Complete Tutorial on Transferring MMD Characters to VAM——Take the character Aemeath from the game "**Wuthering Waves**" as an example

——64843425-lin

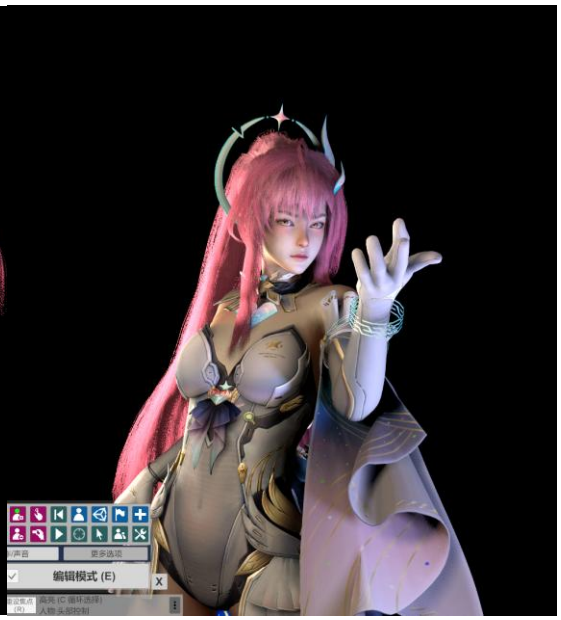
Preface:

This time, I would like to share with you the production process of the character Aemeath from the Wuthering Waves series. The main purpose is to document the production experience of this set of clothes. During the process, I learned a lot and have written it into a tutorial as a process sharing. I hope to record it as detailed as possible. If it can help you, that would be great.









Newbies who want to start creating usually begin by importing pre-made models. I often thought that there are so many attractive game model clothes available online. It would be great if they could be used in VAM. However, I haven't seen any complete process instructions in the community. After exploring on my own for several months, I summarized this complete process and shared it as an experience, hoping to give back to the community and help everyone make progress together.
To read this guide, one needs to have a certain understanding of the functions of VAM and the operation of modeling software. I have tried to provide detailed explanations, but of course, there may still be some omissions. This guide provides a comprehensive explanation of the entire process of character creation, with a focus on clothing production. I think this set of clothing is very suitable for process explanation because it includes a wide variety of clothing types, such as tight-fitting clothes, hard-surface equipment, simulated clothing with different patterns on both sides, trailing and drooping ribbons, and flexible bone sleeves made with CUA.

My English is not good. This guide is written in Chinese and translated by AI. The VAM software is also in the localized version. Therefore, the translations of some terms might not be completely accurate. I will take screenshots and mark out the corresponding positions. I hope this won't affect your viewing experience.

The tutorial is quite long and there might be some parts that are not very detailed. If you have any different opinions, please feel free to discuss them with everyone.

Creating characters for VAM is no easy task, as every critical step can go wrong—problems that you might only discover when importing into VAM. In practice, you may need to repeatedly revise and refine your work. A tribute to everyone who tirelessly fixes and improves their creations.
Note: Creating characters for VAM is no easy task. Every crucial step can go wrong, and these issues are likely to only be discovered when you import VAM. During the actual production process, you may need to constantly rework to make corrections. Let's pay tribute to everyone who continuously refines and improves their work.

Note: First and foremost, pay attention to copyright issues!!!! Never reuse clothing or textures created by other paid authors for redistribution. For example, do not use paid works from VAM creators or content downloaded from other platforms such as the DAZ Store. If detected during review or successfully reported, your account may face penalties or even be banned by the VAM community.
This guide does not use any materials prohibited from distribution.

This tutorial mainly consists of the following sections:
1
Preparations before importing VAM
2
Import the clothing grid into VAM and create the materials for the clothing.
3
Creating simulated fabrics and flexible bones
4
Creating hair and deformation, as well as body textures
5
Package and publish on the hub

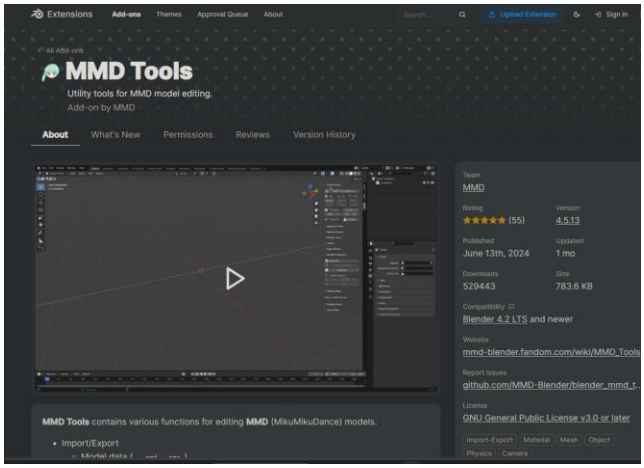
The tutorial begins here!!

Part One

First, we import the game model into the modeling software (you can usually find free ones on the MMD download website), and modify the model's mesh to achieve a good display effect in VAM. Here, I will demonstrate using Blender. The same process should apply if using other modeling software.

1-1
Preparation:
I downloaded the character model from a free MMD model sharing website. It was already rigged with bones, which was perfect for me.
Here, I imported it using the MMDTool plugin in Blender, which can fully preserve the model's mesh, bones, and materials.
This Blender plugin can be obtained at the following website:

https://extensions.blender.org/add-ons/mmd-tools/



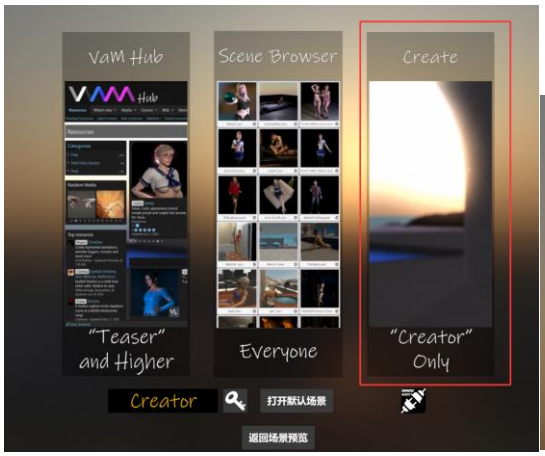
According to the instructions of the plugin, import the mmd model into blender. Select the bones, choose the pose mode on the upper left corner, and give the character a simple movement to check if the bones of the hands, feet and waist are normal, and whether there is any adhesion or misalignment.



1-2

We only need to use the clothing part of the mmd model. We also need to export the character's model mesh from vam to conduct a rough match (so that the clothes can be put on the character), and the subsequent modification of the clothing mesh needs to be based on this character model.

Enter the default scene of vam and select the character



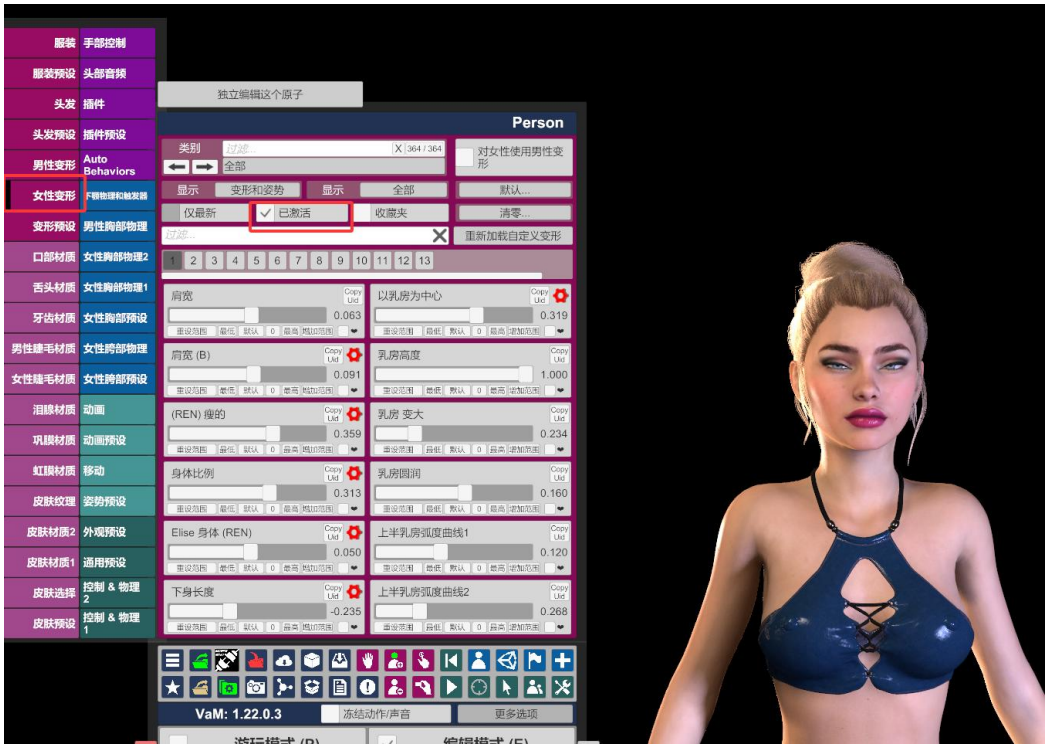


1-3

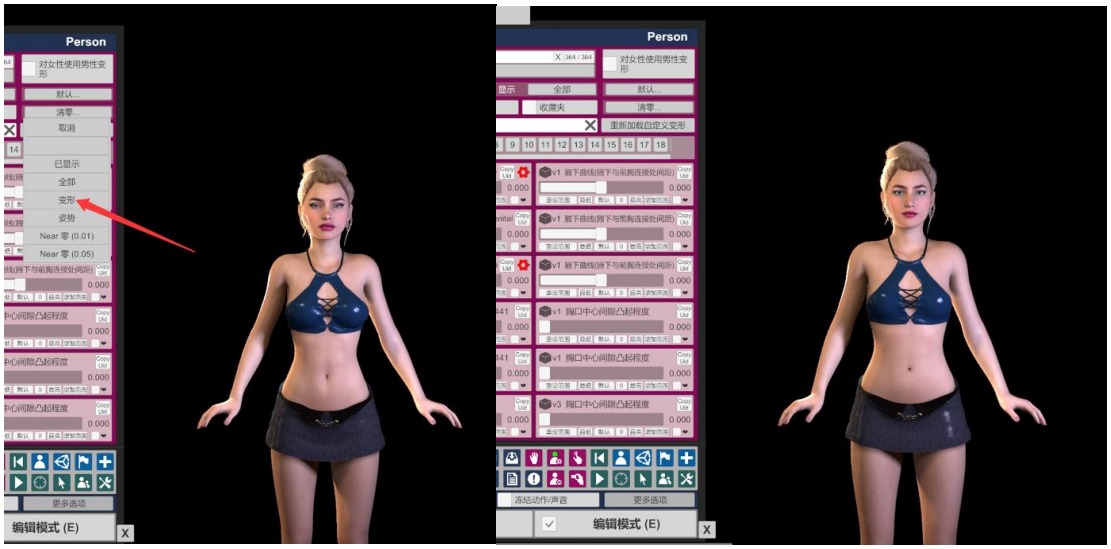
Next, we will import the default human model in VAM and bring it into Blender as well.

Attention!!! The default characters in the default scene are not the default characters!!! The characters in the scene have custom deformations!!!

If we open the character deformation interface and check the activated deformations, we can see a large number of activated deformations.

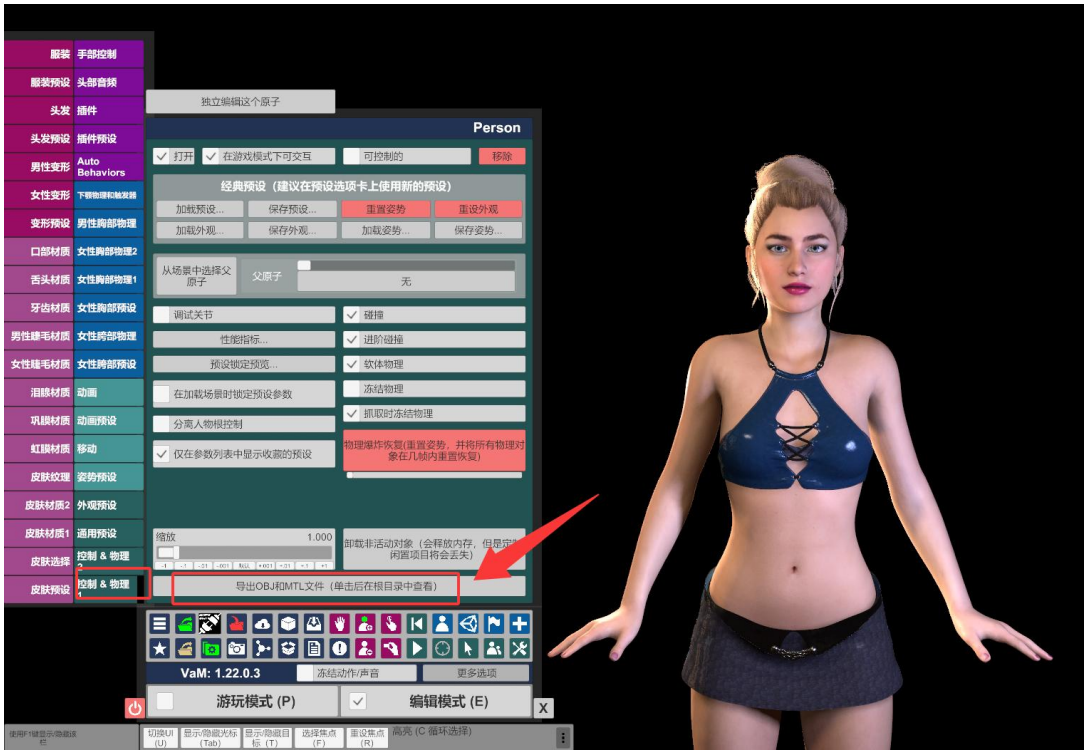


We enter the female transformation interface and select to clear the transformation. Then we can see that the character's form has changed. This is the original basic character form without any customized transformation.



1-4

Next, we move to the Control 1 interface. Click "Export", and VAM will convert this character's nude model (without clothes and hair) into a Tpose format and send it to the VAM installation directory.



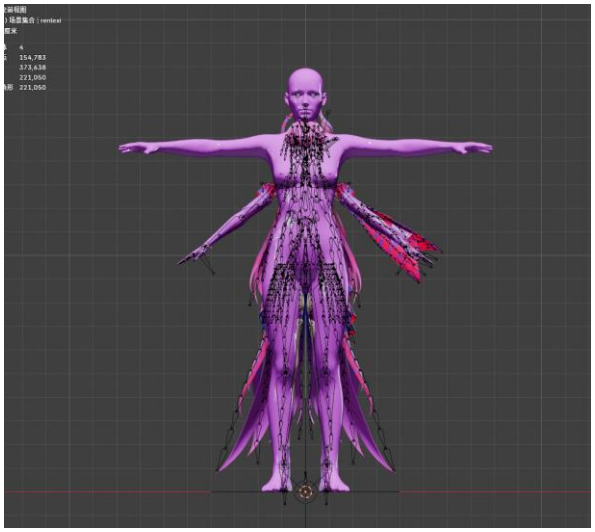
Attention!!! The process described in this guide is based on the default VAM body type. The advantage is that it provides better compatibility for other similar body types, making it suitable for playing dress-up games in VAM. (Most authors' characters are created by slightly adjusting the default body, with little difference in general.)

Alternatively, if you want to create clothes for characters with custom deformations, such as to better replicate the original appearance, with exaggerated large breasts and large buttocks, you can add your own deformations before exporting. This method requires adding the clothing to the deformed mesh (which requires a plugin, as VAM does not support this aspect very well natively). If worn on characters with other body types, the mesh will distort or even tear, resulting in a poor effect. I will also release a related tutorial later.

If you are a beginner and making your first attempt, I strongly recommend using the default body type.

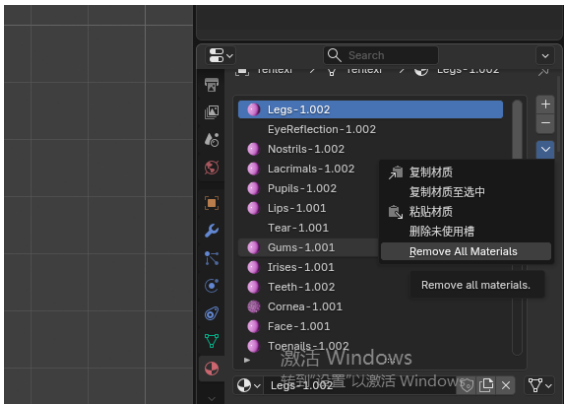
1 - 5

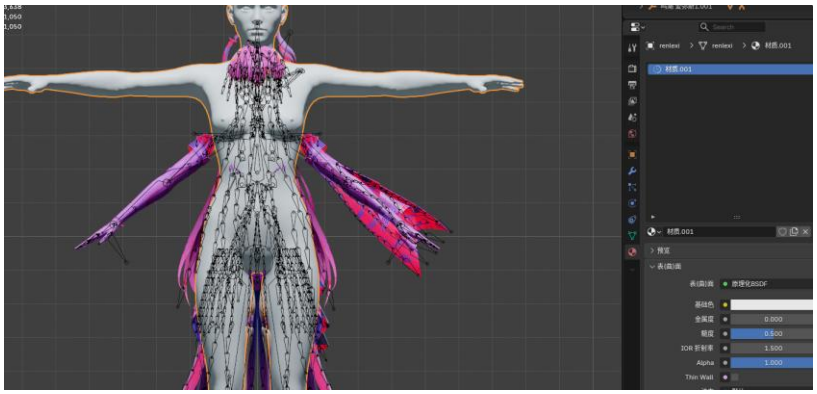
After determining your model, press the export button as shown in the figure and manually load it into Blender. After the import, we can see that both the character and the clothes on the MMD model are purple, which looks very ugly. In Blender, this is usually due to a texture error. Later, I will explain how to fix it (for some models, the import may be normal, and only the incorrect ones need to be repaired).



1-6

Select the human body and delete all except the material. Add a solid color material to the human body to facilitate distinction.





1 - 7

Now we have:

1 - The fully equipped MMD model

2 - The basic nude character model

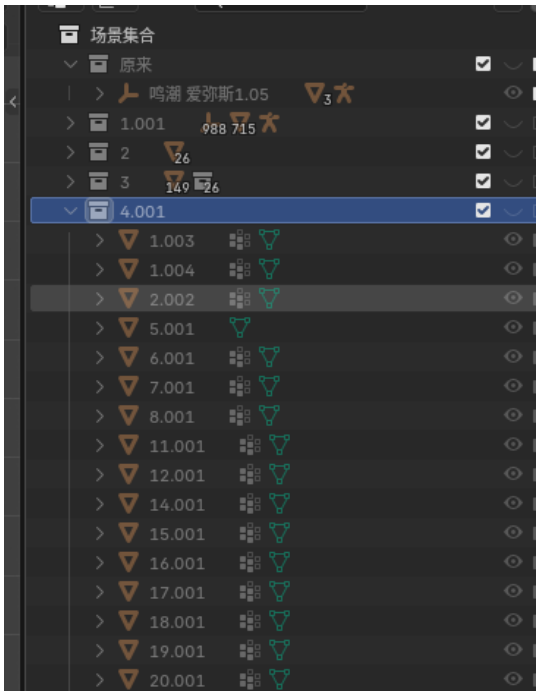
Next, I will match the equipment and character mesh in Blender.

Attention!!! For the following steps, I suggest you make a mesh backup at each stage to facilitate modification when errors occur. Because mesh modifications (such as applying modifiers and deleting parts of the mesh) are irreversible.

Also, the model name and mesh name cannot contain Chinese!!! Otherwise, there will be errors in VAM.

I like to use the Blender shortcut key shift+d to generate a mesh backup, and then hide it. It is recommended to group and name each stage's mesh according to your habit, such as I group them as 1 (pose setup) - 2 (component splitting) - 3 (wrap the human body) - 4 (material grouping) in this order. I also named this tutorial 1-7- (production sequence) below.

It is recommended as shown in the following picture.

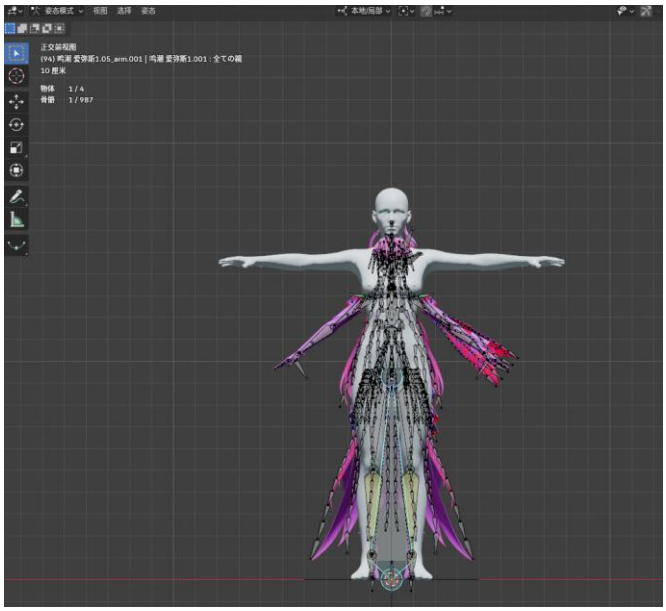


1-7-1-1

It can be seen that the default posture of the MMD skeleton is A-pose, while in VAM it is T-pose. Moreover, there are certain differences in the body proportions between the two. We can simply manually adjust and match them. This is not a difficult task. Here, we will do a rough matching first, and then make detailed adjustments later.

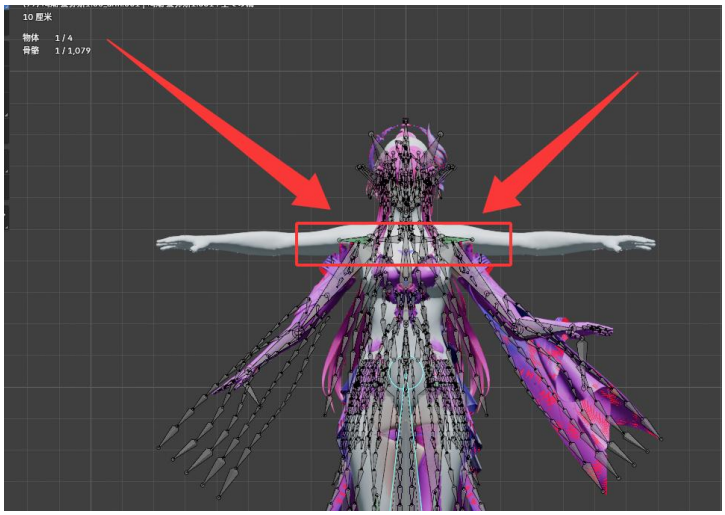
1-7-1-2

Select the character's skeleton. Enter the pose mode in the upper left corner. Select the root bone (the largest one, which can control all the bones at the same time).



Use the "S" key for zooming. Zoom in until the shoulder part aligns properly.

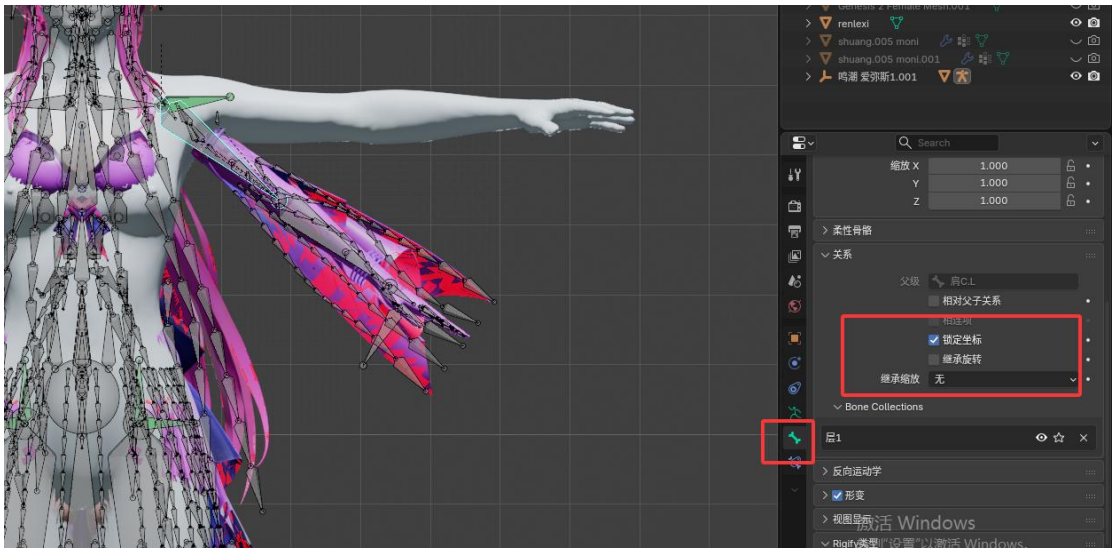




1-7-1-3

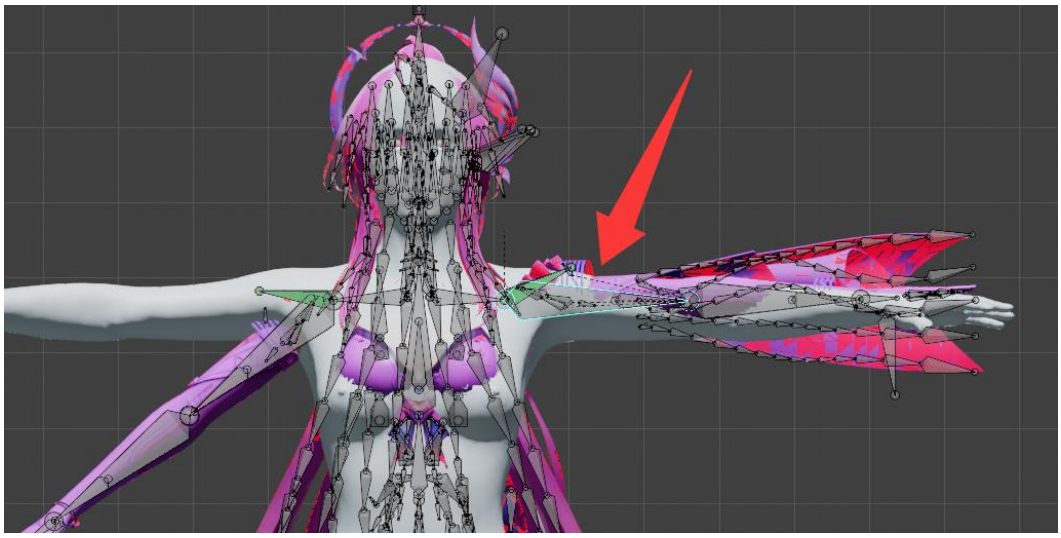
Select the arm bones. In the lower right corner, disable inheritance of rotation and scaling to prevent the arm adjustment from affecting other bones of the hand below.

Perform the operation of disabling parent influence on all the remaining hand bones on this side to facilitate the separate adjustment of a single bone in the future.



1-7-1-4

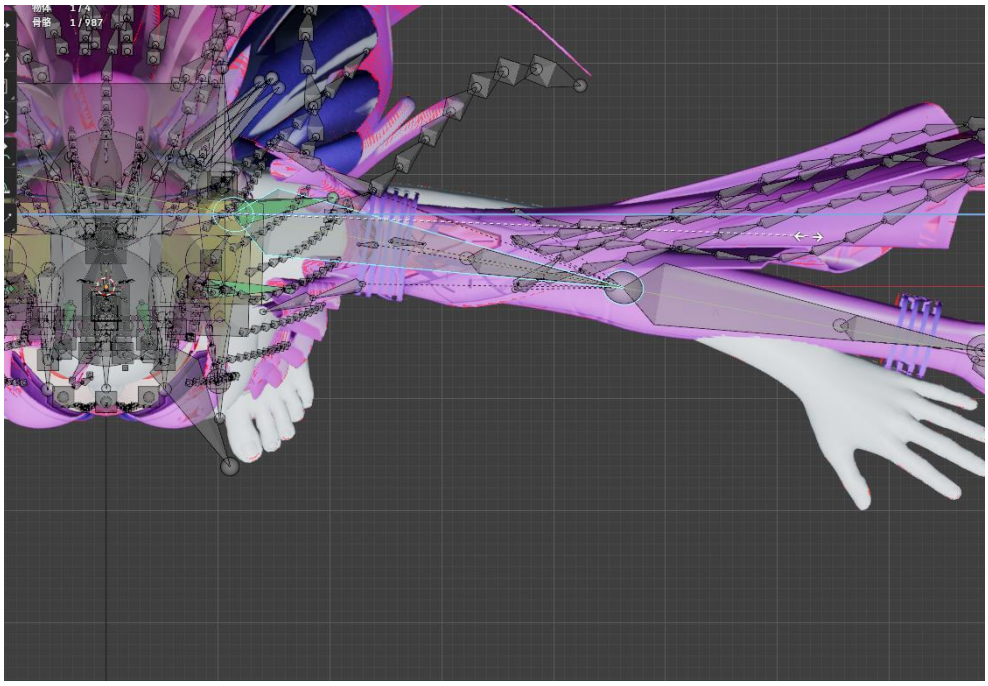
Next, adjust the bones of the mmd model to match the posture of the human model. Only one side of the bones needs to be adjusted. Later, you can perform a mirror operation. Switch to the front view, select the bones, press R to rotate, and pull the shoulder and arm parts flat. Just make sure the angles look approximately the same from the naked eye, and a slight difference doesn't matter much.



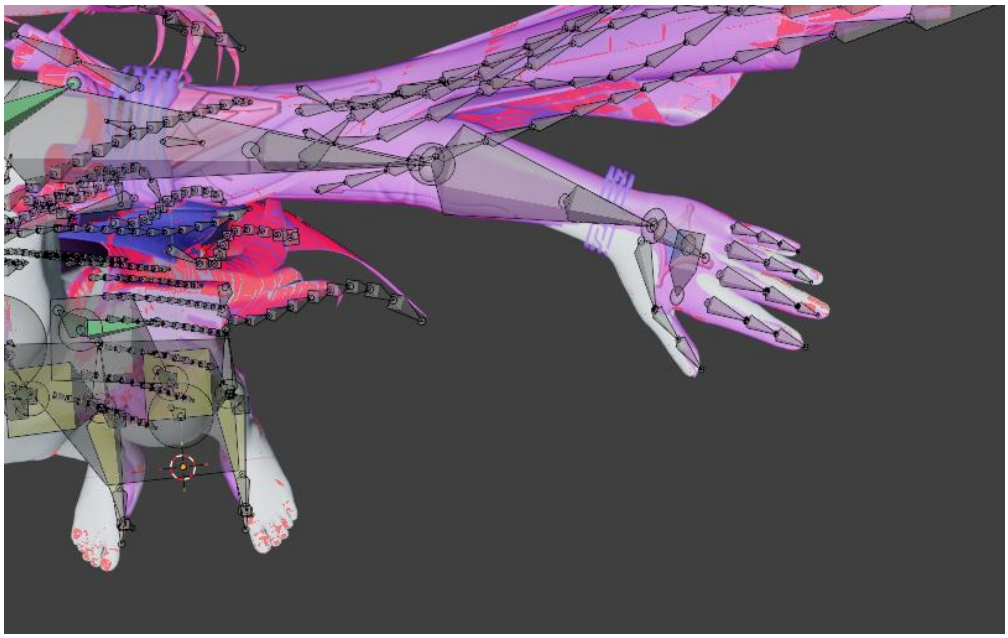
Perform a grid backup!!! As an archive point, it may be very useful later on.

1-7-1-5

Stretch the bones along the 's' axis to match the length. If the arm is stretched too thickly, you can use 'Shift + axis' (such as 'x') to perform single-axis scaling.

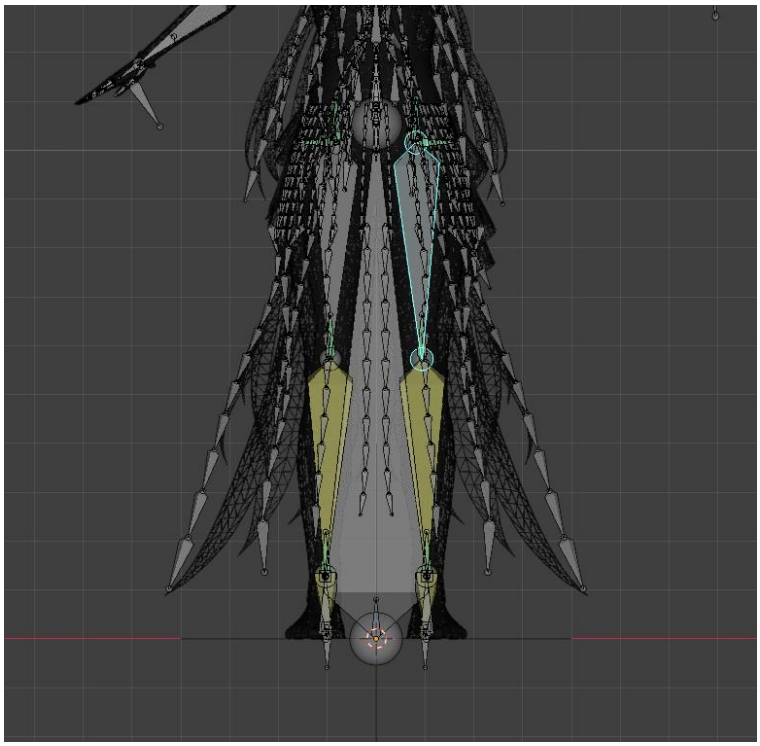


By using the top view and the front view, match the positions and scales of the palm and fingers.



1-7-1-6

Then we select the leg bones. First, we remove the parent influence. Then, we proceed with the matching process. Just align the upper 80% of the positions. There is still room for further adjustments. The thigh needs to be stretched to roughly align with the knee position.



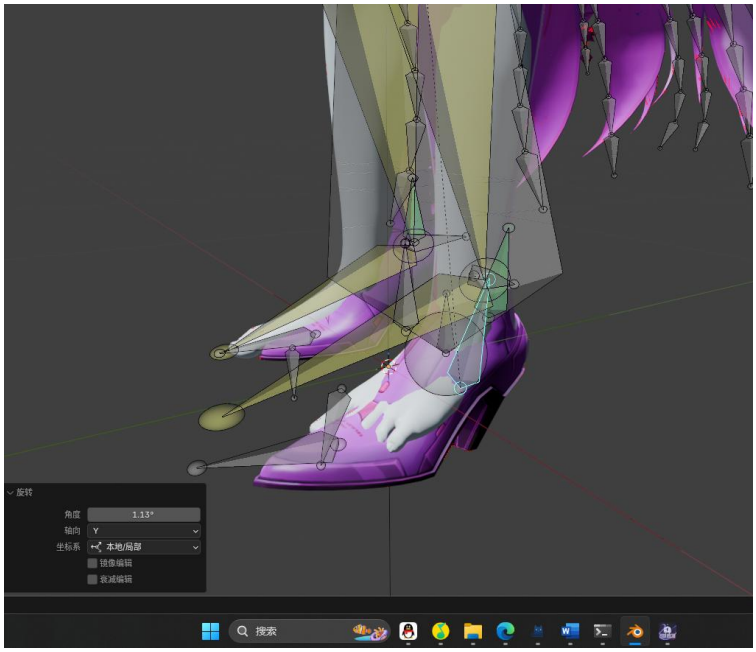
1-7-1-7

Stretch the length of the lower leg by stretching the bones at the knee area



1-7-1-8

Rotate and move the position of the heel bone to make the instep of the foot roughly fit the shoes. Do not require complete coverage of the foot sole at this stage. Later, modify the mesh locally to achieve the coverage.

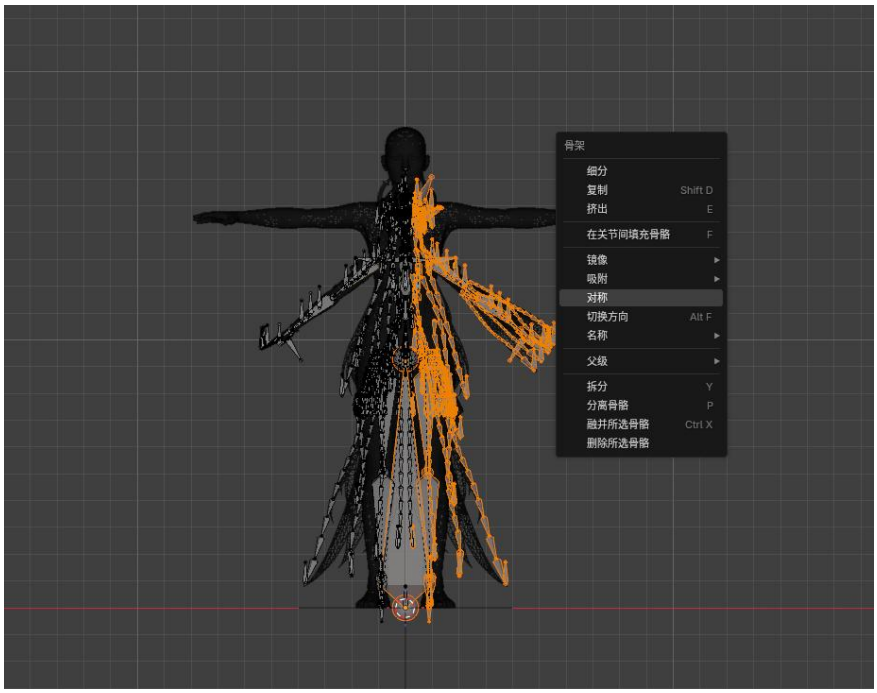


Pay attention to aligning the knee part and the approximate thickness of the legs. Rotate the sole to align with the angle of the outward eight position. Do not rotate the knees or the lower legs.



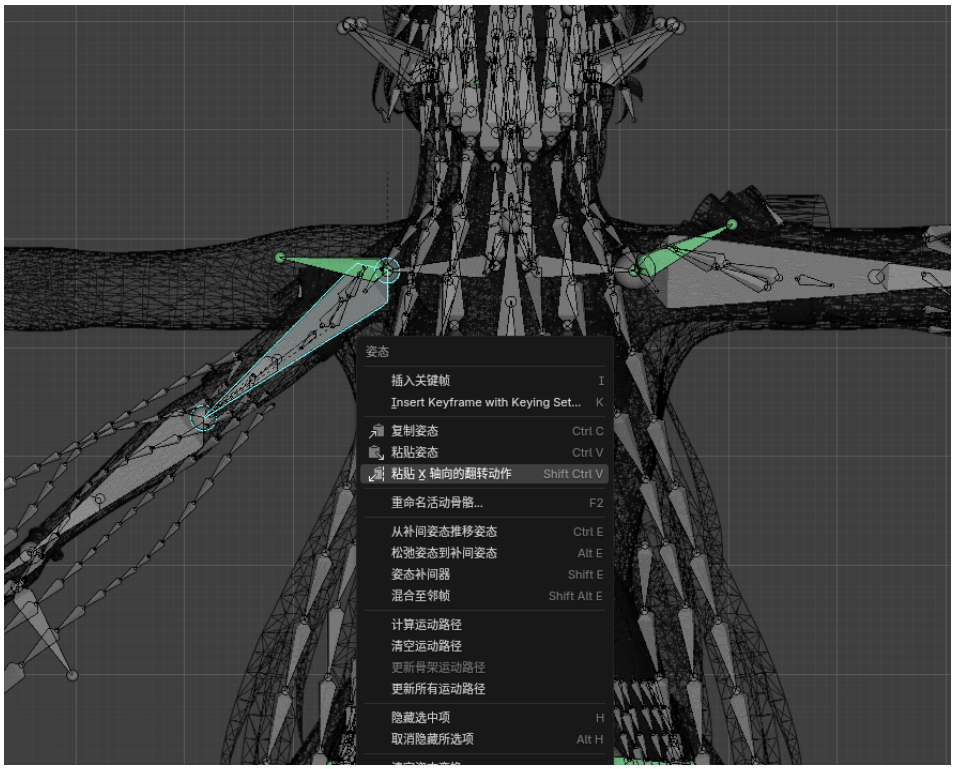
1-7-1-9

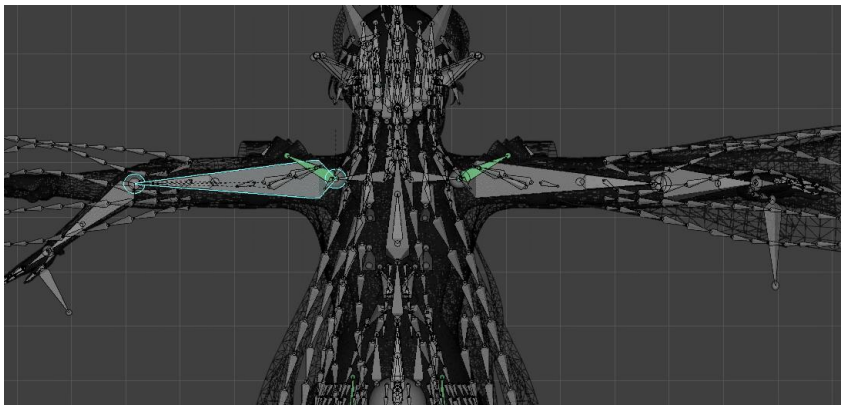
Press Tab to enter the bone editing mode. Select the bone that we have modified, then right-click for symmetry.



