CleanerWolf Avatar
for VRChat

Documentation

Updated 2024/03/16

Thank you for purchasing my avatar! This documentation should help you to create and upload your own customized version as quickly as possible. To do that it is important to understand the basics of Unity but also be aware of some special features concerning the texturing process.

This documentation only covers the specific information about my avatar, it is *not* a Unity tutorial, please refer to other sources to get at least a basic understanding about the Unity editor and Avatar SDK 3.x.

Make sure to backup your Unity project(s) frequently, at some point Unity will corrupt your project, it's like a rule of nature!
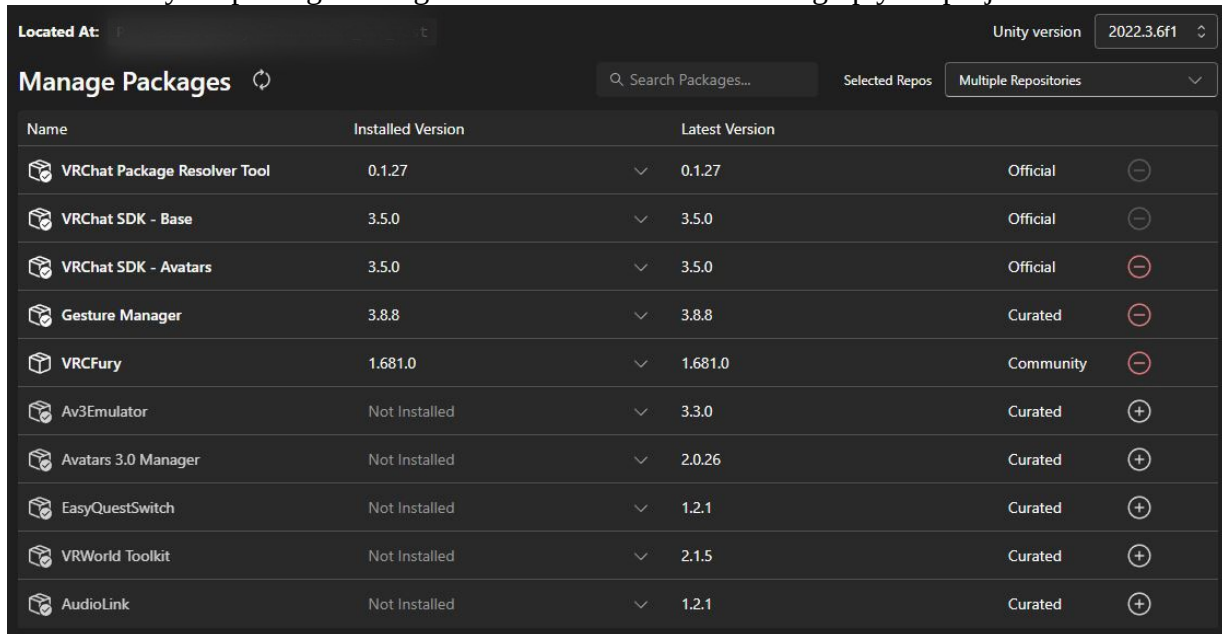
What you need

- The Unity Editor, version 2022.3.6f1 for PC or 2019.4.31f1 for Android and the VRChat Creator Companion.
Please refer to the VRChat documentation how to set it up correctly.
https://creators.vrchat.com/sdk/

This is how your package manager should look like after setting up your project:

- VRC Fury
https://vrcfury.com/download/
This free package allows you to assign additional props in an easy and non-destructive way and also comes with some nice extra features. Installation through the VCC package manager is recommended (see screenshot above).

- Mochies Shaders.
https://github.com/MochiesCode/Mochies-Unity-Shaders/releases
This is a free package of custom shaders for Unity. It is needed for the hair/fur to work correctly.

- Poiyomi Shaders.
https://github.com/poiyomi/PoiyomiToonShader/releases
This is a free package of custom shaders for Unity. It is needed for some of the materials.

- Warren's Fast Fur Shader
https://warrenwolfy.gumroad.com/l/atntv
A furshader that can be used as an alternative to the haircards. There is a free version of it available, but I recommend to buy the standard version to support the creator.

- Nirvash Lay/Sit Animation (optional)
https://github.com/Dervali-git/VRC-Tips/blob/main/LaySittingPrefab.md
A set of animations that allow you to put your avatar in laydown or sit poses. Useful for people without FBT.

- The latest „CleanerWolf_Avatar_VRChat_Unity_vXXX" package that you find in the download section of the avatar on Gumroad. Importing this package can take some time, please be patient. The smaller „CW_" packages are optional assets you can import in addition to the avatar.
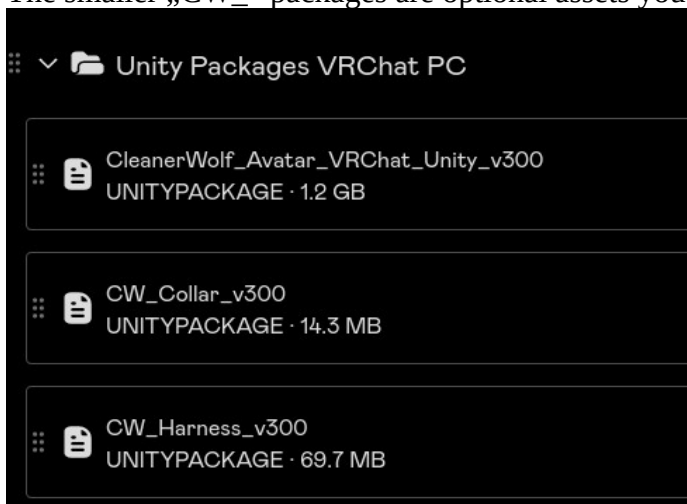
Additional files for the AD variant of the avatar, like the „Red Rocket" asset can be downloaded here → https://my.hidrive.com/share/50vl0wv20l

Optional, but recommended:
- Pumkin Tools
https://github.com/rurre/PumkinsAvatarTools/releases/
Very useful for transfering settings from one avatar to another.

- 7zip
https://www.7-zip.org/
Some of the files on my Gumroad page are compressed using 7zip (with the file extension .7z)

Getting started

Open the example scene in the project under „Assets/CW_Avatar/Scenes". There are 3 variants of the model:

- CleanerWolf_Model_PUB (Public)
This is the „standard" version. It is configured for good balance between visual quality and performance optimization. Use this version in public worlds and larger crowds.

- CleanerWolf_Model_AD (After Dark)
This version is meant to be used in private situations or small groups, using a few more hair cards and 8K textures for the body to provide the highest level of detail. It also supports VRCFury's SPS, for enhanced romantic interaction with other avatars for users who are into that kind of activities. However, the „Red Rocket" is now a separate prop that needs to be imported as a Unity package, after that you should drag the „CW_Red_Rocket" prefab from the „Prefabs_Extra/RedRocket" folder onto your avatar.
Important: NEVER upload this as a public avatar, it would be a clear violation of the VRChat community guidelines. Only enable the „Red Rocket" in „Invite" instances! Please act responsibly!

