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KUKERMAT: INTERPRETING A BULGARIAN COSTUME IN SUBSTANCE PAINTER

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Abstract: The paper reviews the wininig entry of the MeetMat 2: The 3D Painting Contest. It was won by the student Nikolay Marinov from the University of Ruse "Angel Kanchev". The contest is organised by Adobe Substance for the second time. The first time was in the year 2017 where more than 300 people from around the world participated.

This year the contest brought together more than 1600 people, with the help of their sponsors. The rules are simple. Everybody receives the 3D model Meet Mat and has to texture him, without breaking his identity. Also Displacement and Tesselation was allowed. The wining entry "KukerMat" was based on a Bulgarian costume called Kukeri. It represents a traditional Bulgarian costume worn by men, who perform ritualistics dances to scare away evil spirits and bring good health to the village.

Keywords: Normal, Roughnes, Metallic, Materials, Meet Mat, Color Variations, Texture Maps, Vectors, Rendering, Focal Length, Aprture

INTRODUCTION

Meet Mat 2: The 3D Texturing Contest

Meet Mat is a contest that is organized for the second time this year by Adobe Substance. Adobe Substance is one of the biggest companies in the industry. The first instance of the contest was held in 2017. The second one has the same rules, but it allowed and encouraged the use of displacement. My entry KukerMat (Figure 1) managed to win first prize in the student category amongst 1600+ participants.



Figure 1 - KukerMat - Winning entry for the Student category

OVERVIEW

I started with my reference board (Figure 2). I gathered as many colors from it and aimed to limit everything to just a few different colors (Figure 3) and their color variations (Figure 4). The

goal was to have as many different materials as possible (Cloth, Leather, Wool, Iron, Fur, Wood, Horns, Cobblestones).

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First, I started with different layer stacks. For example – I created a fill layer, put in a folder, named that folder appropriately (for example "Vest" or "Shirt") and started to hand paint where I wanted that material to be applied so that had all of my black masks before actually starting to texture it. After I made the materials, they were automatically placed onto their places. The first thing I do when starting to create a material in substance is to start with a smart material so that I can have an already made stack, that I can change, delete and work on, rather than creating one from scratch every single time.



Figure 2 – Reference board inside of PureRef



Figure 3 – Early Stage of using black masks



Figure 4 – Dominant Color Variation

DISPLACEMENT

Because of the big difference between the height values of the horns and everything else I had to constantly relay on Levels to control the height more precisely. The most important part is that, I used most of the alphas that come with Substance Painter to hand paint the shape of the horns(Figure 5). Everything else was just experimenting with alphas and noises to get the result I desired.



Figure 5 – Hand painting the height of the horns

I use displacement a frequently in my materials in Substance Designer, but I have never used it in Substance Painter. I carefully planned which details I want in the height and which only in the normal map. Having the horns extruded, that high from the head meant really precise work with all the other elements of the head/mask.

TEXTURING

I created a couple of alphas in Substance Designer. I didn't use any materials form Substance Source. I only used two external materials. One that I created in Substance Designer and one from Substance Share, that I blended with the one from Substance Designer and with the other layer stacks in my file.

Before continuing further, we should learn about different texture types: NORMAL MAP

We know from applied mathematics that every geometric face has a perpendicular **vector** called – **normal**(Figure 6). What if we changed the direction of that **vector**? The result is an "optical" illusion that simulates depth. It is not that easy to calculate, because we also have to know the **tangent space**of the respective **normal** and the store the color information of each axis into Hex colors in different matrixes.



Figure 6 – Normal map and tangent space

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ROUGHNESS MAP

The **roughness map** (Figure 7) is a binary grayscale image, with values between zero and one. Zero being completely black and one being clamped to completely white. Black areas represent parts of the map, where the area will be highly reflective and white areas represent parts where there won't be any reflections.

METALLIC MAP

It is a binary grayscale image with values between zero and one. Zero being completely black and one being clamped to completely white. In **PBR(Physically-Based Rendering)** it will show where on the map the surface should be made from metal (Figure 7).



Figure 7 – Roughnes and Metallic maps

MATERIAL BREAKDOWN

The first material we'll talk about is the horn material. I used some of the alphas that come with substance to create and refine the shape and then painted out the pixels around it with a couple of different materials to texture the sides, when the tessellation was active, as you can see on the image below (Figure 8):



Figure 8 – Shape creation and extrusion

The second material we'll talk about is the wool. It's a pretty simple material that utilizes tricks I learned from my work with Substance Designer. On the image below, I illustrated my workflow with Substance Designer although that I made everything in Substance Painter because I find node based workflows more intuitive (Figure 9).



Figure 9 – Shape creation via noises

The third material we'll talk about is the Global Edge Wear material. I made it a couple of years ago and I use it in all of my textures. Every time I use it I modify it to fit the purpose of the project. It consists of a couple of different layers that utilize different noises to get a more naturally worn result and after I'm done with it I create a simple white Fill Layer and multiply it on top of the layer stack to get a sun worn effect (Figure 10).

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Figure 10 – Global Edge Wear

The last material I wanted to talk about is the very simple cobblestone material on the base. I use a brick generator, offset the bricks by 0.5 and use the scale random parameter. After that I use bevel and blur and then slope blur it with a couple of noises. After that I just hand paint a green fill layer with the blending mode set to passthrough so that I can save the mid-level detail underneath.

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CONCLUSION

I created just a few alphas in Substance Designer to be used in this project. Everything else I've painted by hand using Alphas from the ones that come with Substance Painter (Figure 11).



Figure 11 – Third party created alpha maps

The entire process is straightforward as you can see on the actiovity diagram(Figure 12)



Figure 12 – Activity Diagram

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