1-7-1-10

The upper left corner reverts to the pose mode. Select the bone that we adjusted, press Ctrl+C to copy the bone position. Then, go to the corresponding symmetrical side and you can copy the pose of the bone over.

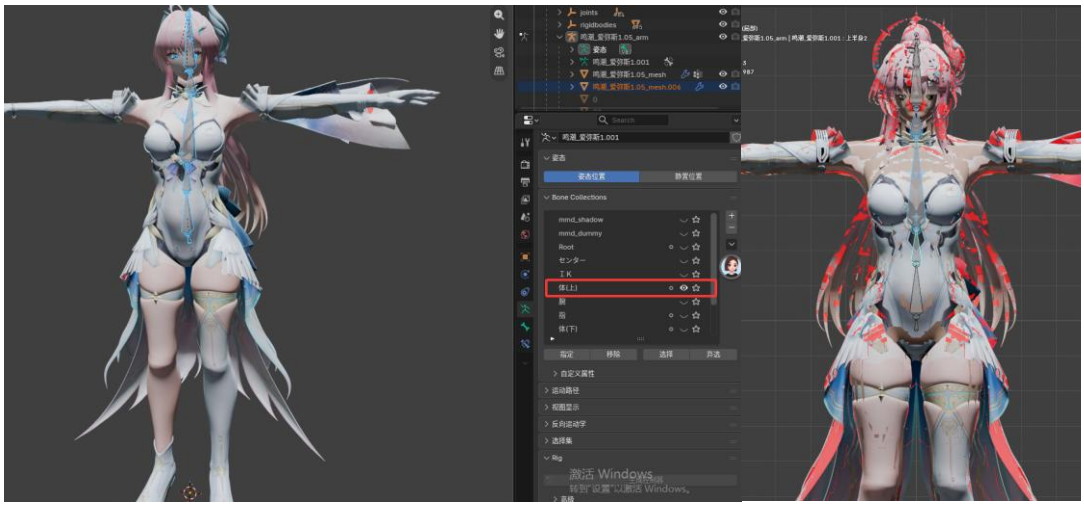




Performing this operation will align all the bones of the hands and feet symmetrically.

The skeletal hierarchy interface can be toggled on or off. Only the bones of the limbs that need adjustment should be displayed.

The thickness of the neck and waist can be controlled by axial scaling. Only the thickness is changed, without altering the height.

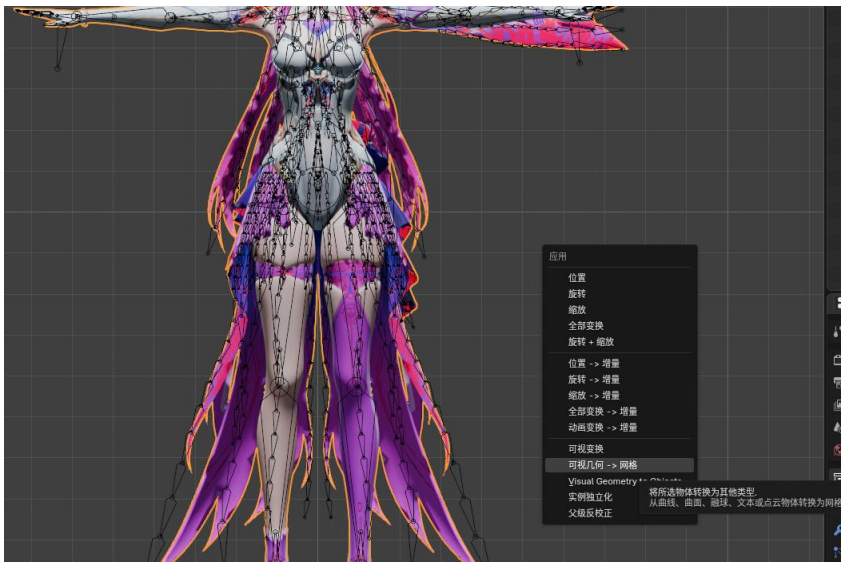


1-7-1-11

After completing the symmetry of the skeleton, we obtain a T-pose, roughly sized MMD character model.

Congratulations! You have completed the first step of the long journey.

Make a backup first! In Object Mode, select the mesh, press Ctrl+A, and in the menu, convert the current pose to a visible mesh.



This way, the model in the desired pose is obtained.

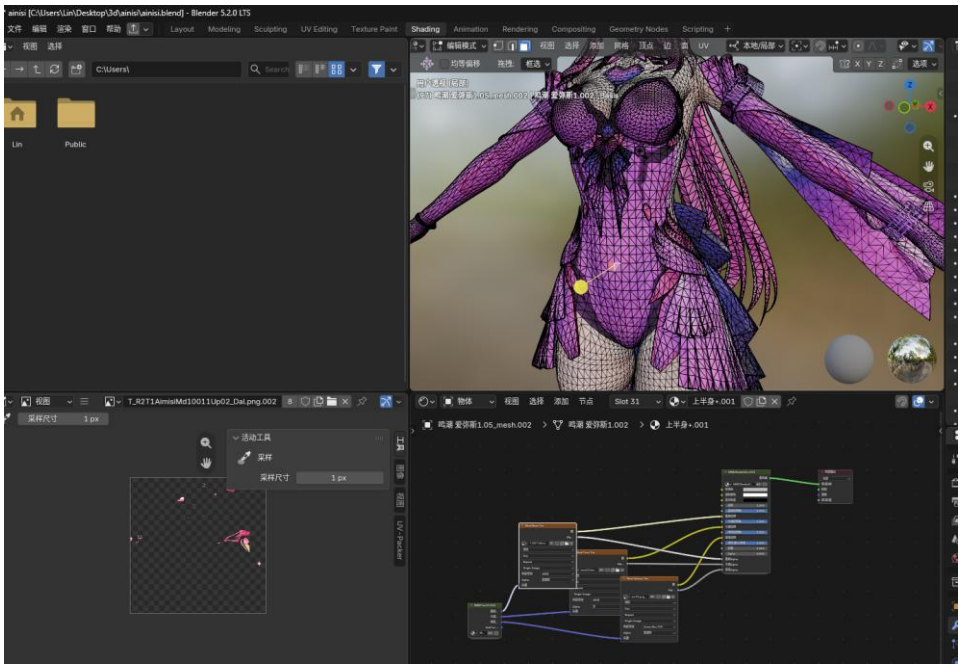


1-7-2-1

Now we move on to the second part of the clothing model preparation, which is to disassemble the clothing components.

Here, we will first fix this entire purple outfit.

Press Tab to enter the editing mode, and then select the shading mode



Select the model mesh, and you will see the following three screenshots. None of them are normal clothing textures (each model may be different, and you can fix them as needed).

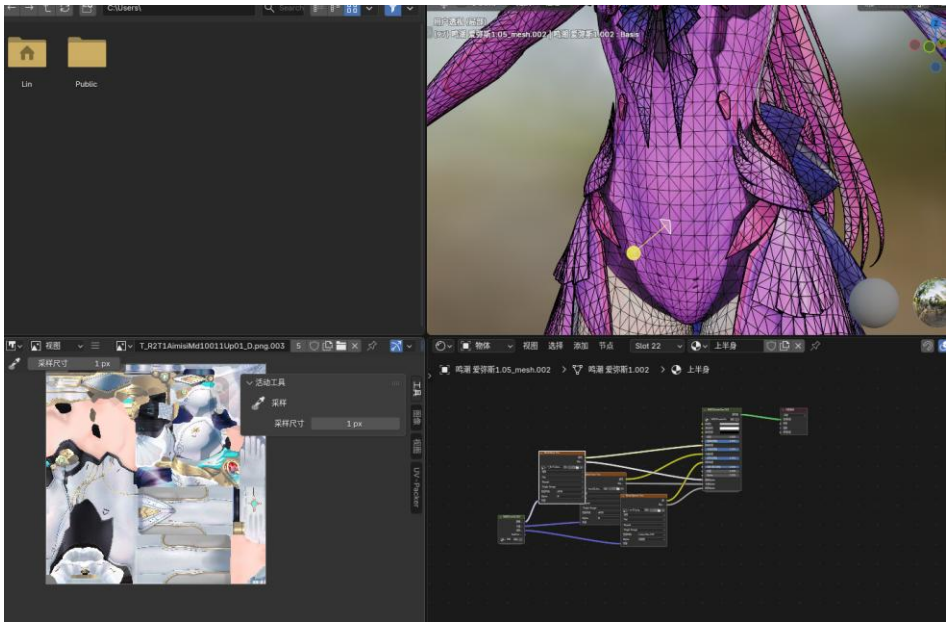
1-7-2-2

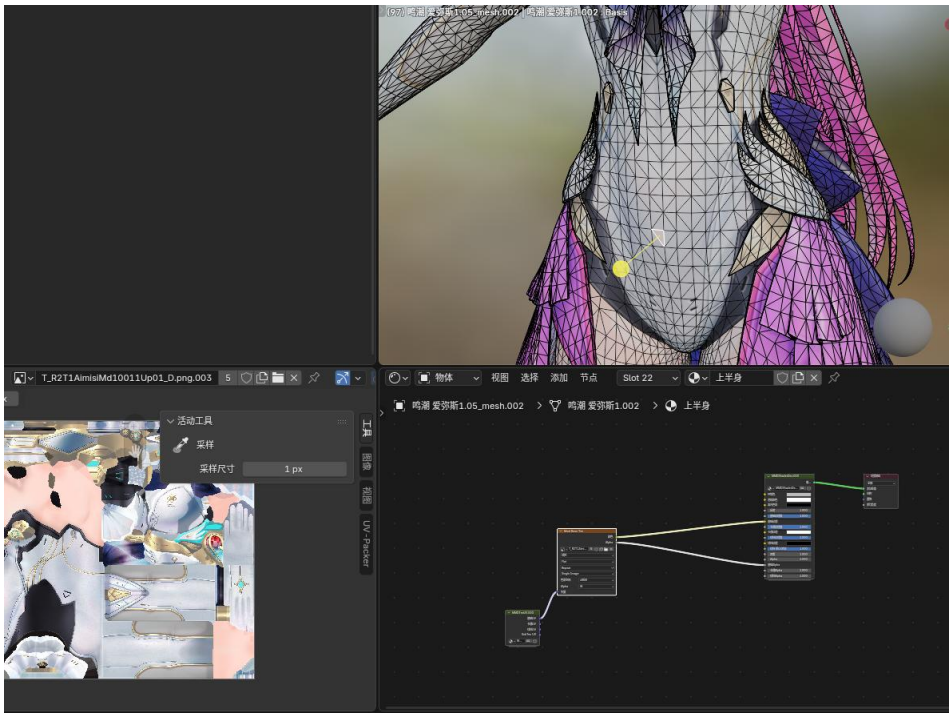
Press the L key to select adjacent grids, then move the g key. You can see that a layer of transparent grids has been moved out. This is usually used for rendering strokes, other effects, etc. Here, we don't need it. You can directly press the x key to delete it. The part that doesn't move is the clothing we need.



1-7-2-3

It can be seen that the part connecting the base color nodes, which is the clothing texture in the lower left corner, is displayed normally. We can keep this one. Delete the other textures in the interface. Then you can see that the clothing color is normal.

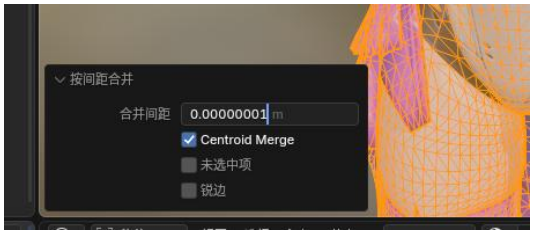




1-7-2-4

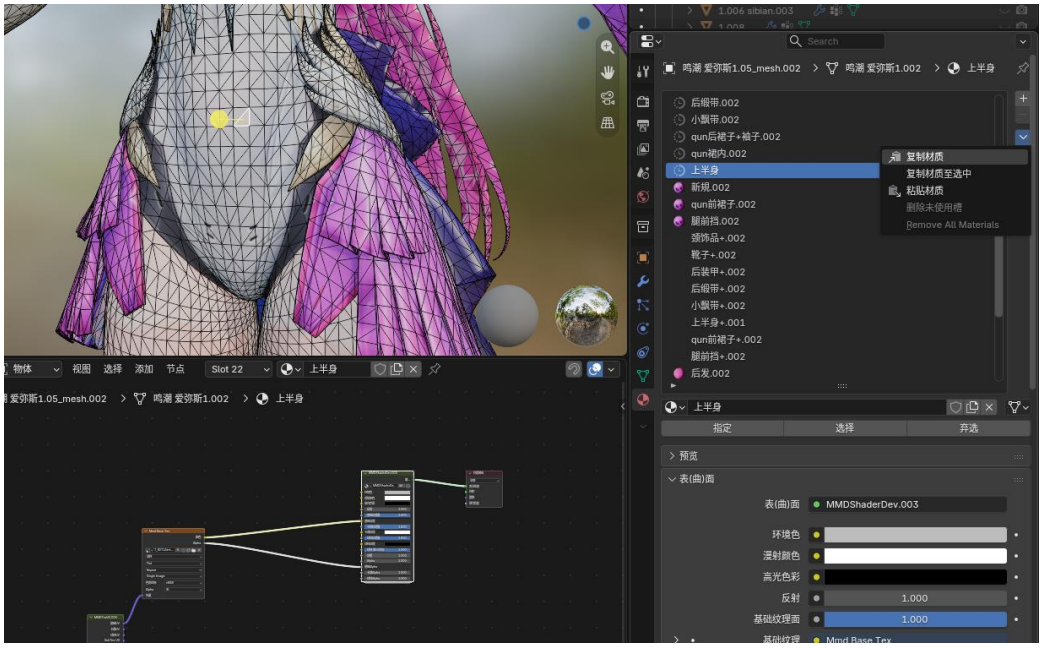
Then deal with the other clothes. Deleting one by one is too troublesome. Let's directly press the A key to select all the elements in the grid, and then press the M key to merge the vertices based on the distance. Add several zeros after the distance. Only the vertices that are almost completely overlapping will be merged.





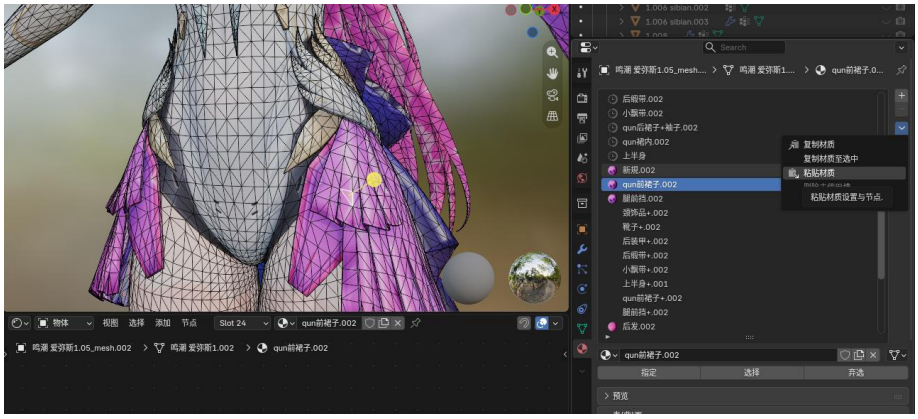
1-7-2-5

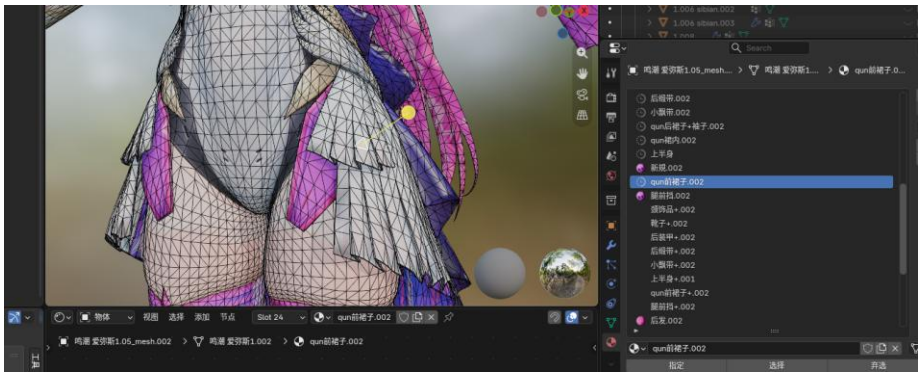
Locate the mesh of the material we just modified. The material selector on the right will automatically switch to the corresponding material. Select to duplicate the material.



1-7-2-6

Select the clothes from the adjacent folder. The MMD model materials are generally categorized by skin, clothes, and hair types, even if the model meshes are separate, the materials are the same. Copy the normal material you just created and paste it over this purple mesh. You can see that the color of this mesh has also been restored.





1-7-2-7

After completing all the material repairs as per the above instructions, you can see that the model's color display is normal.

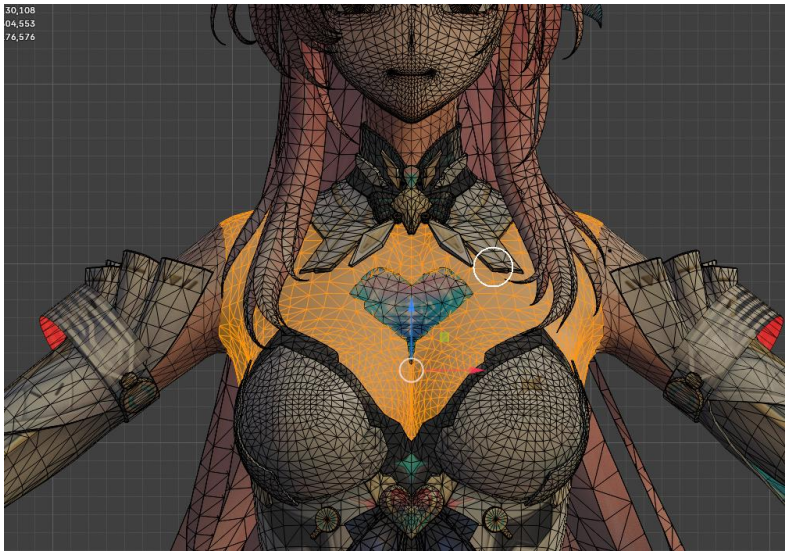
Make a backup, then continue the operation. It is recommended to package all the previous files with the M key into a collection and hide it.

Then enter the second stage in the new collection.



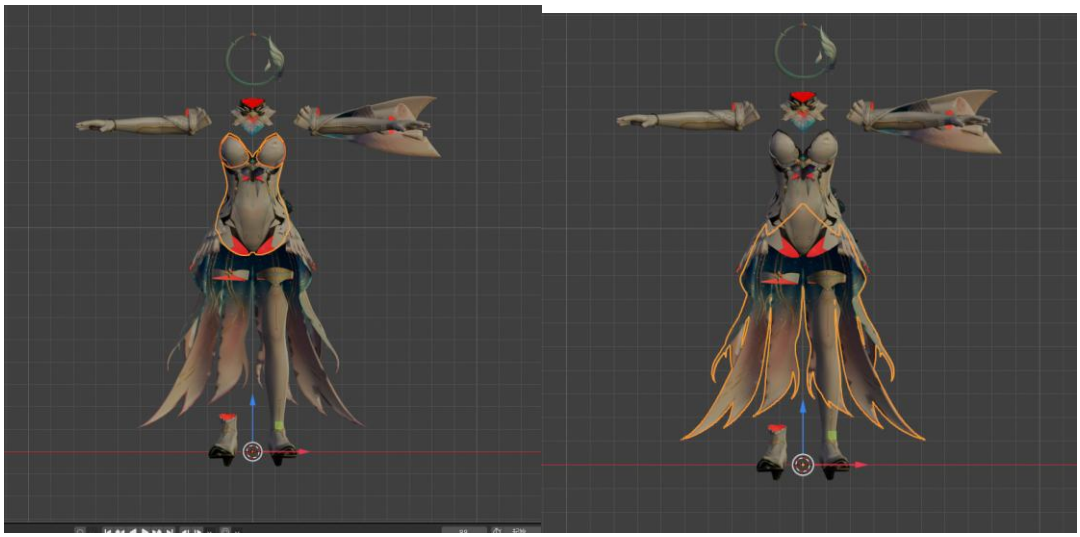
1-7-2-8

Select the character's skin. Press the L key to select adjacent meshes, press the X key to delete. Also delete the hair, eyebrows, eyes, tongue and other objects, and keep the clothes only.



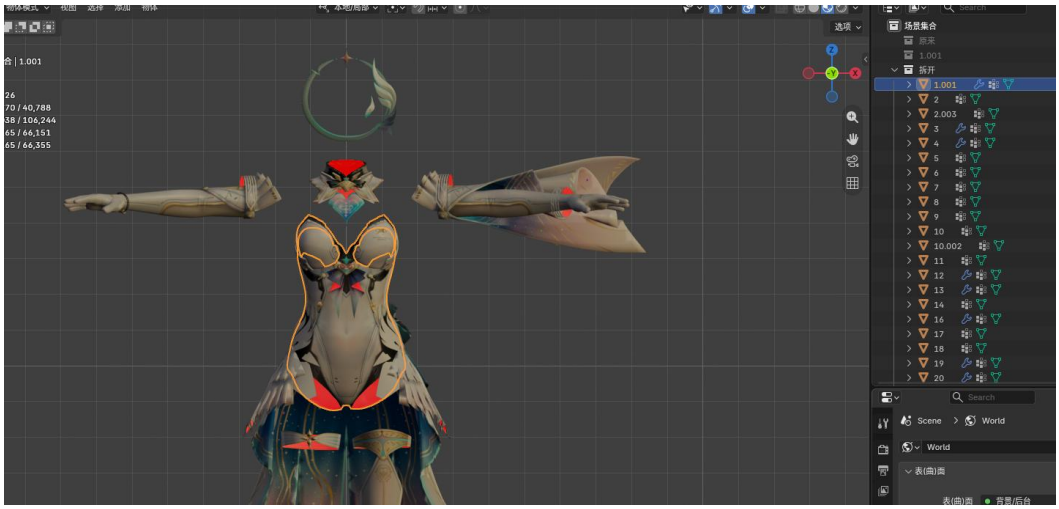
1-7-2-9

Separate the model mesh into individual pieces of clothing and equipment. For example, underwear, outerwear, gloves, shoes, etc. Each mesh corresponds to one piece of clothing in the VAM. Select the mesh part, press L to select all, and then press P to separate it into a new object.



1-7-2-10

Clearly label each component. I usually number them as 1, 2, 3, 4 and so on. Make a backup first and then proceed with the subsequent modifications.

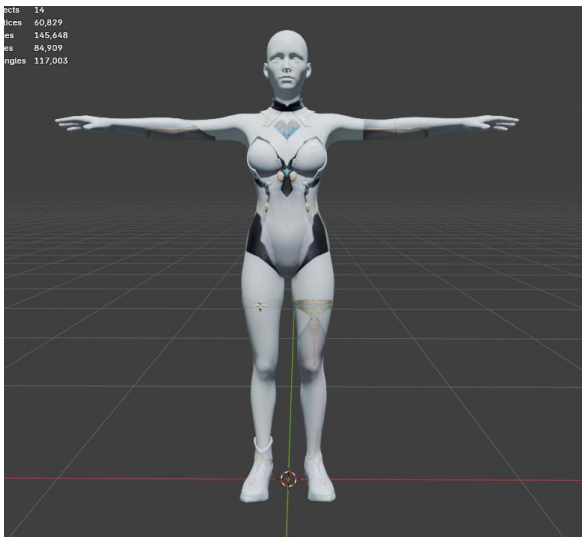


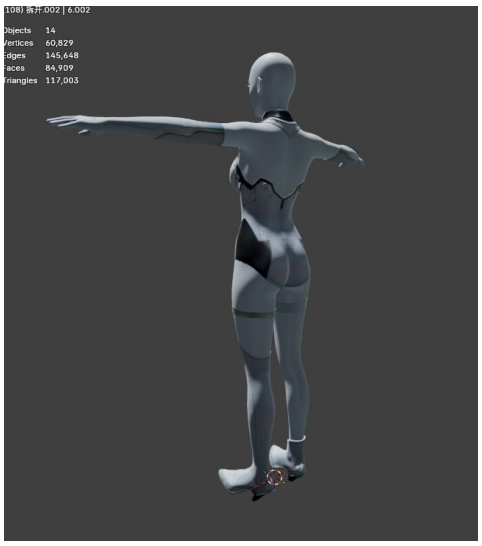
1-7-3-1

In this way, we have separate clothing components for each part. Now we move on to the third part of the model clothing mesh processing, where we match the clothing mesh to the VAM character.

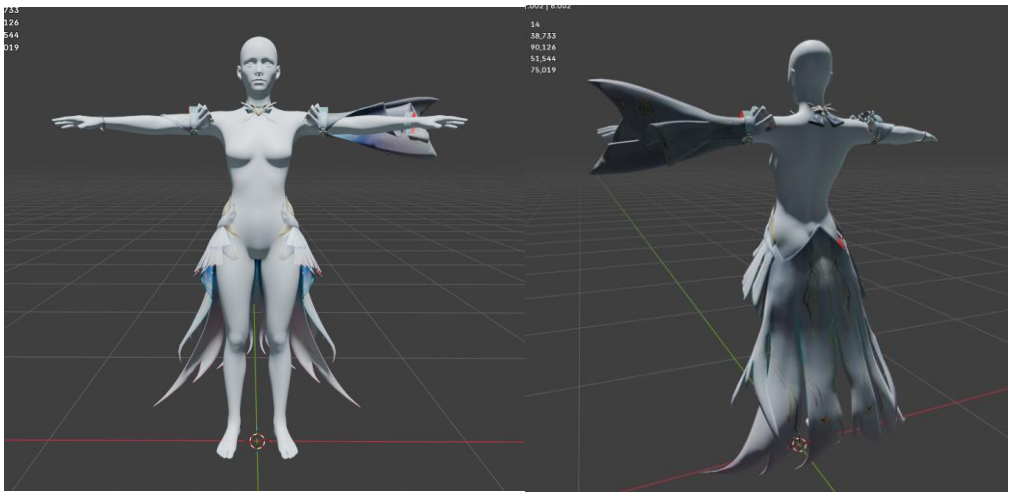
The clothing that needs to be matched can be divided into three categories (which I will explain later)

1: Constrictive parts, which need to fully adhere to the skin mesh of the character (such as bras, tight-fitting clothes, boots, gloves)

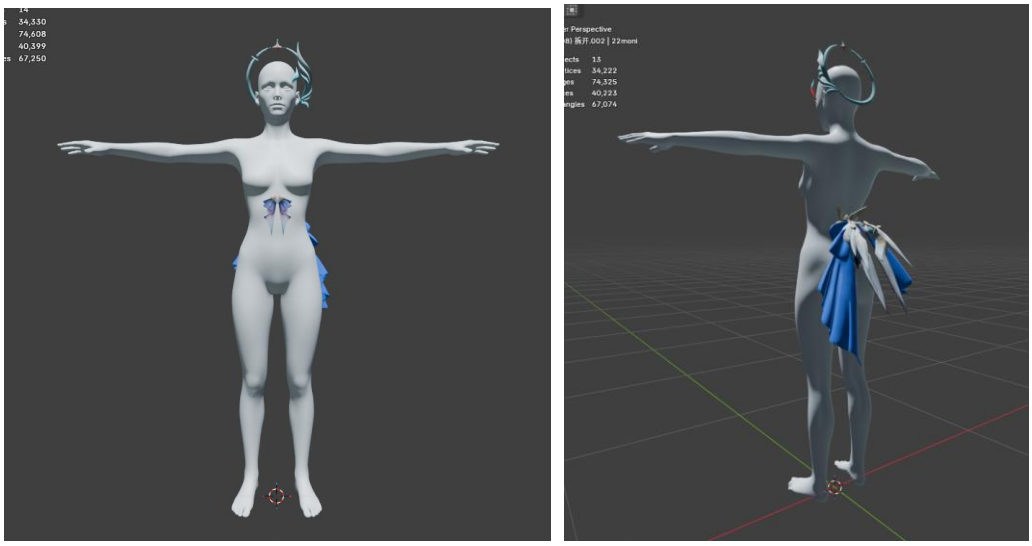




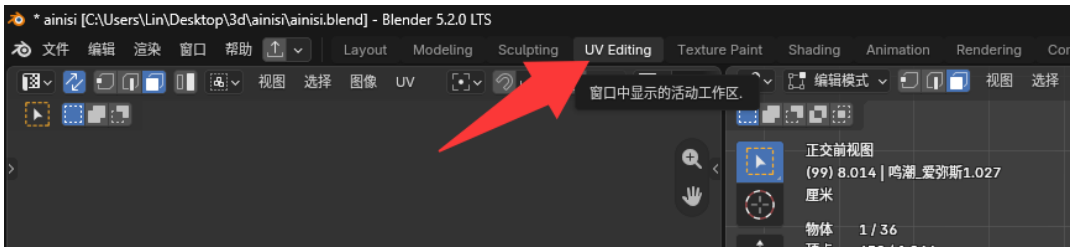
2: Semi-enclosing parts, which only need to be adjusted in terms of size and position to match the proportion of the body's thickness (such as leg rings, hand rings, neck ornaments, semi-enclosing dresses)



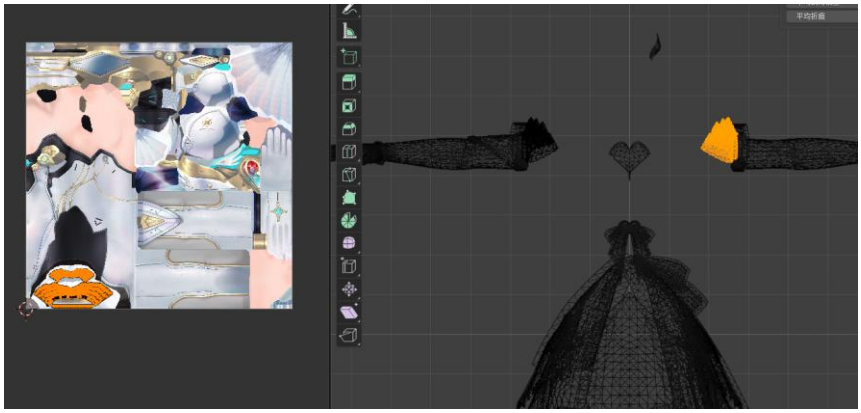
3: Floating parts, which do not require size adjustments. They only need to keep the clothing outside the character's mesh (such as floating mechanical devices, headwear)

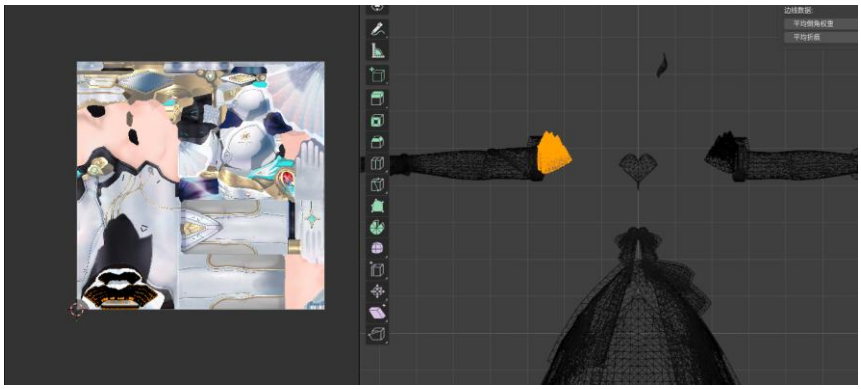


Then we proceed with the operation. Back on the UV interface, press Shift + Z to enter the perspective mode. For some models with symmetrical left and right parts, the UV grids are overlapping. If this is the case, we can delete half of them, make the modifications, and then mirror them, which can save a lot of time.

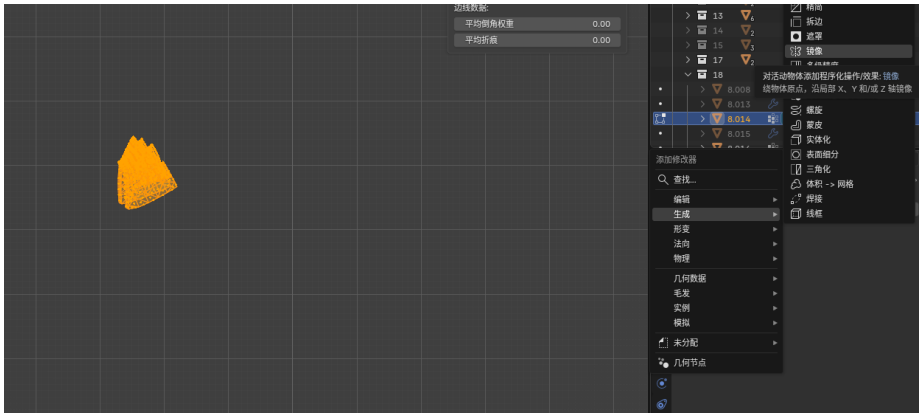


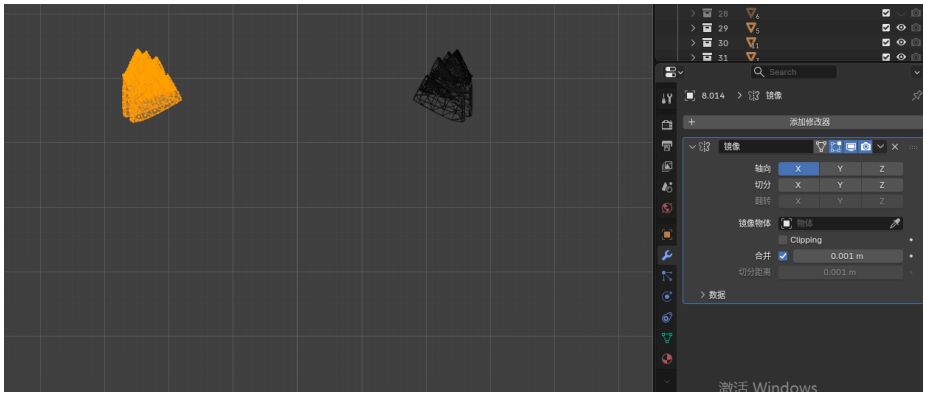
It can be seen that the grids on both the left and right sides use the same area in the UV map.





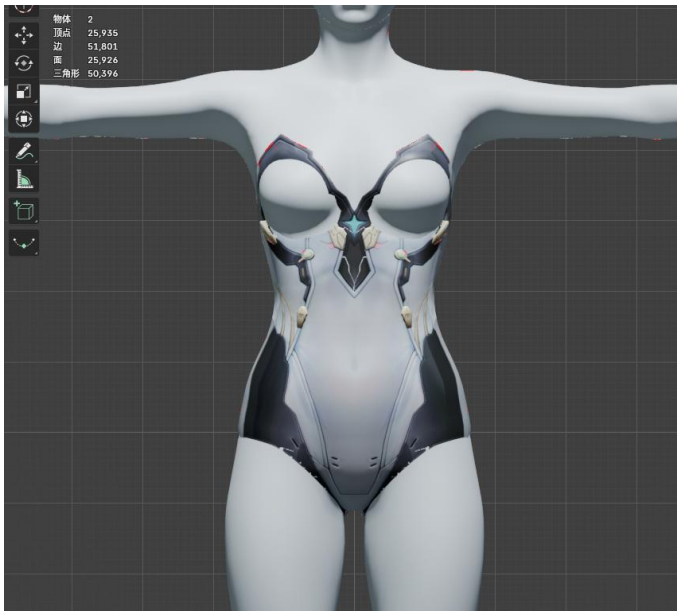
After deleting one side, use the mirror modifier to replicate the other side. This can save a lot of work for subsequent modifications. As shown in the figure





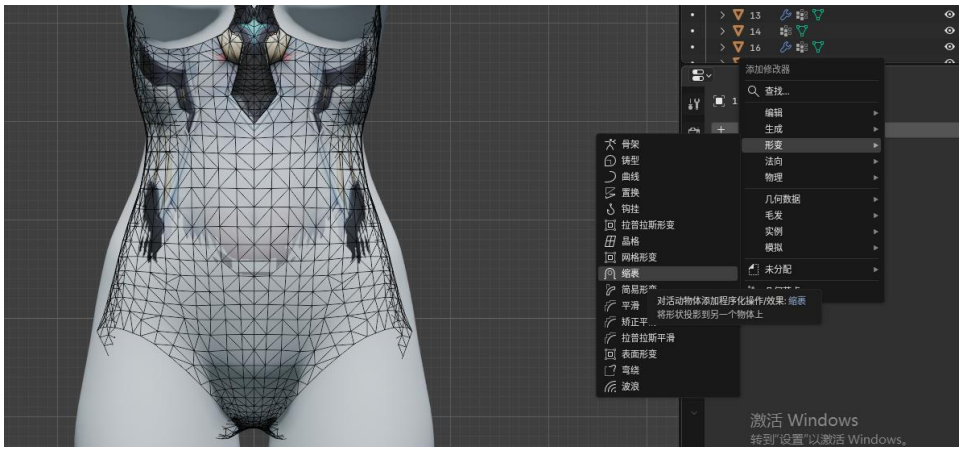
1-7-3-2

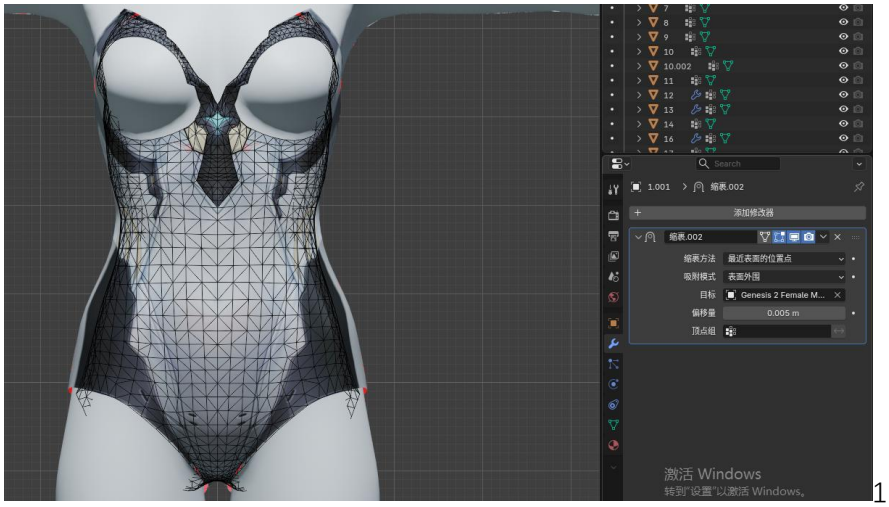
Next, we will discuss the way the clothing grid wraps around the human body. Now, let me take a tight-fitting garment as an example.