- CleanerWolf_Model_WF (Warren's Fast Fur Shader)
Similar to the AD version, but is set up for Warren's Fast Furshader. Uses a model without haircards. Provides a different, softer look, but also has some limitations. Doesn't work well with most props and clothes, because the fur peeks through the added geometry. Performance is worse than with the haircards versions, therefore it should only be used in smaller groups.
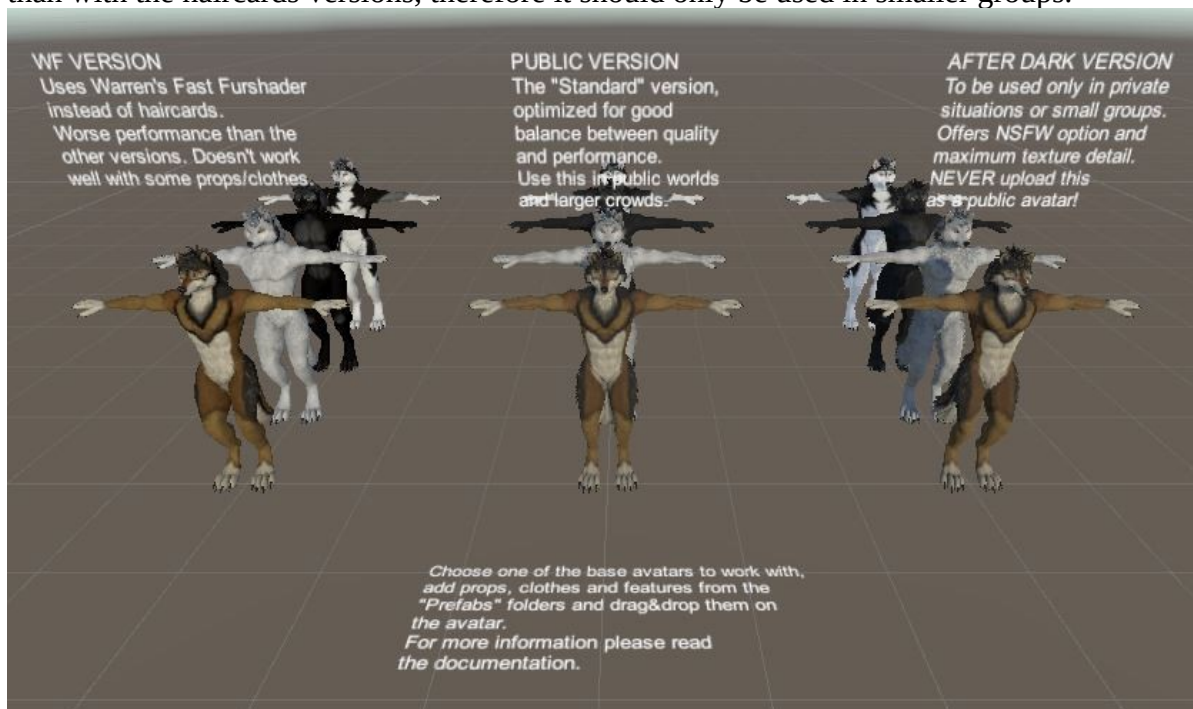
Before you start customizing the avatar, choose the variant you want to start with, duplicate it with CTRL+D and hide all the other ones.

Now you can start to play with the settings, import assets and textures.

I highly recommend to make a duplicate of everything (materials, controllers, menus etc.) you want to modify and rename it. This way you can export all your custom objects as a Unity package later. This makes it easier to transfer your custom stuff to other projects in the future.

Android version (Quest, Pico, Mobile)

*Please note – at the moment the Android version still needs Unity 2019.4.31f1*
The Android version of the avatar is meant to be uploaded alongside the PC version using the same avatar ID (Blueprint ID in the avatar descriptor) to make the avatar being displayed for Android users instead of some ugly fallback avatar. It is based on a lower quality version of the model with less polygons, materials and bones. I tried to find a good compromise, preserving the look and feel of the PC version, while providing good performance on Android.
There are a few restrictions, besides the obvious polygon reduction I also had to remove the halo and get rid of all alpha cutouts for the hair. The number of physbones is reduced, the nose and ears are not dynamic anymore.
The Unity package for the Android version „CleanerWolf_Avatar_VRChat_Android_Unity_vXXX“ should be imported into a fresh Unity project, do not import it in the same project alongside the PC version!
You don't need to import the Mochies shaders in this case, they don't work on Android anyways. Other than that it's the usual process, first setting up a fresh project with the Creator Companion, installing VRC Fury and then importing the package of the avatar.
After that log into your account and make sure to click the „Switch build target to Android“ button in the „Builder“ tab of the SDK. Of course this only works if you installed the according Android components of the Unity editor.
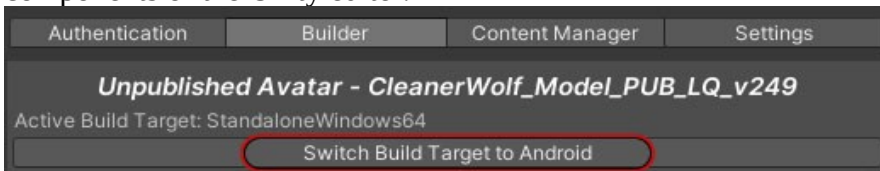
If you create own materials, only use the shaders from the „VRChat/Mobile“ section, all the others are not supported on Android.
Texture resolution should not be higher than 2K and compression should be set to „RGB(A) Compressed ASTC [blocksize]“. The blocksize defines the balance between image quality and file size. Larger block size means smaller files, but worse image quality. Usually 8x8 is the best compromise, but I recommend to experiment with that setting, because it depends on the texture.
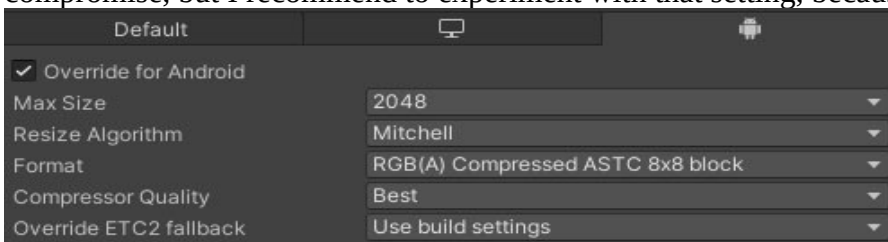

The Android version has an additional blendshape „Tail_irregular_shape“ that tries to give the lowpoly tail a more puffy and uneven look.

There is a hard limit for the file size of the whole avatar package on Android and that is 10MB. If you get a warning about your avatar exceeding that file size, you have to go back and optimize things.

Adding optional Props and Clothes

The setup of the avatar project is modular. The base avatar is configured to be as clean and optimized as possible, additional features, props and clothes are configured as prefabs that can be imported as Unity packages and then be applied to your avatar.
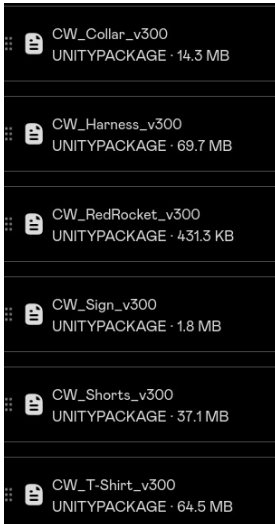
First download the Unity packages you would like to add from Gumroad and import them into your project.

Apply the assets by dragging them from their „Prefabs_…" folders in the Project window onto your avatar in the Hierarchy window.

Please note - In older versions of the avatar, the Sign and „Red Rocket" were part of the bodymesh, now they are seperate assets aswell.
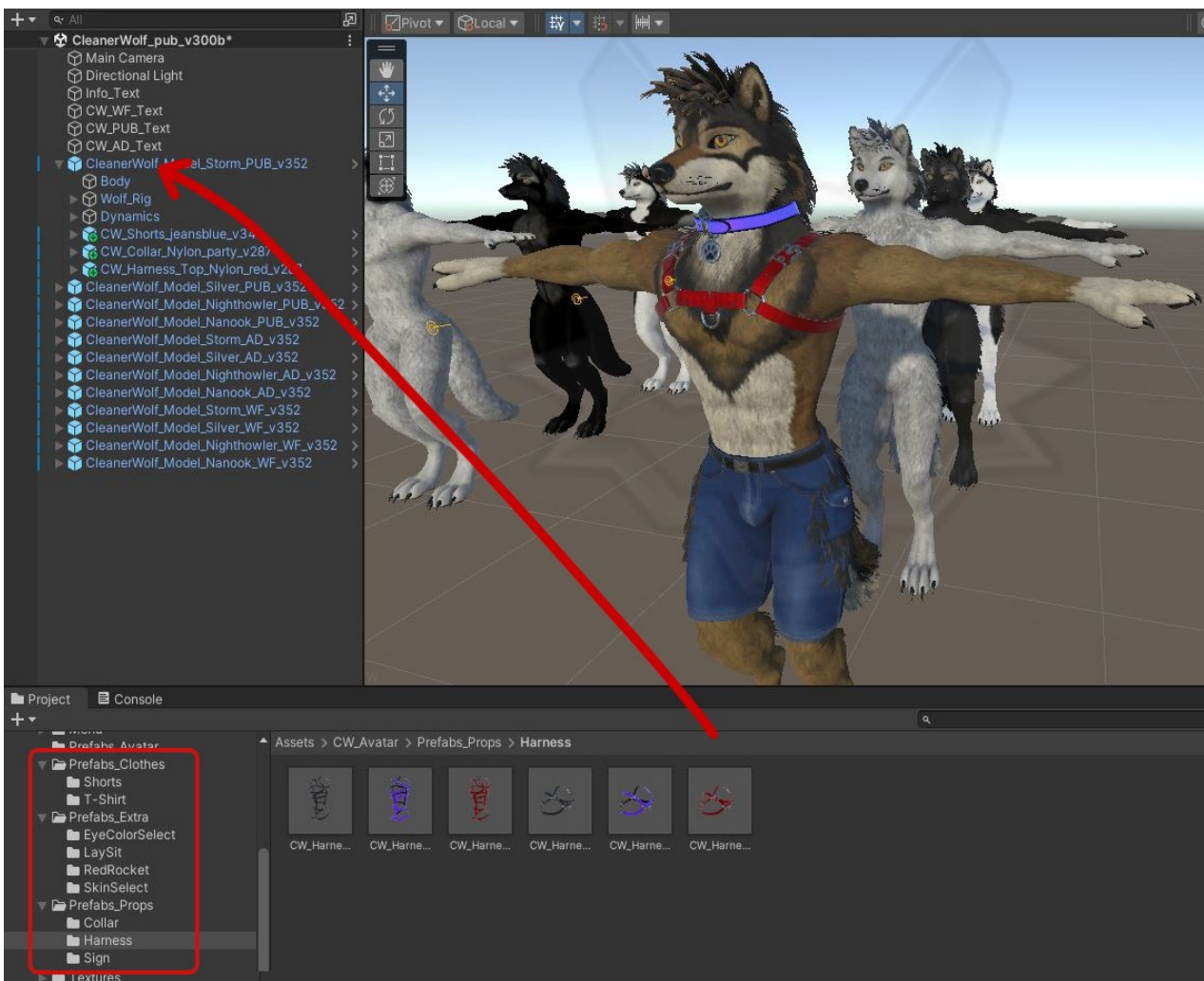
In most cases no additional steps are required, all the armature & blendshape linking, animation layer merging and menu entry creation will be done automatically during the build process, either by switching to play mode or by uploading the avatar with the VRChat SDK. This method is non-destructive, so if you delete the asset(s) from your avatar, everything will be like before. However, all this only works if you installed VRCFury beforehand, find more info about it on this website → https://vrcfury.com/download

