

Digital 3D Postcards of Heritage Sites in Bosnia and Herzegovina

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ABSTRACT

Computer graphics techniques and methods for presenting virtual reality are increasingly being used for inventing new concepts in presenting cultural heritage objects and interesting sites. Bosnia and Herzegovina is very rich in cultural heritage sites. In this paper we will present the basic concepts of creating digital 3D postcards and show five examples of Bosnian cultural heritage sites used for demonstrating the applicability of such 3D postcards.

Keywords: Virtual reality, cultural heritage, 3D postcards.

1 INTRODUCTION

Every one of us has at one time received a postcard from someone they knew, someone they loved. All these cards are personal but also contain general information about the site represented on the card. 3D postcards already exist, for example in the form of an auto stereoscopic image. One can buy them in any post office. Our idea is a little bit different and based on VRML. The idea is to create virtual models of interesting sites and hide a greeting message within this site. Receipt of the “postcard” is achieved by the user receiving a link to the set of files containing his/her 3D postcard and instructions how to browse it. In this paper, we will explain the general idea of 3D postcards as well as the process of creating them.

The rest of the paper is organized as follows. In Section 2 we review the basic concepts of 3D postcards. In Section 3 we explain how they are implemented, including which tools we have used. Section 4 shows some examples we have created. Section 5 explains the advantages and constraints we have encountered in this work. Finally, in Section 6, we point out in which direction we plan to go concerning our future work.

2 BASIC CONCEPTS

3D postcards, as we said, already exist, but digital 3D postcards, are different. The idea in this paper is to create a virtual model of historical sites in Sarajevo and hide the link to HTML file containing the greeting message somewhere inside. The models, used here as examples, were created in 3ds max or Maya and then exported to VRML.

We divided 3D postcards in two groups: personal and general. Personal cards have a “present” hidden somewhere in the virtual environment. To enable the viewer to find the present, we created blinking arrows to indicate the direction to go, Figure 1.

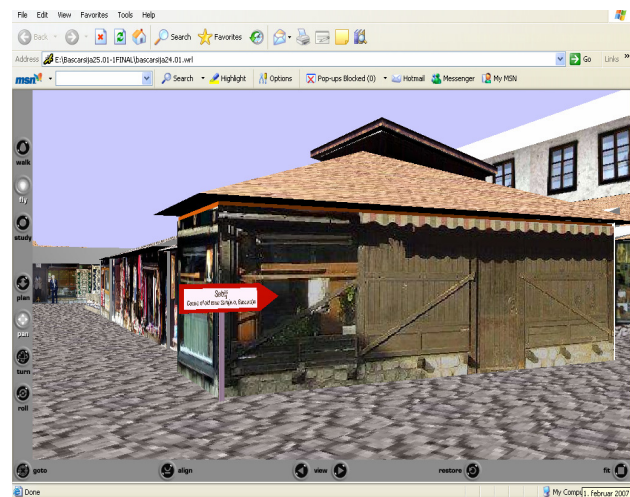


Figure1. Bascarsija, old part of town. Arrow indicates in which direction to go.

General postcards have a greeting linked to the most important object in that scene, such as the old Jewish book of rites, Figure 2.

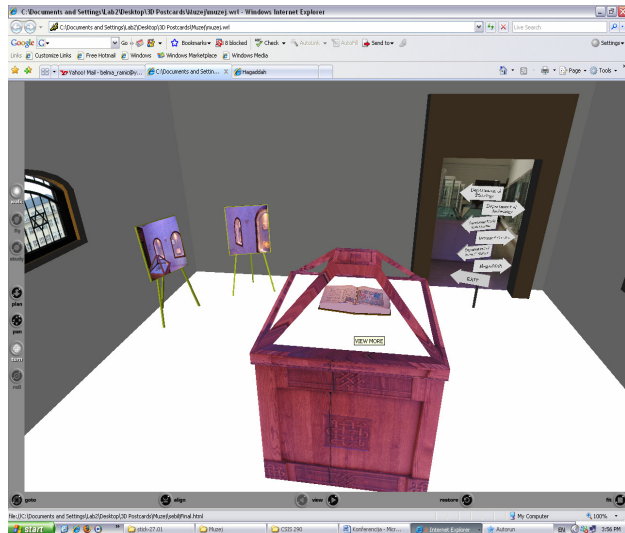


Figure 2. Room in National Museum of Bosnia and Herzegovina where Haggadah is held.