1-7-3-3

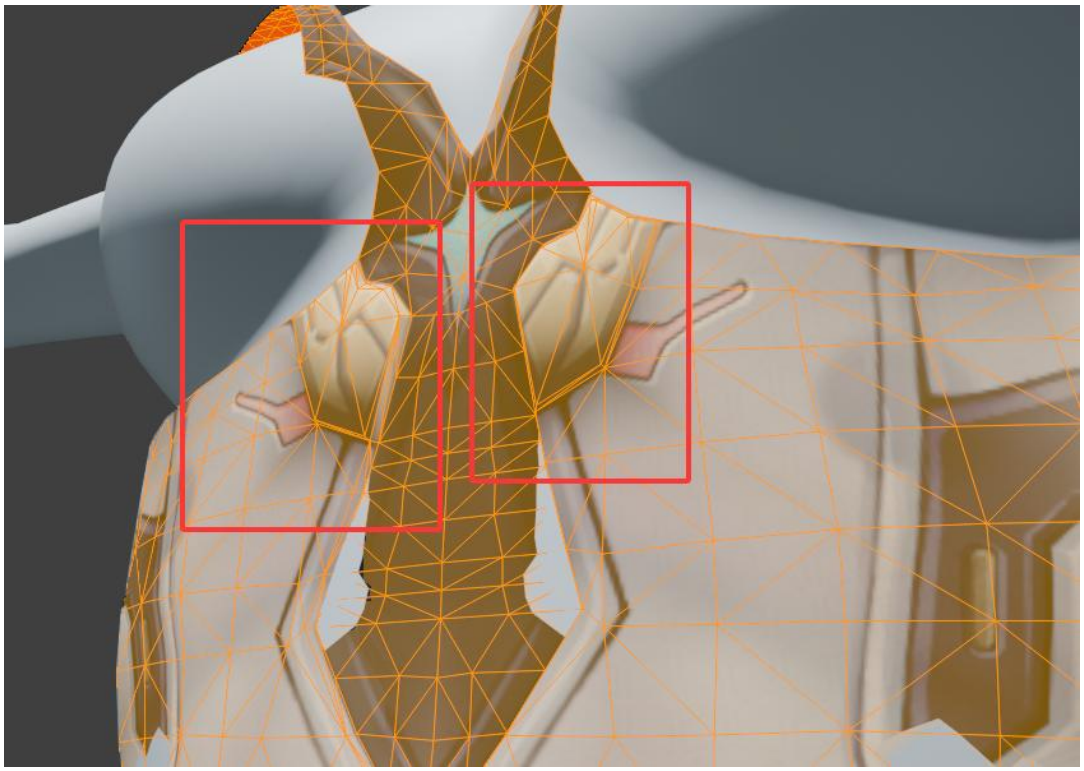
Using the wrap modifier enables the clothing to adhere to the specified mesh surface.

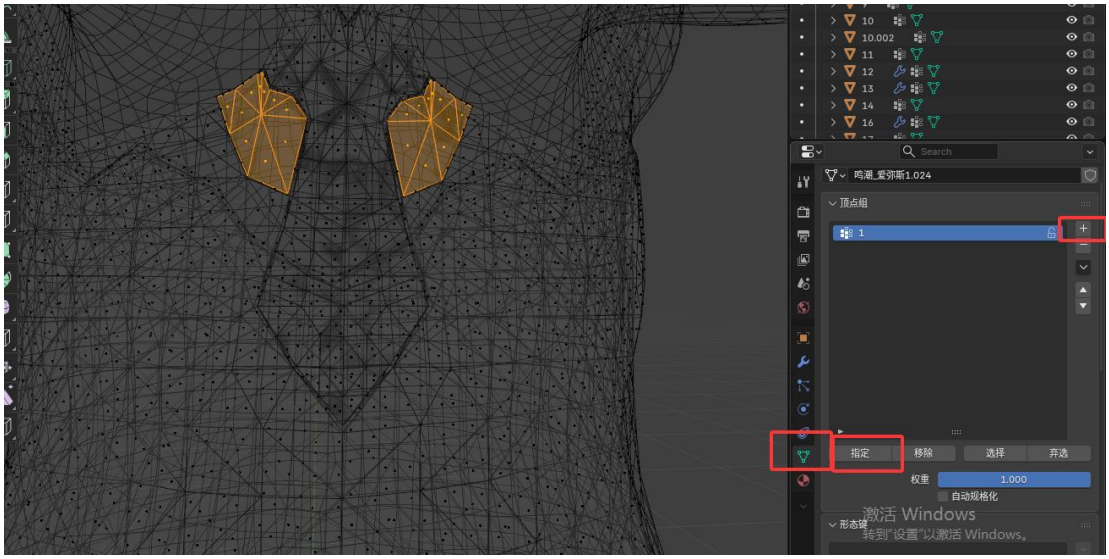




1-7-3-4

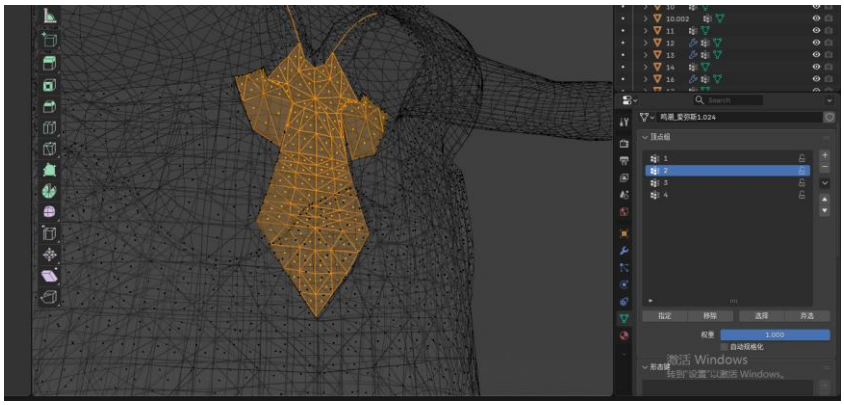
However, when we exit the modifier, we can see that there are stepped hard surfaces on the clothes, which are not suitable for being completely flattened and adhered to the grid surface. I used multiple modifiers and specified vertex groups to achieve different distances of adhesion effects.

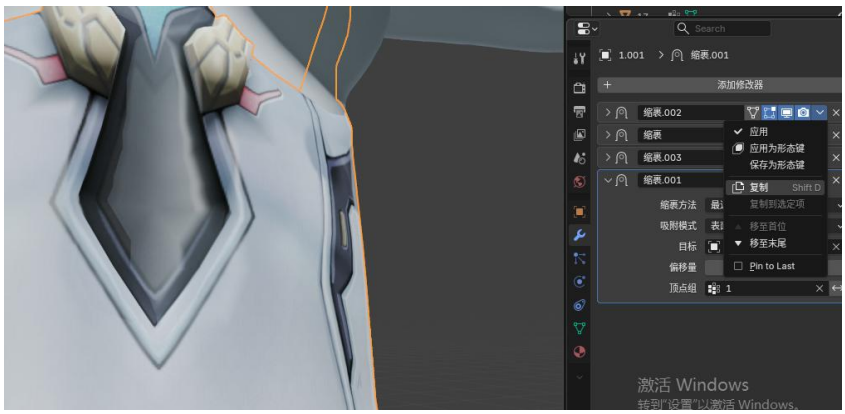


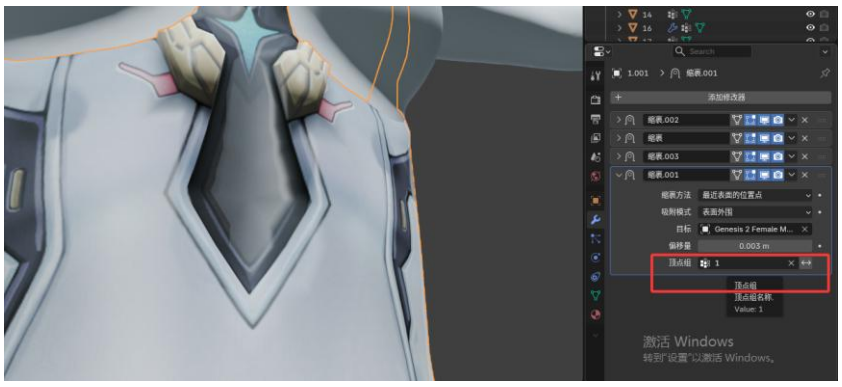


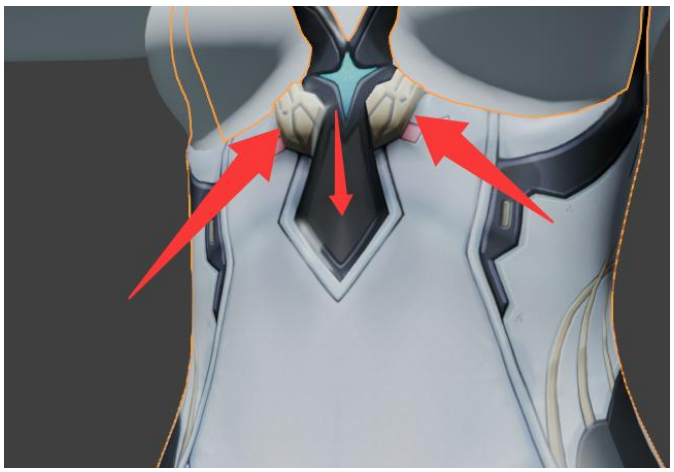
1-7-3-5

I divided the total into four layers of vertex groups. I duplicated several wrapping modifiers and dragged each corresponding vertex group into each wrapping modifier. Then, I adjusted the distances to achieve the effect of distinguishing the levels of adhesion.



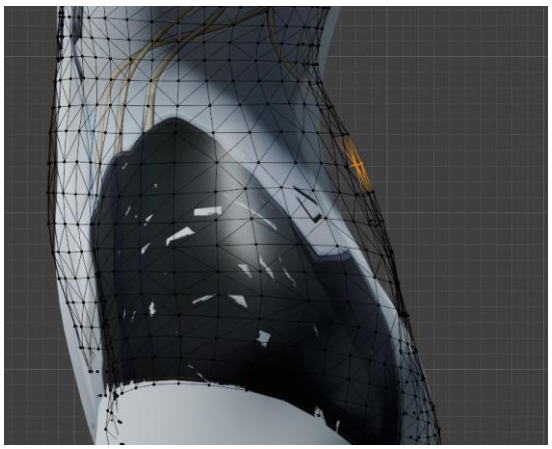


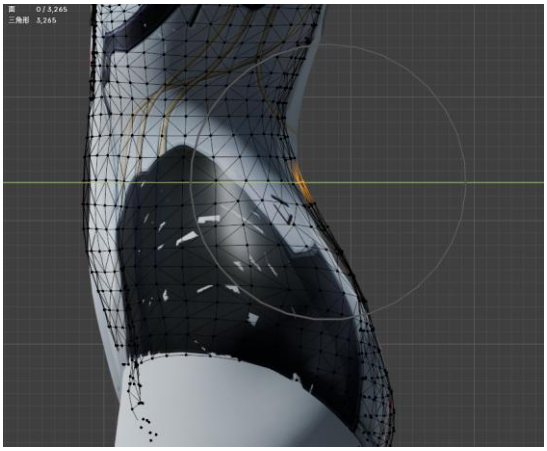




1-7-3-6

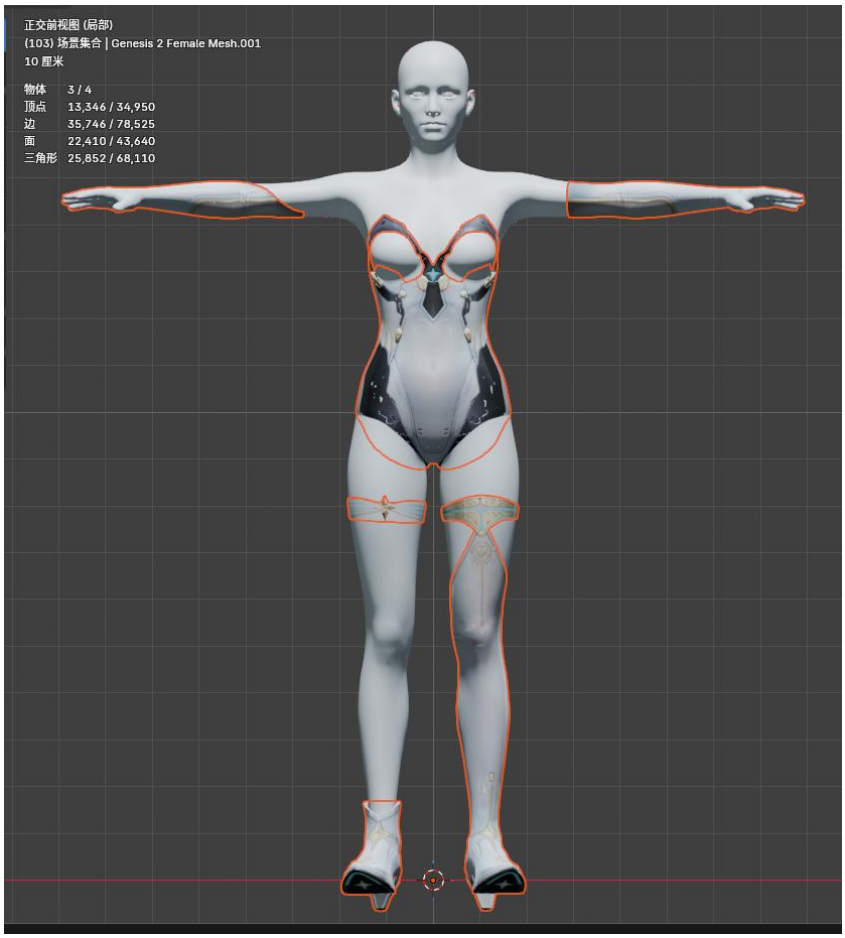
It can be seen that if the adsorption grid is far from the target grid, it may affect the adsorption effect. You can manually adjust the grid. Press the O key to activate soft selection, use the mouse scroll wheel to control the range, and press the G key to move the vertices to make it as close as possible. When adjusting the vertices, always pay attention to the deformation of the texture and try to keep the texture from deforming.





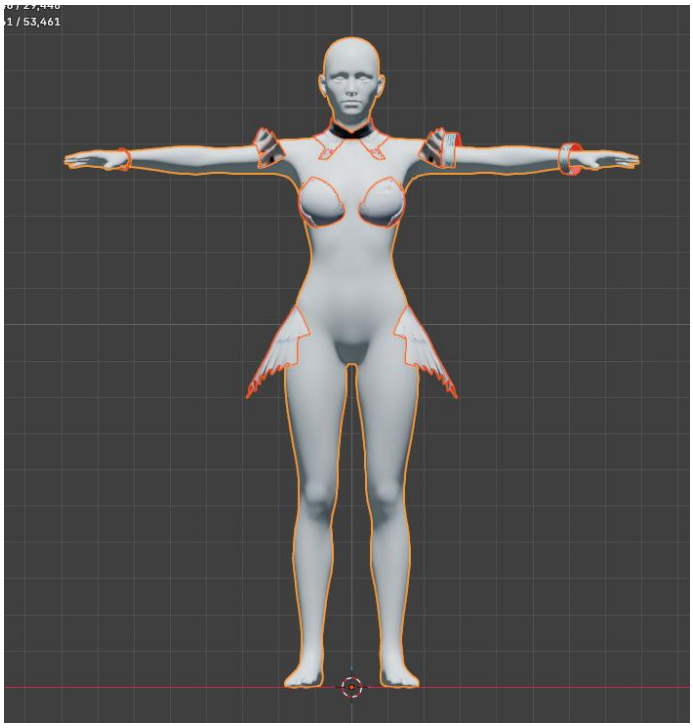
1-7-3-7

Following the same pattern, other tight-fitting garments such as shoes and gloves also use a combination of contraction and flexibility to adjust the vertices for mesh matching.

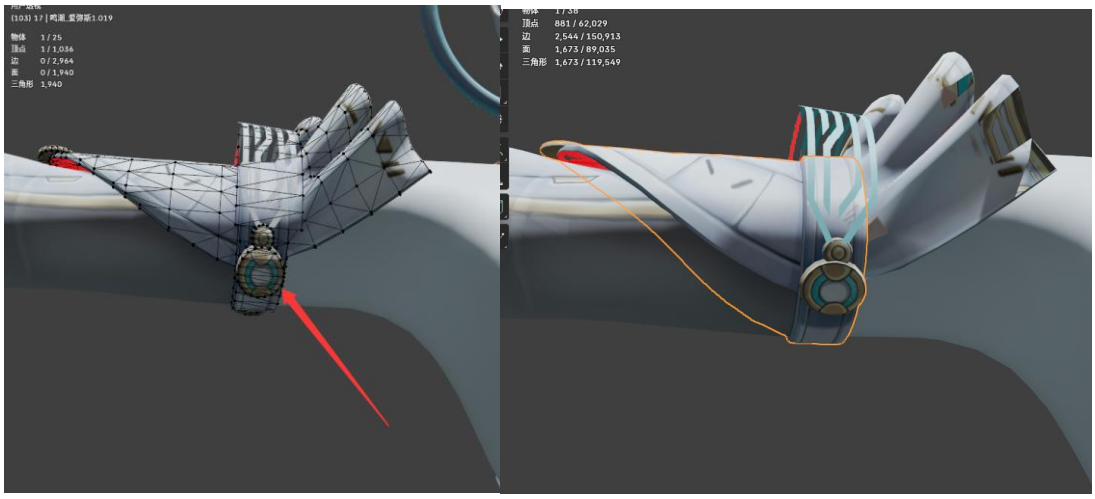


1-7-3-8

Next, we'll handle the close-fitting fabrics. This type of fabric generally doesn't require the use of the shrinkage modifier. Occasionally, soft selection is needed. The main approach is to use rotation, scaling, and moving to match the character model, such as the thickness of the arms and neck, as well as the mesh range of the buttocks to avoid model overlap.

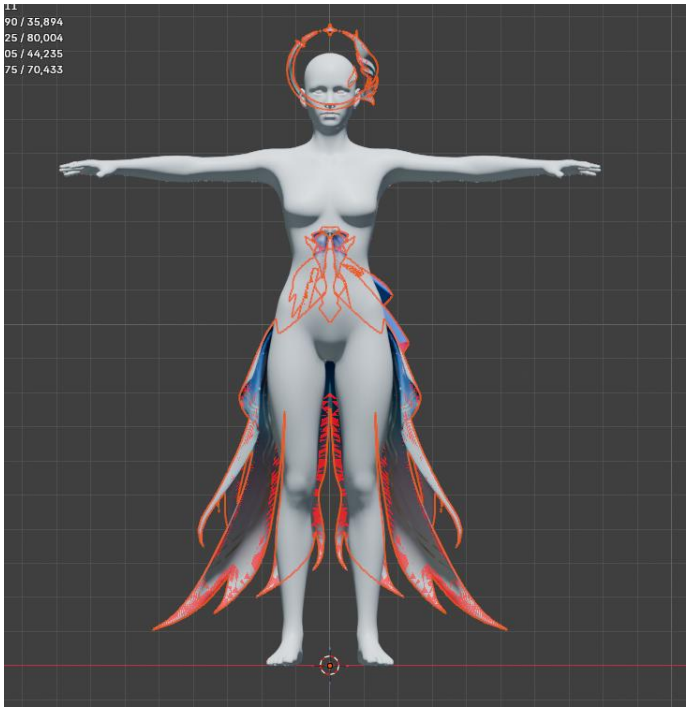


For hard surface equipment types, such as metal hard parts, shoulder guards, helmets, etc. I suggest using only proportional scaling. Do not use soft selection or axial scaling to adjust. Try to avoid any stretching deformation (stretched circles are not aesthetically pleasing). If the clothing has already stretched after being set to the correct proportions, you can convert it back to a mesh from the backup in the 1-7-1-4 sequence, then copy out the corresponding parts and make adjustments.



1-7-3-9

Next are the loose fabrics and the levitation equipment. They are far from the body grid, so there is no need to adjust the vertices. Just adjust the overall position is sufficient. It is necessary to maintain the original scaling ratio as much as possible.



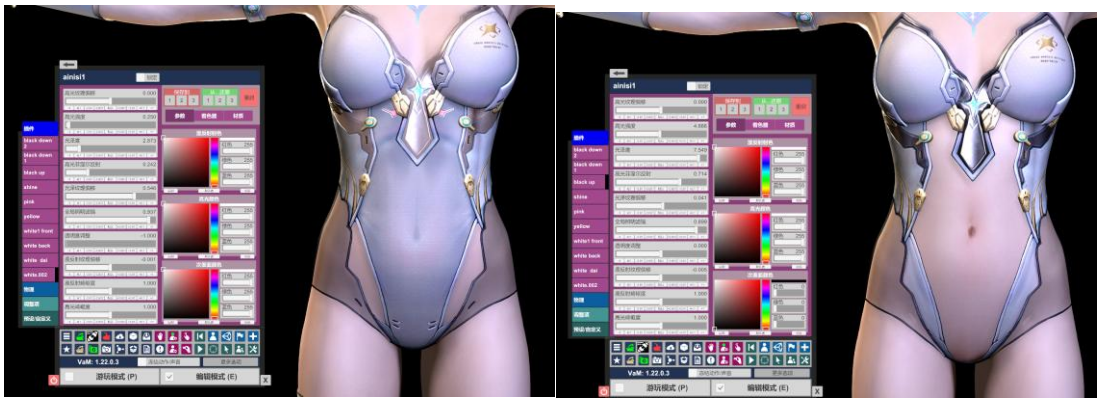
1-7-4-1

When all the models are wrapped around the human body, back up the models once. Move to the fourth step. Assign different materials to the mesh. Although the materials have been drawn on the model mesh, in order to make further adjustments in VAM and make distinctions between different materials, this is a necessary step to enhance the texture of the models.

As shown in the picture, the right side is the modified one.

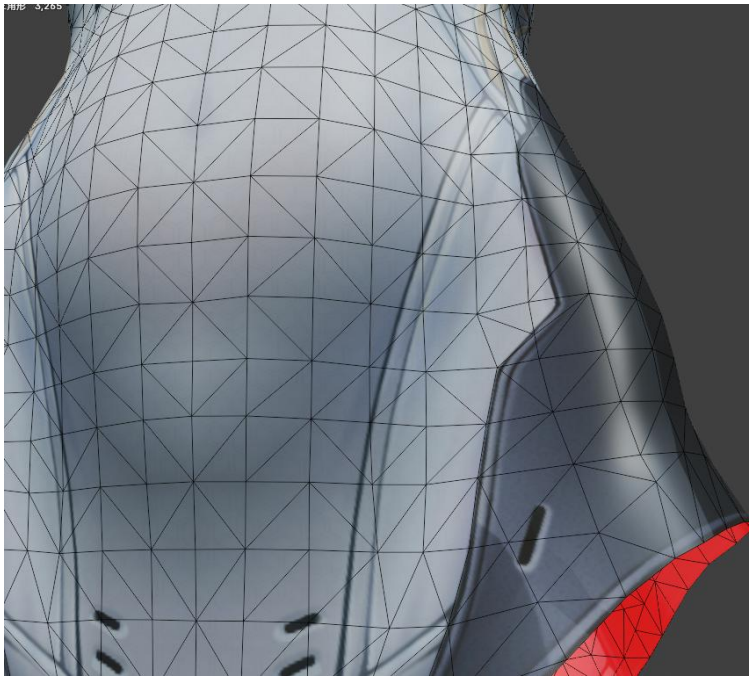


After separating different materials, we can then use the VAM software to create more interesting effects on the same piece of clothing by hiding certain materials.



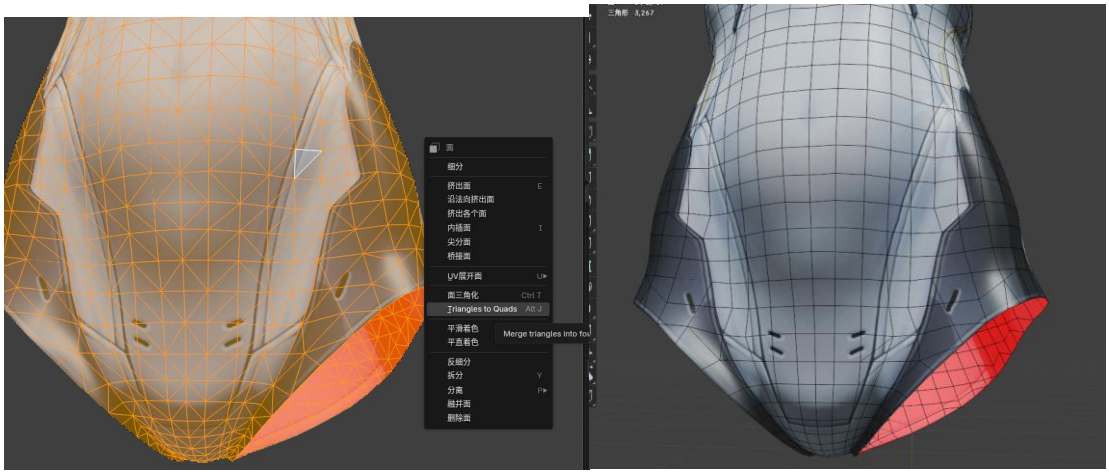
Before we start, let's analyze the materials of the model. Generally, in a piece of clothing component, there are several types of materials such as metal, fabric, leather, etc. We need to separate different material areas in Blender using mesh divisions.

Next, let's take the main part of the tight-fitting clothing as an example. We can see that the model's mesh does not distinguish according to the edges of the materials, so we need to manually split it.



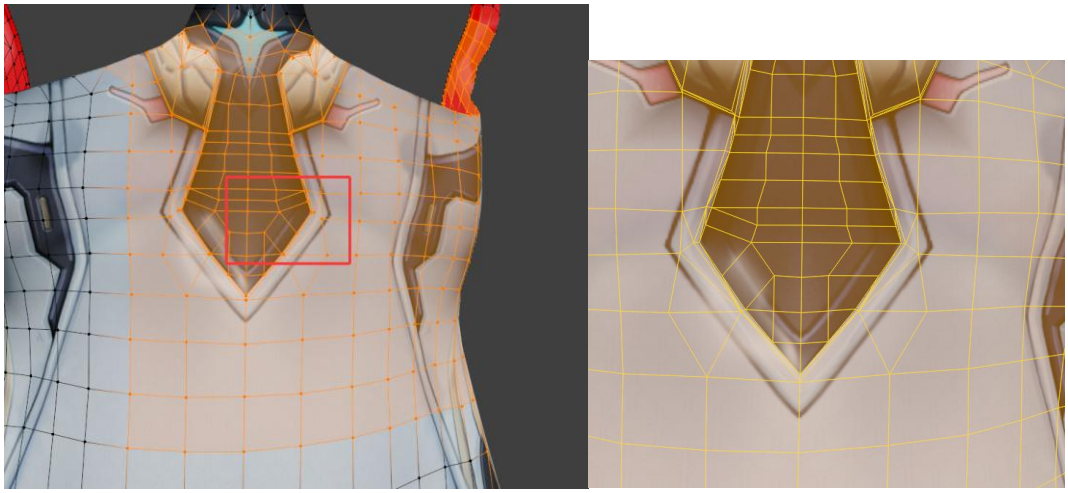
1-7-4-2

In the face mode, the A keyboard selects all the grids and then converts them to quadrilateral faces. Although the final model used in VAM will automatically be converted to triangular faces, quadrilateral faces are convenient for us to perform mesh optimization processing. For example, when reducing the number of split materials, manually merging vertices, and preventing errors in chamfering, making it more aesthetically pleasing (not really). This will be explained in detail later.



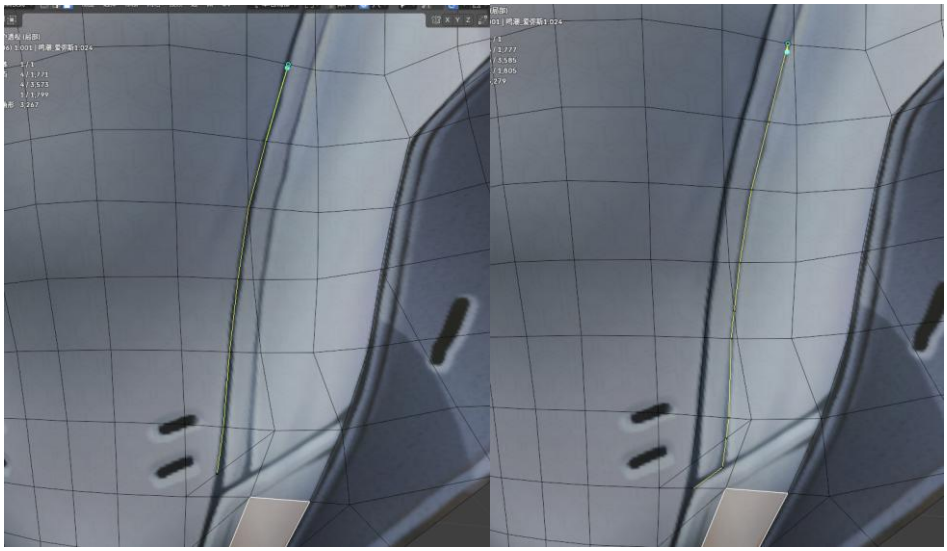
1-7-4-3

Check for any wrongly deleted edges and manually correct them (delete edge - press 'x' to merge the edges; add edge - select two points and press 'j' to create a connection line) The grid flow should follow the edges of the model's turns as closely as possible



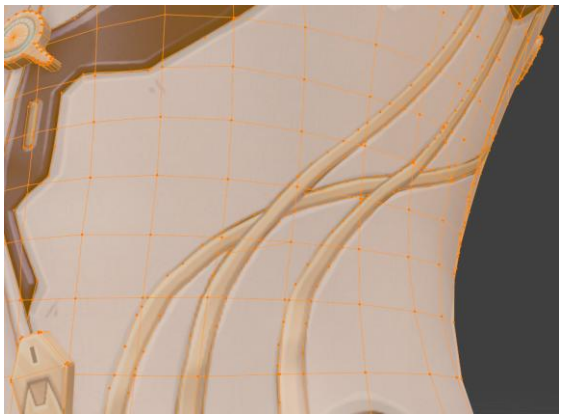
1-7-4-3

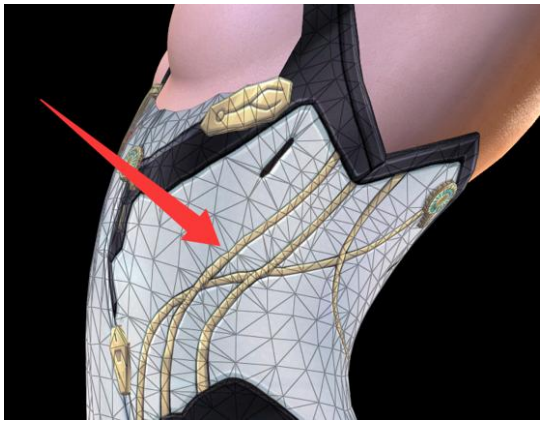
Press the K key to use the cutter tool to divide the texture edges of the model





When we cut more vertices along the curved surface, the gaps between the materials will fit more closely. However, if we cut too many edges, the mesh becomes denser. When the character is in motion and twisting in the VAM, distortion will occur. This requires one to make a personal choice. As shown in the following picture.





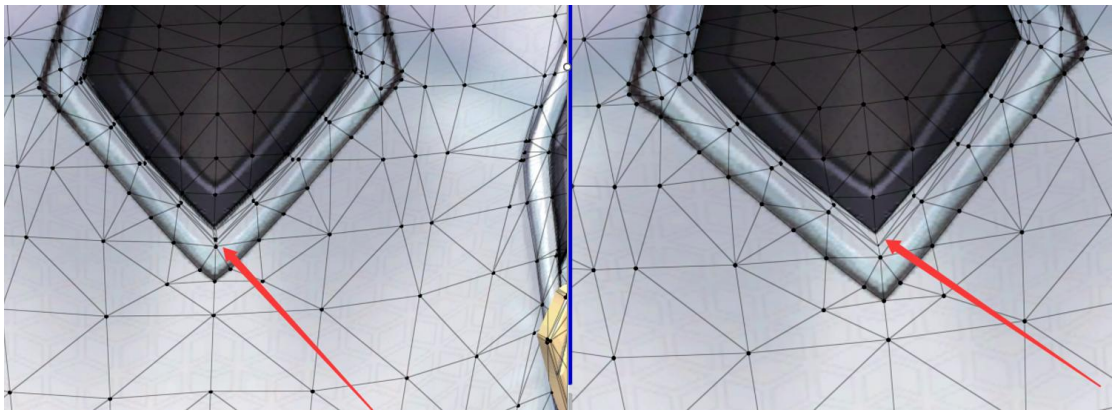
1-7-4-4

The mesh has been divided according to the texture color. Then, mesh optimization is carried out, which is very important.

After the mesh is cut, there are many slender or too small faces. When the close-fitting clothes are imported into VAM and used for character binding, if there are slender triangular faces or overly dense meshes, it will be a disaster for the binding.

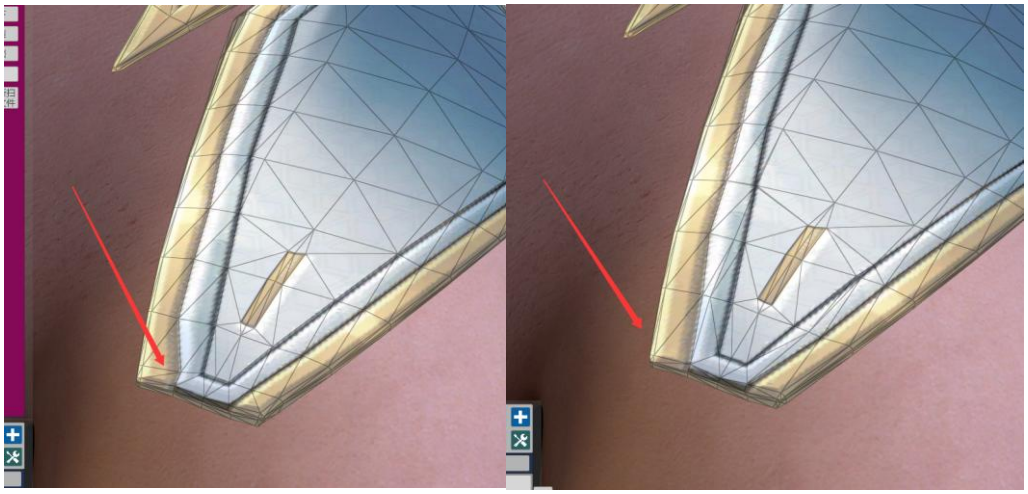
If there are too dense vertices, there will be misalignment after importing VAM, as shown in the figure below.

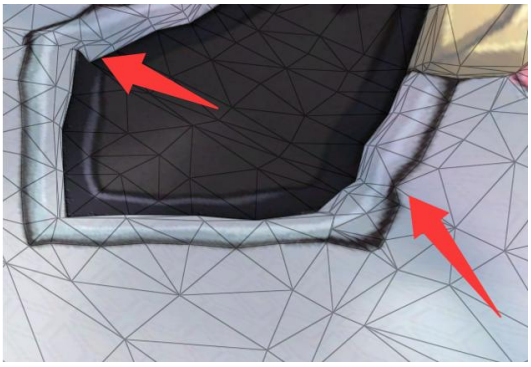
On the left is the normal mesh, and on the right is the mesh after binding in VAM. You can see that after the model enters VAM, there will be some small distortions, and overly dense meshes will interlock with each other. This will cause errors in lighting and the appearance of black faces.

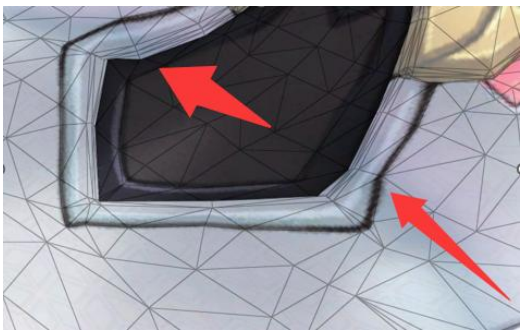


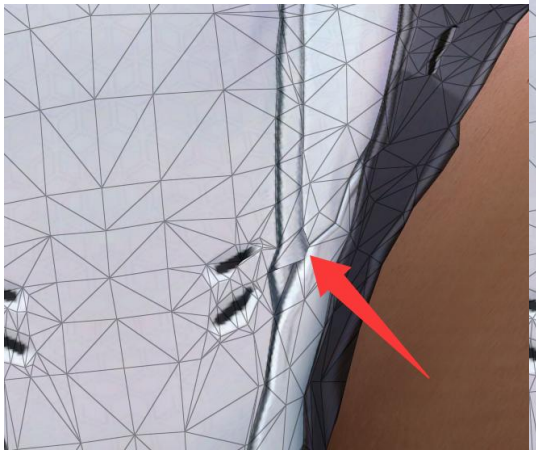


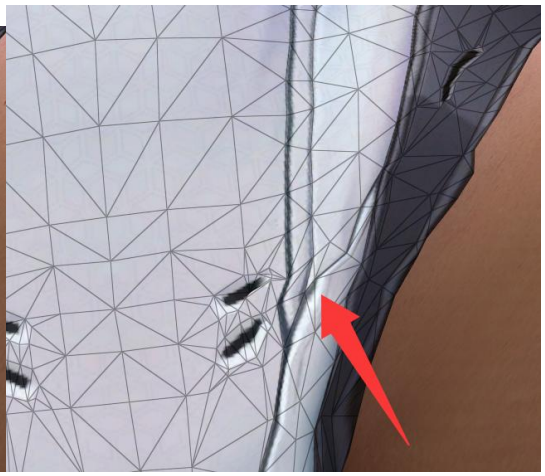
More edges will undergo more distortions as the character's posture changes. Therefore, on the curved surface, we need to maintain the uniformity of the mesh as much as possible. Here is a comparison of the effects before and after optimization in VAM. On the left is the effect before optimization, and on the right is the effect after optimization.