The „Red Rocket" is a bit of a special case, because after applying it to your avatar, you have to assign the „Body" material to it, otherwise it would not match the color of the body. It is configured to use VRCFury's SPS already.
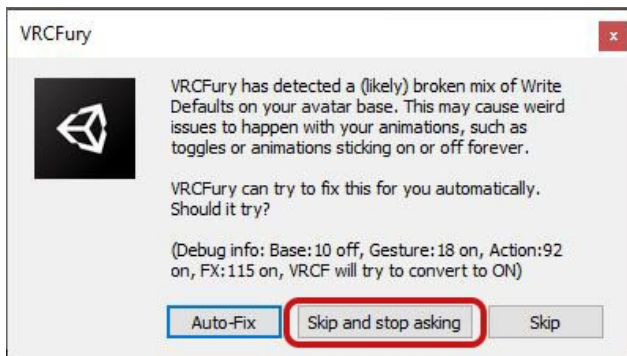
If you get this message from VRCFury, please choose the option „Skip and stop asking". Auto-Fix could mess up some animations.

Every asset you add to your avatar creates an additional „Skinned Mesh Renderer" and also an additional material slot. To keep things optimized, only add the props/clothes you really want. I recommend to create and upload at least two different variants of your avatar, one that is optimized for good performance to be used in larger crowds and one for smaller groups and private situations. All the props and clothes I provide are made by me and adapted to work on my avatar, they will not work on avatars of other creators and vice versa. However, if you are a prop creator and want to make props for my avatar, I highly recommend to use VRCFury aswell to make adding the props as easy as possible. I would also like to encourage my customers to make their customizations a VRCFury prefab, because it could be a great time-saver re-applying those to future versions of the avatar.

Please note - If you want to make your avatar „cross-platform", uploading a PC and Android version, it is very important to place all assets in the exact same order in the hierarchy on the PC and Android version, otherwise it can happen that custom parameters don't match properly between both platforms.

Custom skins

Making your own textures for the CleanerWolf avatar isn't more difficult than it is for other avatars, but it is important to understand a few concepts about my approach of making the avatar looking fluffy using haircards.

The haircards for the fur have their own material, but are using the same texture for the color (albedo) as the body. Therefore you don't have to care about texturing them separately. However, for the alpha cutout they use a different texture and a different UV set. This only works if the shader being used for the haircards supports seperate textures and UV sets for color and alpha transparency and also allows to disable backface culling. Unfortunately the Unity standard shader doesn't support this, therefore I had to look for a custom shader and decided to use the Mochies shader. This is why you have to install this shader alongside with the avatar to make it look correctly.
So, as a result, this workflow makes retexturing quite easy, but it restricts the user to shaders that support this special feature.
The hairstrands on the head are using separate textures aswell, but they are not taking their color from the body, instead they have their own color texture with non-overlapping UVs.

Following the standard PBR workflow, many parts of the body not only have color maps but also normal and smoothness maps.

Here is a schematic explanation about the material and texture assignment:
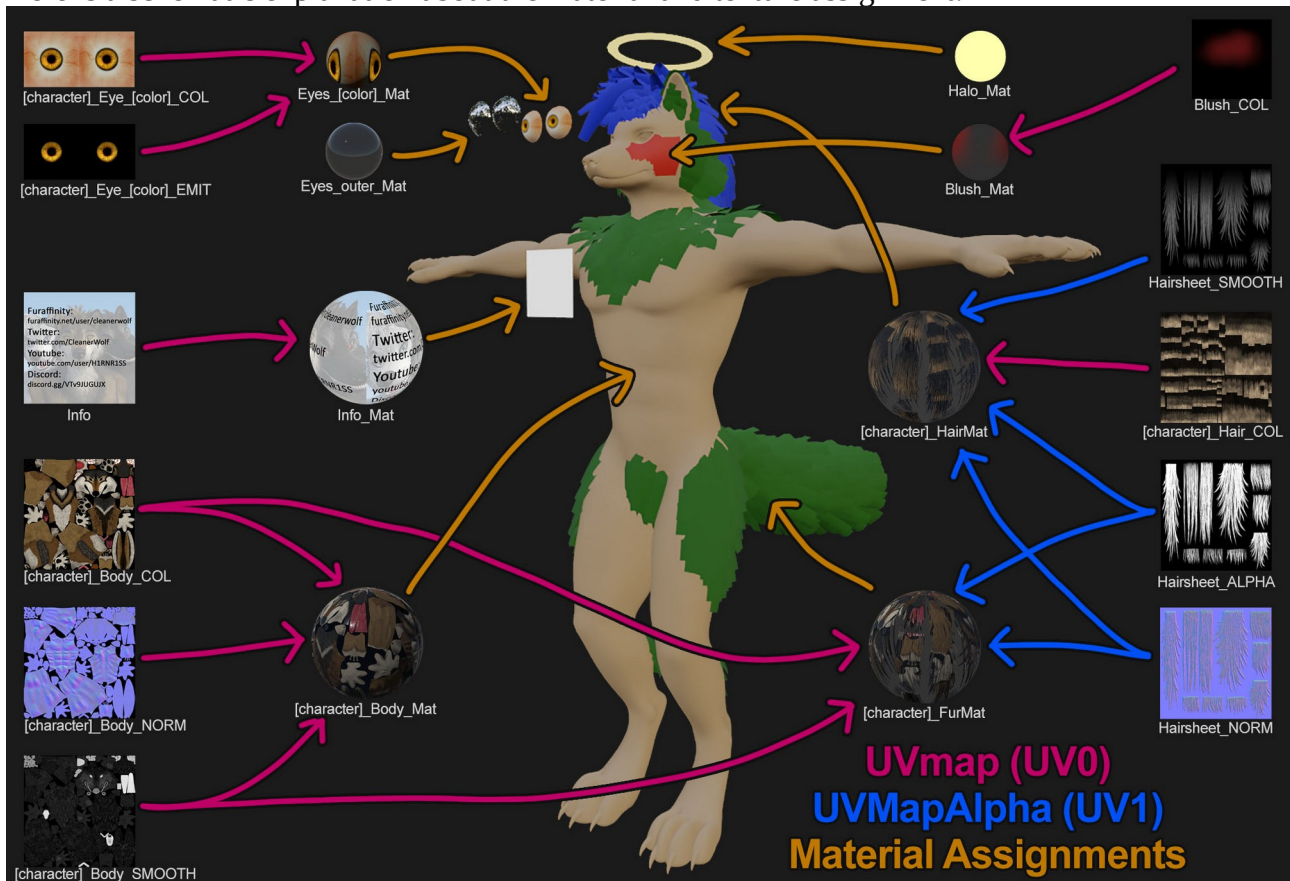
Depending on what you want to achieve and what software you use there are many different ways to make your own textures. The easiest way to make a custom skin would be to just create a new or modified color texture for the body and hair, but to re-use the existing normal- and smoothness maps.

