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Denys Zolotukhin, Anatoly Sachenko, Volodymyr Kochan and Myroslav Komar

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Denys Zolotukhin[2], Anatoly Sachenko[1,2], Volodymyr Kochan[2], Myroslav Komar[2]

[1] Department of Computer Science, Kazimierz Pulaski University of Technology and Humanities, ul. Malczewskiego 29, 26-600 Radom, Poland
[2] Research Institute for Intelligent Computer Systems, Ternopil National Economic University, 11, Lvivska, Ternopil, 46020, Ukraine
grakinoua@gmail.com, as@tneu.edu.ua, vk@tneu.edu.ua, mko@tneu.edu.ua

Abstract. 3D character texturing - the process is long and requires a high level of professional skills, it is also one of the most important stages in the development of 3D model, because the texture is the first thing that the viewer sees, and the quality of the object's shader depends on its quality. To simplify and accelerate this phase, we offer an approach using the textures maps complex. This complex includes a set of prepared, segmented and sorted textures of different types (diffuse, specular, displacement, bump, SSS). Thanks to it, the developer can combine and edit the already finished fragment of textures, which turns off the need to make a texture from the scratch. The complex enables to skip the stages of sculpting and retopology, and get various visual outcomes for same 3D model geometry. The texturing result is connected with the quality of the shader and visualization. Finally, we described the application of the proposed approach as well as experimental results.

Keywords: texturing, texture map, 3D character, computer graphic.

1   Introduction

3D graphics are an integral part of the industry and the media. The most important stage in the development of a 3D model is texturing, because the textures reflect the surface of the object, its relief, reflection, color. Texture is the first thing the viewer sees, and the quality of the object's shader depends on its quality.

Today, there are various services and solutions that allow to simplify the texture stage of a 3D character model. Among the most professional services are: Substance Source [1], TexturingXYZ [2]. They offer high quality textures, photo references, materials that can be used for character texturing. Also, for today there are two most common methods of 3D models texturing [3-4], which are quite long and difficult to implement. In work [5] the authors describe a joint project using Augmented Reality to enrich the Konzerthaus printed media. The project contains images, illustrations, audio, video, simple 2D and 3D animations, interactive media as well as 3D objects.

The goal of this paper is finding a new way to simplify and speed up the 3D model texturing, using a set of prepared and segmented textures of different types. Received results are described below.

2 Structure and Principle of the Textures Maps Complex

Textures maps complex – is a module that contains a set of prepared and fragmented textures of different types (diffuse [6], bump [7], SSS [8], displacement [7], specular [6]). This set consists of channels that represent a certain type of map, each channel consists of directories that classify a certain part of the character's head (nose, eyebrows, forehead, etc.), each directory stores a set of textures that contain fragments of images that can be used for the texturing process. Examples of these textures are shown in Figure 1.
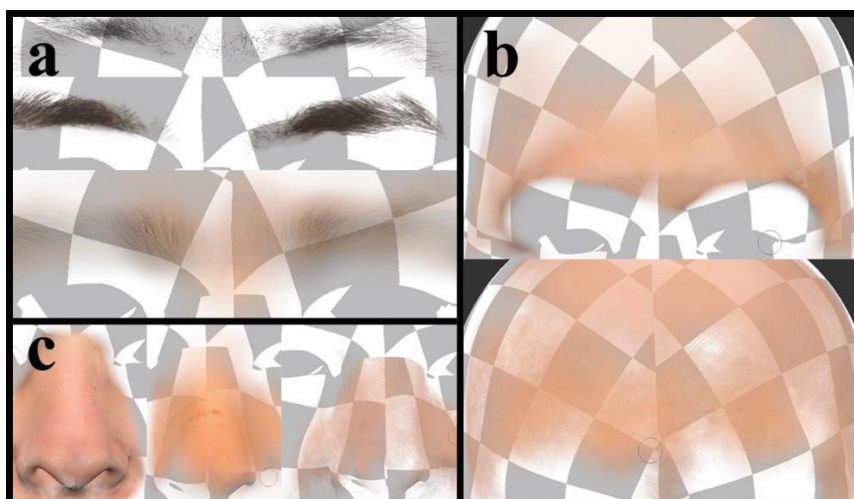

Fig. 1. Samples of (a) eyebrows. (b) forehead. (c) nose textures of diffuse channel.