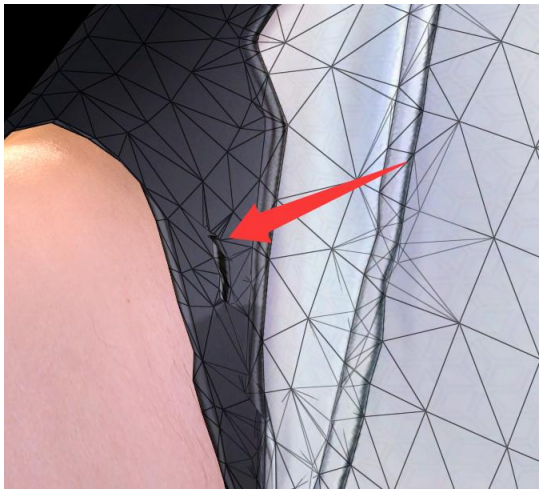




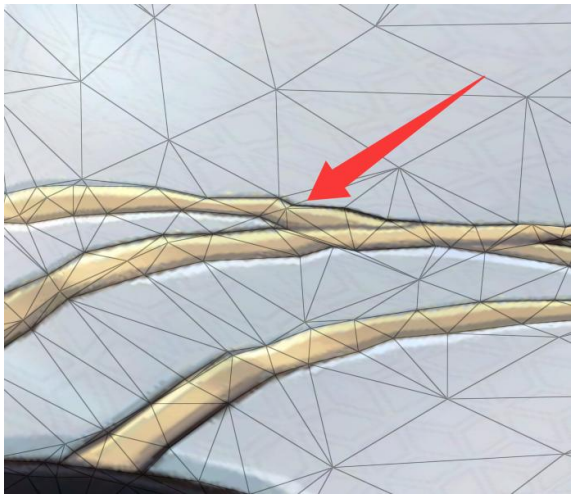


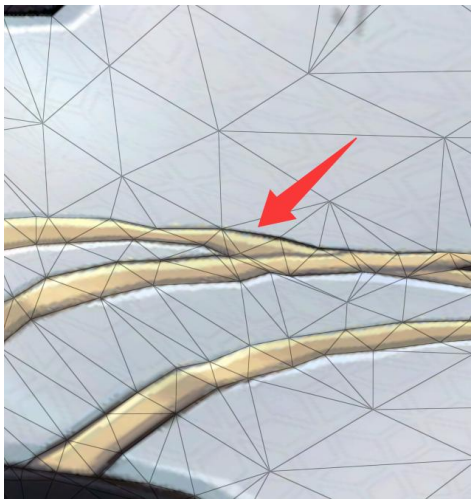








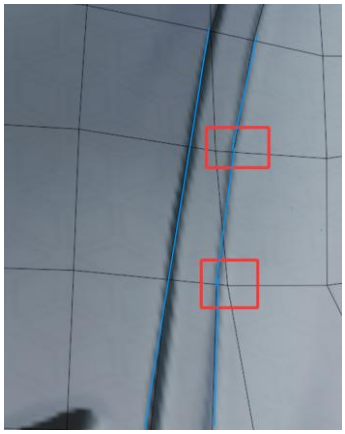




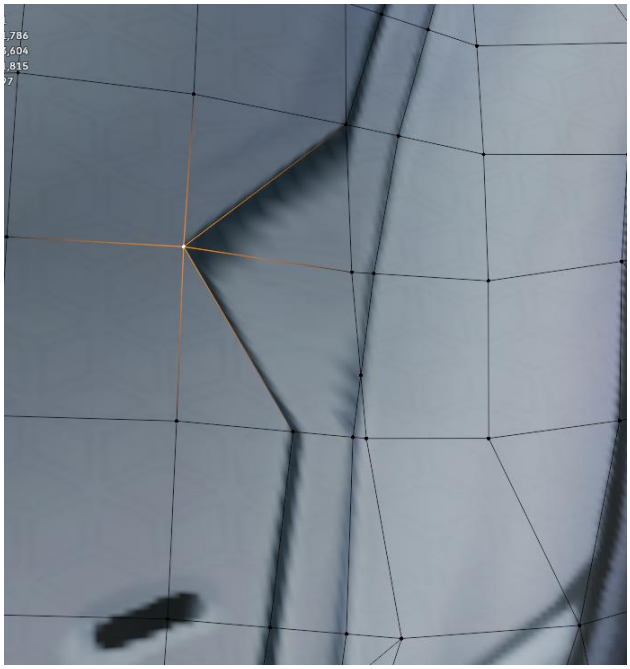
The overly dense vertices on the clothes will cause the mesh to be disrupted or even torn when the characters move (for hard surface equipment, a plugin can be used to solve this problem). Therefore, we need to optimize the model mesh to be uniform. (For floating non-fitting equipment, this step can be ignored as it doesn't need to twist along with the character mesh). This is also the most painful and time-consuming part of clothing production.

Try not to disrupt the original vertex positions of the model. As shown in the picture below, close vertices can be combined together, but not using - the merge vertices tool!!!!

For example, in the following, while keeping the blue edges, I need to combine the vertices enclosed by the frame.



As shown in the figure below, if the vertices are directly merged into one, it will modify the UVs (the texture information corresponding to the model mesh) of the model, resulting in the texture being stretched.

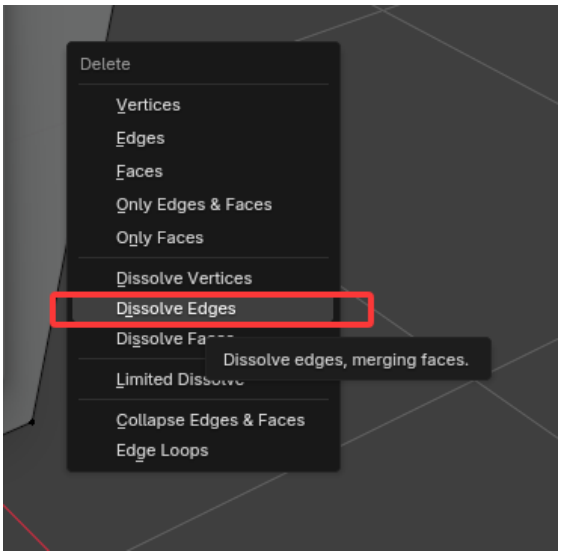


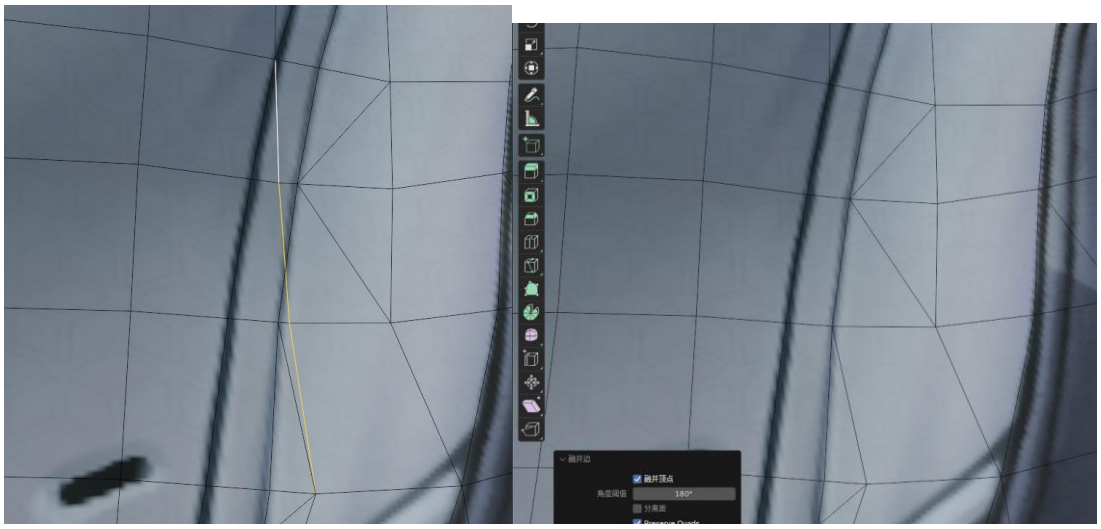
Before the merge operation, I first added supporting edges to the vertices that needed to be merged.



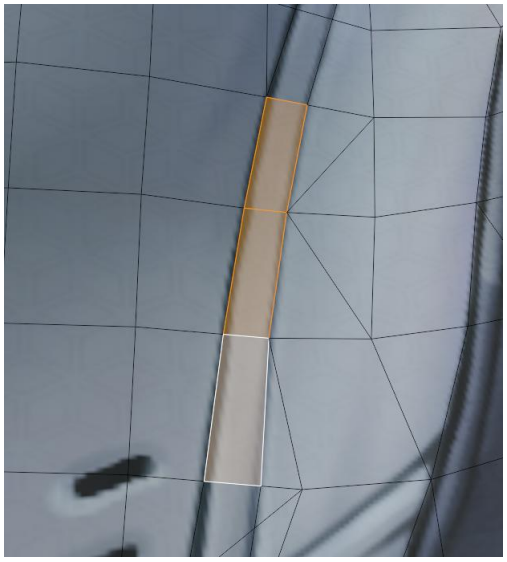
Then select the unwanted edges, and press the "x" key to merge the edges.
Note that it is "dissolve", not "delete".







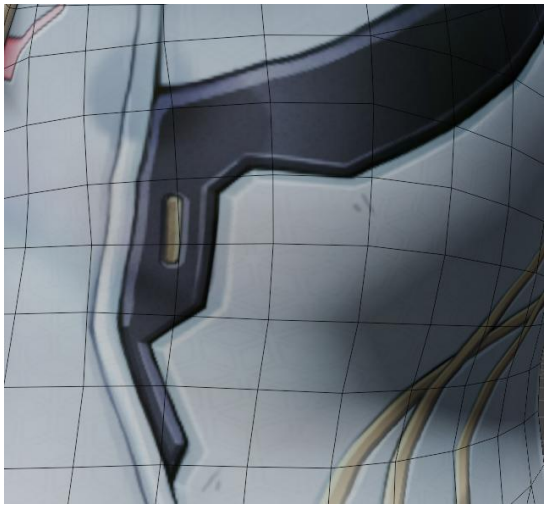
This way, we obtain a grid with relatively uniform wiring.

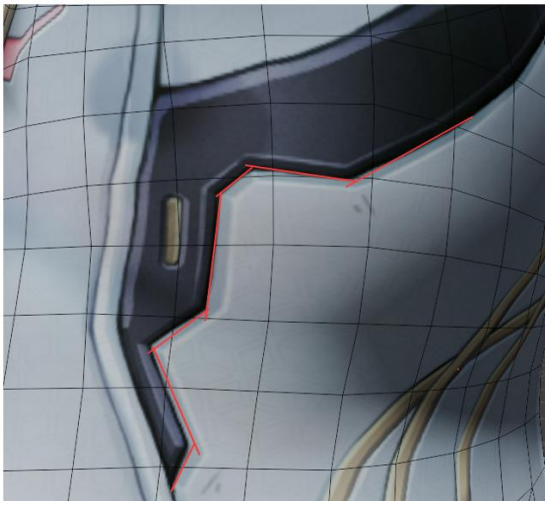


Increase the number of vertices at the curve edges of the texture. You can select the edges and right-click for subdivision, or use the cutter tool to cut out new points. Press the "g+g" keys to make the vertices slide along the line segments and adjust their positions.

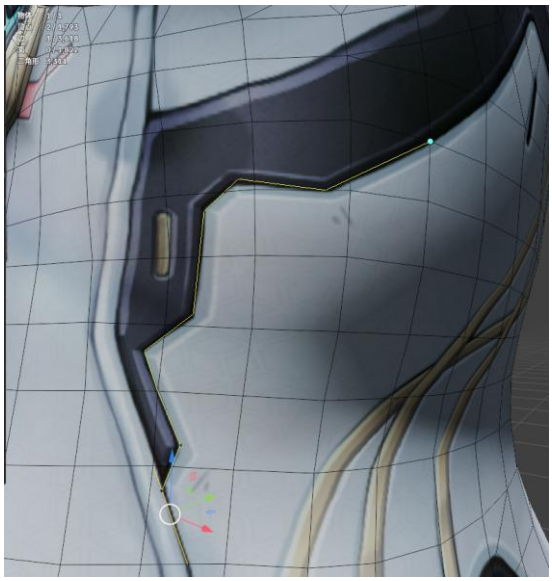


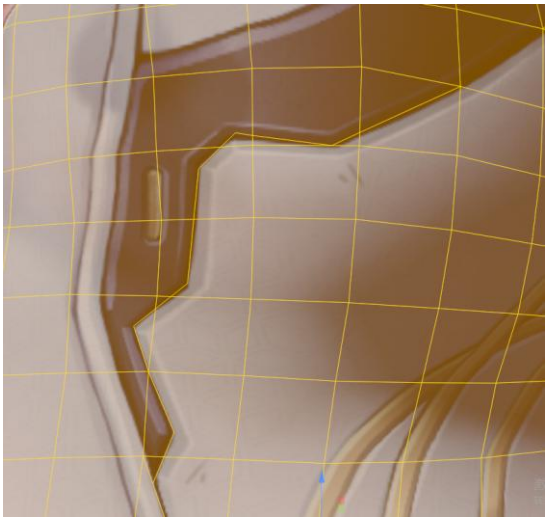
I will now demonstrate the second optimization. The aim is to merge the nearby vertices at the points where the material is cut.



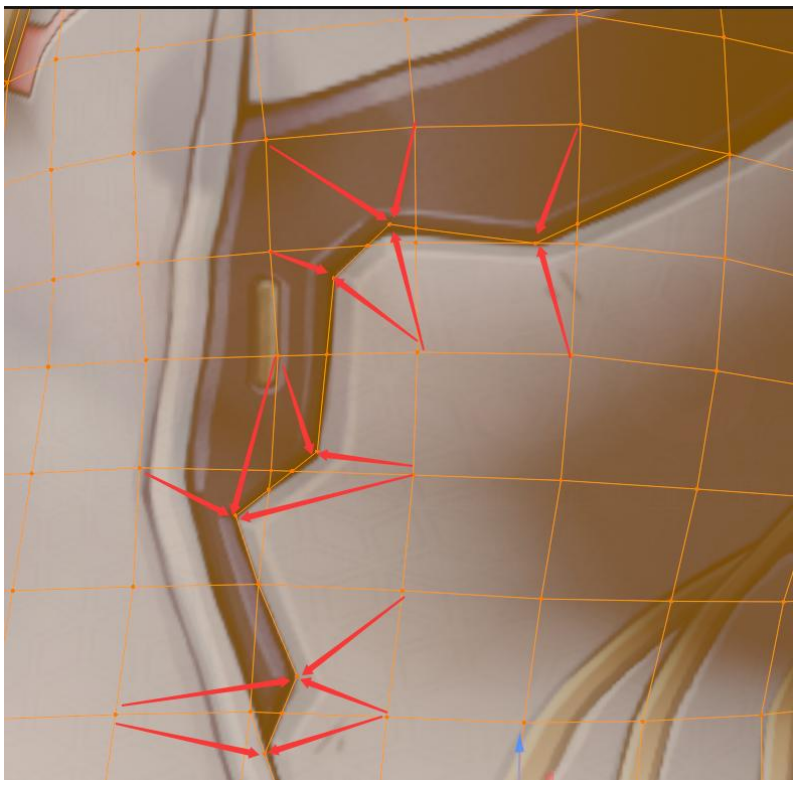


First, cut along the edges of the material.

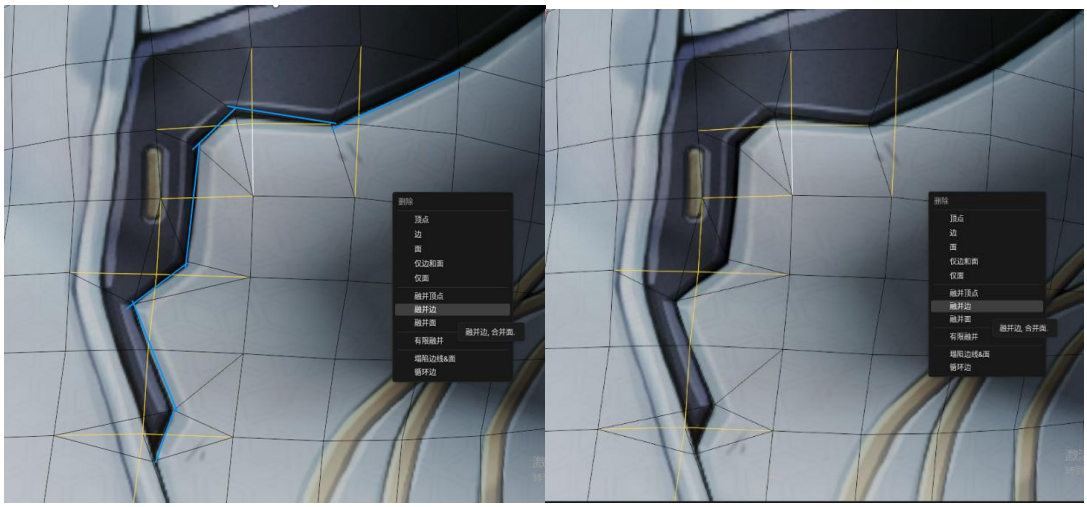




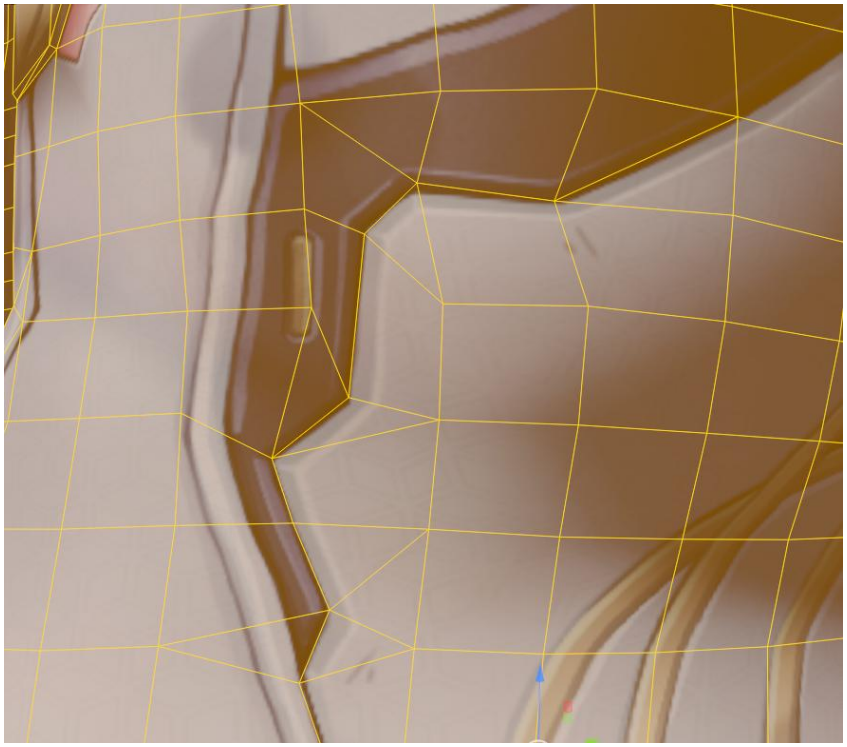
Add supporting edges in the direction indicated by the arrow.



Remove the redundant edges, retain the blue line segments and the supporting edges at the corners.



Obtain a uniform grid

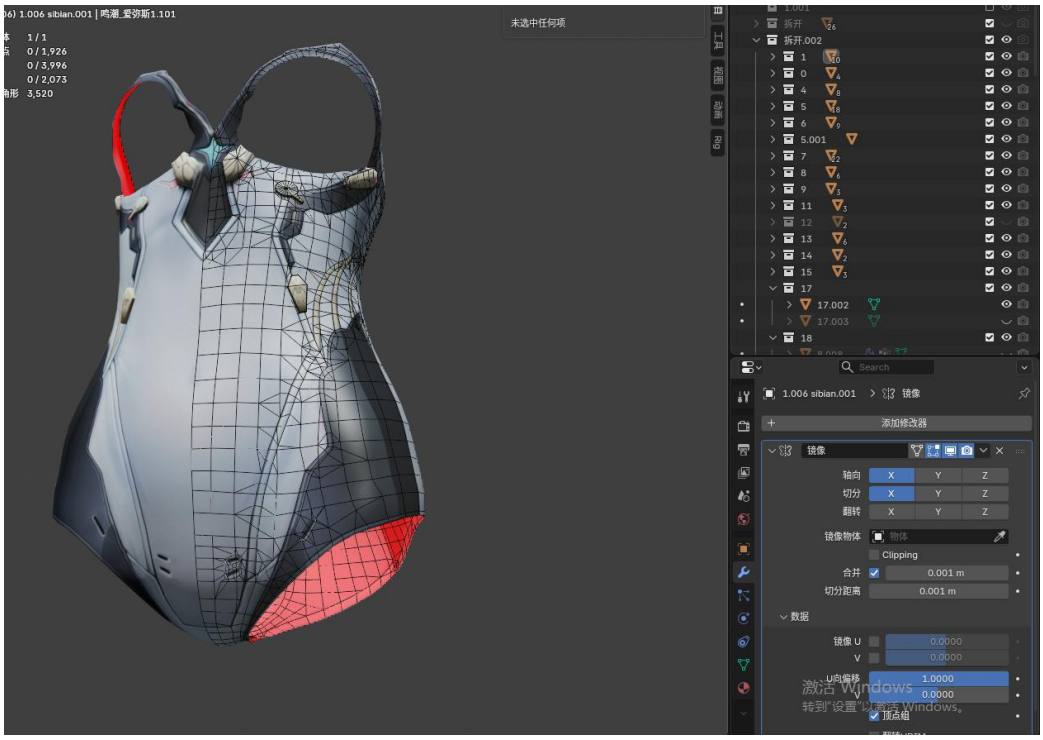


Optimize the materials of all parts of the model mesh. Separate the different material sections and optimize the vertices. This part requires a great deal of patience and time, but it is also very crucial for the visual effect in the VAM.

1-7-4-5

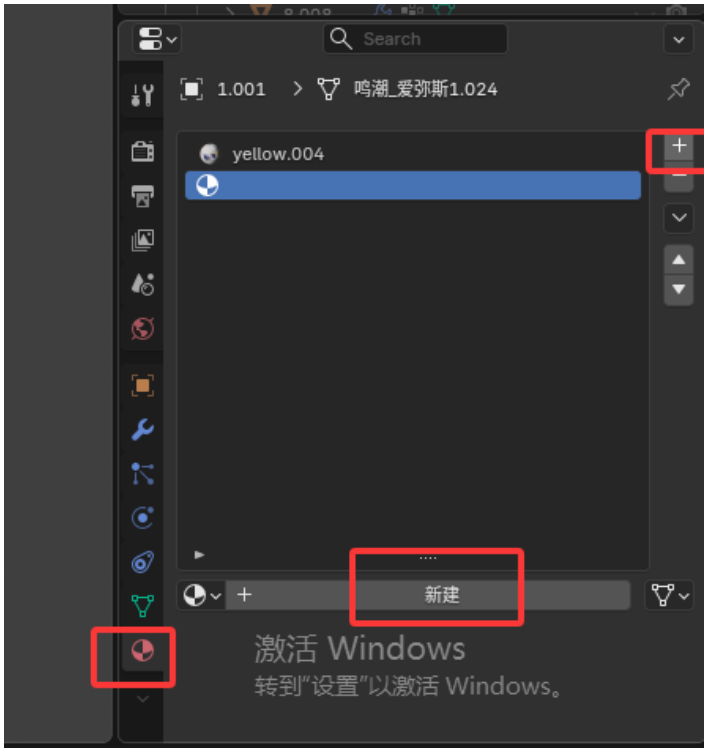
When dealing with left-right symmetrical models, we can first delete half of them, process them, and then use the symmetry tool to generate the other side.

The result after completion is as shown in the following picture.

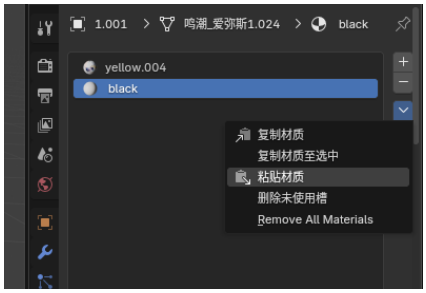


1-7-4-6

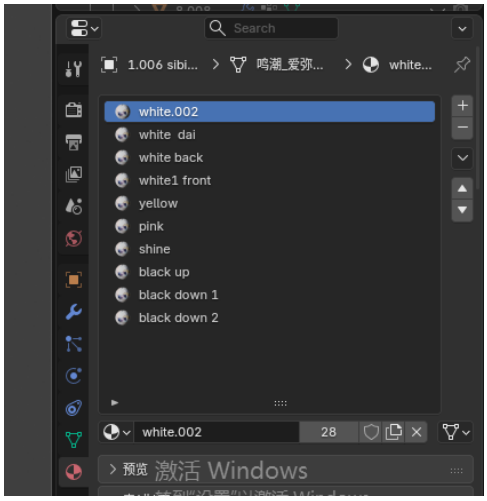
Next, we assign the materials to the segmented mesh sections. Create a new material and change the material name to an English word or a number.



Copy the texture information from the original material and paste it onto the new material sphere.

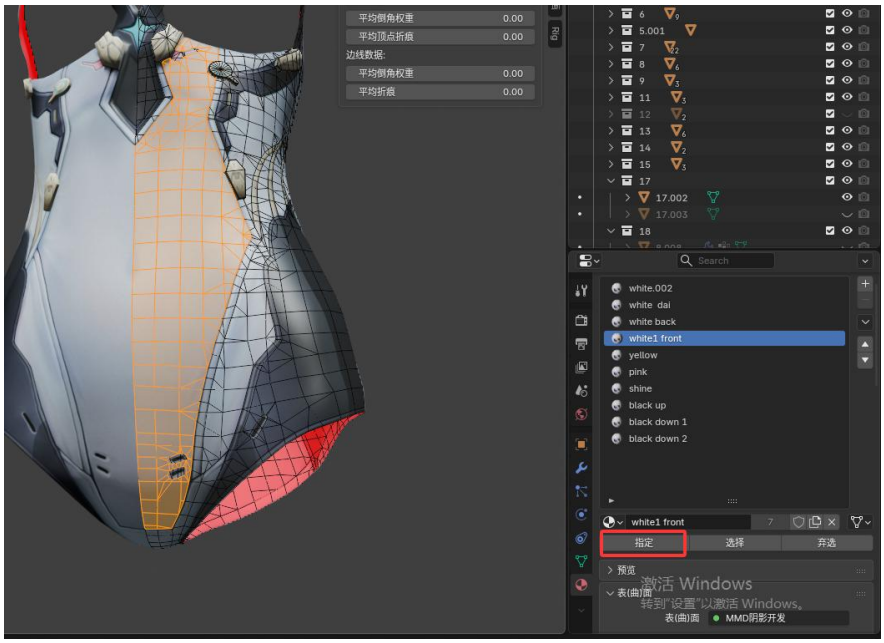


Follow the above process to create more materials. Once several textures have been separated, several materials will be needed. In VAM, we will use different texture parameters to distinguish them.

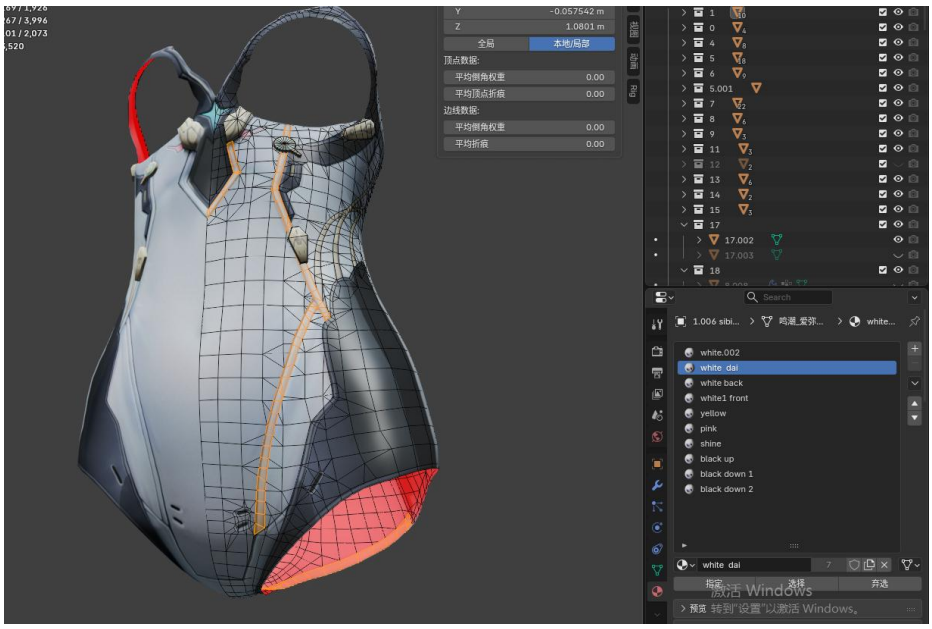


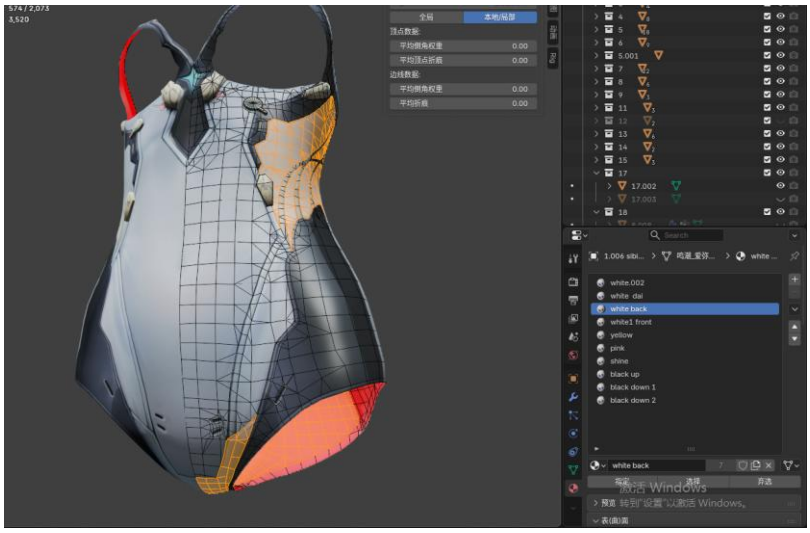
1-7-4-7

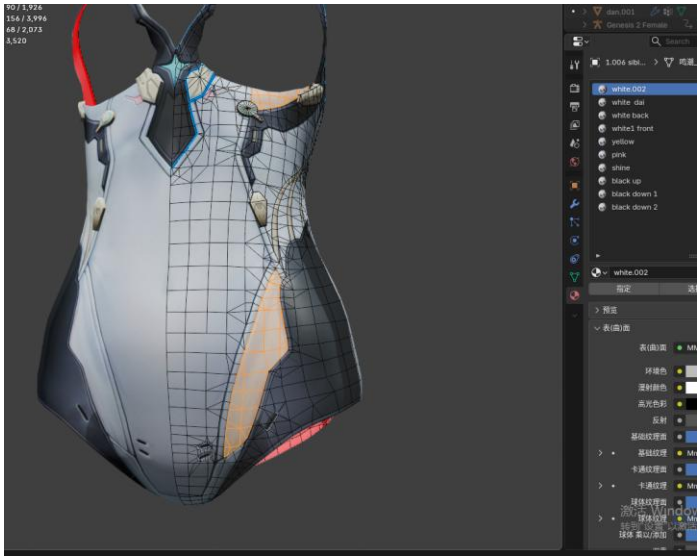
In the model, use the face mode to select the same texture parts and assign them to the corresponding materials, as shown in the following figure



Then specify other materials



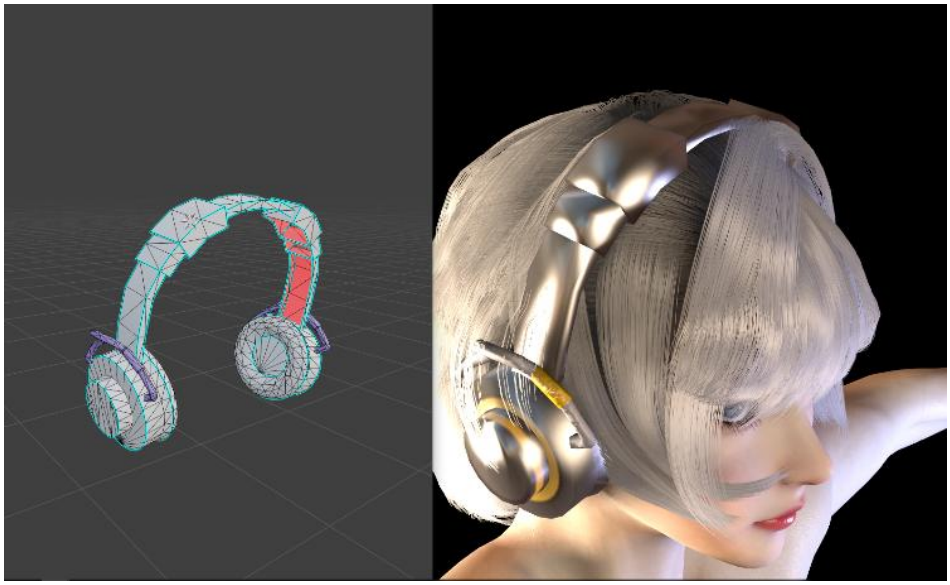




I divided the model into ten materials and assigned each one to the corresponding mesh.

1-7-4-8

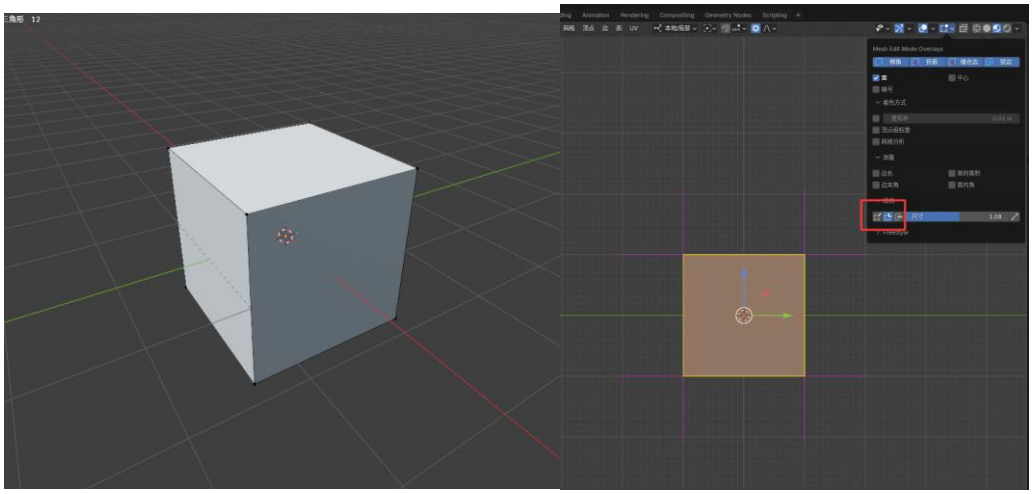
Then we need to add chamfers to the model mesh at the corners. The reason for this can be seen in the earphone model in the picture. Before adding the chamfers, even if there were corners on the model, it still had hard edges (it was found that VAM couldn't recognize this). In VAM, by default, all the mesh angles are smoothed (the light and shadow at the corners do not fade out).



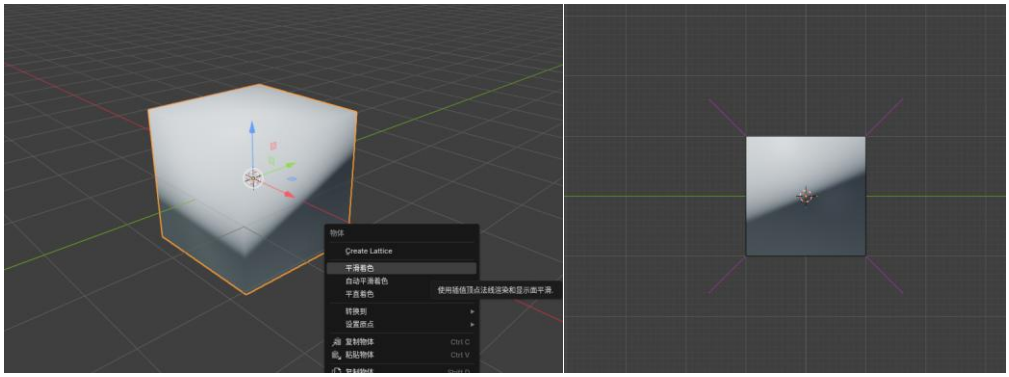
这种效果类似于 blender 里的平滑着色，把模型所有面的法线角度做平滑处理。
如图基本 box 是棱角分明的，打开法线显示可以看到法线是垂直于网格面的。

This effect is similar to the smooth shading function in Blender, where the normal angles of all the faces of the model are smoothed out.

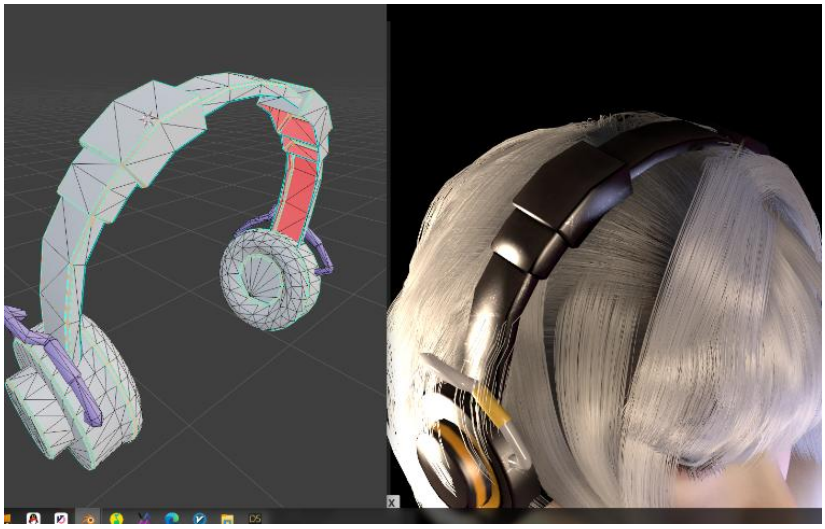
As shown in the figure, the basic box has sharp edges. When the normal display is turned on, it can be seen that the normals are perpendicular to the mesh surfaces.

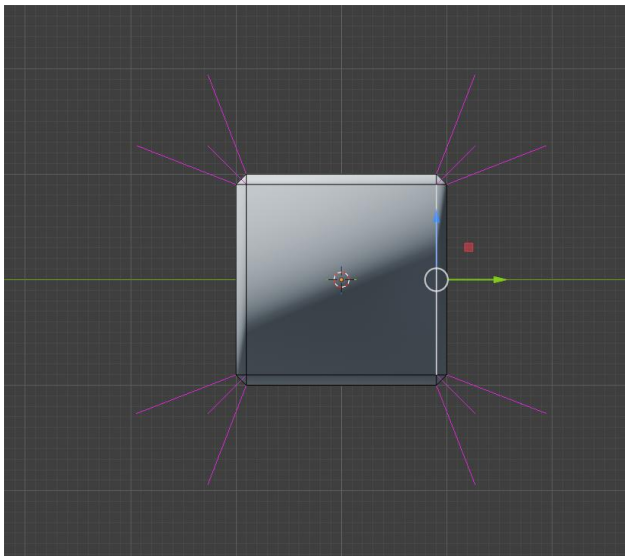


After enabling smooth shading, you can see that the edge normals have been merged and smoothed, which is just like the effect of headphones in the previous VAM.