In any case you should create your own material(s) by duplicating the existing one(s). For example, if you want to make a customized version of the „Storm_body_Mat", just duplicate it with CTRL+D and rename it. Now you can either drag & drop the material on the model in the 3D view or in the material slot(s) in the inspector.

Creating or modifying textures

The easiest way to customize textures is to modify the existing ones that I provide with the avatar. No matter which software you use, the idea is to use one of the layered base textures as a starting point. You would just create or modifiy the color of the texture, but re-using the fur structure and body parts (nose, mouth, tongue, teeth…).

3DCoat
I use 3DCoat for almost all of my texturing work, therefore I provide 3DCoat files for the body texture of my avatar(s).
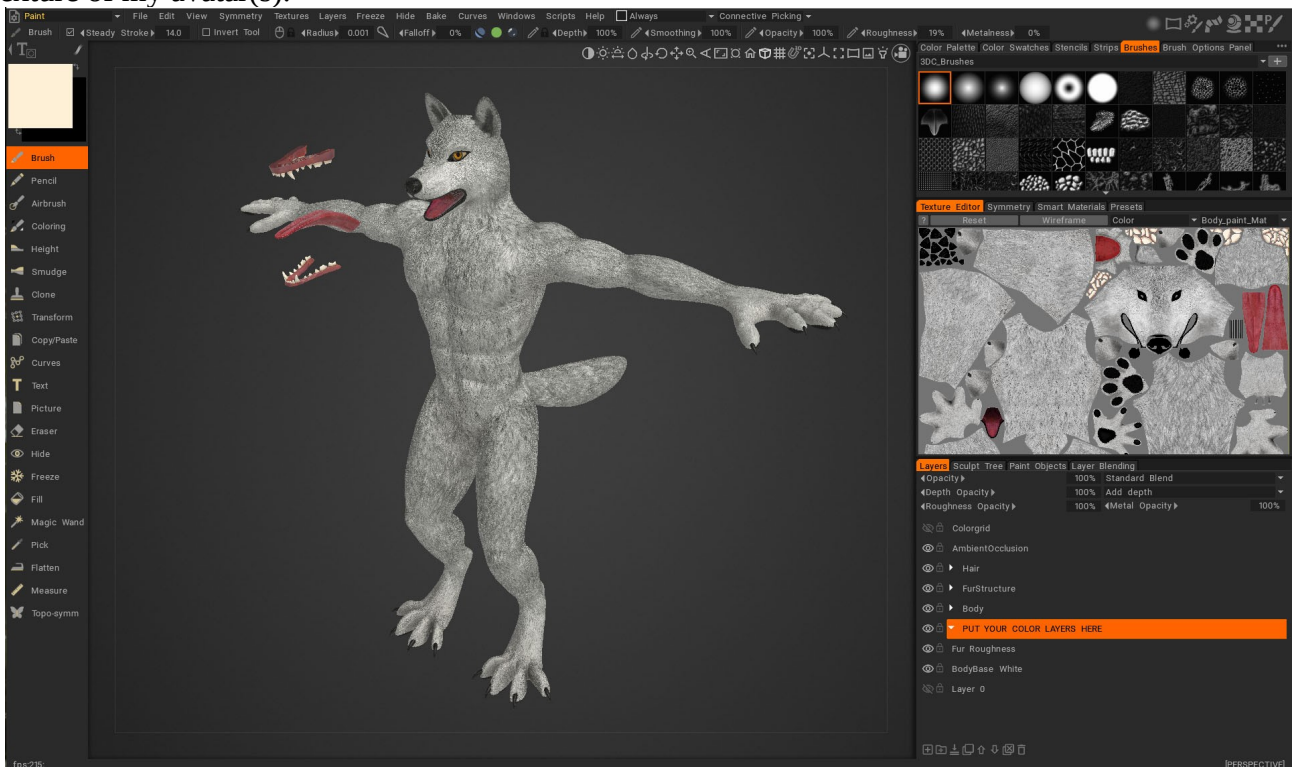
The 3DCoat file contains a special version of the model and the base layers of the texture in 8k resolution. Create your own color layers *below* the „FurStructure" and „Body" layers. The fur pattern will be multiplied with the color and this way you get all the fur detail on your texture.
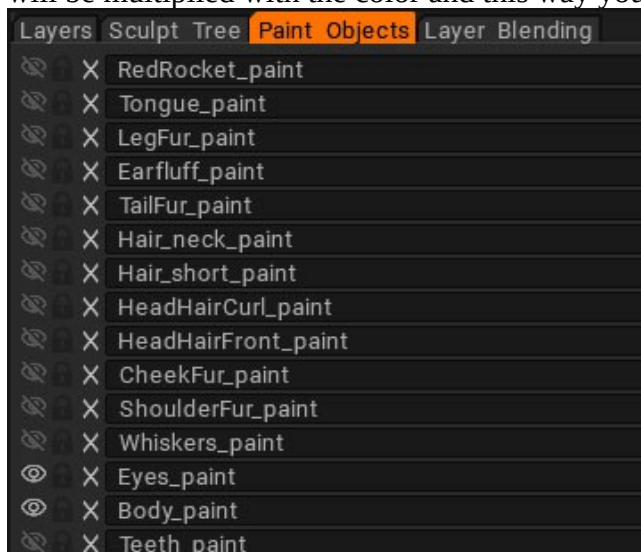
You can toggle parts of the model, most of them are hidden by default. Open a „Paint Objects" panel to see the full list.

As explained above, the color from the body will be used on the fur and hair parts automatically. You can check this by enabling those objects in the „Paint Objects“ panel. The alpha transparency of the fur will not be shown, this is a technical limitation of 3DCoat.

To export your color texture go to the „Textures“ menu, then „Export → Color/albedo Map“ and choose „Body_paint_Mat“ as the UV set.

Important: If you export your own roughness texture, you can not use it in Unity directly, because Unity uses smoothness maps instead of roughness. Fortunately the conversion is really easy. Just use the image manipulation software of your choice to invert the image.

Please note: To open the 3DCoat files you will need at least 32GB of RAM, more is better. The loading process can take several minutes, please be patient.

Substance Painter

I am offering Substance Painter projects of my avatar, with a painting-friendly version of the mesh and some base textures (color, roughness and normals). There are 4 variants of the SP project available, the PUB and AD versions, both with or without fur. The AD version includes the „Red Rocket" body part, the PUB version does not. I recommend to use the „nofur" versions, because they are easier to work with. *Please note – you need at least Substance Painter version 2022 to open the file(s).*

The provided texture layers are just a starting point for your own creations, but you could also just delete them and start from scratch. In Substance Painter the maximum texture resolution is 4K, therefore I cannot provide an 8K base texture in this case.

If you want to keep the existing fur structure, create your own layers BELOW the base layer, those layers will then get multiplied by the base layer.