3 IMPLEMENTATION

The models that we will be using here were created either in 3ds max or Maya, using polygonal modeling techniques, see Figure 3.

Before we started modelling, we visited the sites, took detailed photographs, measured the objects and later on validated the created models. Each one of them was modeled using basic geometry (standard primitives) and compound objects – cubes and Boolean operation. [6]

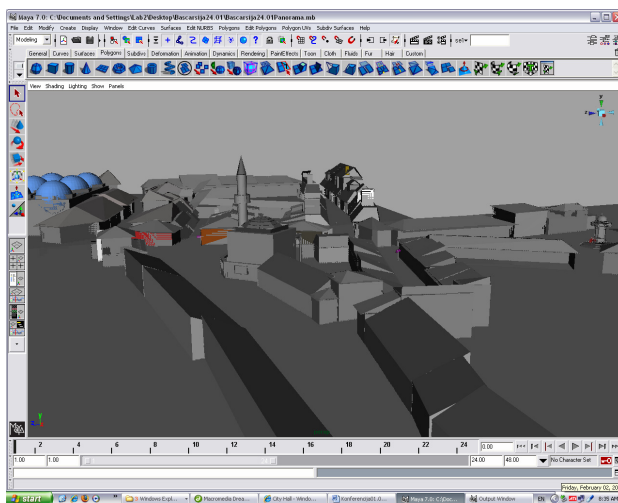


Figure 3. Objects created in Maya using basic geometry.

Textures we used for object mapping, were created using photographs. Since we choose to model highly visited sites, taken photographs had to be edited in Photoshop in order to remove unnecessary details, such as shadows and people, from images.

We also had some objects laser scanned, optimized and then added to the scenes. Again, the procedure was the same. Laser scanners provide a method of capturing accurate information about object's surfaces [1, 2]. In our work we used Minolta 910 laser scanner, as shown in Figure 4.



Figure 4. Minolta 910 laser scanner is a scanner for close range and indoor applications and has an accuracy of less than a millimetre [4].

All the information about important objects used here, were gathered from many different sources and then presented on the card. When the models were completed and validated, all the objects were exported to VRML, as shown in figures 1 and 2.

VRML browser used in this research is Cortona. It can be easily downloaded from Internet since its size is no more than 1,58MB. Cortona works perfectly fine under Windows, as a plug-in for either Internet Explorer or Mozilla Firefox. Speed is not dependent on the size of the model at all. Size of the VRML file received by receipt differs from scene to scene, from 2,71MB for Bascarsija till 50MB for National Museum.

To further enhance the atmosphere of the card, and provide more than a standard 3D postcard, we introduced traditional music appropriate to the site and the greeting.

4 EXAMPLES

Five historical sites of Sarajevo were used as example 3D postcards. The sites modeled are: Bascarsija (the old part of Sarajevo), National Museum of Sarajevo, Sarajevo Haggadah, Sarajevo City Hall and Bosnian gravestones, or stećak. The model of Bascarsija is used for presenting the personal type of postcards and the others are used for the general type of postcards.

4.1 BASCARSIIJA

Bascarsija is the heart of Sarajevo old town. Sebilj (Fountain) was built in the centre of Bascarsija square in the 19th century and is one of the symbols of Sarajevo. There is an interesting legend associated with the Sebilj fountain in Sarajevo. It is said that once you drink its water, you can never leave Bosnia for too long.

In the model of Bascarsija we created the arrows to indicate in which direction the viewer should look for his/her present in this personal type of digital 3D postcards. Arrows were modelled in Maya using polygonal cubes for each scene individually. On inner part of the arrow we added image texture indicating the name of the place where present is hidden.

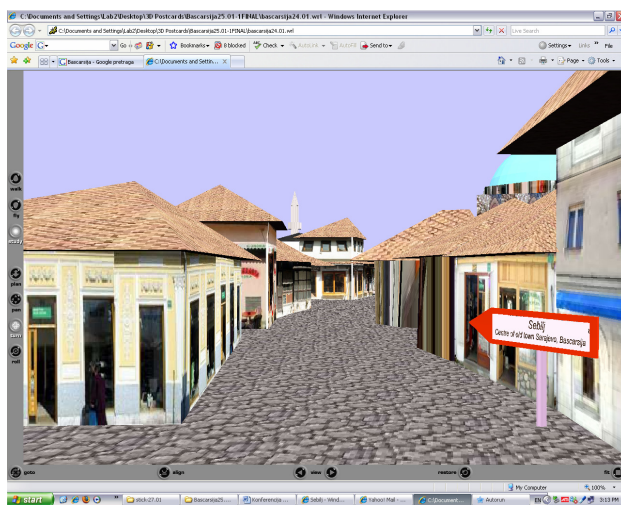


Figure5. Bascarsija, old part of town. Arrow indicates in which direction to go.