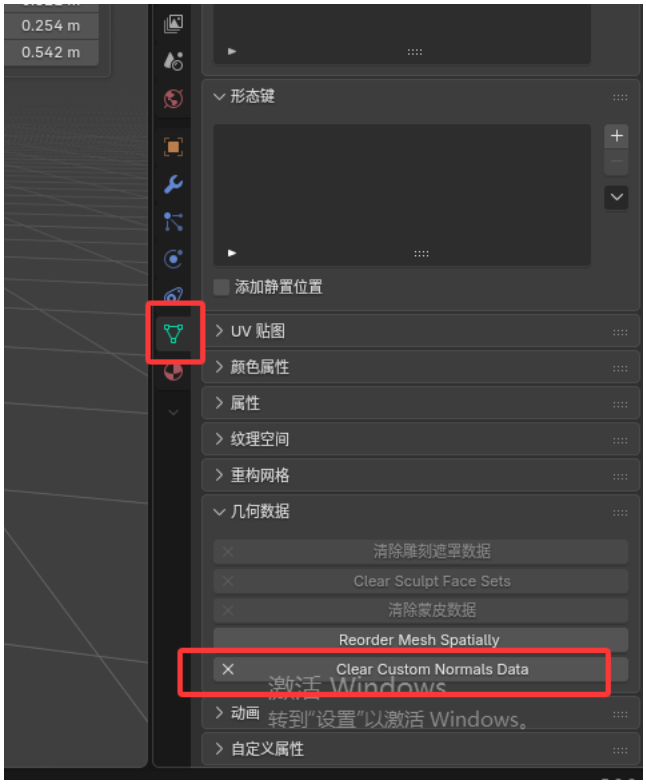
If we select all the sharp corners and add a bevel to each of them (I usually only add a bevel to one section, if there are too many bevel sections the number of mesh faces in the model will increase significantly), the bevel area can be smaller without affecting the original mesh shape. It gives the appearance of a slope, as if it has been polished. As shown in the following image, the light and shadow at the corner have been corrected. This is because the extra faces from the bevel have spread out the normal vectors of the originally merged edges.





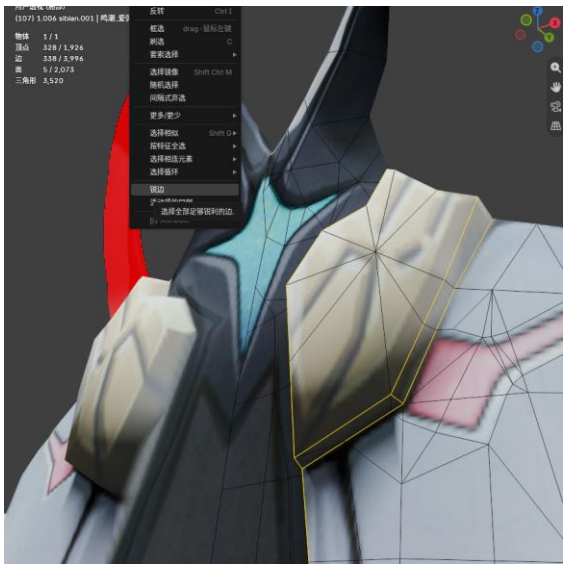
1-7-4-9

Returning to the clothing production, we first remove the normal information that comes with the model (for MMD models, this usually needs to be done as otherwise the normal information we have modified will be overwritten)



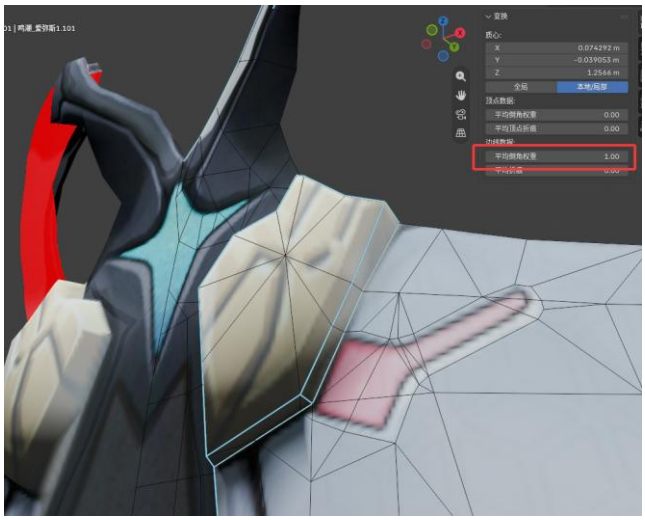
1-7-4-10

Then in object mode, right-click to enable smooth shading. In edge mode, select sharp edges. Check the entire area to ensure only the edges are selected and no extra areas are selected. The default 30 degrees should be sufficient for most cases. We need to create chamfers for this metal part.



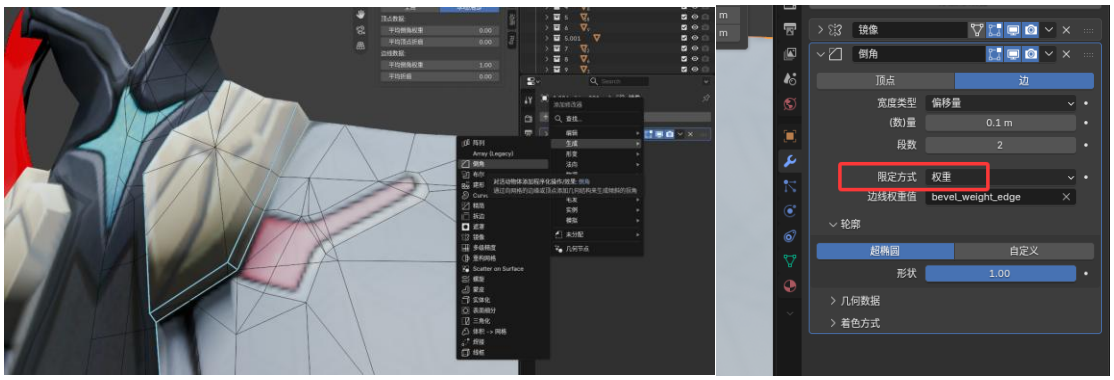
1-7-4-11

Press the N key to open the side panel. Adjust the chamfer weight to 1.



1-7-4-12

Add chamfer modifier and select the weight

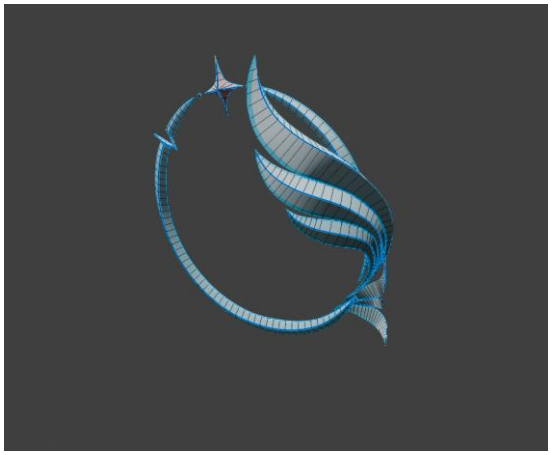


Returning to the object mode, you can see that the light and shadow at the turning point have returned to normal.

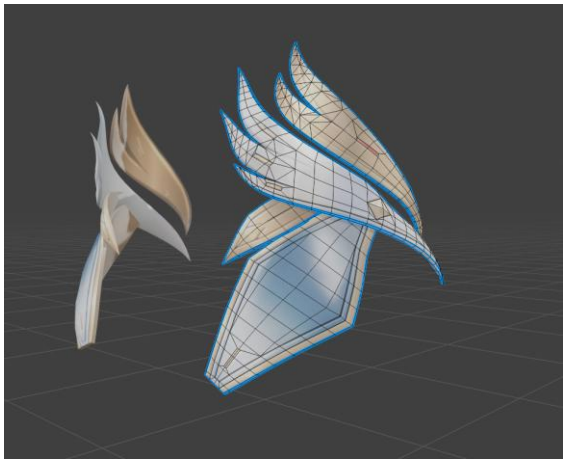


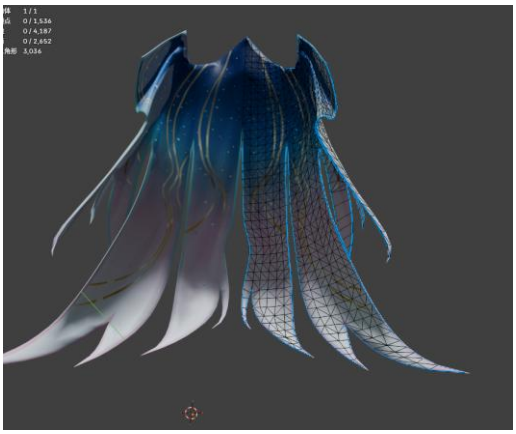
1-7-4-13

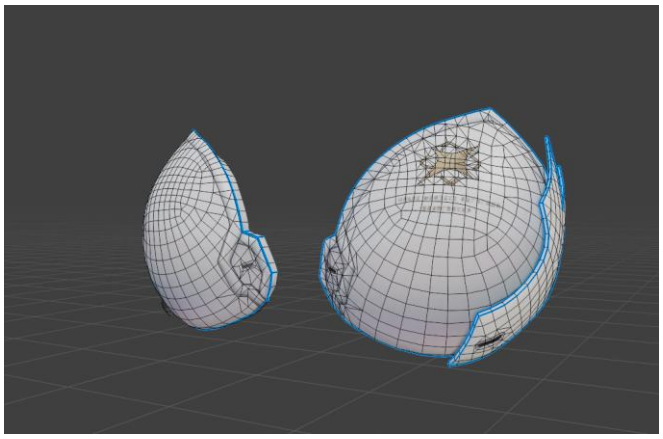
According to the above operation, add chamfers to the edge corners of all components, and for the fabric, add chamfers to the edge of the thickness as well. After modifying all the grids, optimize as shown in the following figure.

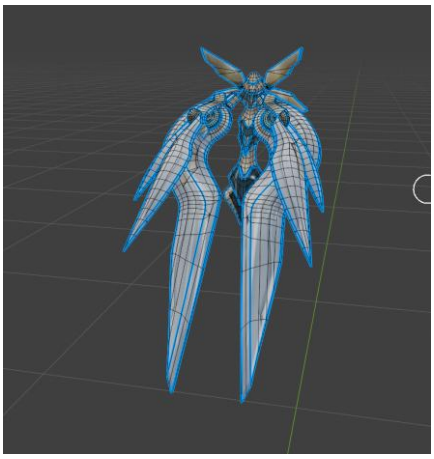


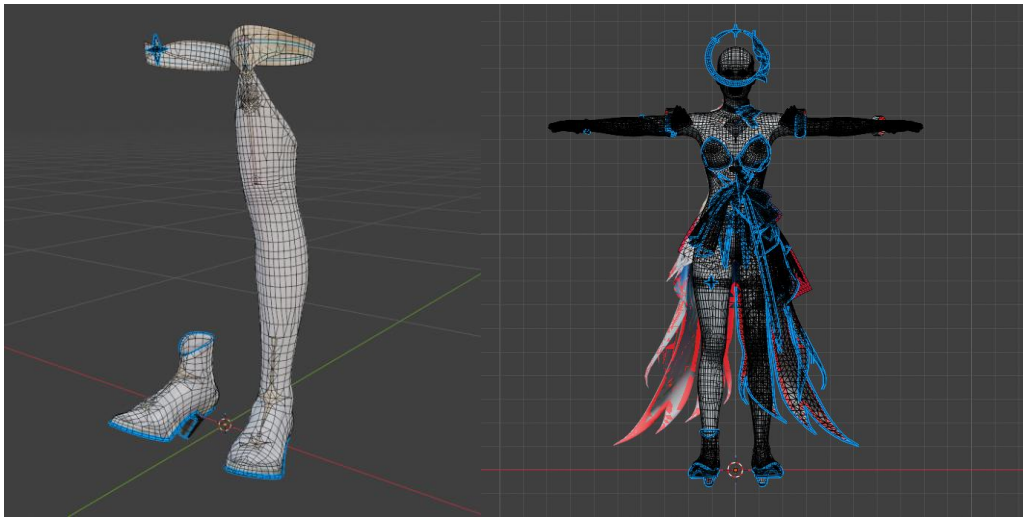












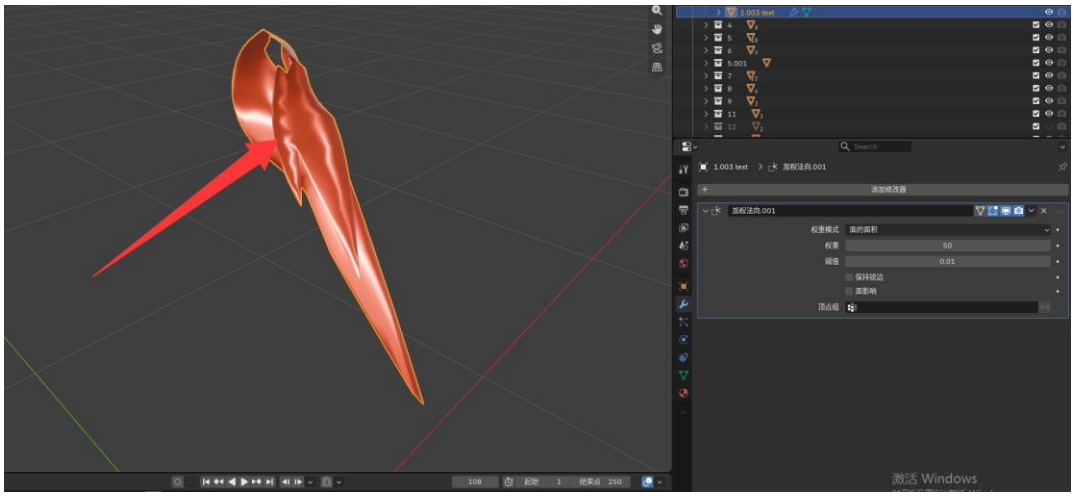
1-7-4-13

Next, we will conduct the model reflection check. The snapshot of the mode on the upper right corner has switched to a red lustrous material. Observe the texture direction of the model's mesh. If there are black surfaces or particularly strange lighting effects, adjustments need to be made to the mesh. (The effect of the metal material is particularly significant.) Since this is basically the reflection appearance shown in the VAM, you can preview the effect and make modifications in advance. Next, I will take the tail wing as an example to explain the influence of the triangular faces in the model mesh on the display effect in the VAM (this is also why I previously asked to convert the reflective metal mesh to a quadrilateral mesh first).

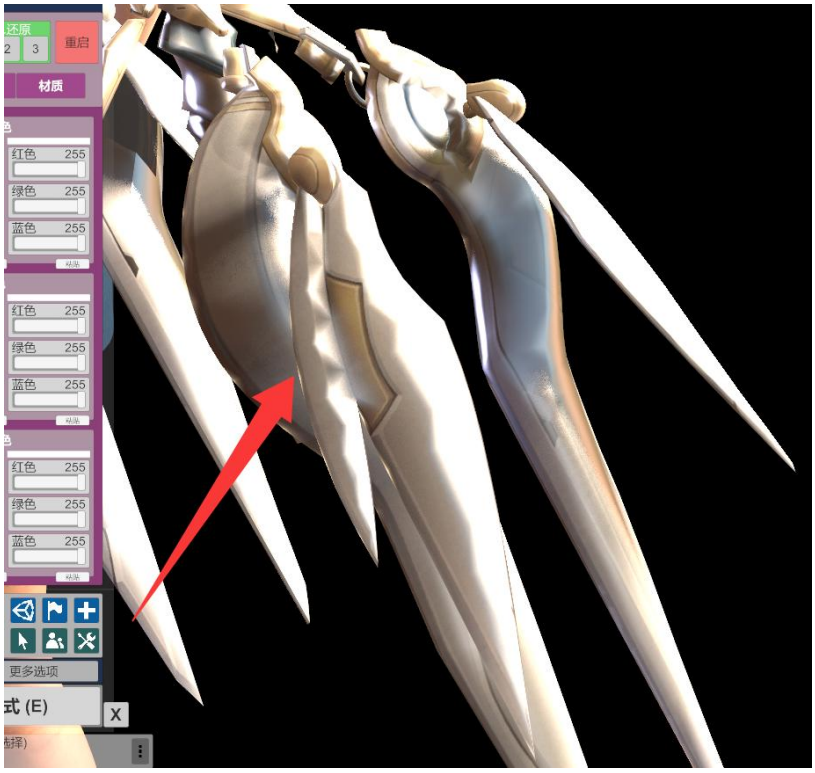


I will demonstrate a part of the grid (before optimizing the grid). The following section is mainly to illustrate the differences in performance of different grid states in VAM, and is only for demonstration and principle explanation. For the specific import steps, we will introduce them in detail later. Here, I will give a brief explanation first.

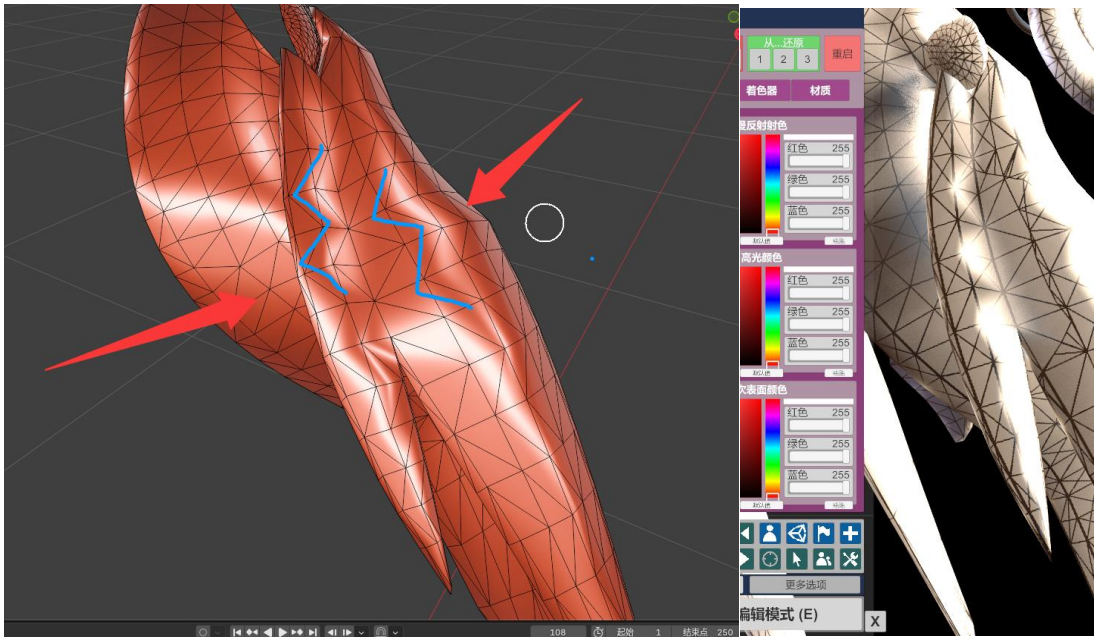
We can use the weighted normal modifier to simulate the default normal effect in VAM. As you can see, there are many distorted reflections on the model.



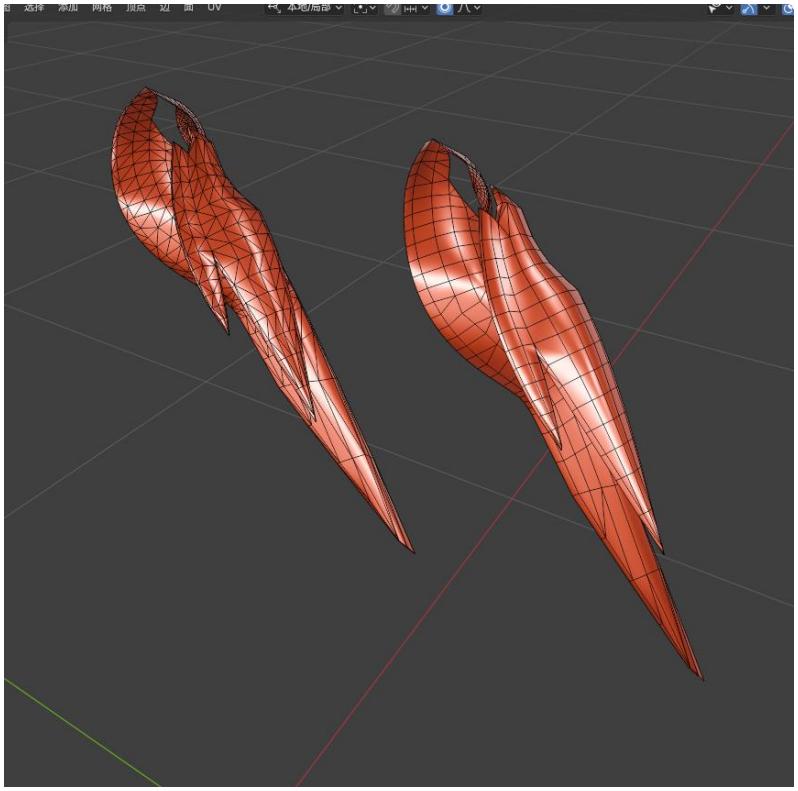
After importing VAM, the effect is as follows - it also has the same distorted reflection. To avoid repetitive rework, we need to resolve this distortion before importing.



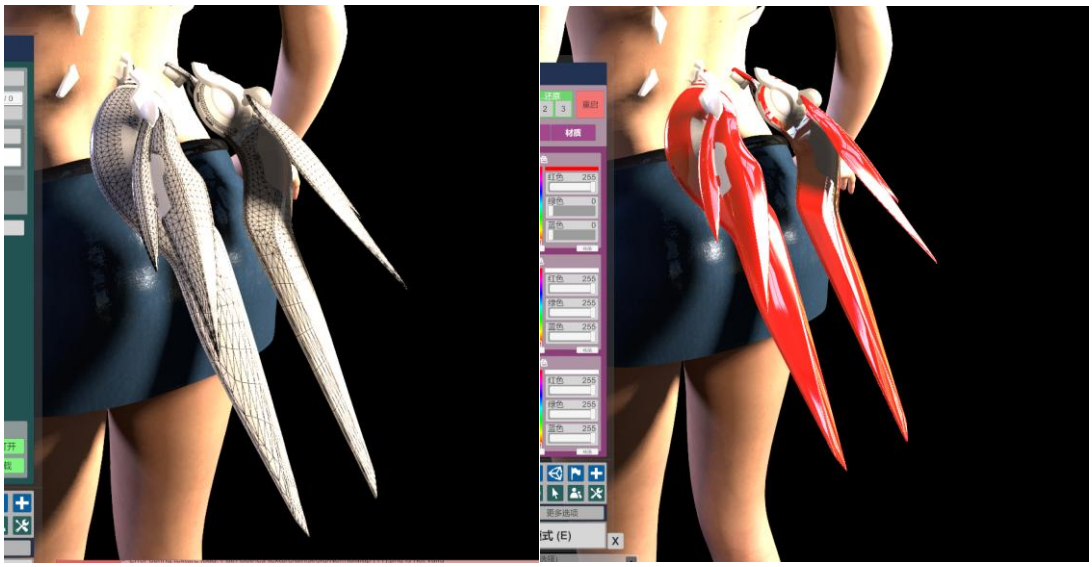
In the grid mode, we can observe that the distorted reflection basically follows the edges.



So how can we avoid this situation? We convert the grid into quadrilateral faces, and we can see that the distorted texture has disappeared.
Therefore, we can see that it is the triangular faces that are the cause. However, we have no way to incorporate the quadrilateral faces into the VAM. When all the grids enter the VAM, they will all be converted into triangular faces.



I carried out three stages of attempts and finally achieved a perfect result.
Attempt 1: I added a subdivision surface to the model, which means turning the model into a high-density mesh. It can be seen that under a denser mesh, the reflection performance of the model is perfect. However, this results in a large number of model meshes, consuming a lot of resources. When loading more than ten high-resolution clothing models simultaneously, the computer would freeze. But this also made me realize that it was the meshes and normals that caused the problem.



Attempt 2: As mentioned in Method 1 earlier, if I add subdivision to the model, the reflection will be fine. The increased mesh from subdivision not only reduces the curvature each triangular face needs to bear, but also changes the angle of the vertex normals.
I used the Eight Monkey renderer to bake the normal information of the high-poly model onto the low-poly model.
As shown in the following image, on the left is the high-poly model after subdivision, and on the right is the low-poly model with the baked normal map added. You can see that in the renderer, there are no ugly triangular jagged reflections.



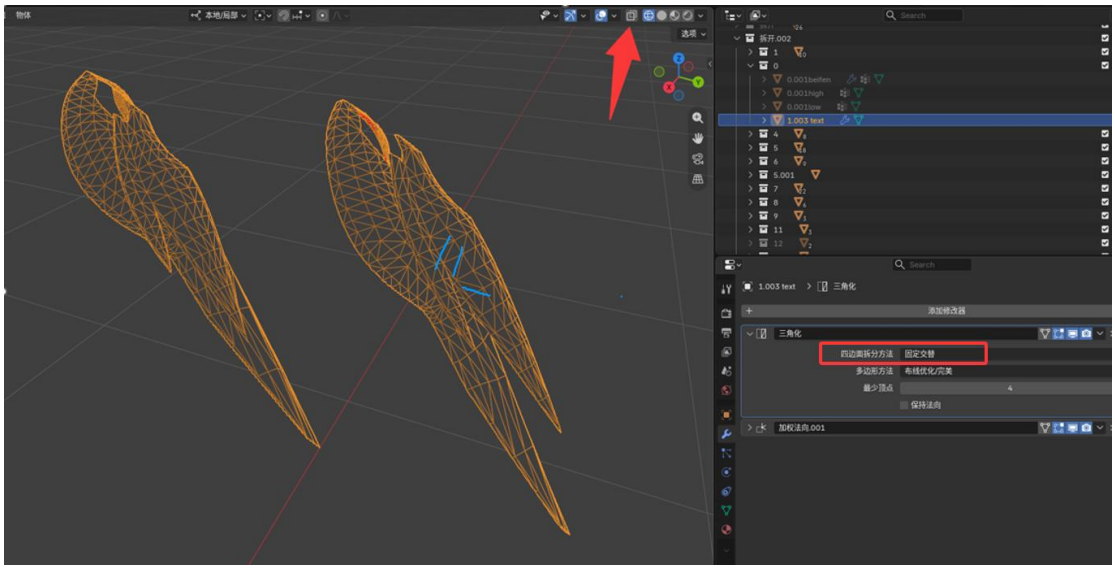
Then I applied the baked texture to the VAM, and the triangular sawtooth reflection reappeared. Although the overall appearance has become much smoother and has improved in some aspects, it can still be immediately noticed that there is an anomaly.



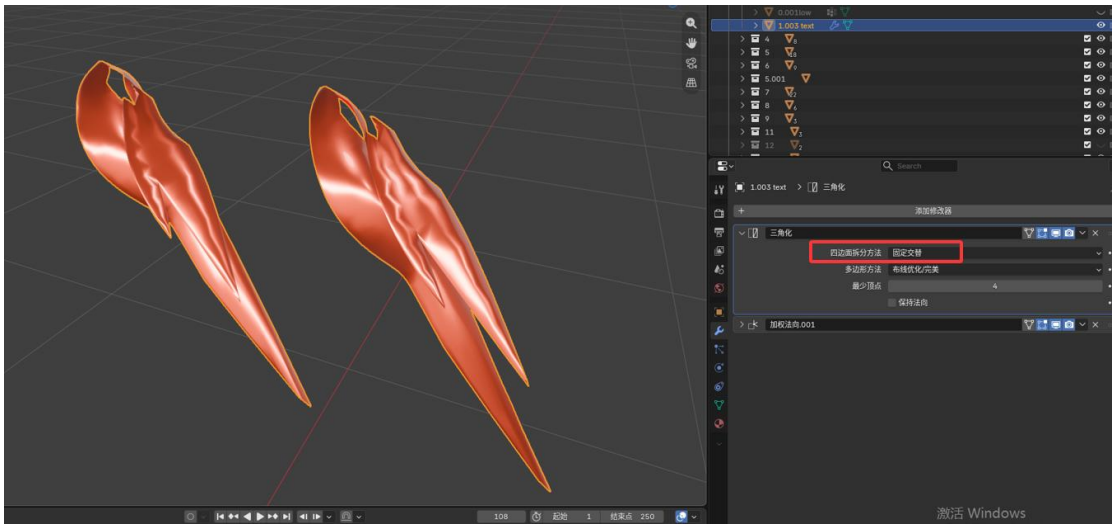
Attempt 3:

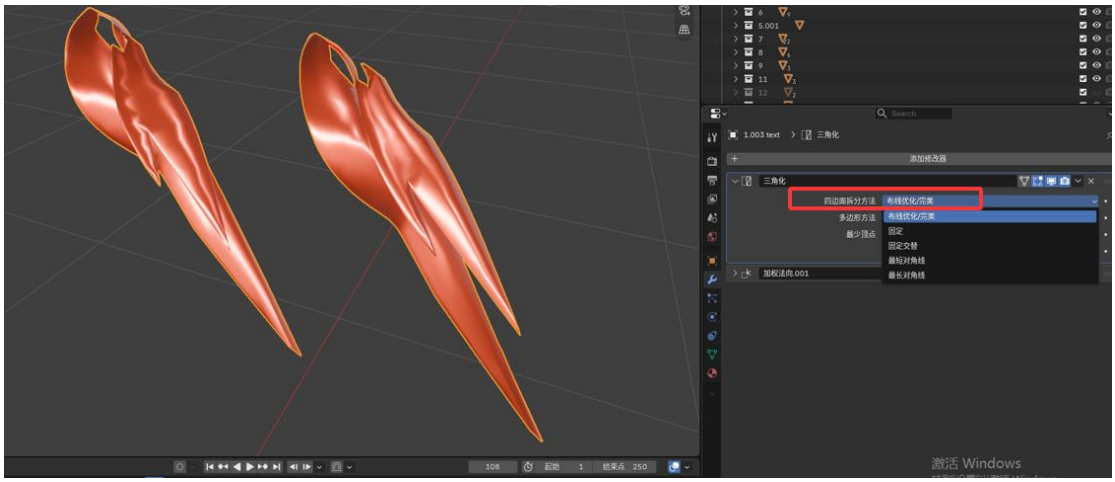
This time, we attempt to adjust the direction of the triangular faces. We add a triangular face modifier to the model, convert the mesh into triangular faces, and adjust the triangulation algorithm.

Press Shift + Z to enter the mesh interface. Note to cancel the X-ray mode. You can see that under different algorithm modes, when connecting quadrilateral faces into triangular faces, the diagonal positions will be different.

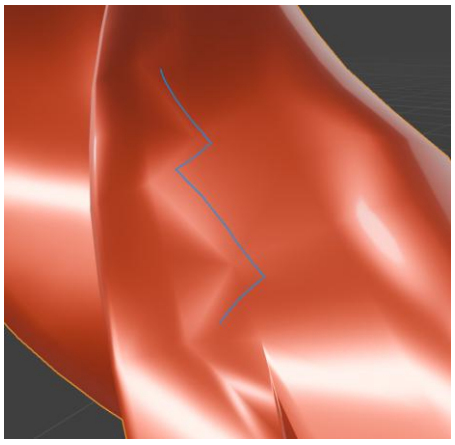


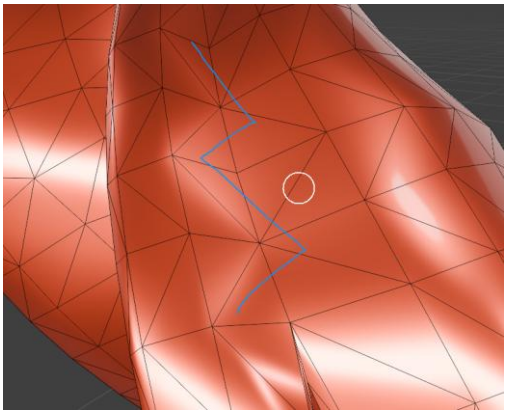
Exit the grid mode and continue to switch the algorithm type for triangulation. You can observe that different algorithms result in different diagonal positions, which will affect the reflection of the model.



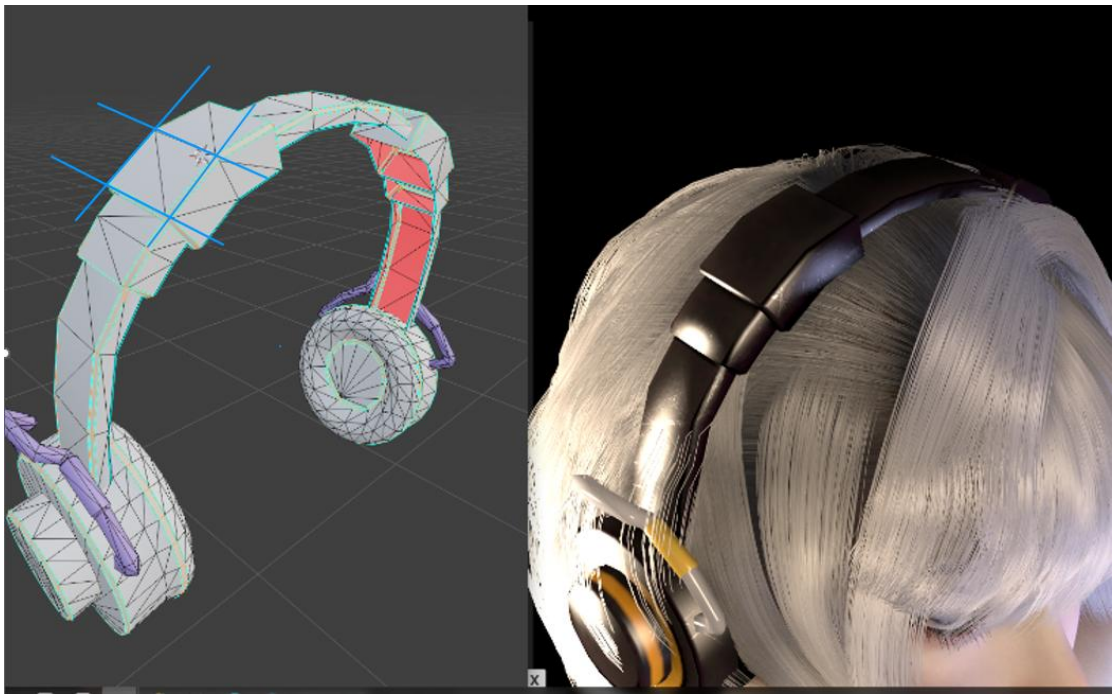


The reason for this phenomenon is that the grid density of the model is relatively low. The edges cannot support the entire curvature, so when processing reflections, corners are generated on each edge, which will cause the reflection to be split apart.

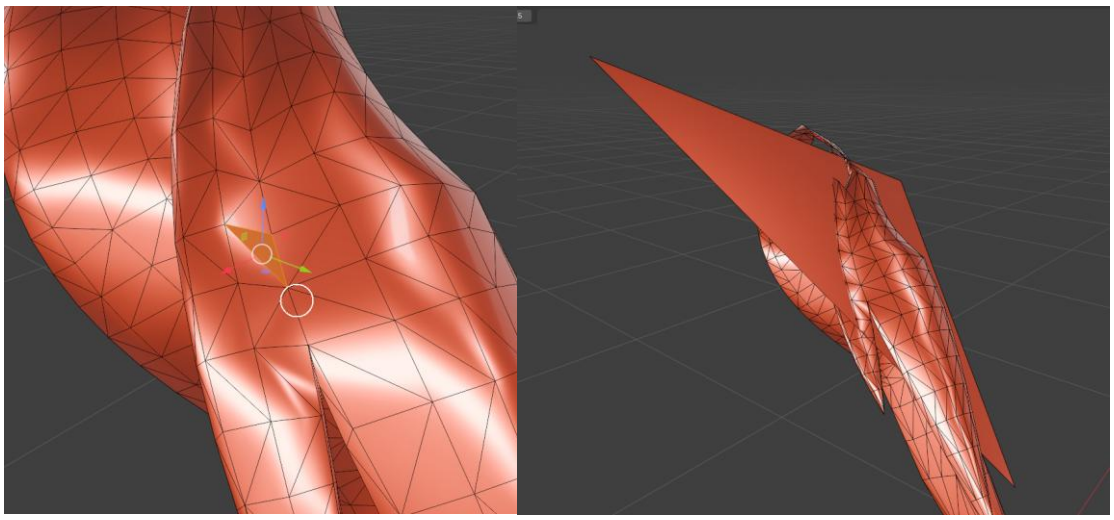




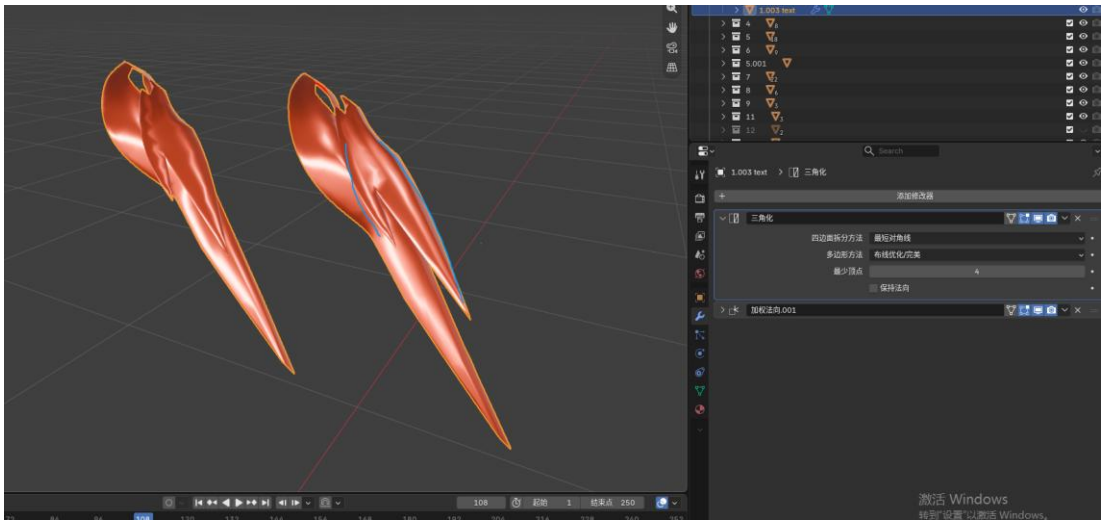
Perhaps you may have some questions. Why didn't the headphones demonstrated in the 1-7-4-8 sequence have this situation? This is because when modeling the grid of the headphones, each quadrilateral was on the same plane, which is equivalent to tilting a plane and then cutting it into triangular faces. However, the wing we are currently dealing with is not like this.



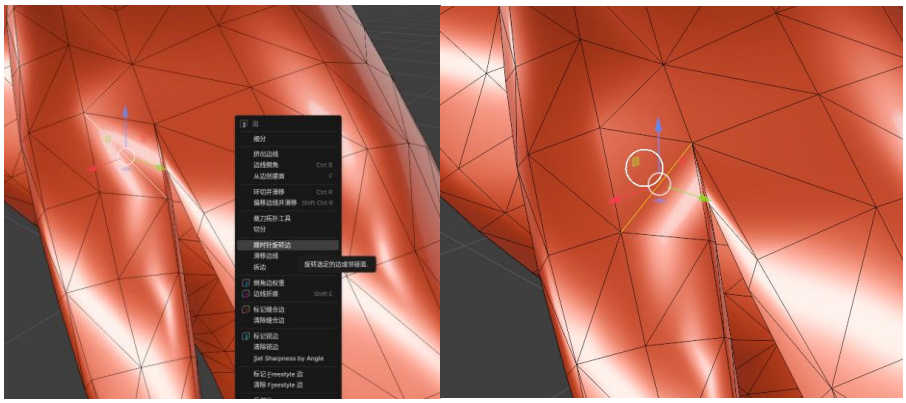
As an example, I copied a triangular face on the curved surface and enlarged it. You can see that the adjacent triangular faces are not on the same plane but are interlaced. This indicates that there is an angle between each triangular face, and they do not form a flat quadrilateral.