There is also a geometry mask to hide the fur elements and other parts of the mesh for easier painting on the body.
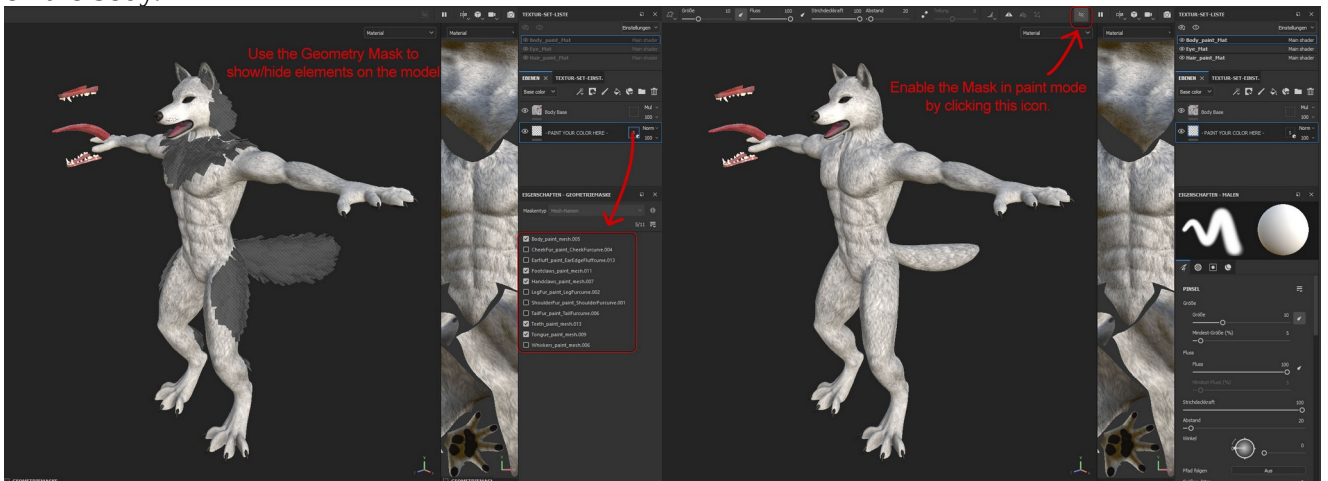
Other 3D painting software
Of course you can use any software to paint your textures on the model, but I don't provide project setups for them, so you have to do a little more manual work. You can download the necessary source files from my Gumroad site.
First of all you will need the „CleanerWolf_Model_for_texpaint_FBX_OBJ" file which contains a special version of the model in FBX and OBJ format, optimized for texture painting. As a starting point for the texture you could use the „CW_Body_Baselayers_COLOR_8K_PSD" and if you need to modify the normals and smoothness maps, you will find them in the „CleanerWolf_Avatar_Textures" archive under „Exported Textures".

Photoshop
In Photoshop you can not paint on the model directly which makes it very hard to achieve the desired result, therefore it is only suitable for simple edits of the body texture.
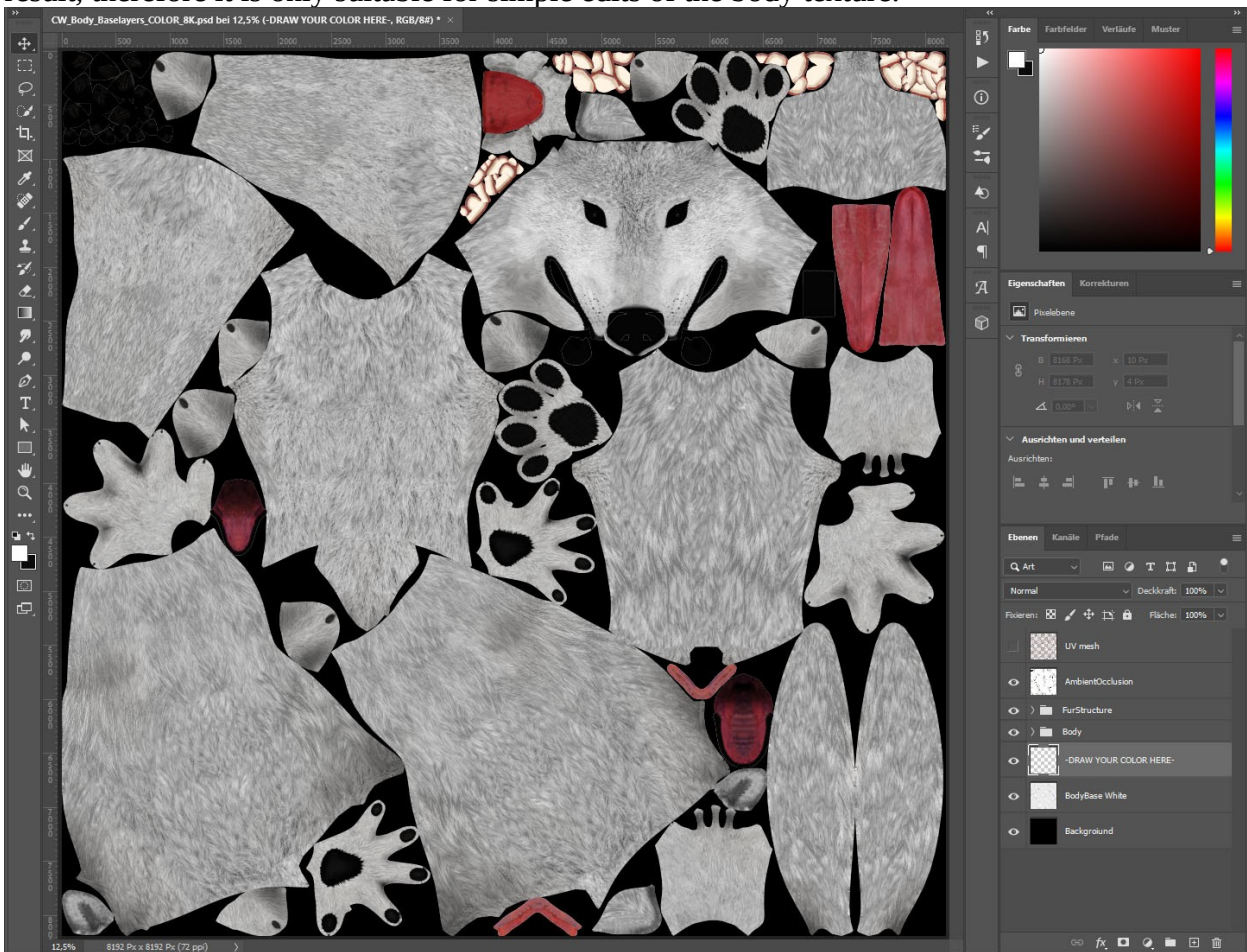