In VRML we applied a colorInterpolator node on the arrows to make them instantly perceivable to viewer. The Color Interpolator node takes a list of RGB values in the field keyValue and can continually loop between the colors.

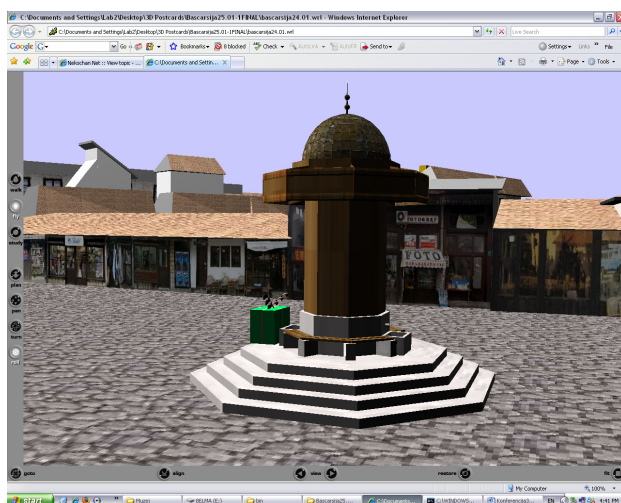


Figure6. Anchor node created on present in front of Sebilj

We also created an anchor node on the present object, Figure 6. The Anchor group node in VRML retrieves the content of a URL when the user activates (e.g. clicks) some geometry contained within the Anchor node's children. In our example, a new HTML page with a greeting message will be opened with traditional Bosnian music playing in the background.

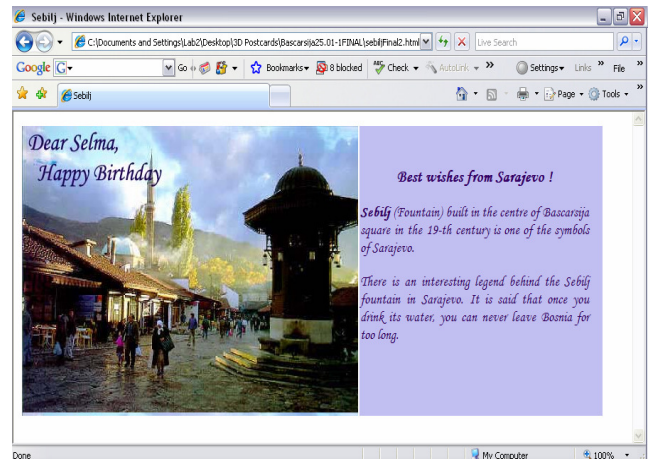


Figure7. Personal greeting card opened as web page [9].

Image with a greeting message was created using Adobe PhotoShop software and then, together with additional information about the site combined into HTML page using Dreamweaver 8 software.

4.2 HAGGADAH

HAGGADAH is the Jewish book of rites, a collection of biblical stories, prayers and psalms related to Pesah, the important Jewish holiday. Written around 1314 in Spain, the book is named after an ancient Jewish prophet Haggai (around 520 BC) and is one of the most valuable such books in the world. Unique by its extraordinarily rich illuminations, it came to Bosnia and Herzegovina at the end of 15th century with Jewish Sephardic settlers, exiled from Spain in 1492. The value of this book of rare beauty is estimated by international experts at 700 million USD (1991). Since 1894 it is in possession of the National Museum of Bosnia and Herzegovina.

In Figure 2, the viewer can see the room in National Museum where Haggadah is held modeled in Maya, then exported in VRML. By clicking on Haggadah, a new HTML page opens with a greeting message and information about the book. In the background, traditional Jewish music from Bosnia and Herzegovina can be heard.