We can modify the triangulation algorithm, or manually make the reflections as smooth as possible. Here, we only need to focus on handling the reflections at the corners. The remaining parts can be dealt with later.



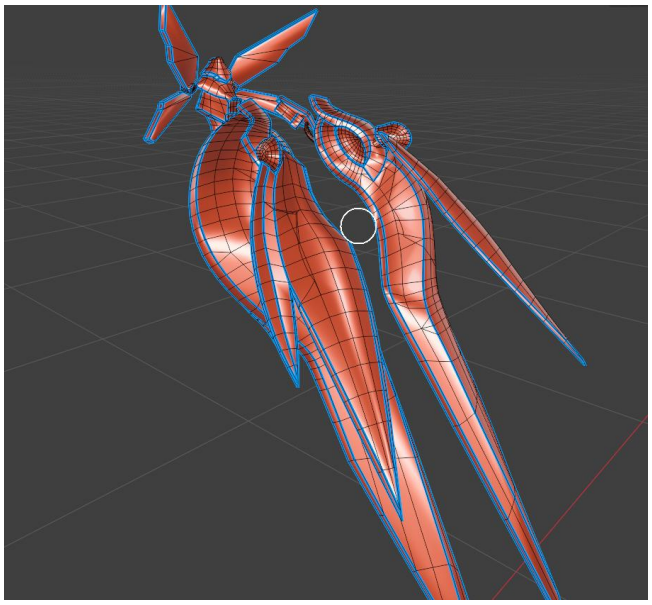
If all the algorithms have been tried but the results are still unsatisfactory, there is a manual adjustment method for this situation: After applying the modifier, right-click on the edge mode: Rotate Edge, and you will see that the reflection also changes accordingly.

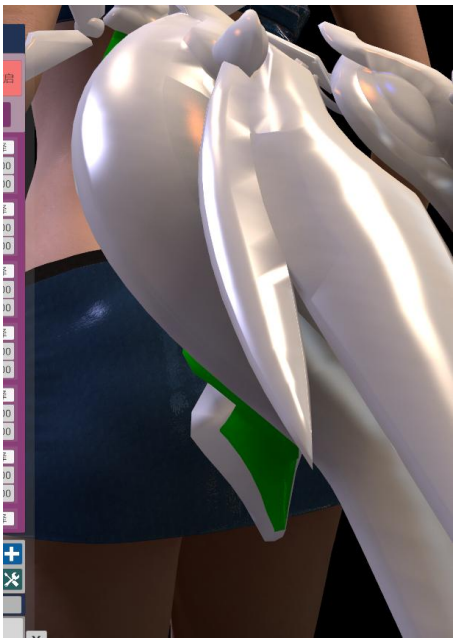


After importing the correctly triangulated model into VAM, I noticed that the edges' transitions were smooth and the reflection effect was basically normal.



This indicates that we are on the right track. Next, we add chamfers to the turning edges of the model to reduce the reflection of the curved surface and create the light and shadow transition effects on the surface. As for the reflection, it looks basically correct, but there are still some obvious small ripples. (Since this part is a floating equipment that does not need to participate in the deformation of the character movement, I did not perform the mesh optimization after splitting the materials.)





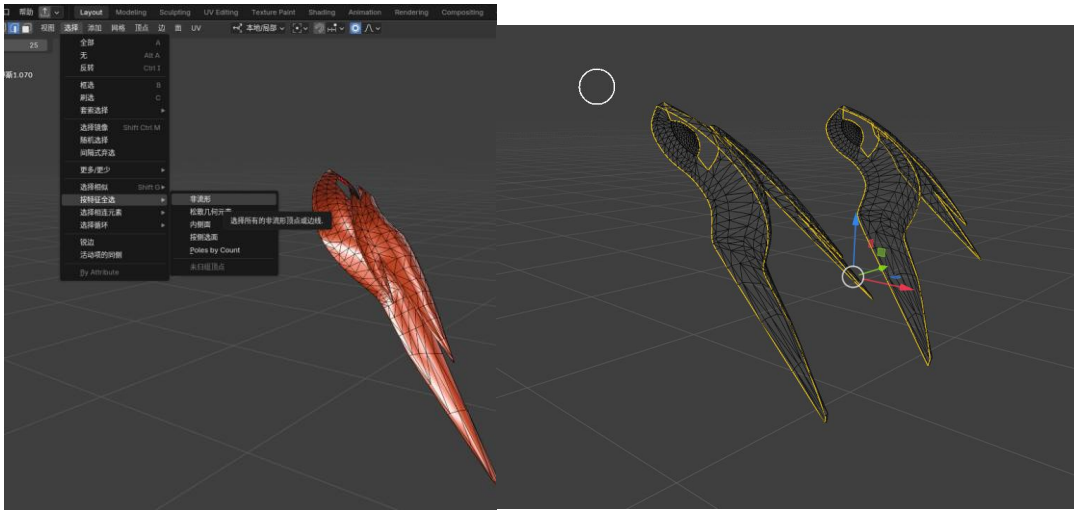
Next, we will import the normal map generated in Stage 1 into the VAM model here. Perfect! Finally, we have a usable visual effect.



So, presenting the reflection effect correctly in VAM is not an easy task. It requires continuous experimentation and iterative adjustments.

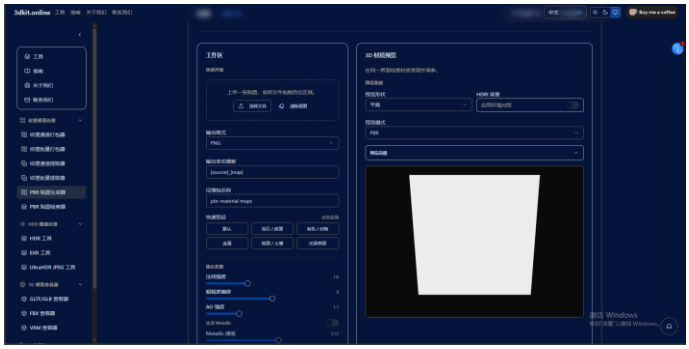
Summary: First, make the model quadrilateralized → optimize the mesh vertices (this step can be skipped if the hard surface equipment does not need to deform with the character) add chamfers at the corners → add the triangulation modifier → check the reflection → adjust the algorithm or manually adjust the diagonals of the triangular faces → generate the normal map → import it into VAM to view the effect (to be described later)

After completing the above steps, we still need to check the model. In edge mode, select "non-convex", normal mode will display a ring of lines around the edges. If other meshes are selected, enter face mode and press the X key to delete.

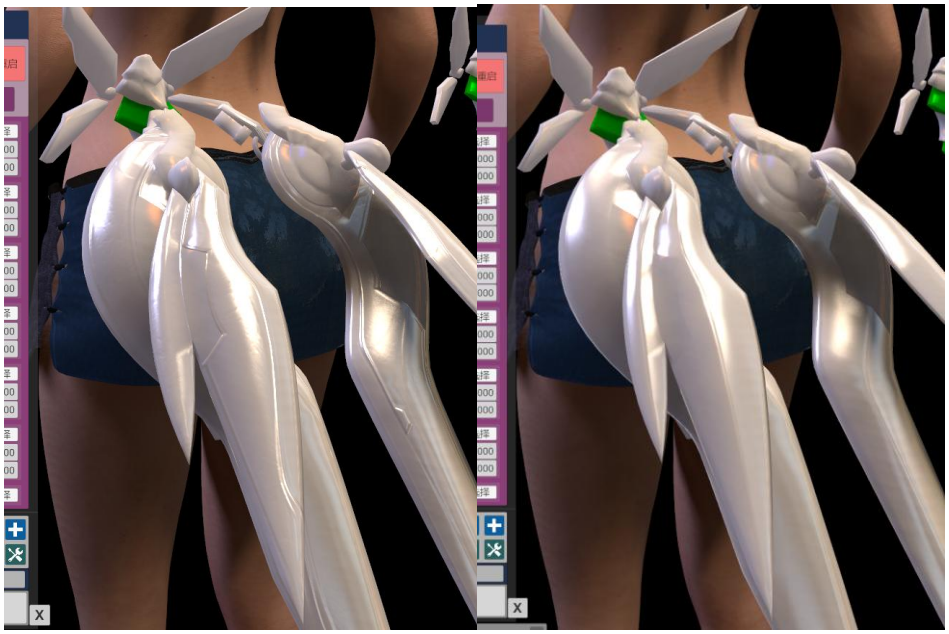


At this point, we have finished processing one component.
Not every component requires such a complicated process. For example, rough objects like fabric basically do not produce reflections, or flat metal blocks also generally do not have any problems. What needs special attention is the reflective metal components with curves.

For me, frequently creating high-poly models and baking normal maps is too troublesome and frustrating.
The following website can directly generate normal maps and roughness maps from texture maps:
https://3dkit.online/zh/pbr-map-generator



Below is the comparison chart. The left side is generated by the website, and the right side is the one baked. Although the accuracy is not as high as that of the baked version and it has noise, it is still basically usable.
However!!! He can bake different textures with high levels of detail. For example, the engraved lines on the equipment!!! He has made the engraved lines in the texture into normal map heights!!! This is a qualitative leap for material rendering and is something that is hard to achieve. I will generate the normal maps and roughness maps for all the model components again using the website in the later processing stage, and then use them in the VAM later.



The first part is now complete. The entire process has been extremely difficult.
As I write this, I'm almost exhausted. Next, I will follow the above process to handle all the clothing grid components. Cheer up!

Attach a final effect of it in the VAM (currently, there's still a long way to go before reaching this stage)

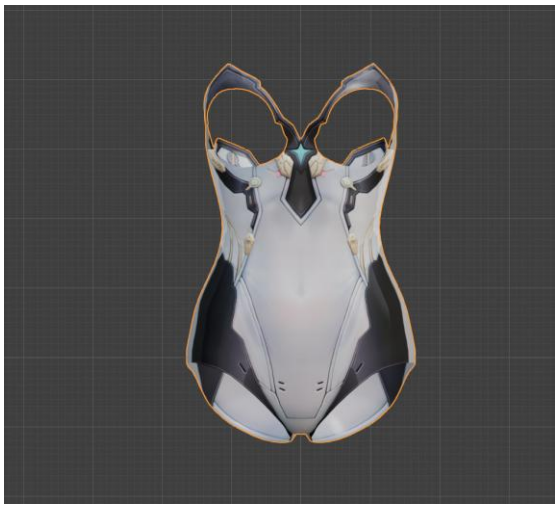


Now we move on to the second part of the tutorial.

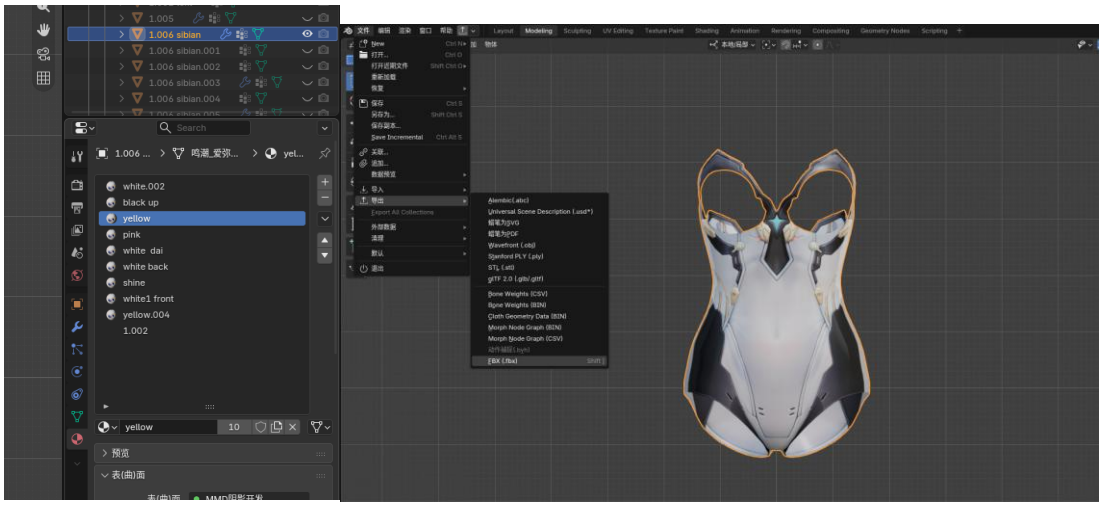
part two

2-1

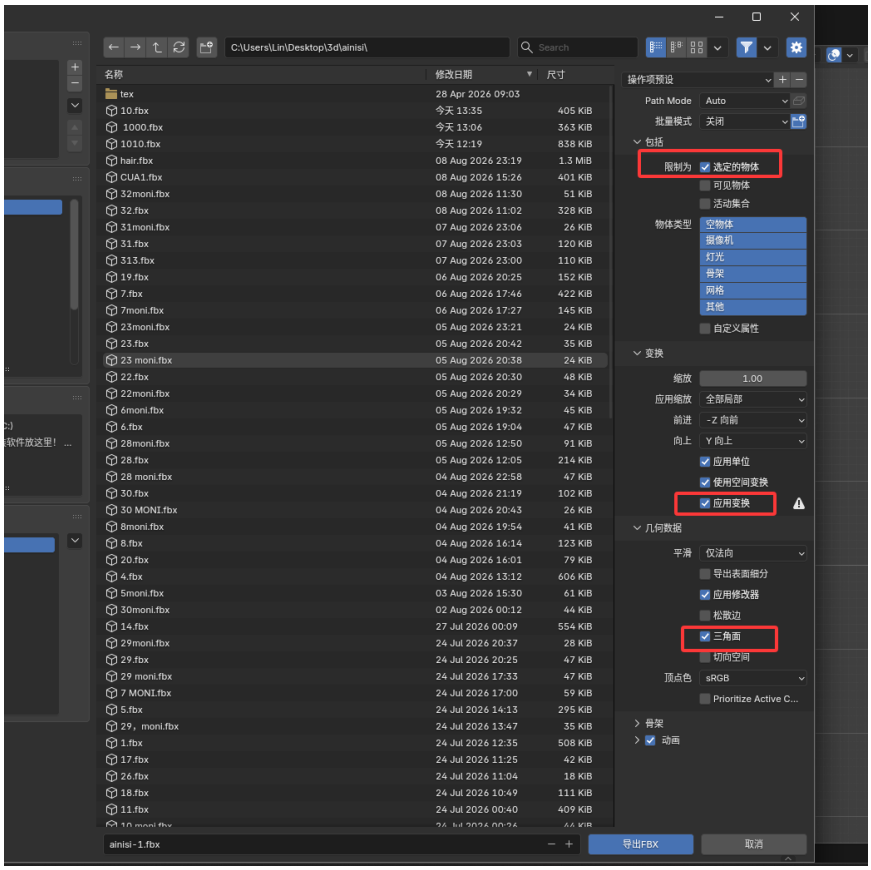
We imported the processed model mesh into VAM. Then, I continued to use the tight-fitting clothing example.



Check if the names of the grids and materials contain Chinese characters. If so, change them to numbers or English.

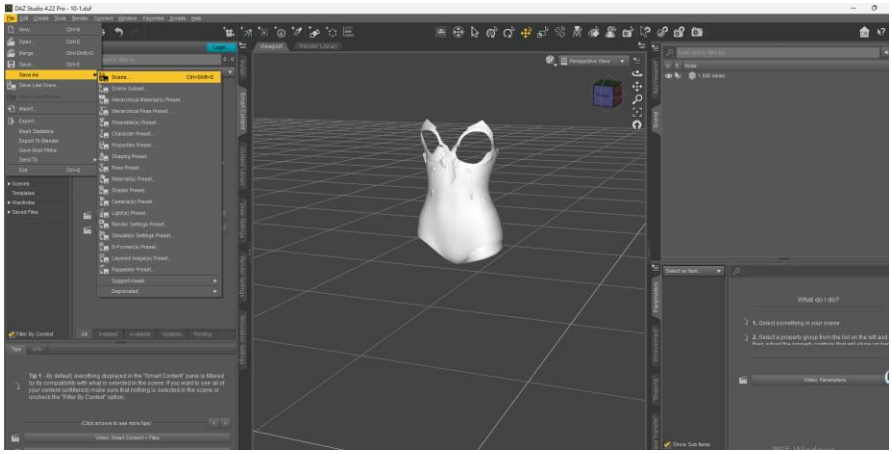


Export as FBX file



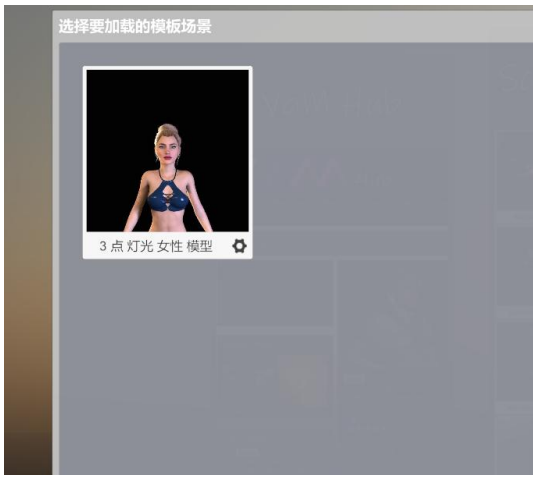
2-2

Import the model into DAZ and save it as a scene file

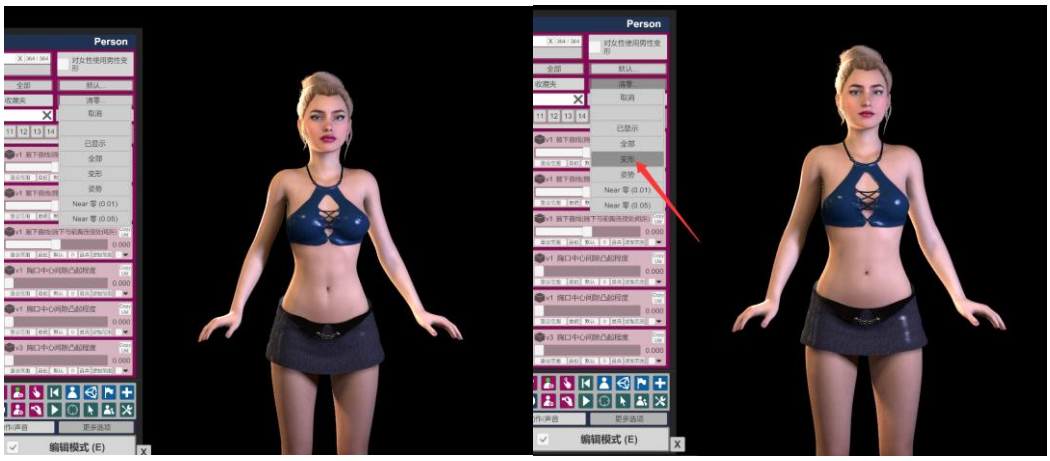


2-3

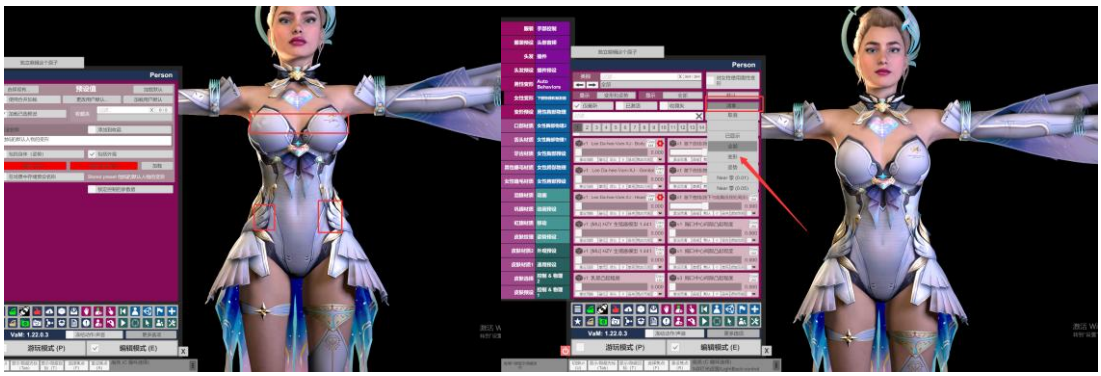
Then open VAM and select the default scene to start.



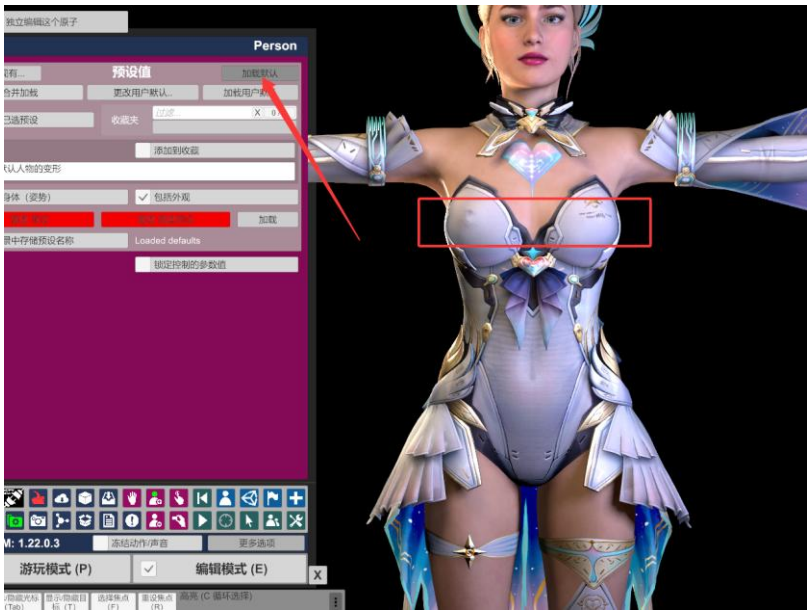
Please note again!!! The default characters in the scene do not have custom transformations!!! If you directly import, you will notice that the clothing is distorted. Select the character, open the transformation preset interface, and load the default transformation.



If the clothes appear to be distorted unnaturally after being imported, it is most likely due to the absence of deformation cleaning. As shown in the picture below, after cleaning, they become normal.



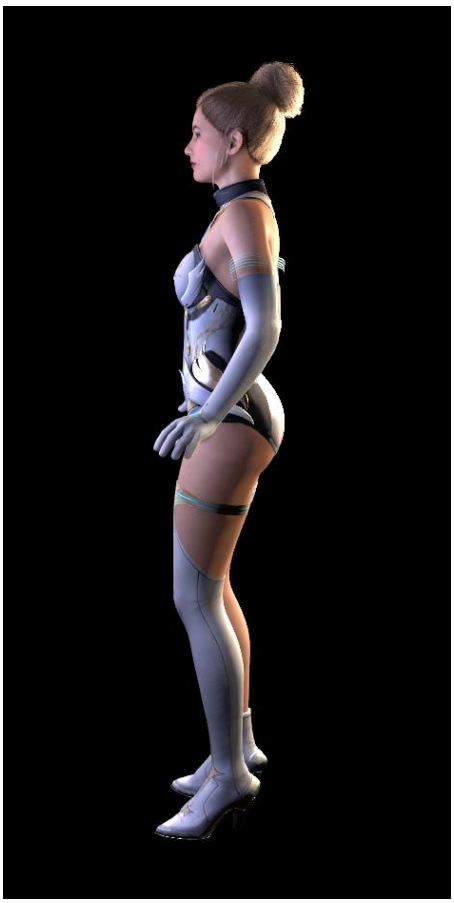
Select the default deformation of VAM. Although most of it has been restored, there is still an unnatural protrusion in the nipple area. It is recommended to completely remove all the deformations.



In Vam, clothing is divided into three categories:

1: Tight-fitting clothes. These only need to move closely against the character's skin mesh without the need to activate fabric simulation. Using the default binding in Vam can solve this problem well.



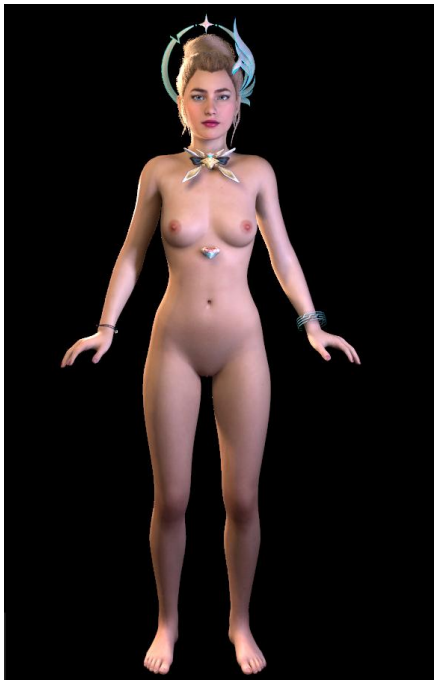
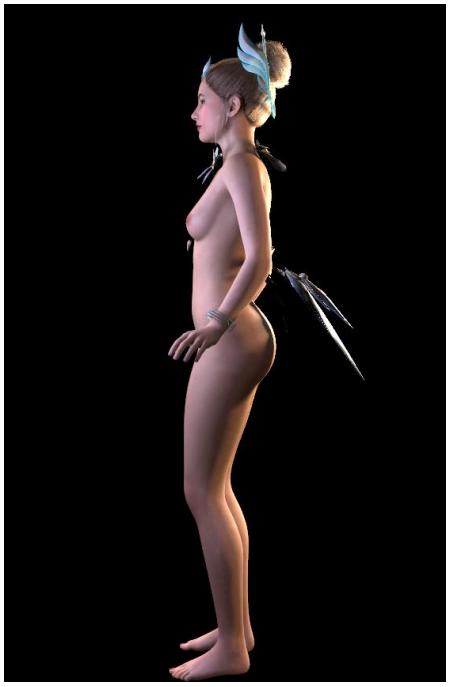


2: Simulated clothing. This part involves clothing that requires physical simulation, such as ribbons and skirts. It is necessary to specify the simulation texture on the Vam default binding, and even use the simulation data of other objects.

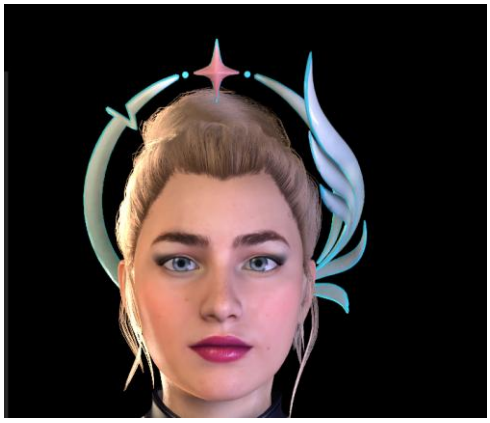



3：硬表面装备，这部分服装不需要参与人物肌肉的形变，只需要跟随骨骼点位置移动和旋转。Vam 默认的绑定算法做不到这点，我们使用插件进行绑定。

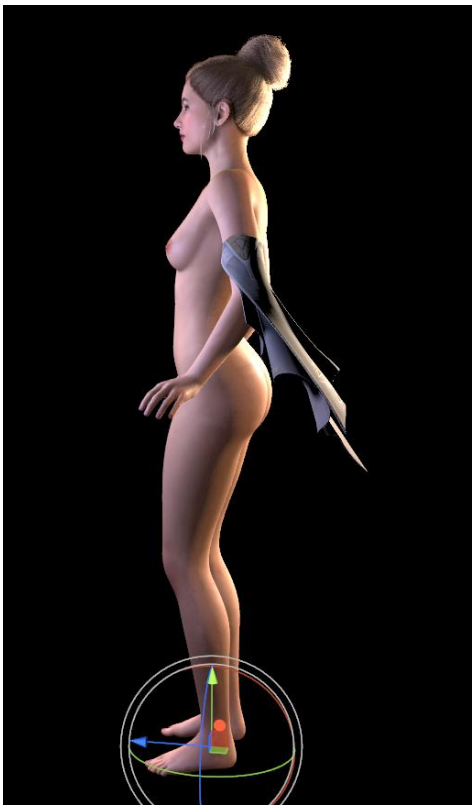
3: Hard-surface equipment. This type of clothing does not need to participate in the deformation of the character's muscles and only needs to follow the position and rotation of the bone points. The default binding algorithm in Vam cannot achieve this, so we use plugins for binding.

Regarding headwear, since the default character face in Vam is not good-looking, we often need to adjust and change the face. Therefore, the head mesh changes, causing the accessories attached to the head to also deform. The advantage is that the head decorations do not need to undergo deformation movement, so we follow the method for hard-surface equipment and make it bound to the fixed bone points on the head.

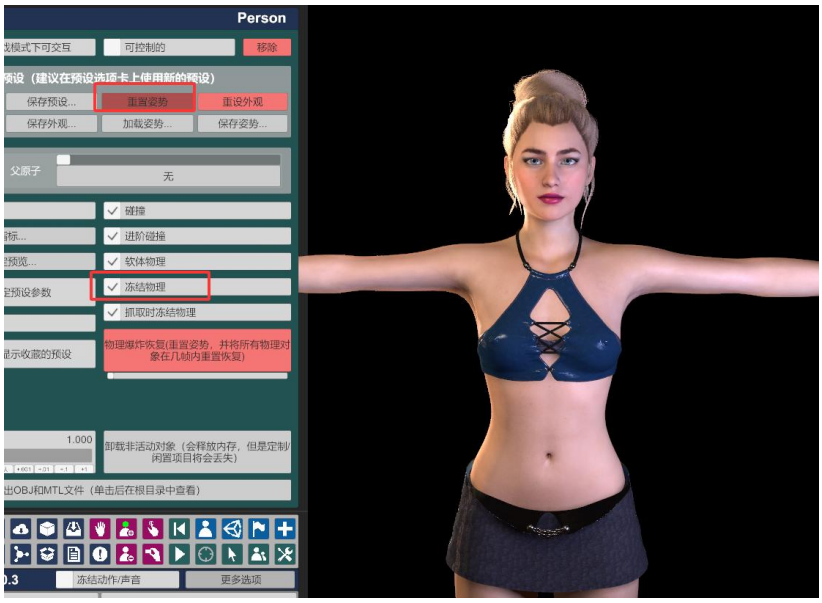



4: CUA clothing: This is used for the types mentioned above that cannot be handled. For example, swaying tails, particularly thick sleeves, and other components. The principle is to bind the bones and create flexible shaking through the delay of joints.

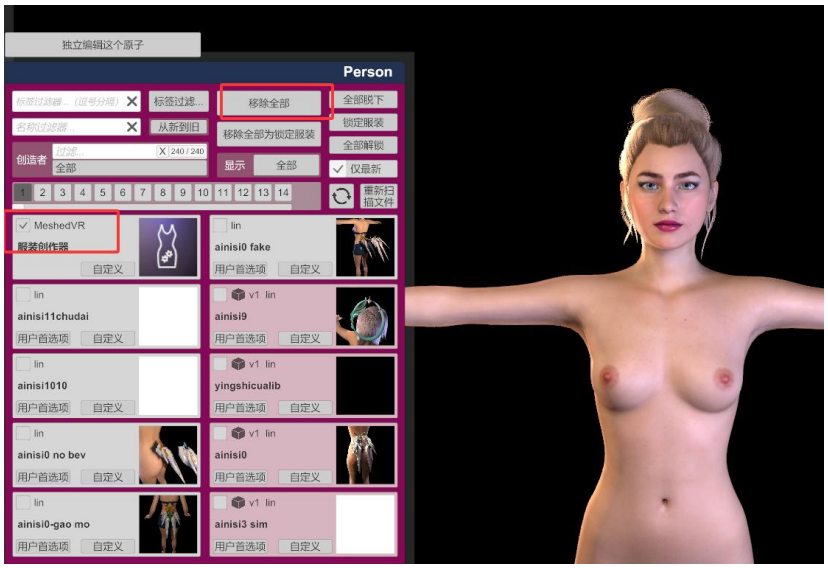
2 - 4

Then, we return to the production process. Open the physical interface, select "Freeze Physics", and then reset the posture.



2-5

Enter the clothing interface. Clear the current clothing in the interface, and then click the clothing creator.



2-7

Select the previously saved DAZ scene



You can see that the default option for the combined materials is checked in the upper right corner. This will merge the previously copied elements (with different names but the same content) from the same material. This import is only for preview purposes. It is necessary to combine the materials together for easier adjustment and effect viewing. Click "Load" and change the file name during the loading process. Vam will generate the corresponding folders and clothing files based on the folder name and file name you provide.





2-8

Click "Generate Simulated Data", create a new project, and take a screenshot to make it easier to distinguish from other files

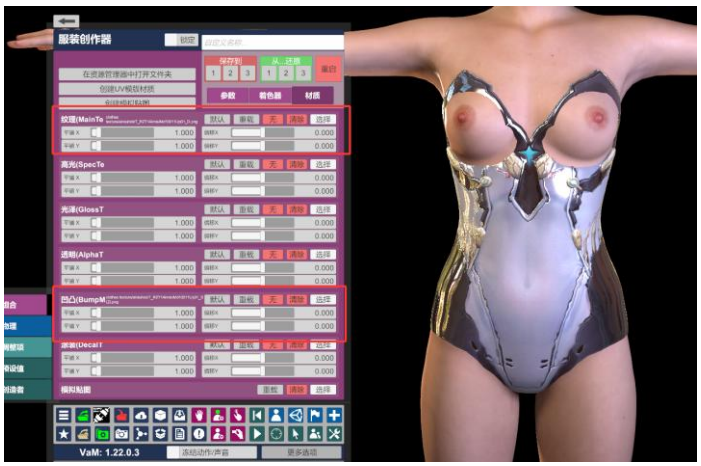


2-9

Go to the material panel, set the glossiness to the maximum, and reduce the highlight intensity to half. This will create a reflective material.



Go to the material interface, select the image, and apply the color and bump textures to the model.



Save (the data/contents)



2-10

Before editing clothing, you need to install a very convenient plugin that adds plugin slots to garments (which isn't possible by default).

Exit the editor and go to the Hub community interface, search for Ashu's ClothingAutoConfigurator plugin, and install it.

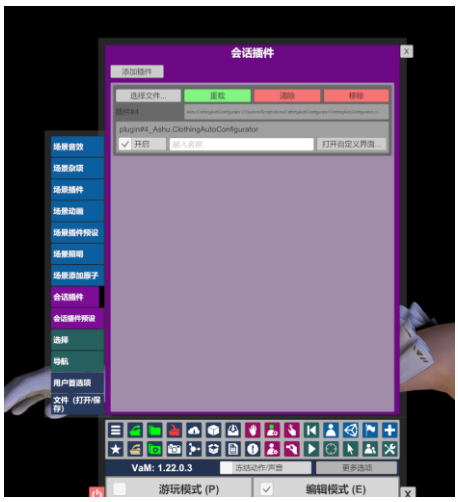
Thanks to Ashu27 for providing this plugin.

https://hub.virtamate.com/resources/clothingautoconfigurator.62366/



Return to the scene after installation.

Add ClothingAutoConfigurator to the session plugin.

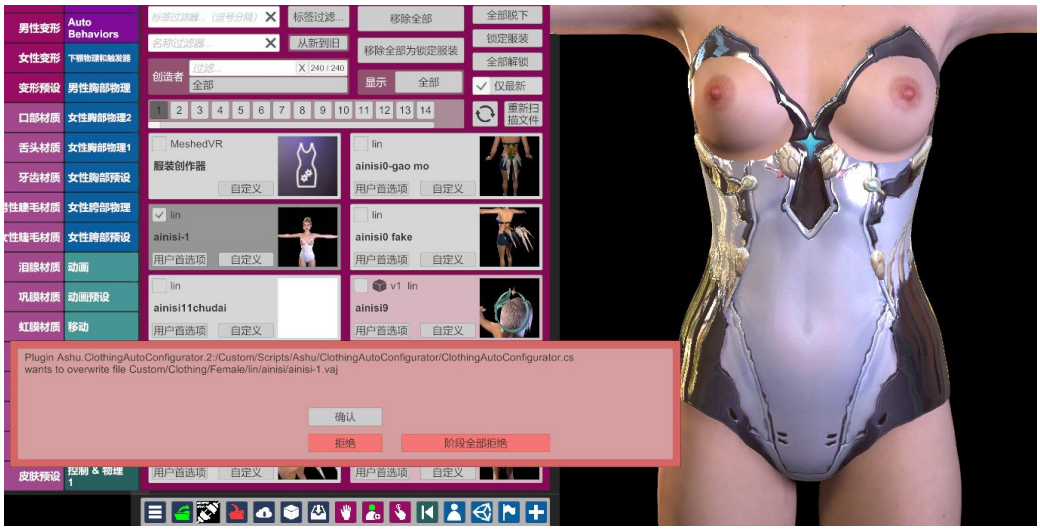


Click to scan all the clothes. It will automatically add the plugin slots. It's very convenient. After seeing the pop-up window, just select "Confirm". The plugin is allowed to modify the data.





Note: The following steps are for the simulation of clothing items such as undergarments and ribbons. For hard surface floating mechanical equipment, there is a separate process. I will explain it later. Select our model and click "Confirm" in the pop-up window.

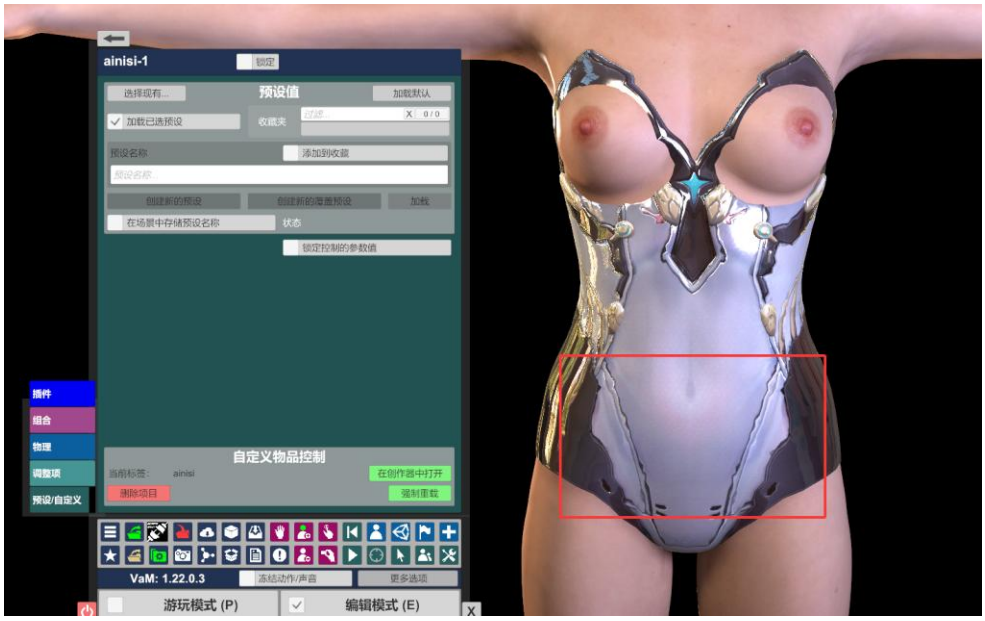


The installation process of the ClothingPluginManager plugin has now been completed.

