors.

Presentations of the new century were created in software tools like PowerPoint. This software allows using animated and interactive presentations, but most of the applied pictures are static. There are more opportunities in the implementation of multimedia in education to achieved multi-sensory influences, while the Internet, mobile technologies and cable TV raised a demand for interactivity among children. Panorama pictures are more effective in education than traditional pictures because they are interactive. On panorama pictures, students can look around, move and enlarge it.

II. TAKING PICTURES

Panorama pictures are created from a series of separate static pictures. These pictures can be taken with an ordinary digital or analogue camera, without special equipment. However, it is recommended to use a tripod because it results in input images, which can be transformed to panorama more easily than freehand photos. Furthermore, the angles are also marked on tripod, so the rotation of the camera will be more accurate. The tripod is especially important in creating multi-row panoramas.

Software for creating panorama pictures aligns the photos the way that they have to overlap. Software usually arranges the input pictures alphabetically or numerically in ascending order. In this case, it is advisable the input pictures to be taken clockwise. This can save time because the series should not be reordered.

For achieving the best results, overlapping should be approximately 30 percent. It might be helpful to memorise one object in the right third during taking the first picture. In the following picture, that object should appear in the left third. The number of pictures to be taken is determined by the range of objects, the lens, the percentage of overlapping and the angle of view. The average number of pictures for one panorama is from 9 to 11 photos.

Moving objects make a problem for panoramas because on images taken at different times, they will appear at different locations of the scene. It is always best to wait until no person or no car moves anymore before the shooting is started (Huellmandel T., 2012).

The picture quality and its resolution define the time of downloading panoramas and their zoom level. Using 1024*768 resolution photos will result in an appropriate combination of quality and

download speed (11 * 140 kb = 1540 kb).

III. IMAGE-STITCHING SOFTWARE

Using image-stitching software is an inexpensive way of creating interactive panorama pictures from separate static pictures. This method eliminates the need for expensive equipment, such as panoramic cameras or mirror lenses.

The most important characteristics of image-stitching software are: type of licence (price), quality of picture-editing tool, quality of aligning panoramas, and panorama output file types.

After trying several trial versions of stitching software (ArcSoft Panorama Maker 5, Hugin 2011.4.0, 360 Panorama Professional, PanoramaStudio) we decided to use PanoramaStudio 2.3.0 Pro. Although the full version of the software costs €69.90, this software has all tools for creating and publishing impressive panoramas.

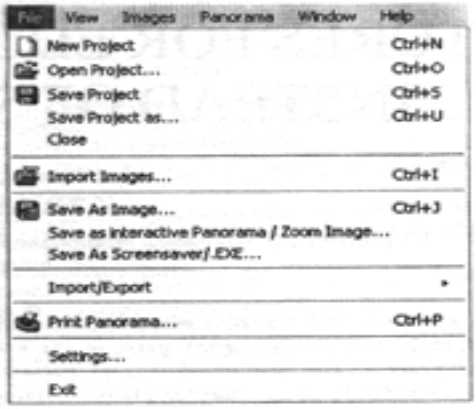
IV. ASSEMBLING PANORAMA PICTURE IN PANORAMASTUDIO

After starting PanoramaStudio, we can select the type of panorama: single-row or multi-row panorama, or opening an older project.

Picture 1. Auto run menu after starting program or creating new project

A. *Importing and editing pictures*

First of all, photos should be imported using the File menu or with the shortcut CTR+I. Through the File menu, the finished panorama project can be saved in a file with the extension *.pap, or another project can be opened.



Picture 2. File menu

After importing separate static pictures, they can be edited from local pictures menu (rotate, crop, mask etc.). The pictures can be moved with "drag and drop" method.

Before creating the panorama view, there are several options that should be set. The first task is to set the horizon on the photos (the line where the ground and sky hit at an even level). It can be determined pressing the Parameters button, through Set focal length and horizon panel. It can be set by dragging the red line on photos or by typing the value of the percentage of ground on photos.

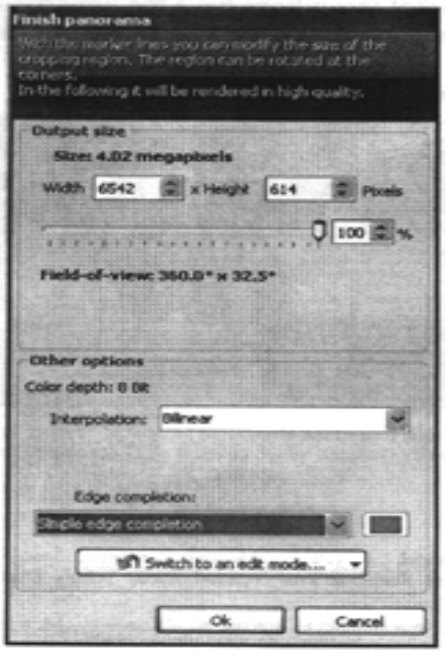
Picture 3. Setting up the horizon

The panorama is created by the Align function of the Toolbar. The drop down menu contains two functions: 1. Align (partial) panorama F3 2. Align a 360-degree panorama F4. A full, 360-degree panorama is more effective than a partial panorama, because full rotation is possible there, while in the first case it can be achieved only partially.