However, editing the eye texture is easier in Photoshop, just open the „CW_eye_v04_PSD", it has groups for left and right eye separately, the color can be easily adjusted through the adjustment layers. If you want to generate the emissive version of the eye texture, make sure to hide the „Eyeball" layers first.
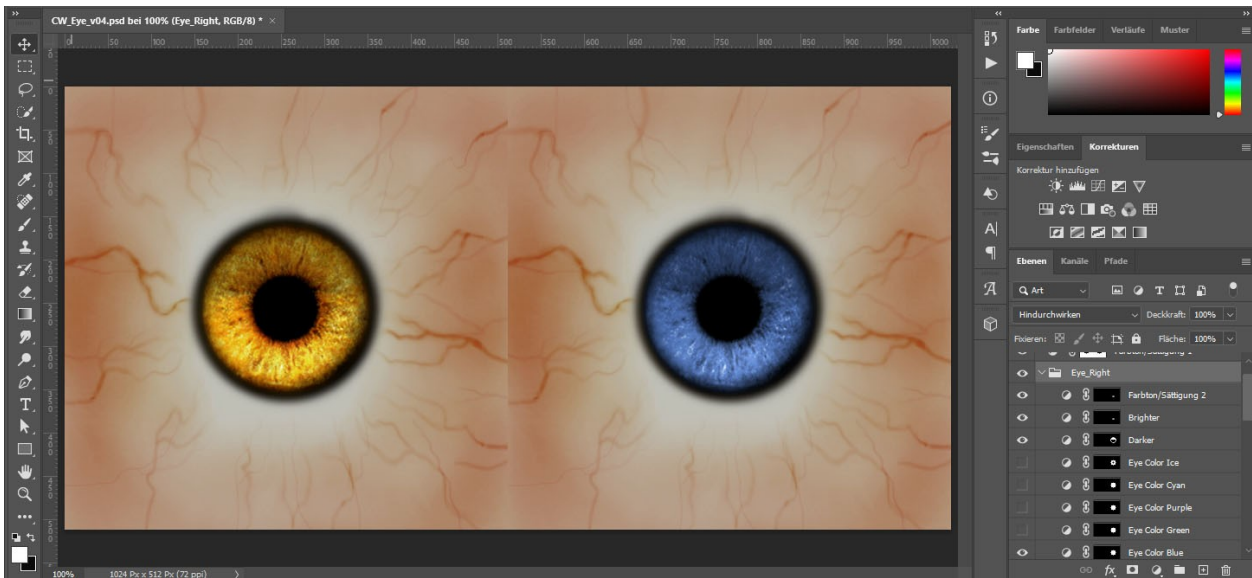
Also editing the Alpha/Depth/Smoothness texture for the hair/fur is easier in Photoshop or any other 2D image editing software, it's the „Hairsheet_v07_PSD" file.
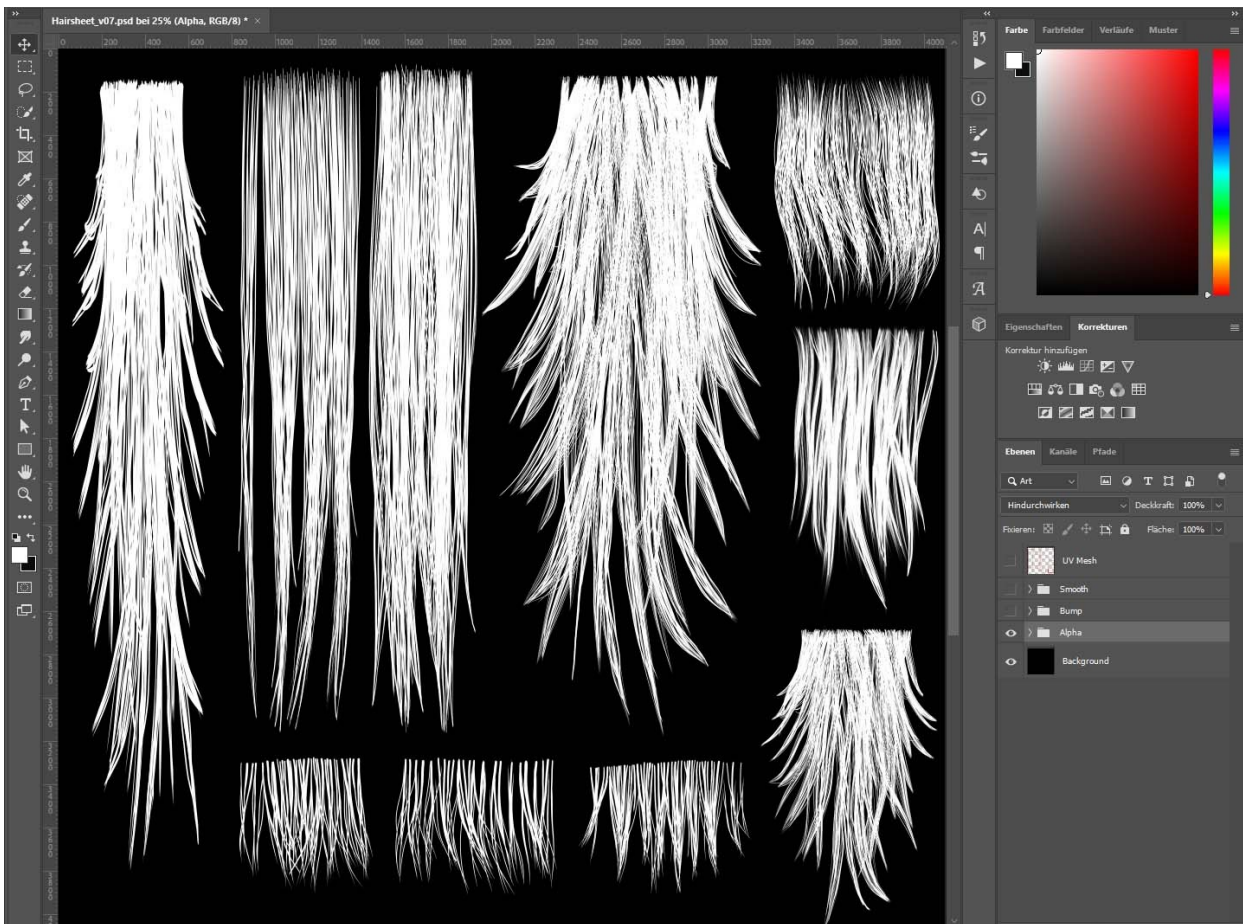
To edit the color texture for the hair, open the „Storm_Hair_COLOR_PSD" file.
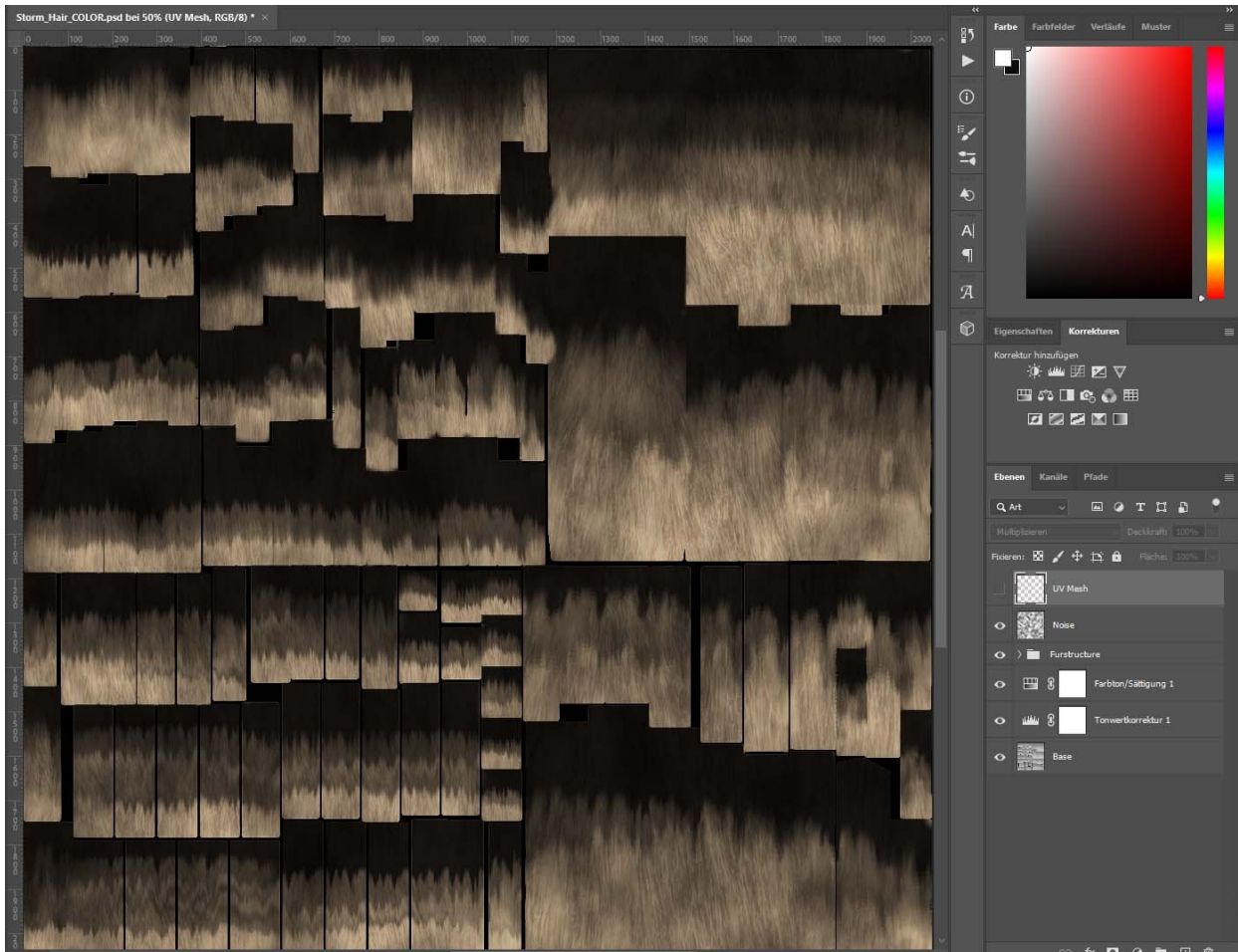
Working with the Blender scene

I assume that you know how to work with Blender, please understand that I cannot provide an exhaustive tutorial about how to edit models.

Open the provided „CleanerWolf_Model_vXXX" file. It was made with Blender version 3.6, but should also work fine with any newer version of Blender.

The model consists of multiple parts, with the hair/fur parts being organized in their own collection (HairGeo_final), but all the parts are assigned to the „Wolf_Rig" armature.
I made this „construction kit" system to make it easier to edit the different parts and to make it possible to just export the parts you want to use for your customized version.

The props, like the collar and harness should be exported as separate FBX files. They are grouped under their own collections.

Please note: Most of the meshes have blendshapes which causes some limitations. Removing or adding geometry can mess up the blendshapes and also applying modifiers is not possible.