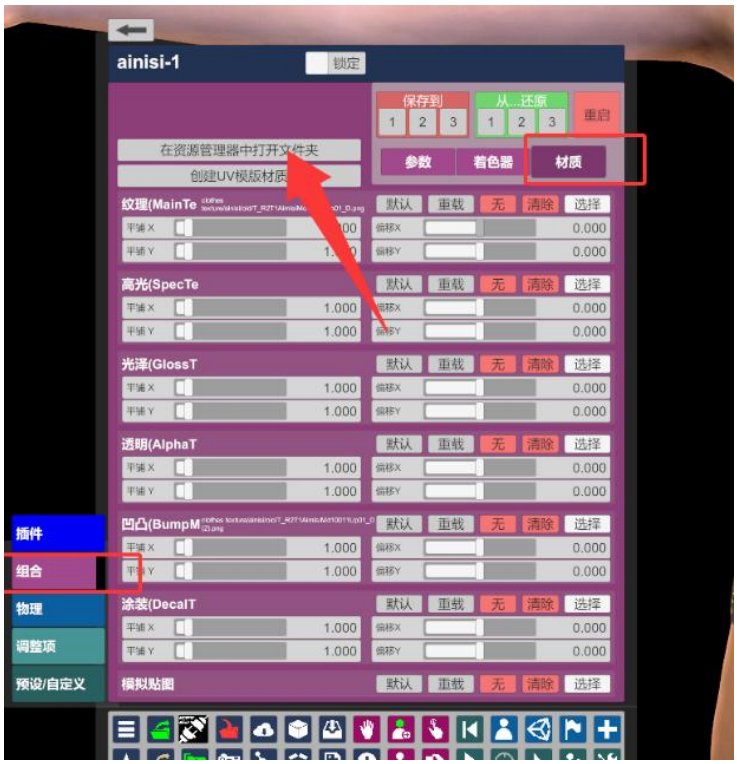
2-11

It can be seen that by default, there are jagged edges. This is the built-in mesh smoothing effect of VAM. When loading clothes into VAM, they are usually given a smoothing effect, similar to relaxing the mesh (making the mesh size more uniform). This can make the clothes look looser. As I mentioned earlier when optimizing the mesh, uniform wiring is necessary for this purpose. Uniform meshes are beneficial for binding and simulation. However, we don't need the secondary smoothing of VAM here.

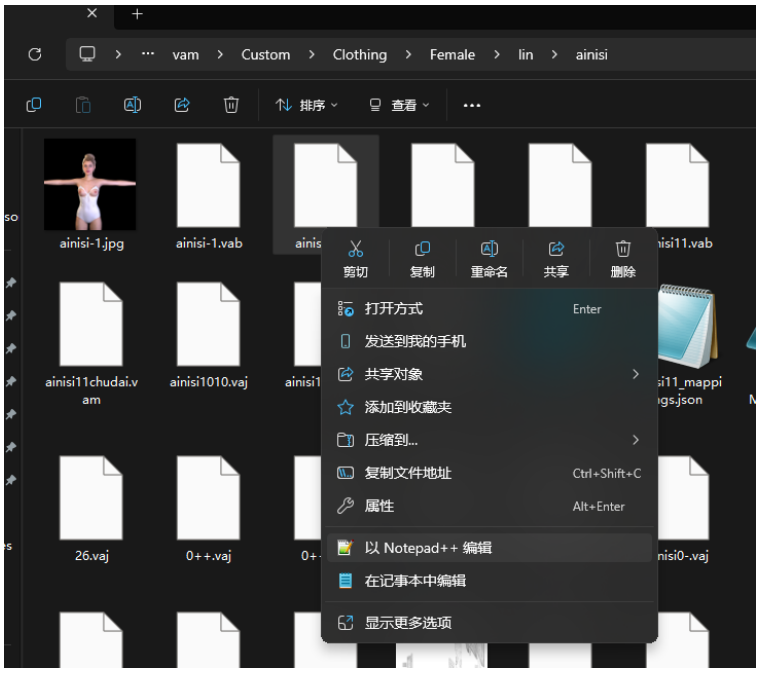
This is good for clothing that requires simulation, but we don't need it now.



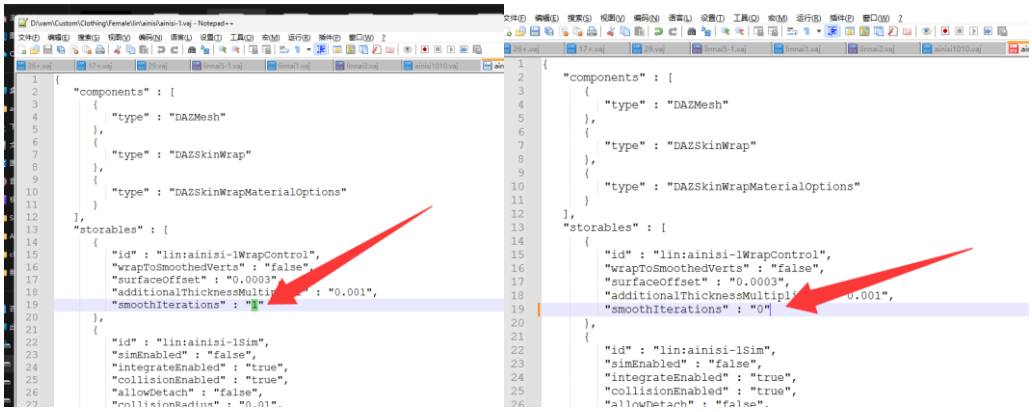
Go to the material panel and open the directory where the previously saved file is located



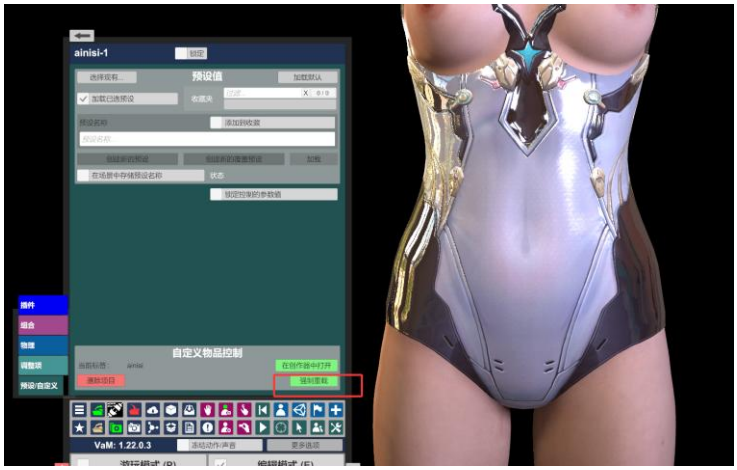
Locate the vaj file that was generated after the recent save operation. Open it using a code editor, such as Notepad++ or a similar program.



Change the "1" in "smoothIterations" to "0" and save the file. The purpose is to disable the built-in smoothing function of VAM.

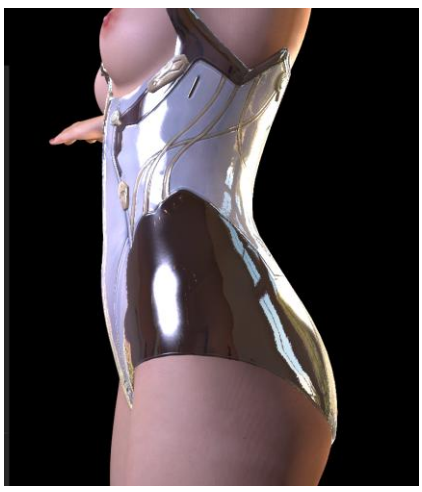


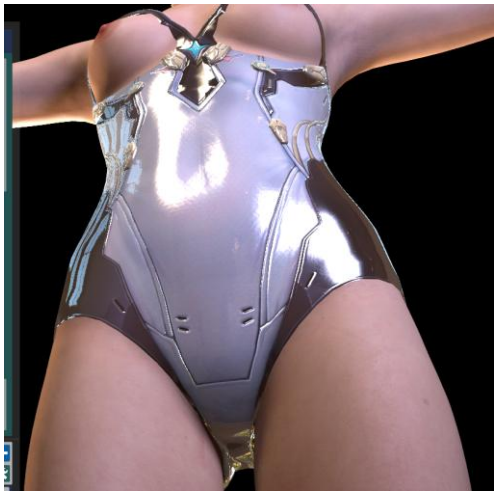
Back in the VAM program, force re-loading of the clothes, and you can see the jagged edges have disappeared.



2-12

Rotate the model at each angle and check if there are any issues with the reflection, or if there are black areas or normal line problems.



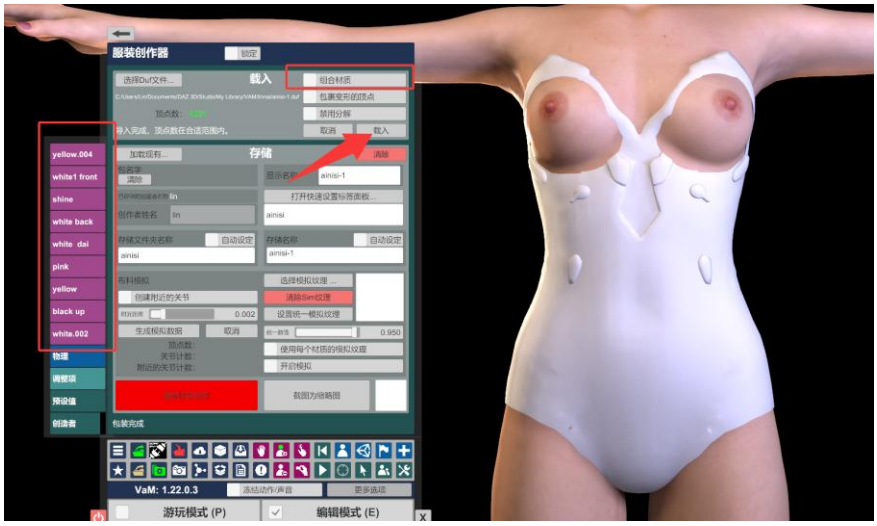


2-13

After the inspection is completed, return to the clothing creation device



Cancel selection: Click the "Combine Materials" button, then reload the clothing. You will be able to see each material separated out.



2-14

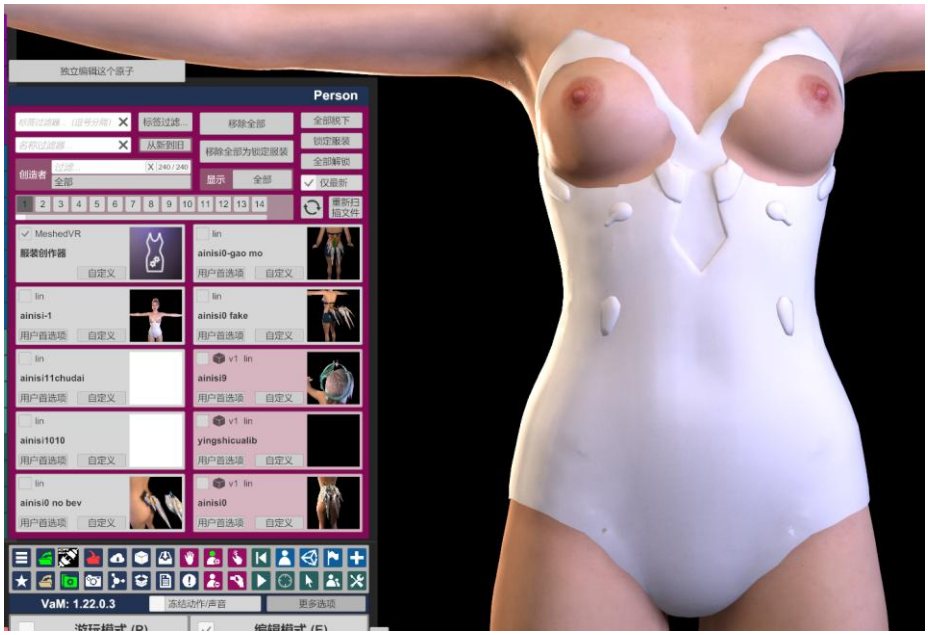
Then we will proceed with the process of saving and closing the VAM smoothing.

After refreshing, it will look like this

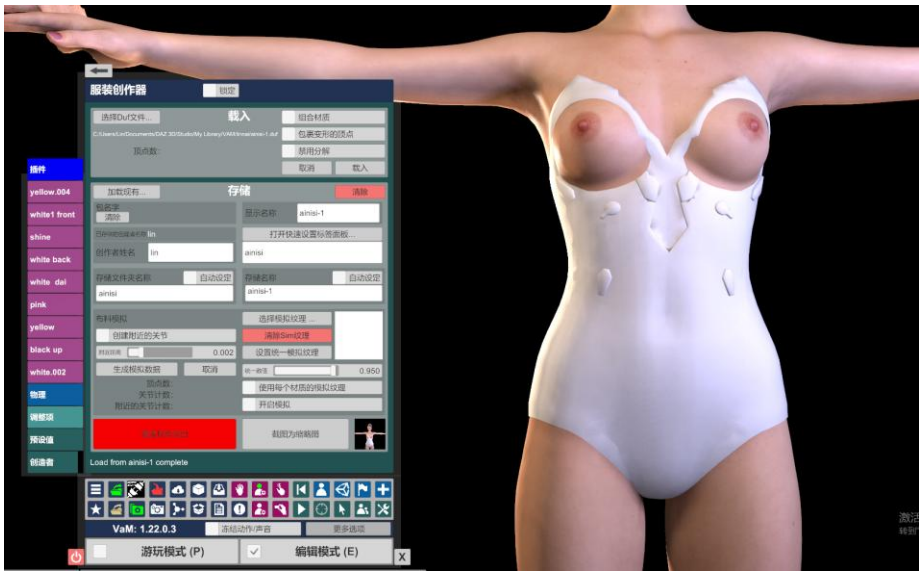


2-15

Next, we will remove the smoothed clothing and re-insert it into the clothing creation tool. Attention!!! We have just imported the same piece of clothing using the clothing creation tool. If we select the newly modified clothing and "open it in the creation tool", the creation tool will only display the appearance we imported at the beginning. This is caused by the cache function of VAM.



We need to select another name for the clothing (any name will do), load it in the creator, because the clothing name is different, the previous cache is replaced, and then we load the required clothing, and it will display normally.



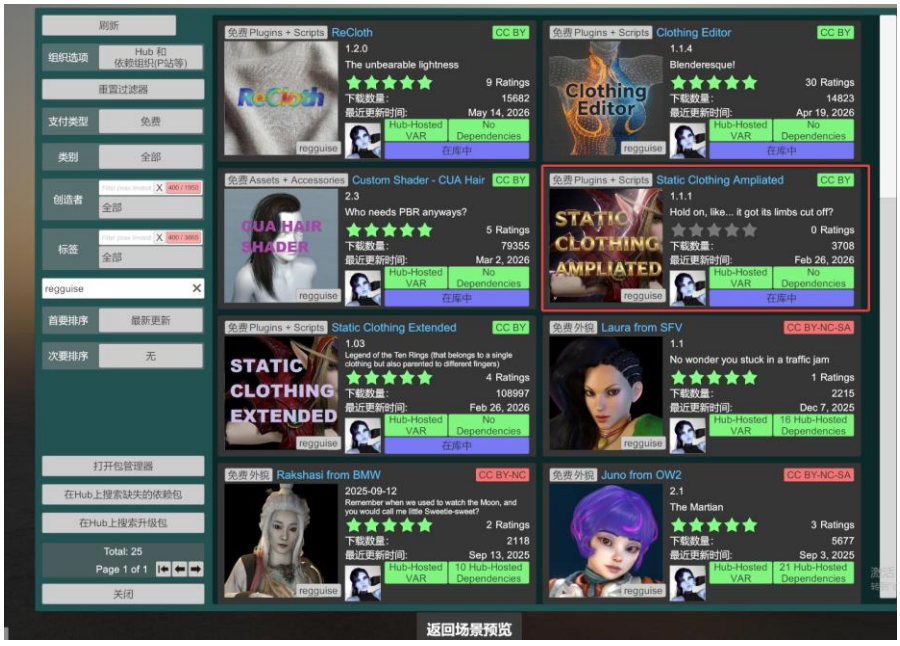
Additional note: If the clothing type is a floating hard surface material, such as the tail wing part demonstrated in the previous mesh example, we can save the time for manually modifying the vaj file and directly reach the end point using the plugin. Let's take a look at what I'm going to introduce next.



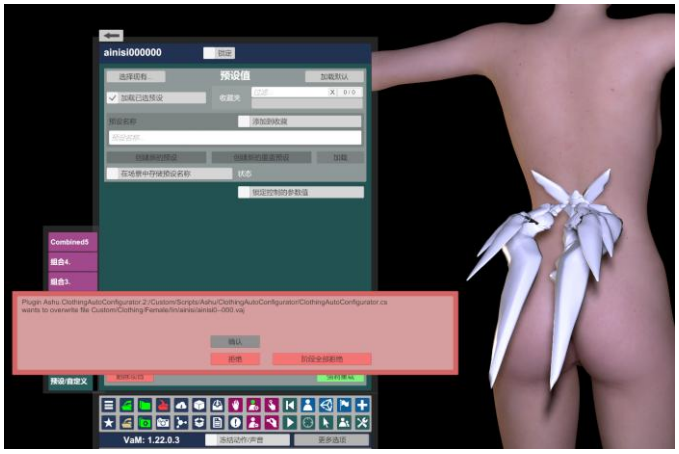
Search and download the "Static Clothing Amplified" plugin of Regguise in the Hub community.

Thank you very much for the plugin provided by regguise.

https://hub.virtamate.com/resources/static-clothing-ampliated.64527/

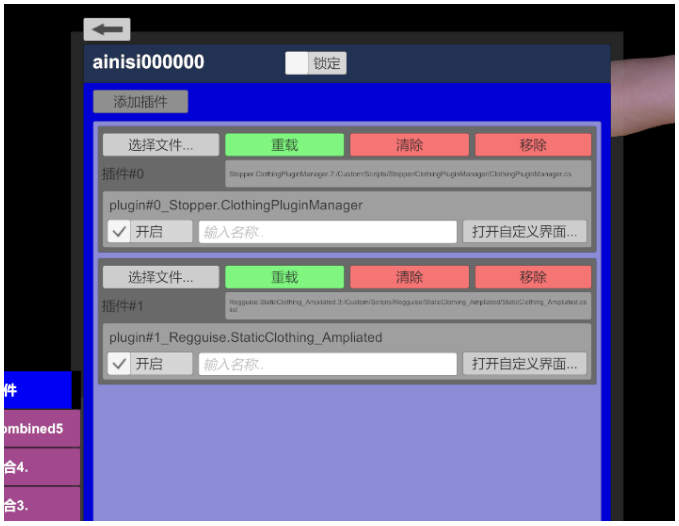


Still select the clothing to enable the addition of the plugin slot. The key slot did not appear. Reload and refresh it in the lower right corner and it will be available.

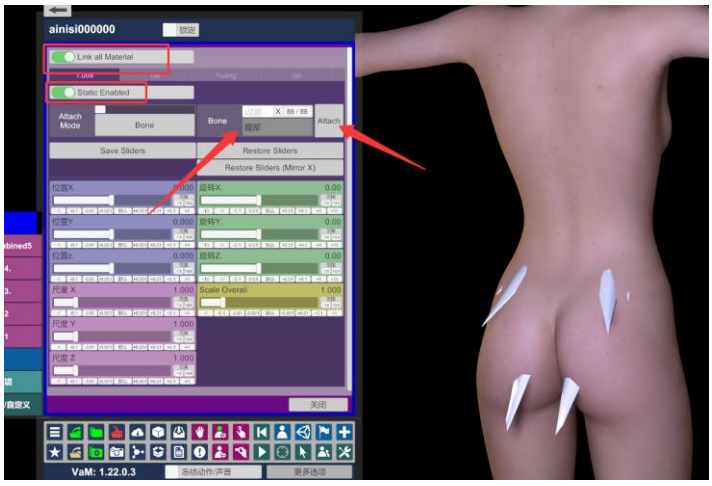




Then load the plugin



Link all materials and enable fixation. Select the binding position and press "attach".



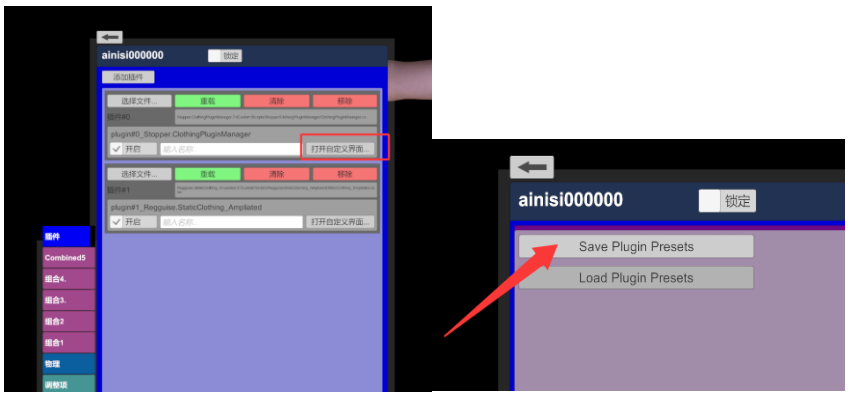
It can be seen that the plugin has completely eliminated the grid deformation and fixed the model at the bone points of the character.
Adjust the slider to match the original position, or you can turn off the fixation button at any time to view the original position.



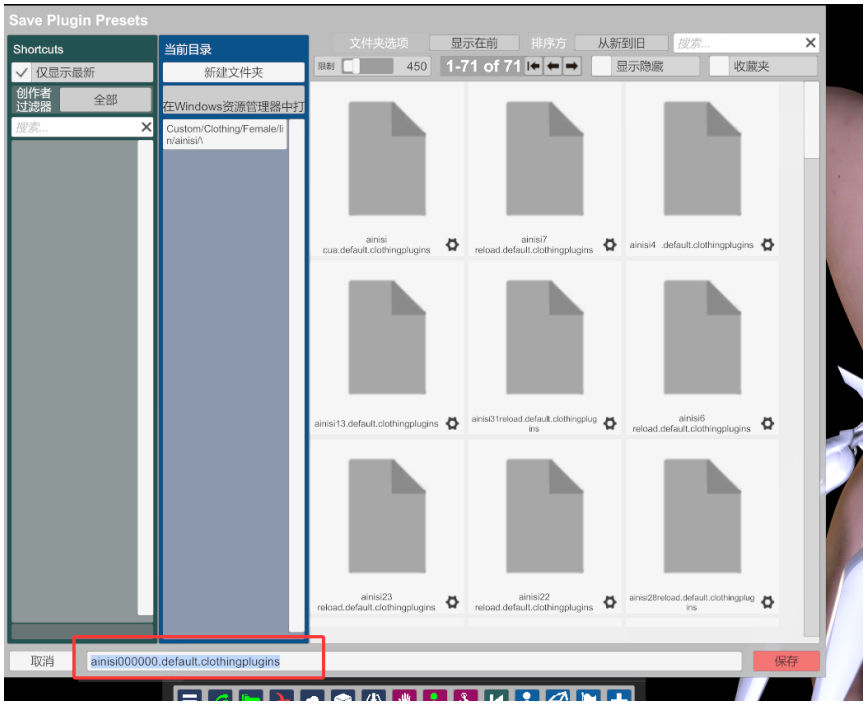
Click the "Save" button to save.



Return to the plugin interface and save the preset settings for the first row of plugins.

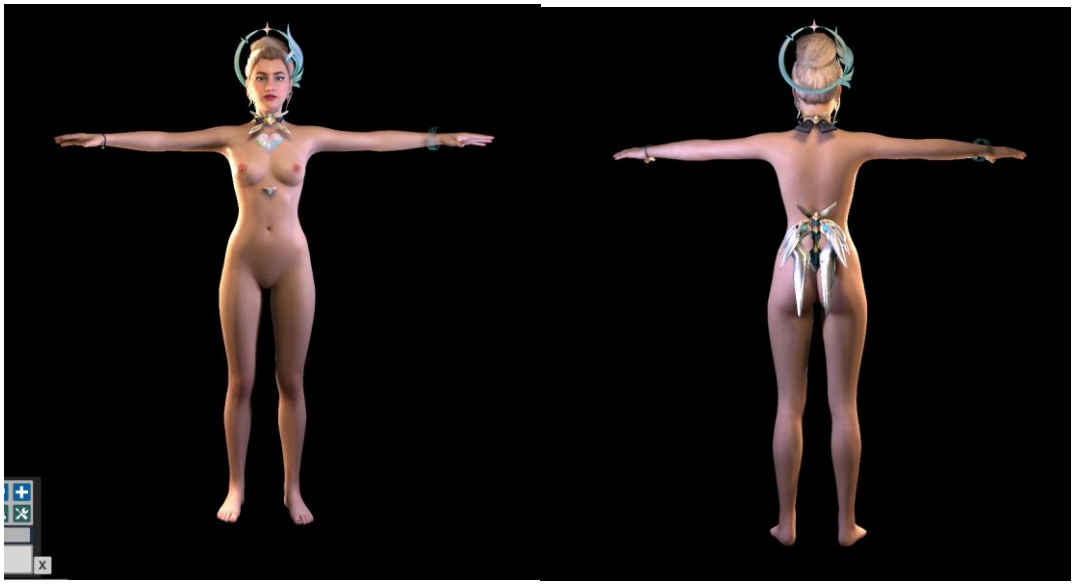


It can be seen that he saved the preset as a new file, which will not become invalid due to the clothing being overwritten. As long as the same storage ID of the clothes is activated, the corresponding plugin preset can be read, which is very convenient.



For the wristbands and the equipment on the chest and back, I use this plugin to fix them. It needs to completely eliminate any deformation, and it doesn't need to distort along with the character.

The final effect of the hard-surface costumes is as follows (I will explain the material part below)



2-16

Then we continue to move on to the tight-fitting clothing design.

We add materials to the clothes. Here, I will first introduce the "parameters" and "material" interface of the clothing materials to you.

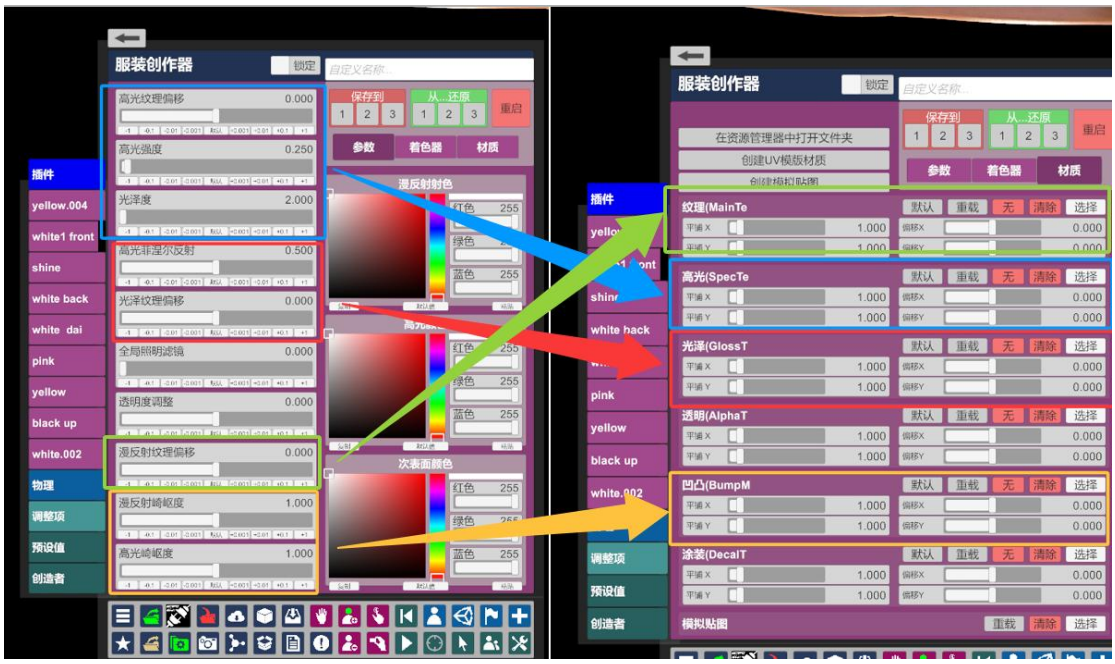
As you can see, the parameter interface has many sliders, while the material interface is all composed of buttons for inputting images.



It can be seen that the information in the material interface and the parameter interface is basically corresponding. Everyone should have figured out what it is.



Yes, we need to first input the image to control each material channel, and then adjust the intensity of the image through the sliders. This is how the VAM material system is used. I will introduce it separately later.



Among them, the texture channel can accept both color and black-and-white images. The highlights and glossiness require black-and-white images, while the bump channel requires a purple normal map instead of a black-and-white height map!

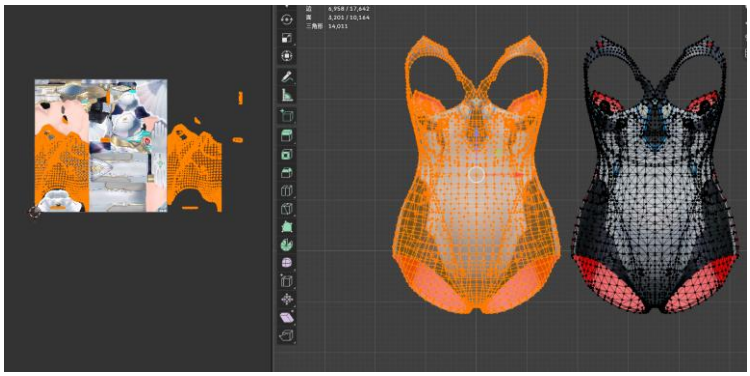
Explanation:
If a color image is placed in the highlight channel, this kind of colorful spots will appear, which is very unattractive.

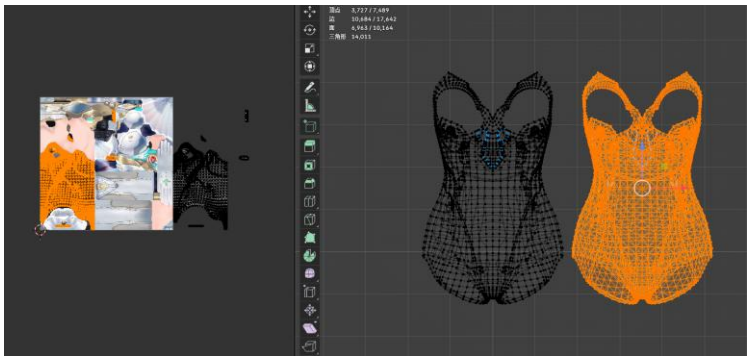


However, if a color image is placed in the glossiness channel, the VAM will directly convert it into a black-and-white image.

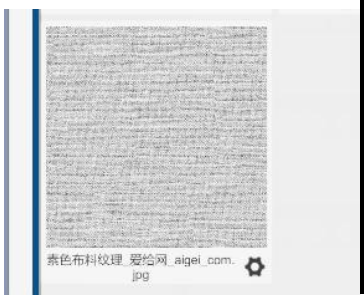
Finally, if you place the black and white photos in the height channel, the following situation will occur.

When the left piece of clothing is mirrored, the symmetrical part of the UV is assigned to the second quadrant.
The right piece of clothing remains in the first quadrant, and the UVs of the two sides overlap.
I will demonstrate the effect below.



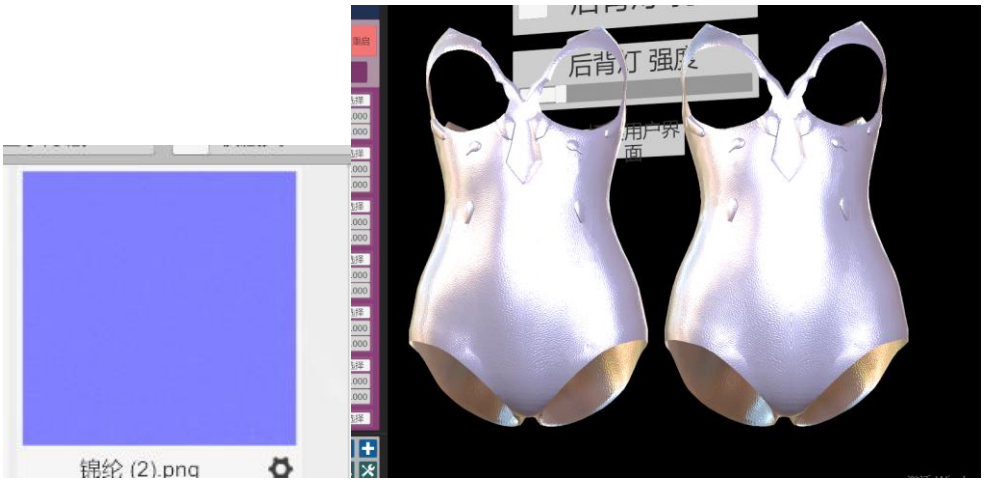


Let's import the model into VAM and add the black-and-white normal maps.
You can see that the shadows of the clothes on the left are split into two halves because the UVs are disconnected in the middle, while the mesh shadows of the clothes on the right are only half correct. This indicates that the two sets of UVs are competing for the shared area in the middle.





And when we replaced the model with a purple normal map, everything worked fine. Therefore, even though the channel name here is written as "height map", it is not the traditional "height map", but rather "normal", which is the normal map.

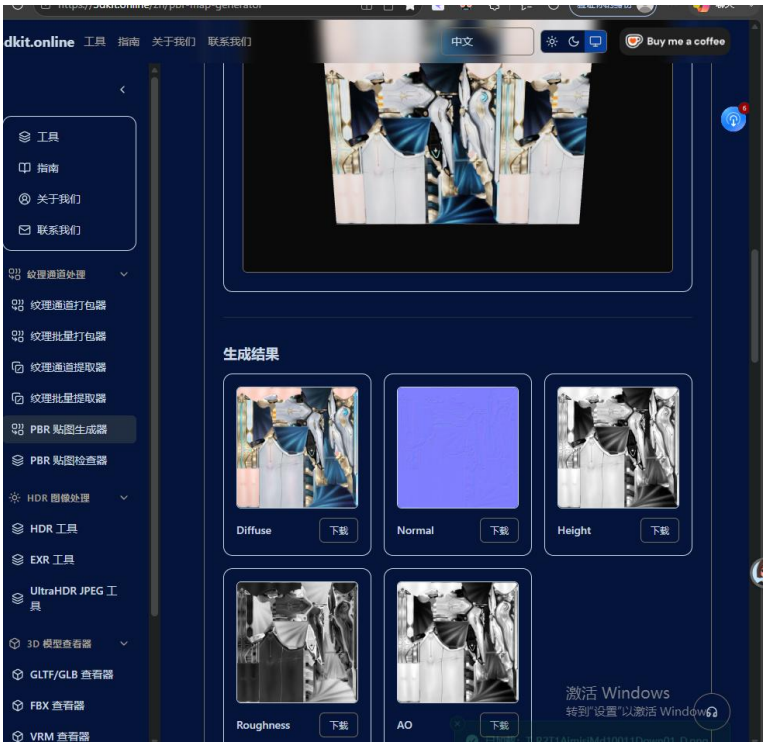


For the color texture images, we can simply use the ones provided by the MMD model itself. For the highlight images, gloss images, and normal images, we can generate them using the website mentioned earlier.

Let me introduce again:

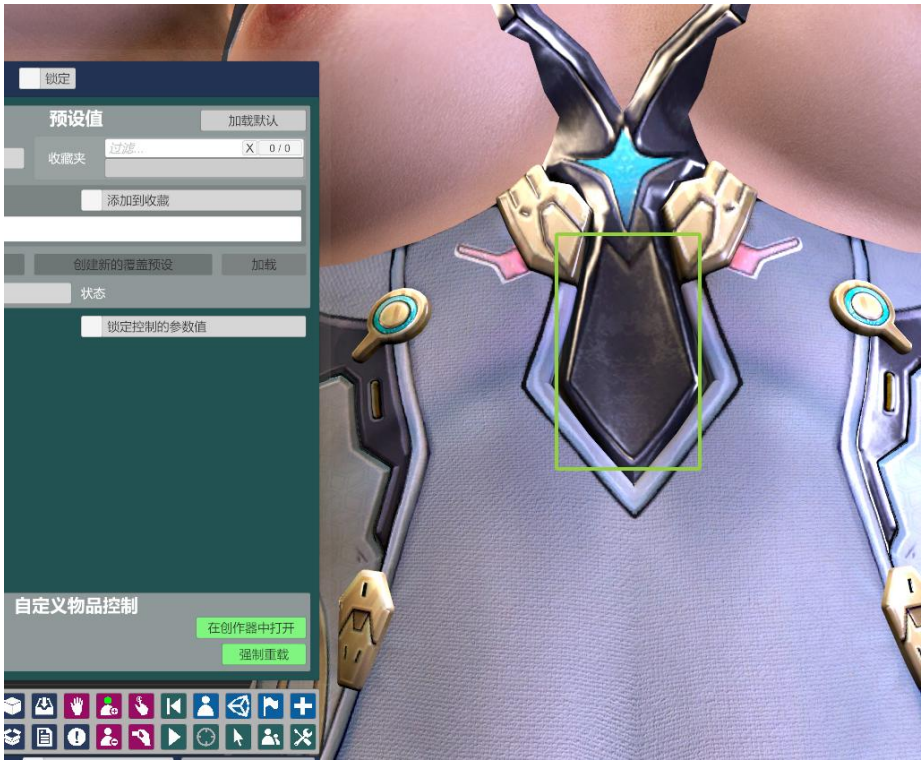
https://3dkit.online/zh/pbr-map-generator

Drag in the dark-colored textured image, and all the others can be generated.



To achieve better results, I superimposed the glossy images generated by the website and the metal stains images downloaded from the internet in Photoshop. This way, not only can the distinctness of the engraved lines be retained, but some stain effects can also be added.



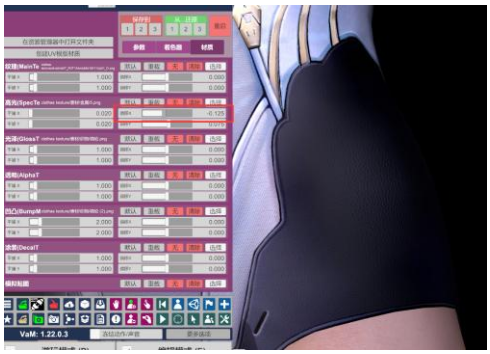


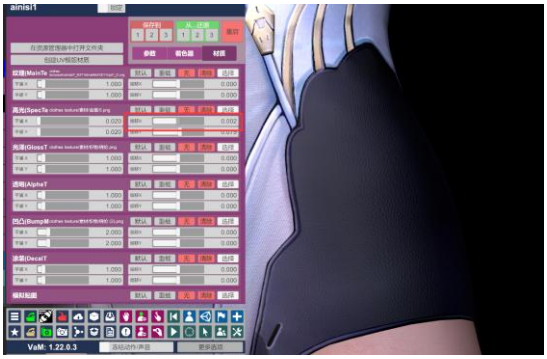
Highlight section: For all the material's highlight textures, I used this one. The large spots downloaded from the internet are fine as long as they can disperse the light and shadow, creating some mottled contrast of light and dark.



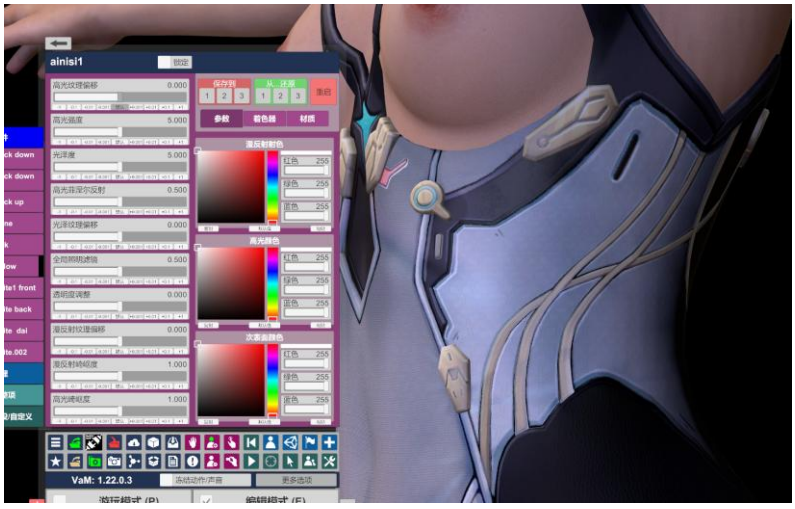


Adjusting the slider to move the image position has achieved different effects.