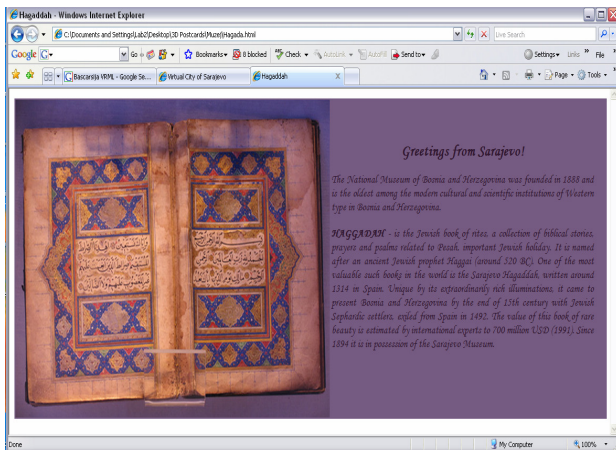


Figure 8. Greeting card with the picture of Haggadah and information about it.

4.3 SARAJEVO CITY HALL

Sarajevo City Hall, also known as the National Library, is one of Sarajevo's most well known sites, built around 1896. Originally the building was used as the city hall, but it was converted into a library in 1945. On 25 August 1992, it was burned down and was completely destroyed in the shelling attack of the Serb forces.

When the viewer opens the VRML model of the Sarajevo City Hall, he/she can look around and examine the outside of the object.

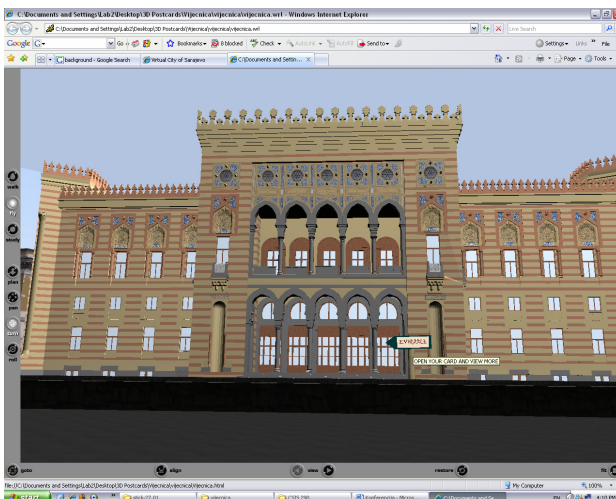


Figure 9. City Hall – The National Library.

In front of the model is an arrow, which, when clicked, will open an HTML page with the image of City Hall today, information about it and a greeting message.

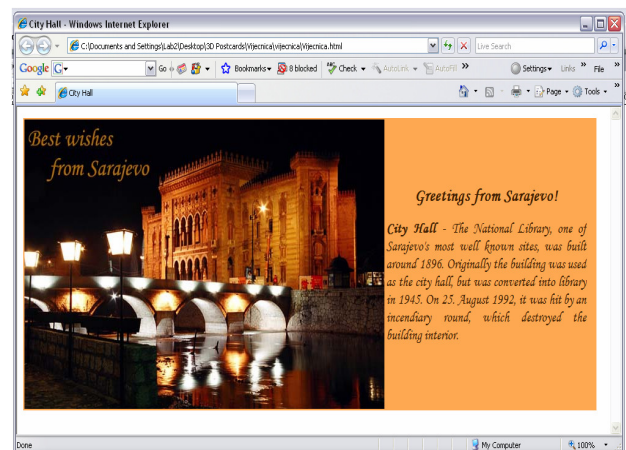


Figure 10. Greeting card with picture of City Hall and information about it [8, 9]

4.4 BOSNIAN GRAVESTONES

The best known, and certainly the most valuable, monuments of medieval art in Bosnia and Herzegovina are the stećaks. Stećaks are monumental gravestones, usually stone monoliths of varying shapes and sizes. [5,3]

The stećak from Donje Zgošće, from the second half of 14th century is perhaps the most beautiful one. It's assumed that under this stećak the Bosnian king Stjepan II who died in 1353 was buried. This monument is now to be found in the botanical garden of the BH National Museum in Sarajevo. For this reason, the opening VRML scene is the National Museum of Bosnia and Herzegovina, botanical garden. As before, we used arrows to indicate to user in which direction to go.