Important: Before you export the model all the mesh parts you want to export (except props and clothes) must be joined to a single mesh! Select all those parts, with the „Body" mesh being the last one, then press CTRL+J. Export only the Body mesh and the Wolf_Rig armature.
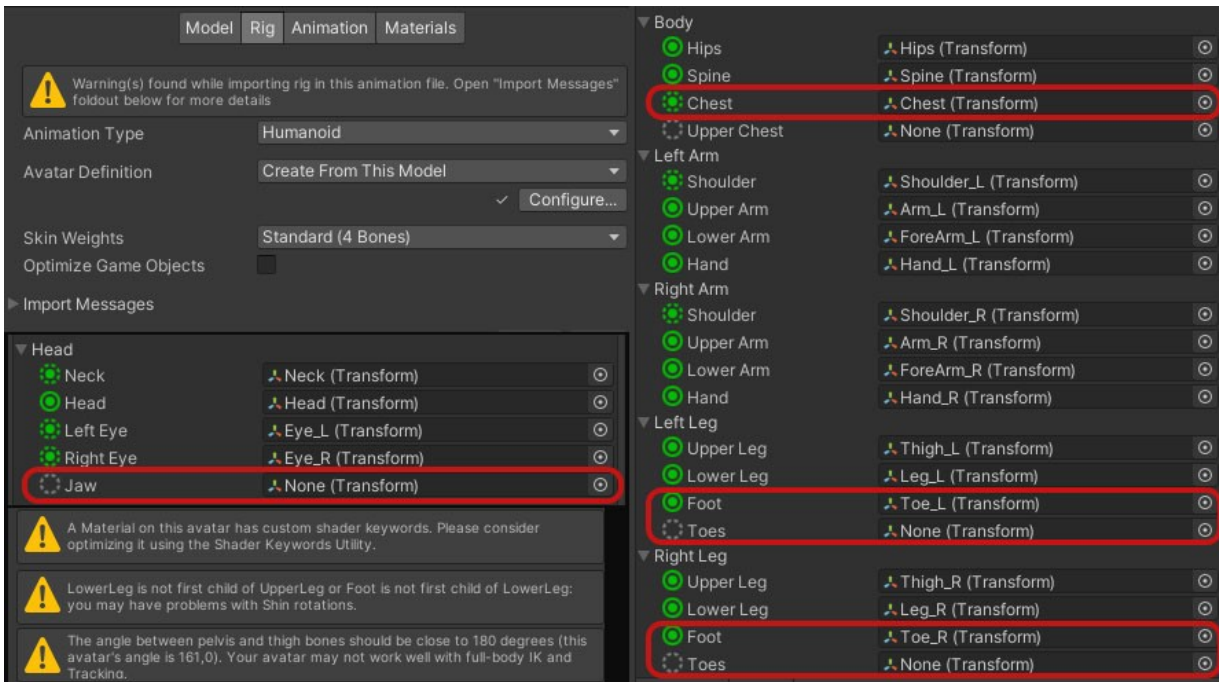
Exporting the FBX

Unity needs the model as a FBX file. Here are the export settings I use for my avatar:
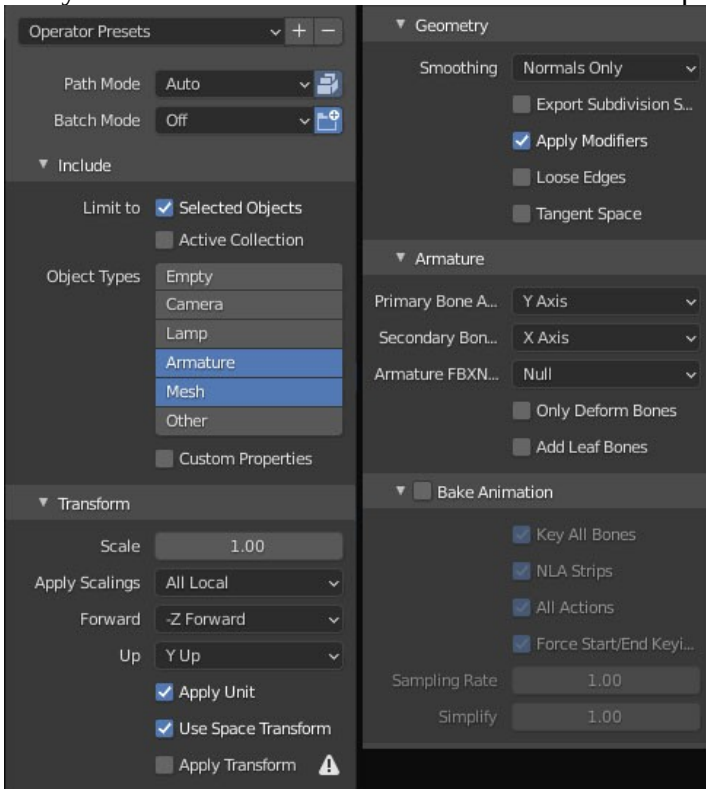
When importing the FBX in Unity, drag&drop it in some custom folder under „Assets/CW_Avatar". Use my FBX files that are provided in the Unity project as reference for the import settings.
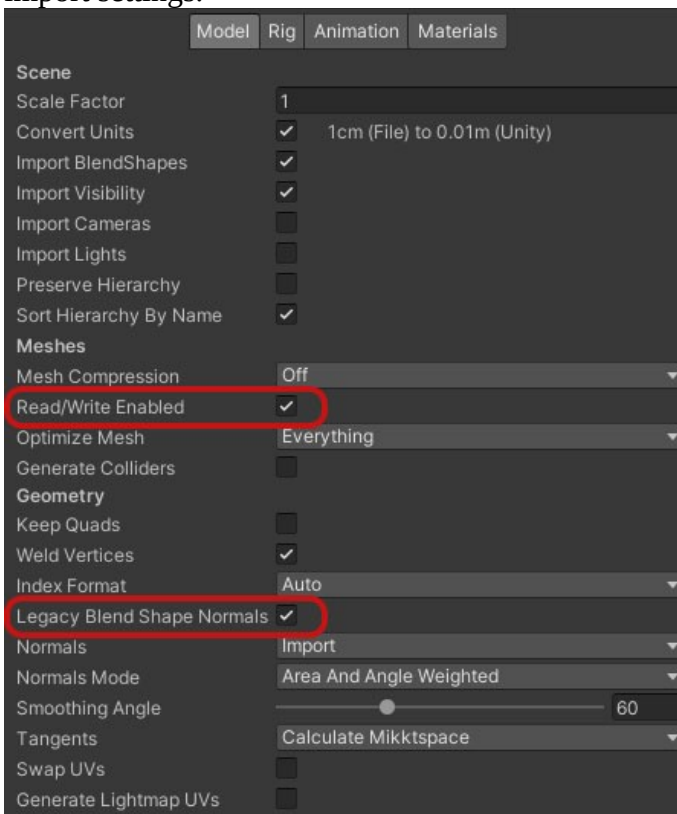
The toe bones are assigned to the foot and the toes have no bone assigend to them. This is a workaround for the IK system in VRChat to work correctly. The warning messages can be safely ignored, the avatar will work fine anyways.
Also make sure, that there is no bone assigned to the Jaw in the head section, otherwise your avatar will have an open mouth all the time. Also assign the chest bone to the chest, Unity likes to forget that!

This is the proper material assignment for the FBX:
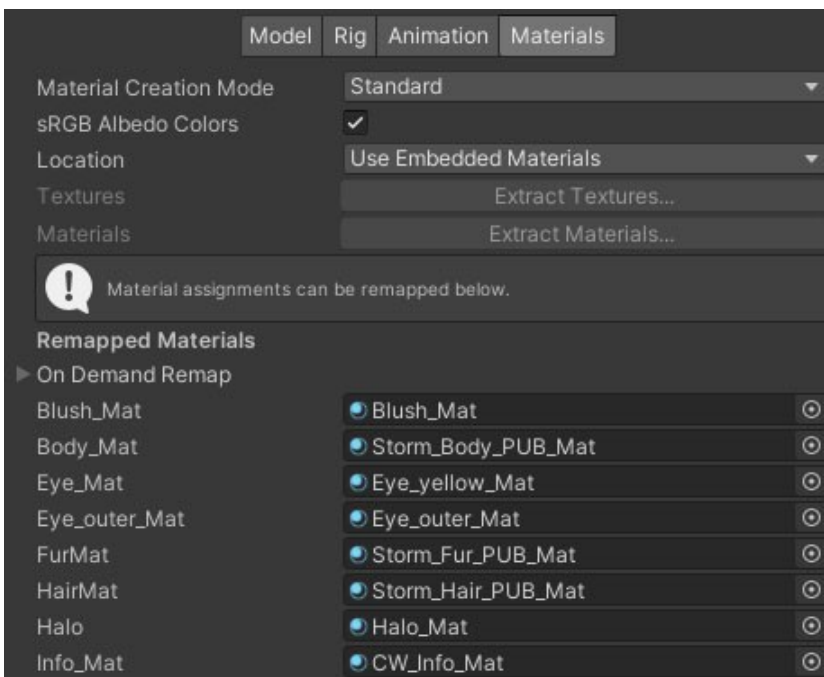
I strongly recommend *not* to overwrite existing FBX files in the project with new ones, because Unity doesn't like that, especially if the rig was changed. Instead, import the new FBX with a new name and use the „Pumkin Avatar Tools" plugin for Unity to copy the avatar descriptor and physbones from an older version to the new version.