After selecting the suitable function, the software starts to process, blurs and blends the imported photos into one related photo.

B. *Rendering the panorama*

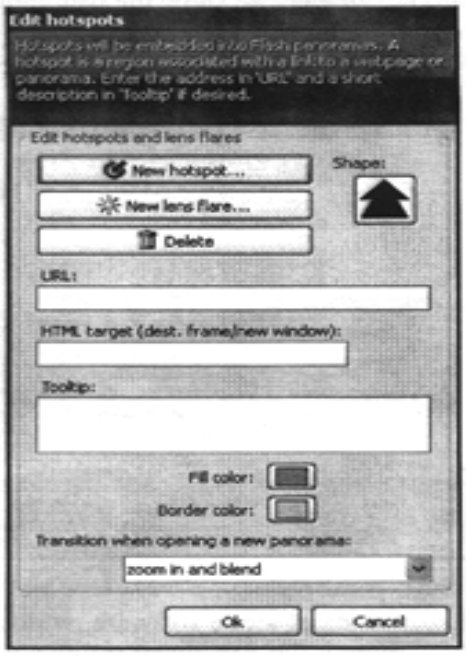
The Render function is the last function of the panorama picture assembling process. Here we can modify the size of the panorama through dragging the marker (red) line or typing values into the right field.



Picture 4. Render panel

C. *Additional options*

Addition options can be added to panorama pictures using Hotspots function. First of all we should select the shapes of hotspots (in most of the cases we used shapes), then set the URL address. In the Tool tip field we can enter the name of the related object (hyperlink). In the bottom of this window, we can select the fill colour and the border colour of the selected shape. Using this function, we can connect panorama pictures, achieving a virtual tour of a territory or building. In other cases, hotspots can be used for external links, connecting parts of our panorama with websites where we can provide additional information about the linked area (for example: Wikipedia). PanoramaStudio embeds hotspots into interactive panorama pictures, on mouse over action will show the tool tip and on mouse clicking will open the corresponding website or panorama.



Picture 5. Hotspots panel

Lens flare is a visual effect on panoramas, which appears just in PanoramaStudio viewer or in exported versions.

D. *Saving or exporting the panoramas*

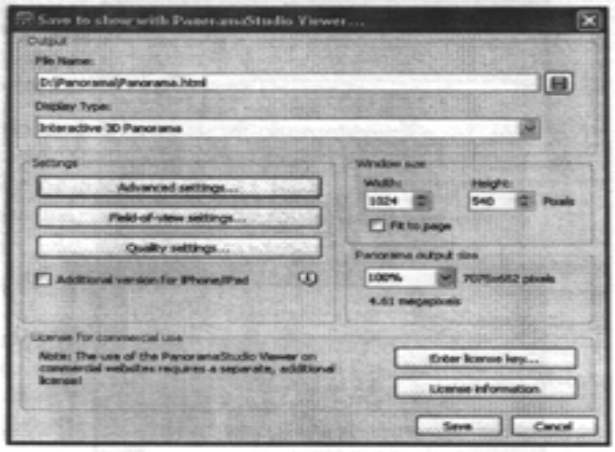
At the end of the process, panorama pictures should be saved. There are more options for saving, which depend on the usability of these interactive pictures.

Our work can be saved in a static-picture format though File menu with selecting Save as Image. We can choose from JPG, TIFF, BMP, PSD, PSB, PNG, TGA, PCX, and RAS extensions. For different file types there are option buttons to specify the compression, the image quality and the size of files.

The most powerful saving option is when our panorama picture is saved as an Interactive panorama / Zoom image. In this case PanoramaStudio creates a panorama, where viewers can scroll and enlarge the image of the specified location (File Name field).

The result of that saving will be an embedded panorama in html file, which can be displayed on local computer or can be uploaded to the Internet. The saved contents contain the photos of the panorama, the html file and the PanoramaStudio Viewer in popular Flash format. The

PanoramaStudio Viewer can show the panorama in 3D (the viewer is in the centre of the screen and can look around using mouse dragging or buttons) and 2D (flat enlargeable image).



Picture 6. Save to show with PanoramaStudio Viewer window

The Viewer is stand-alone software, which can be configured though the Advanced settings menu, where we can type the title, insert our logo, background music or sound, and configure the position and the skin of menu buttons.

V. POSSIBILITIES OF IMPLEMENTING INTERACTIVE PANORAMA PICTURES INTO THE EDUCATIONAL PROCESS

We can use interactive panorama pictures instead of static ones in the entire educational process. Students can create panorama pictures from pictures taken during trips. Through assembling panoramas, students develop their IT skills: take pictures, copy them, use panorama-creating software, import, edit, align, save, export and upload them to a web server. These skills are important in everyday life and in the IT sector as well.

Teachers can effectively motivate students with panorama pictures, can create or use some prepared panoramas from the Internet, such as Google Street View (http://maps.google.com/help/maps/streetview) or Treasures of Szeklerland (http://virtualisszekelyfold.ro/index_en.html).

Interactive educational material like panorama pictures can be presented most efficiently on interactive whiteboards.

Educational institutions have the opportunity to present their building and equipment though connected panorama pictures, developed into virtual tours.

Picture 7. Virtual tour of the Hungarian Language Teacher Training Faculty created by students, which consists of 37 connected panorama pictures

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