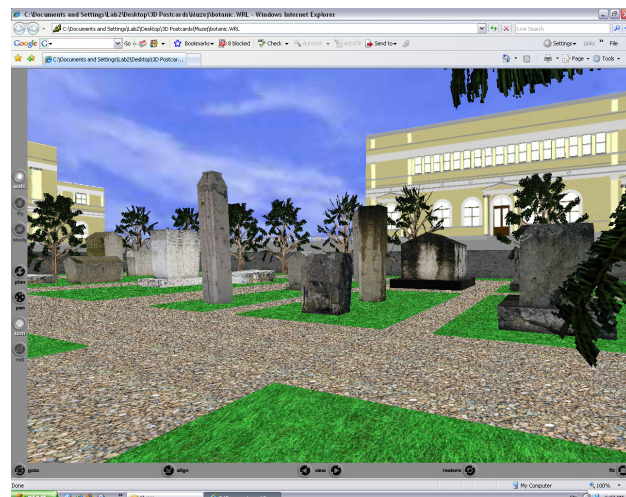


Figure 11. Botanical garden of National Museum of Bosnia and Herzegovina

When user clicks on a stećak in the botanical garden, a HTML page opens with the picture of Stećak from Donje Zgošće. This model was laser scanned and optimized by ISTI tools [1].

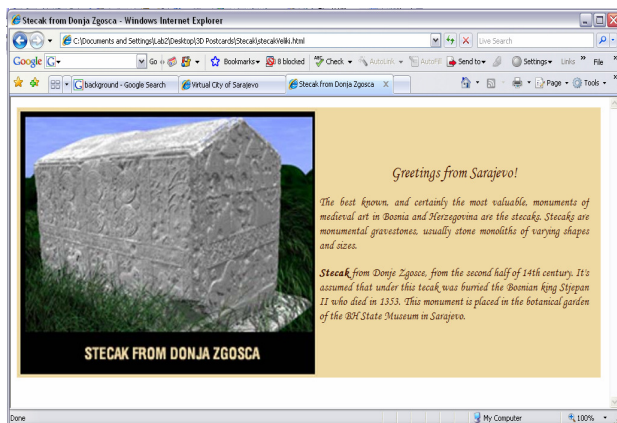


Figure 12. Greeting card with picture of stećak from Donje Zgošće and information about it [7, 9]

By clicking on another stećak, also found in Donje Zgošće, a HTML page with its picture opens. This stećak was laser scanned from a small physical model of the stećak.

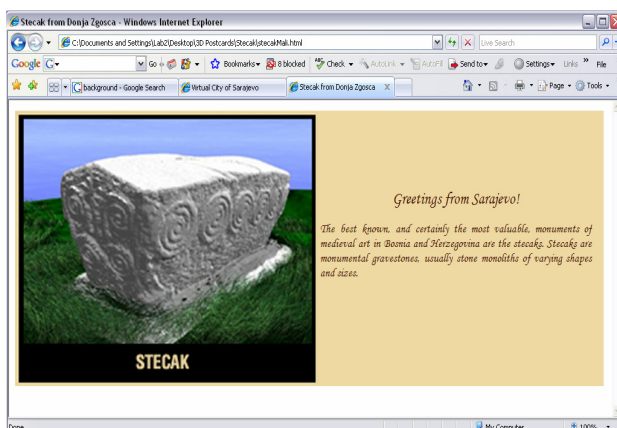


Figure 13. Greeting card with picture of stećak and general information about them [7, 9].

Aside from the picture of stećak, that will be displayed on the web page, there is also a greeting message together with some general information about stećaks from Donje Zgošće.

5 ADVANTAGES AND CONSTRAINTS

Digital 3D postcards have the following advantages:

- new, more interesting way of presenting the sites
- possibility of looking for a personalised present
- personal note in the postcard

In our investigation of these postcards we were faced with the following problems:

- size of the vrml files
- providing the user with the vrml browser

- offering the user navigation possibilities that would enable him/her to find the greeting in the virtual environment in a straightforward manner

These problems could partially be solved as VRML files can be optimized using, for example Viz3d software [10]. An appropriate VRML browser can be sent with the greeting and the user will then need to install it. The arrows which we have introduced into the 3D postcard help the viewer significantly to find the greeting.

6 CONCLUSION

In this paper we introduced a new concept in presenting historical sites - Digital 3D postcards. Through five examples of some interesting sites in Bosnia and Herzegovina, we presented two types of 3D postcards: general and personal. To evaluate our 3D postcards we have sent them to a number of people, all of whom really liked the concept. In future we will conduct a more formal user study to identify how such digital 3D postcards can be further improved. In addition we will develop a user interface that would enable the users to choose and send Digital 3D postcards easily using Internet and insert their personal messages.

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www.virtuelnosarajevo.com.ba

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http://www.tucows.com/start_dl/353031_131112_9302/dlp/