As seen in Figure 1, each directory contains various patterns of textures that can be used for their further processing, for example, the directory "eyebrows" contains different eyebrow textures, the directory "nose" has different textures of noses, etc. This fact applies to all channels.

To work with the proposed complex, the user needs connect it to a graphical editor that supports a system of layers (for example Photoshop, Substance Painter), in this example we used the Mari 3.0v1 program. Texture should be superimposed on a low-poly 3D model.

We got the low-poly character model from Hi-poly within the ZBrush program. As next step, it is necessary to select the needed textures of each type and category in the corresponding catalogs. The designer can form and edit any texture segments using the chosen software (Figure 2).
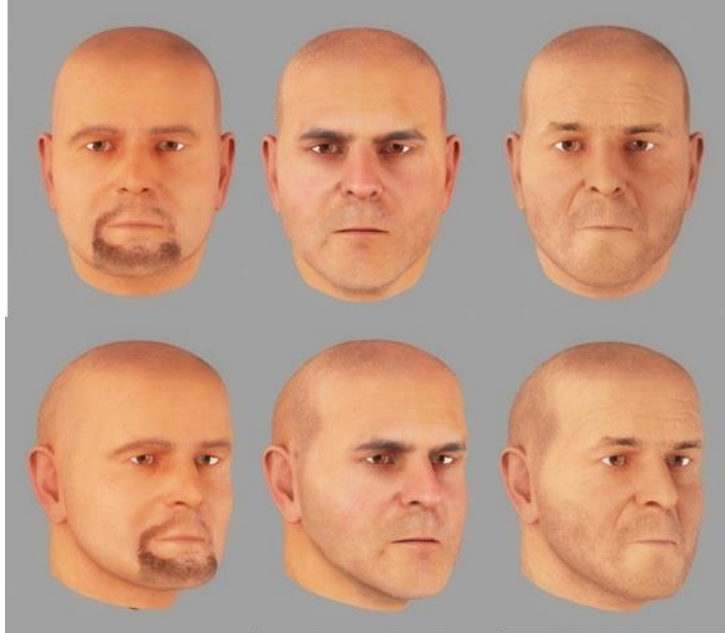
Fig. 2. Three versions of the character's head. Two angles.

To run the experiment, we created the one 3D character model head. Texturing was made in the common way [3], and we spent the 6 working days for that. We used fragments of the textures that have created for this head to replenish the library of our complex. There the 3D geometry has exploited as the basis for creating the following faces.

In Figure 2 are shown the three heads of the character, and all the three models have similar geometry and the same topology. That is, the geometry of one head is the original (the extreme right model), and the other two are its copy. Texturing has made using the proposed complex of texture maps.

We selected the completed textures, combined them with each other, edited, duplicated, and we spent the 2 days per each head.

The proposed approach can be implemented in both gaming and film industries. Also, we can consider some other fields for the application, for example interior, furniture design, automobile makers, clothing, shoe, and jewelry [9-10].

3　　Conclusion

The proposed textures maps complex allows to simplify and speed up the 3D character model texturing. The development speed depends on the developer's abilities, we spent 2 days for texturing one character's head. The proposed complex allows to combine and edit already prepared, segmented textures, which eliminates the need to make them from scratch.

The proposed textures maps complex reduces the entry threshold, it requires fewer professional skills from the developer to create textures, since he already has basic fragments, which he can use them for his work.

In future we are going to design own interface for improving the comfortability of texturing stage. We also plan to create a set of prepared and segmented 3D character geometry, which can be used to speed up sculpting and receiving the displacement map.

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