Plantigrade legs vs digitigrade legs

Many anthro characters have digitigrade legs, like most animals they walk on their toes, not the entire foot. However, the leg IK of VRChat expects a humanoid leg and foot for full body tracking to work correctly.

My current workaround for this problem is as follows - If you look at the model in Blender, you will notice, that the legs are indeed rigged as digitigrade legs, with correct bones for foot and toe.

However, with the current state of things in VRChat, I am not using the foot bone in Unity, instead the foot gets remapped to the toe bone and the toe mapping is not used (watch screenshot in FBX section above). The result of this is, that the ankle of the foot is stiff, but the leg IK works correctly with FBT and also MMD animations work much better. But if you want to try use the foot bones, you could map them accordingly and compare the result.
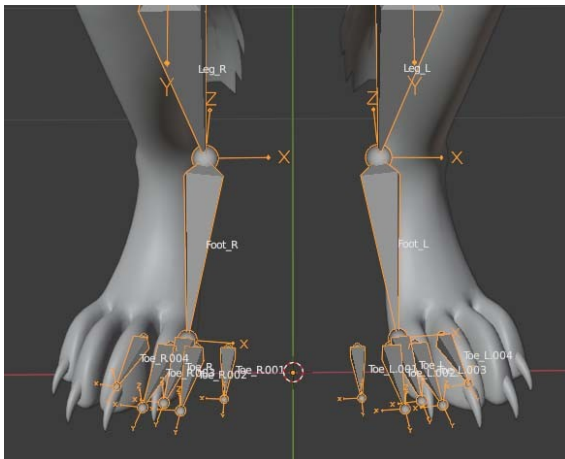
In addition to that I also made a blendshape „Armature_Digilegs" that pushes the geometry of the legs a little bit outside to make them look more „animalistic", compensating the straightened rig. This works, because the blendshape deformation happens after the bone deformation.
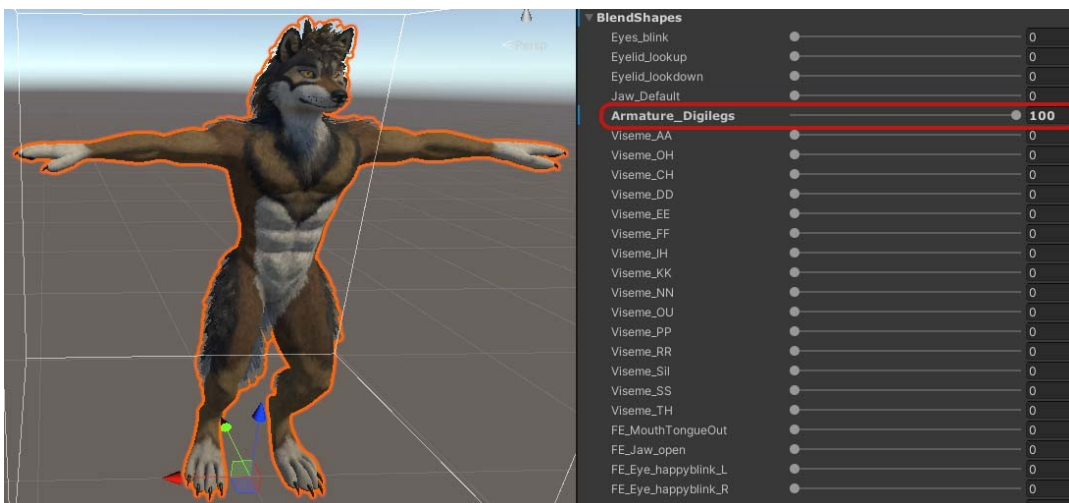
Optimizing textures

While it makes sense to work on the textures in 8k resolution, usually the target resolution that will be used in any game engine should not be higher than 4k (4096x4096). That's also why only the AD version of the CleanerWolf avatar uses 8k textures for the body, it's supposed to be used in small groups anyways.
If a texture is just a grayscale image, convert it to 8 bit grayscale.
The preferred file format for textures should be TIF with LZW (lossless) compression.

All textures you import in Unity will be converted and compressed in a special format. In addition to that you can enable „Crunch Compression". It's lossy, however you will not notice any visual difference in most cases, but will notice a huge difference in file size. I highly recommend to always enable Crunch Compression!
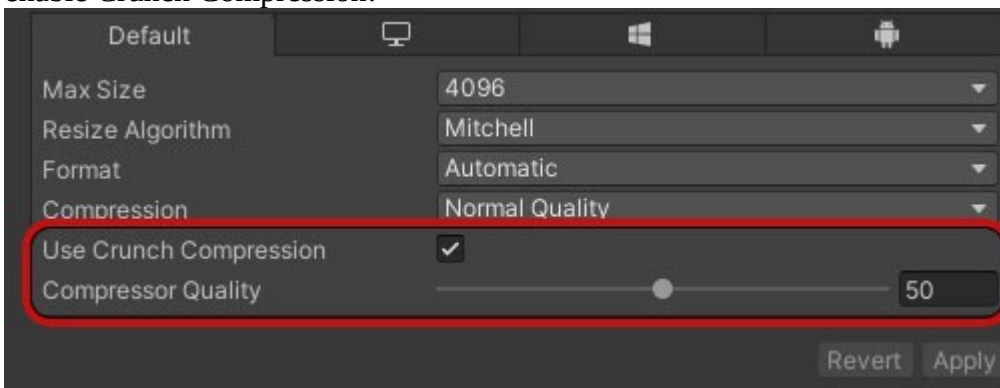
Thoughts about avatar rippers

Unfortunately there are some VRChat users who think that stealing other peoples avatars would be cool. Those „rippers" use mods to either force-clone avatars (no matter whether they got uploaded as public or private) or they download avatar files to offer them on various websites. On a technical level there is not much you could do about it, but there are a few things you could do to lower the risk of your avatar being ripped or to troll the rippers.
- Use your personal avatar only in „Invite" worlds together with people you trust. In public worlds use public avatars that are clonable anyways.
- When uploading your avatar give it an unspecific name like „Test XYZ" and an empty/funny thumbnail. This way people will have a very hard time finding your avatar on ripper archives.
- In specific cases of ripper mods downloading other user's avatars automatically it turned out to be good practice to troll the rippers by uploading unusable „junk" avatars, let those get ripped and then to delete them from VRChat again. This way, the ripper's archive gets filled with unusable data.
- There is now a tool that promises to „encrypt" avatars, if you like to give it a try, get it here →
https://github.com/PlagueVRC/AntiRip

Product support:
I am just a one-man-army so please understand that I am not able to provide individual product support. However, I highly recommend to join my Discord server to get help and report problems.
→ https://discord.gg/VTv9JUGUJX

License:
- You can upload and use customized versions of this avatar in VRChat as a „private" avatar.
- You can upload and use customized versions of this avatar in VRChat as a clonable „public" avatar only if you include my creator info.
- Commissioning custom skins or modifications for this product is allowed only if both, the customer and the commissioned person own it.
- You can NOT use this product for commercial projects. If you want to do so, contact me for making a deal. However, using the product for Youtube or Twitch content is allowed.
- You can NOT redistribute or sell any parts of this product.

Terms and conditions:
- This product is not refundable. By purchasing this product you are buying a digital copy and because of this there is no fair way to give it back.
- I am not responsible for any violation of the VRChat community guidelines or platform rules being caused by misuse of my product.
- This product is provided „as is" without any warranty of any kind.
- You are not allowed to make any hateful, discriminating, racist or offensive content with this product.

Thanks to (in alphabetical order):
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- Reimajo
- Senky
- Shywolf
- Warren