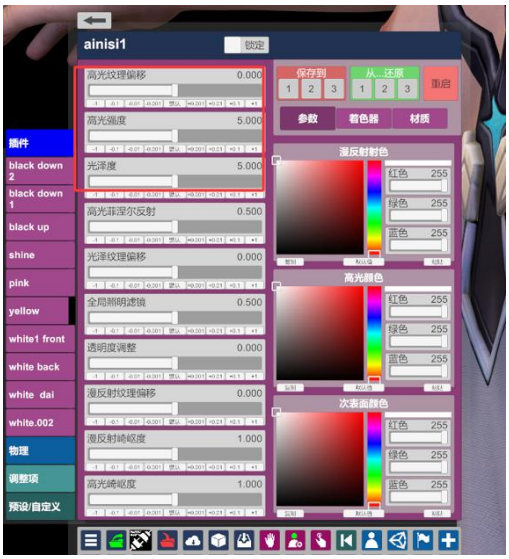


Now that we have the images for each channel, we can put them into the vam parameter interface and adjust the intensity using the sliders.
Next, I will detail the function of each slider.
Let's take the metal material as an example. I will move each slider to the middle position to facilitate the comparison of the effects.



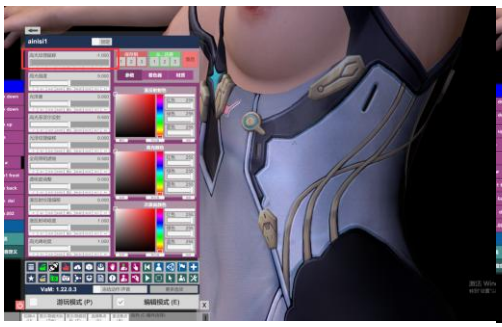
First, for the highlight group, the influence of the highlight texture is controlled by the slider. The brighter the highlight texture is, the greater the highlight intensity is, and the brighter the object becomes.

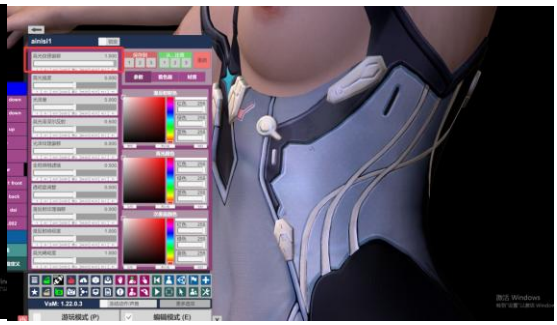




1:

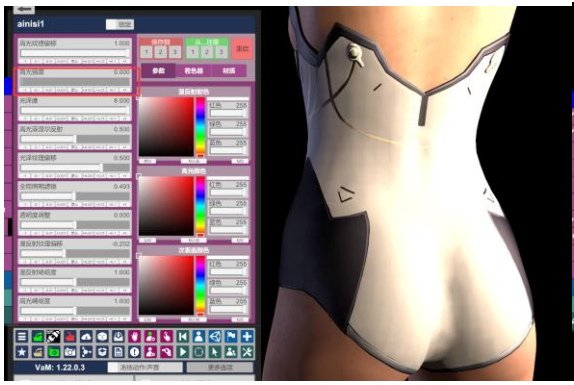
Highlight texture offset is used to control the brightness of the highlight texture. Pulling it to the right will make the highlight texture brighter.

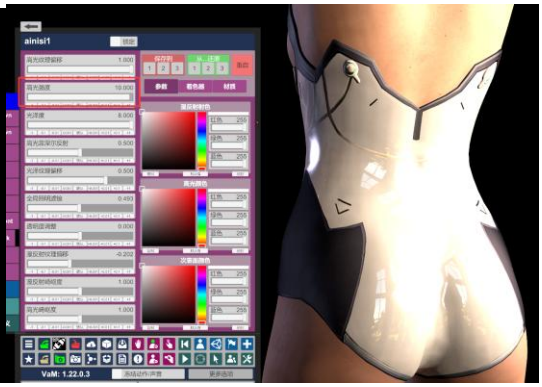




2: High Intensity

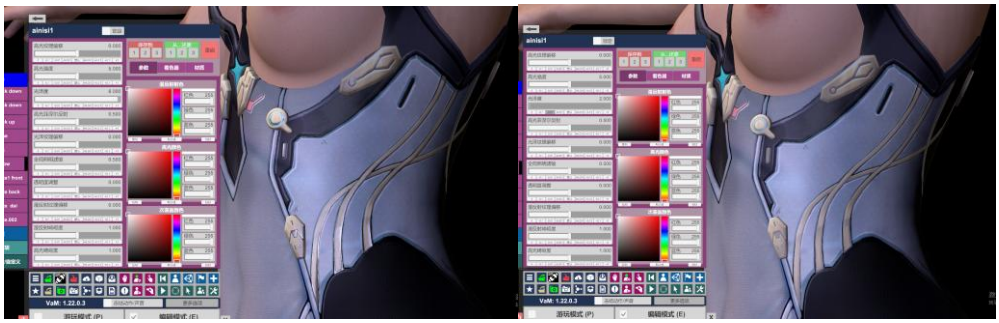
This is equivalent to adding a layer of reflective texture with environmental texture to the surface of the object, just like applying a coating. When fully applied, it will have a similar mirror effect (only reflecting the environment texture). This is used for creating gems or metals. To achieve good performance, it is necessary to increase the "High Light Texture Offset" and "Glossiness" to relatively high values.





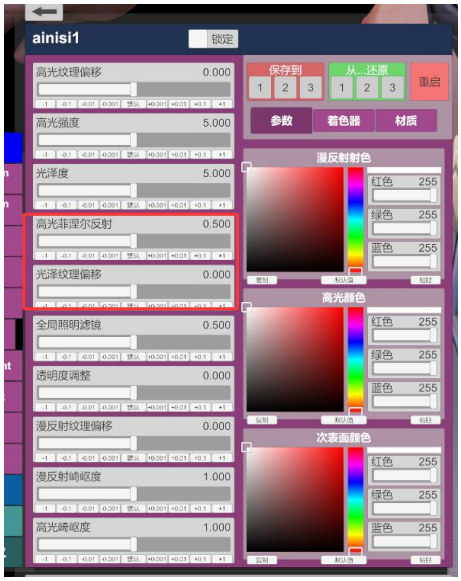
3: Glossiness

This is used to adjust the contrast of the specular map. You can see that when you pull it to the right, the bright areas continue to become brighter, even causing overexposure, while the other areas remain unaffected.



Next is the Glossy Group

Controlling the influence of the gloss map



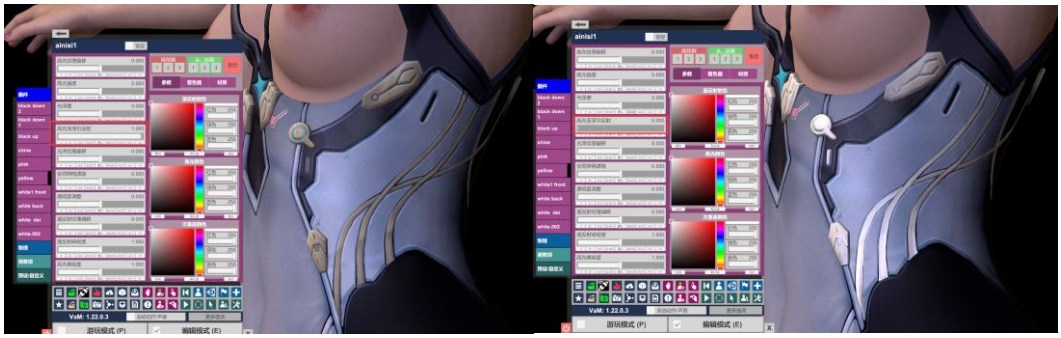


1: Highlight Phineal Reflection

This slider should be adjusted in the opposite direction to adjust the brightness of the gloss map.

At the maximum value, the object has no highlights and appears rough.

When pulled to the minimum, the entire object becomes white, and the gloss map is at its brightest, making the object smooth (it could be renamed as roughness)

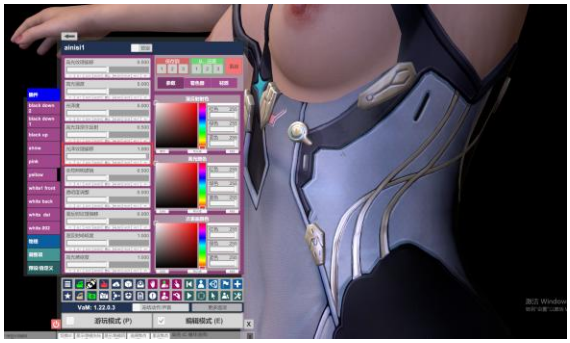


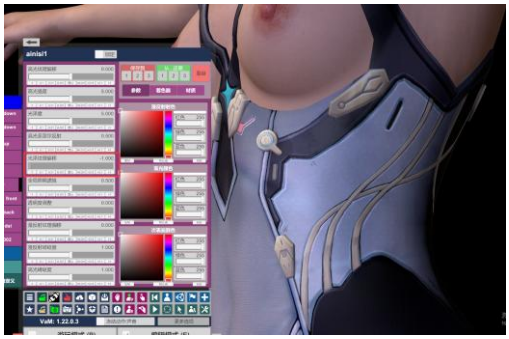
2: Gloss Texture Offset

Used to adjust the contrast of the gloss map.

When fully pulled up, some brightness increases, corresponding to the white part of the gloss map.

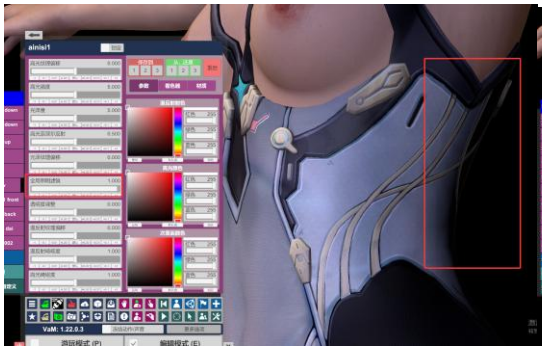
When pulled to the lowest point, the highlights do not completely disappear but are expressed weakly, like being smoothed out, indicating a decrease in the contrast of the highlight map and an averaging of brightness.

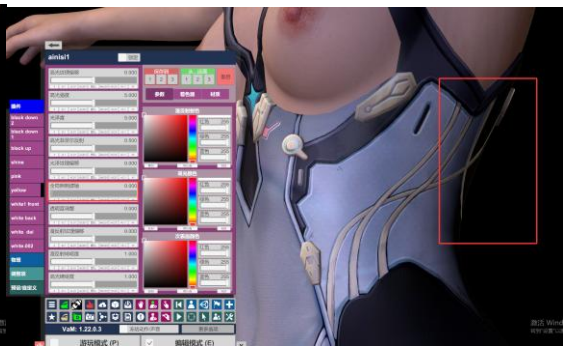




Global lighting filter,

When turned up, it can make objects located away from the light source darker, achieving the effect of being in shadow.





Transparency

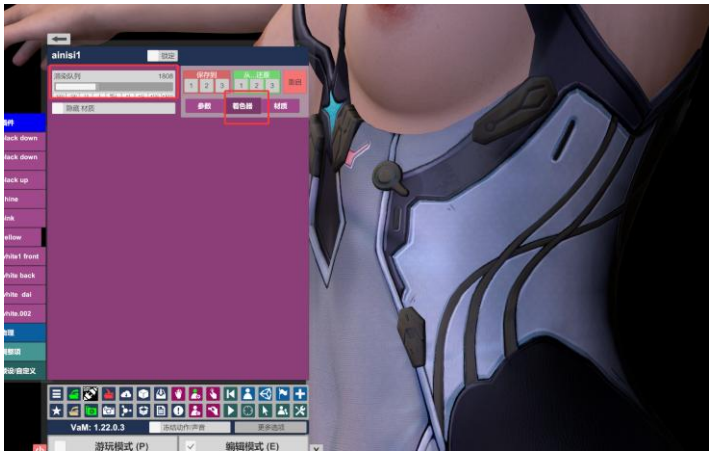
Reducing the transparency can make an object transparent. If a semi-transparent effect is needed, it needs to be used in conjunction with the rendering sequence.

It can be seen that when the transparency is not yet at its lowest level, it will also allow the other components to be displayed through, reaching the skin part.

Solution: Reduce the rendering queue a little and make the rendering order of other components higher, then it can be displayed normally.

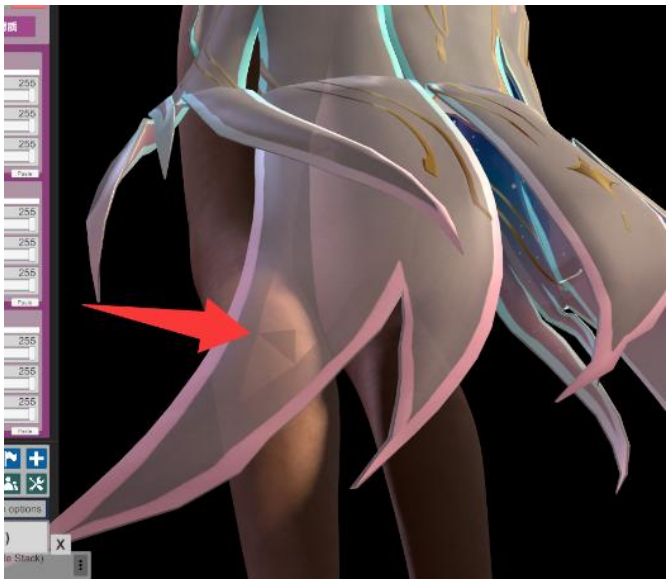




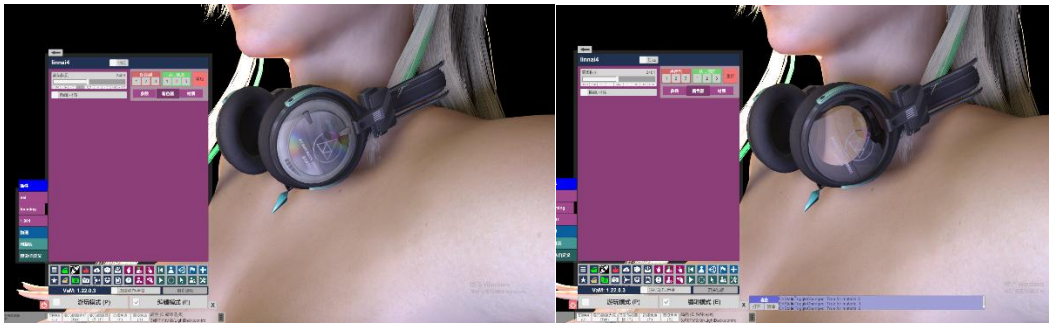


Addendum:

For the transparent effect of double-layer materials, triangle face shadowing issues often occur. I haven't found a solution yet. In this case, it's recommended to make it an opaque material directly.



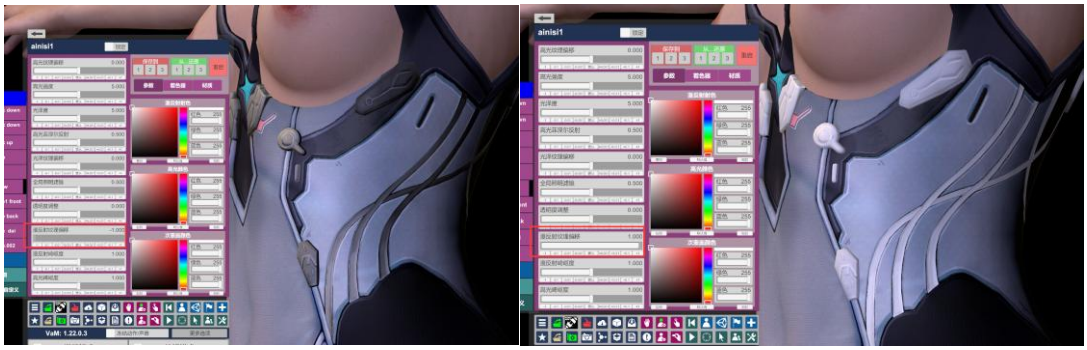
2: There may be issues with saving the rendering sequence. When reloading the clothes, you will notice that the sequence number has been saved, but the clothes are still invisible. You need to manually pull down the sequence slider to restore them.



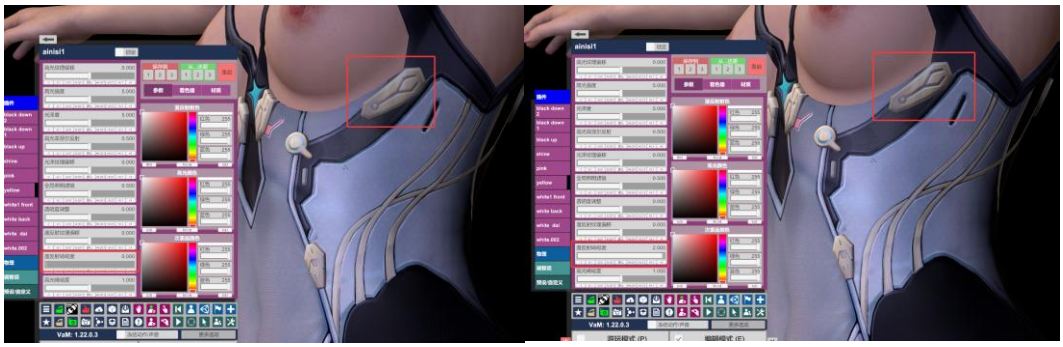
Diffuse reflection texture offset
Adjustment of corresponding texture map



This is used to adjust the brightness of the texture map. When set to the maximum, it becomes white; when reduced, it turns black.
For metal materials, I prefer to lower this value a little bit, keeping it within -0.2. This will make it slightly darker, enhancing the heaviness of the metal.

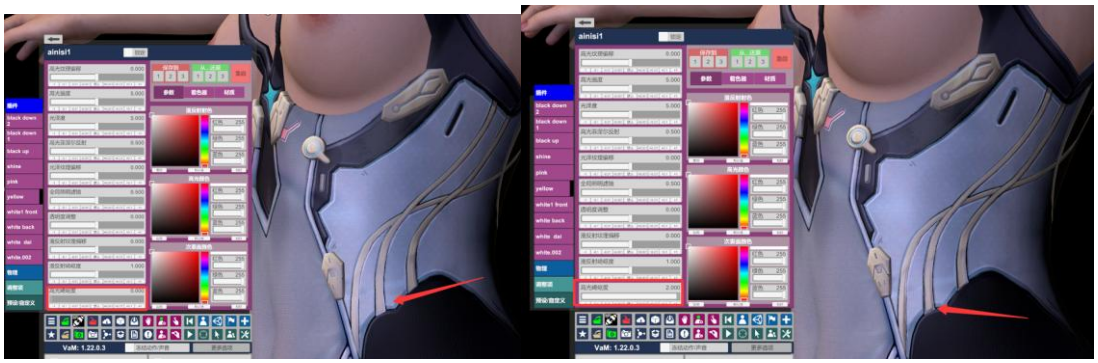


Specular reflection roughness

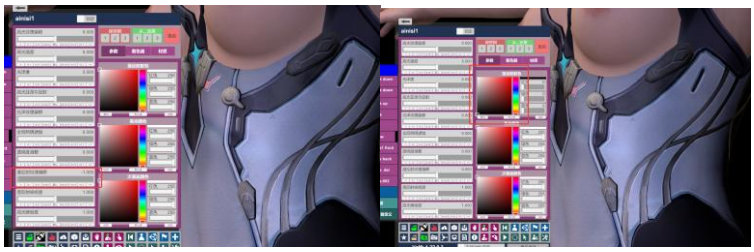


Used to adjust the blending effect of the diffuse map (i.e., the base color texture) + the normal map
It can be seen that after being fully adjusted, the darker engraved parts have a greater influence on the color

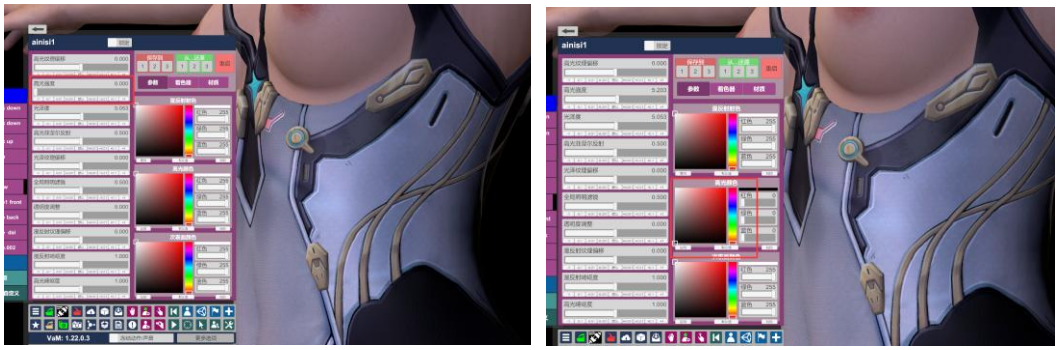
Roughness of highlights
This part is mainly used to adjust the blending effect of the highlight map + the normal map
It can be seen that after being fully adjusted, the overexposed parts of the highlights have a greater influence



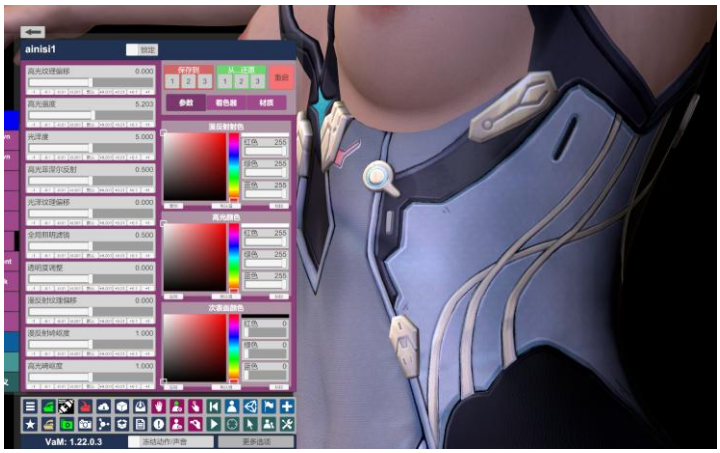
Next, let's introduce the three boxes on the right. The advantage is that it allows you to adjust the color for various parameters. However, there are basically no scenarios suitable for this, because everyone prefers normal colors.
Diffuse color: When the color is adjusted only in the middle of black and white, it has the same effect as the diffuse texture offset.



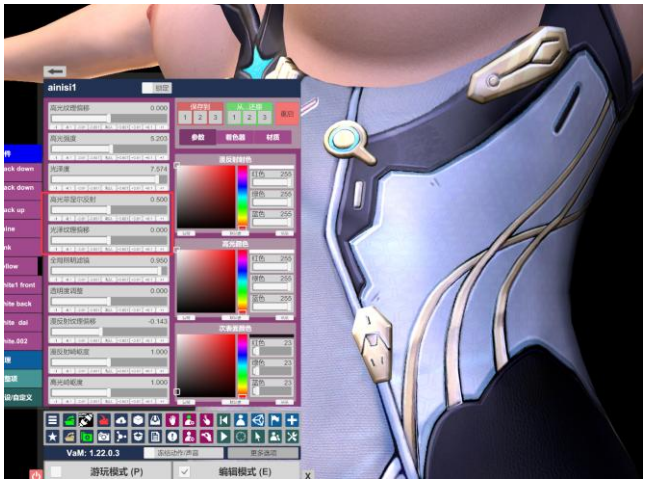
Highlight color: Moving to black corresponds to a highlight intensity of 0.



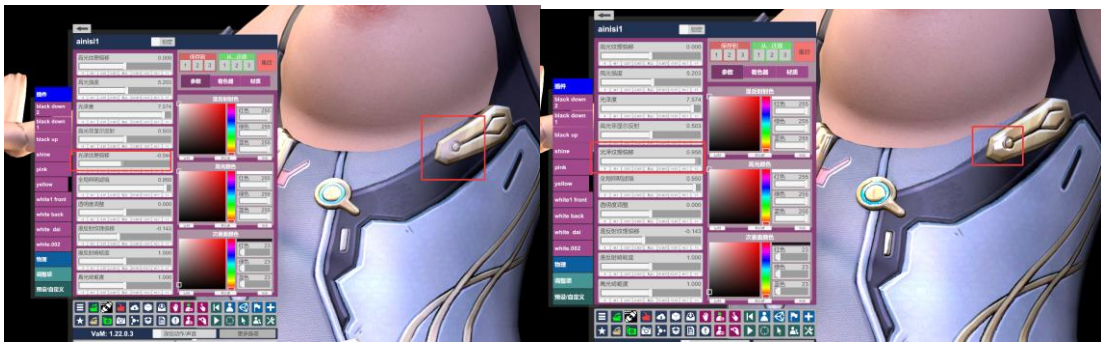
Subsurface color, this is very useful. It's like adding an extra layer of pure white reflection to the object without any environmental color.
It performs well on metals. I will adjust the intensity according to the material I want to create.



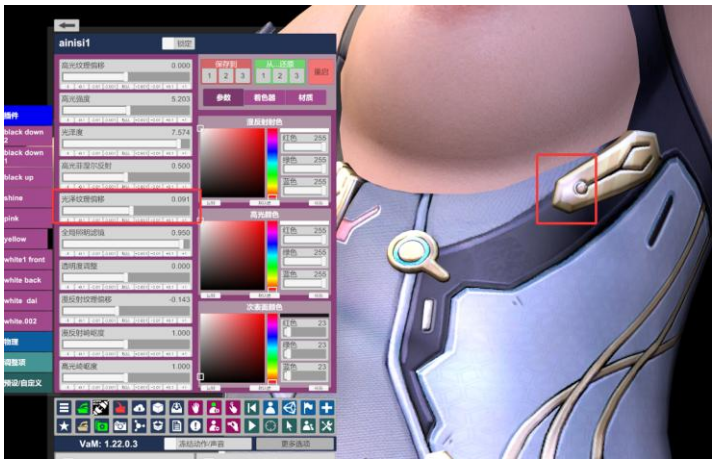
Now I will demonstrate how to adjust the settings:
I'll take the glossiness channel as an example, corresponding to the two sliders highlighted in the picture.
First, set it to the middle value, and then adjust the "texture" slider below.



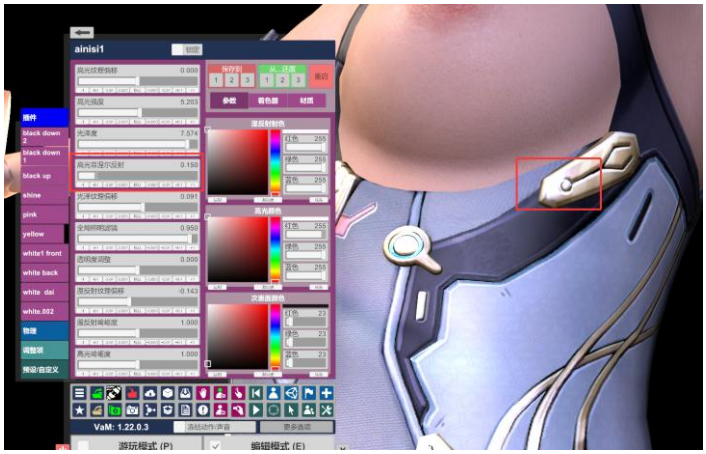
As you can see, pulling to the right will enhance the reflection, turning it into a smooth metallic surface. Pulling to the left will cause the reflective points to spread out, resulting in the high-light areas becoming flatter and the overall reflection becoming weaker, with the roughness increasing.



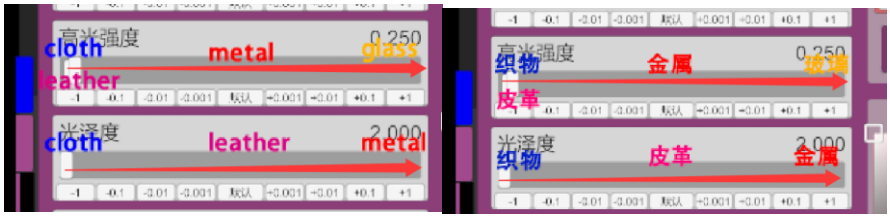
And I need a rough metallic texture, so between the two options, I'll adjust it until the highlights start to fade, reaching the critical point where the texture details of the roughness map can be best displayed.

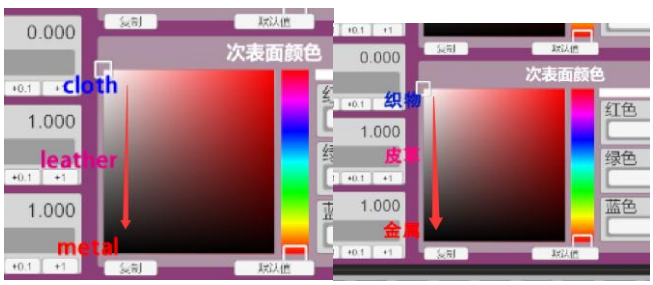


Next, we adjust the intensity of the highlight reflection. If you pull it to the left, you can see that the highlight area continues to expand but does not become flatter. Except for the strongest part of the highlight, the range and intensity increase, while the other parts remain unaffected. This is the effect I want.

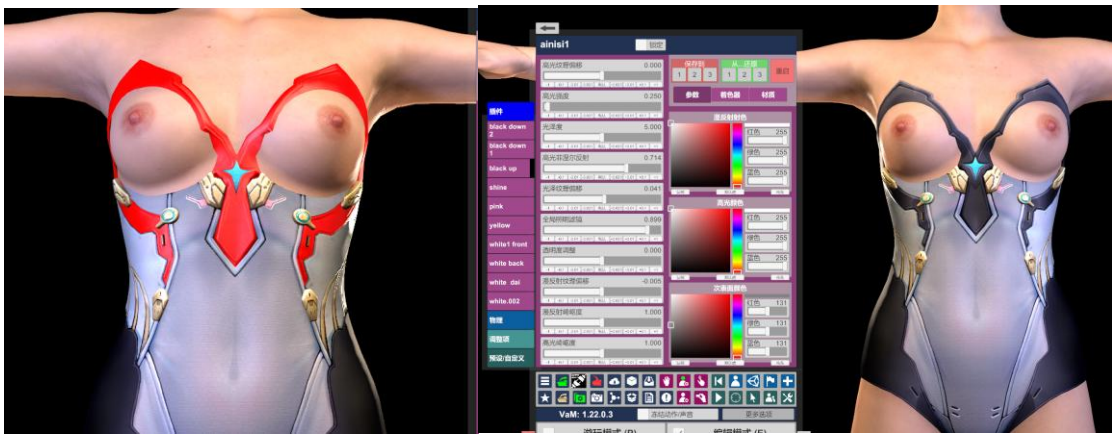


Below is my subjective adjustment of the slider, for your reference.

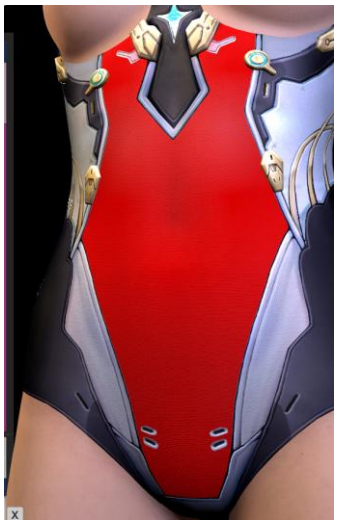


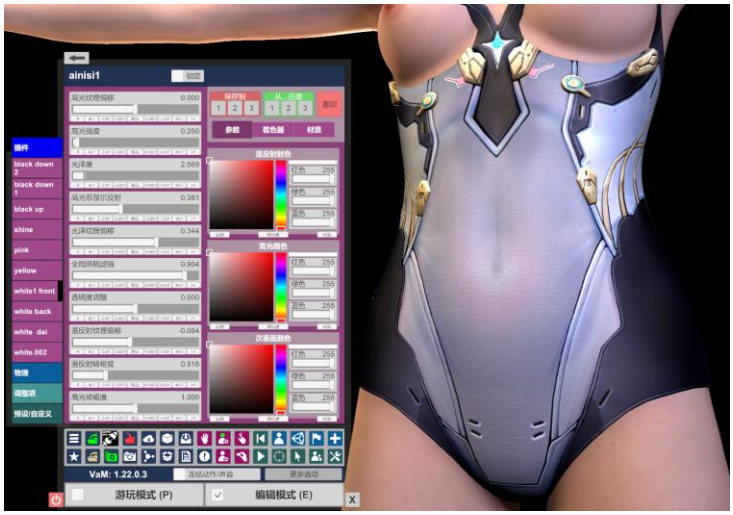


Here I will demonstrate adjusting the material of the red part. The aim is to achieve a leather-like effect.



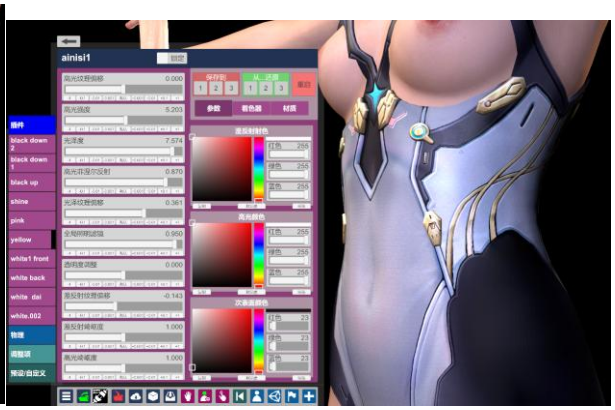
Then comes the part for the baby's waistband. I need to create a fabric effect.



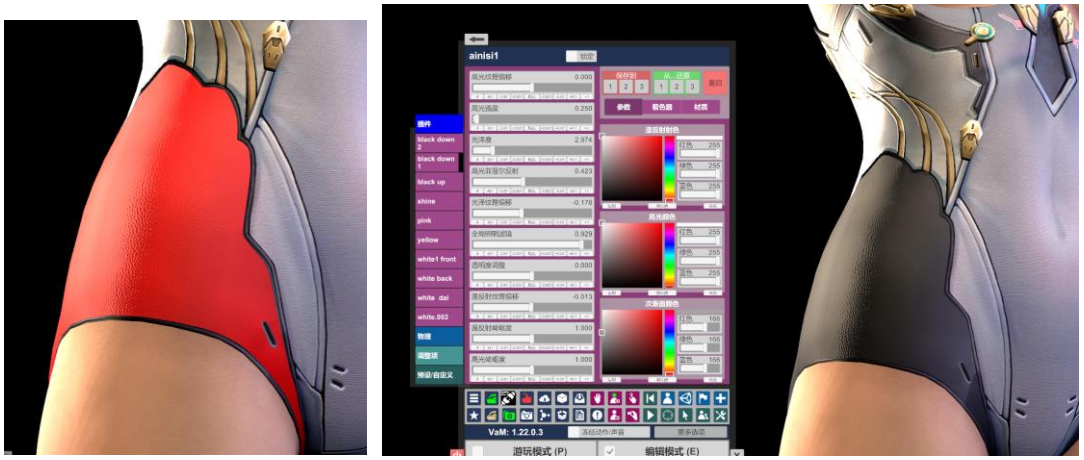


Then comes the metal part





Create another effect of polyester sportswear



The same process should be applied to other materials as well. Once this is done, the character's clothing mesh and material will have been completed.

The final effect of the entire material production is as follows



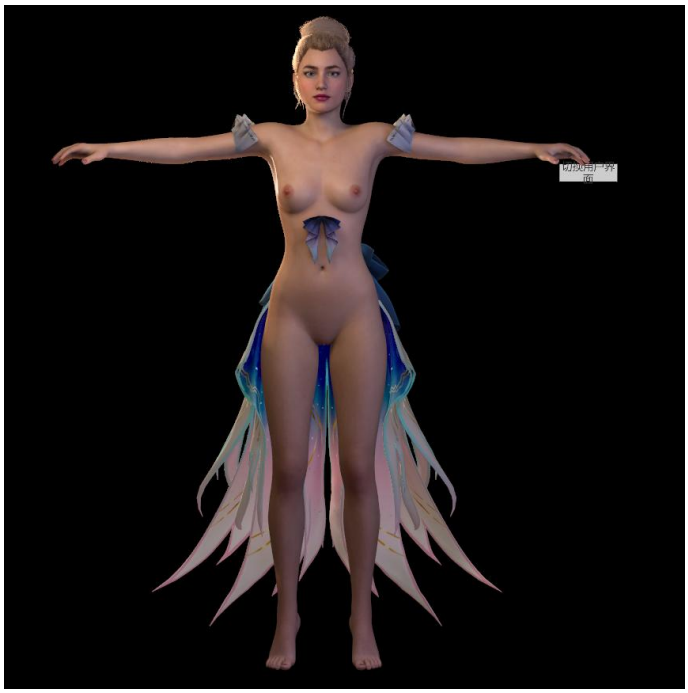
Now we move on to the third part of the tutorial,

part three

creating simulated fabric and flexible bones

3-1

Let's start with the fabric simulation part. There is quite a lot of fabric that needs to be simulated on this piece of clothing.



When creating the simulated fabric, there are three key points to keep in mind:

1: Try to avoid overlapping the fabrics as much as possible, especially with the fabric grids of the same piece of clothing.

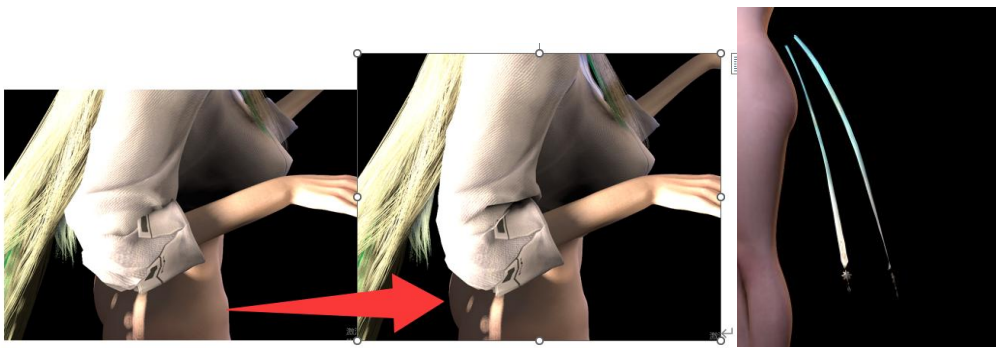
2: Avoid light leakage.

3: When enabling the simulation, ensure that the textures on the fabric do not distort.

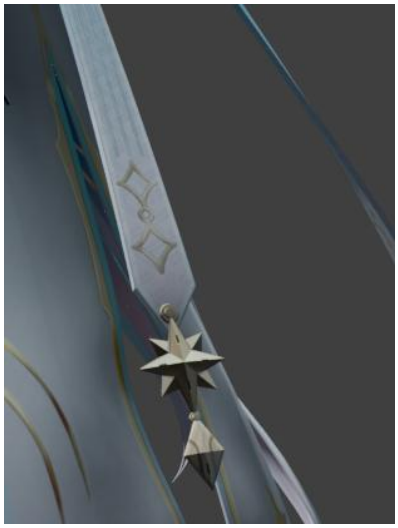
The effect is as shown in Video 1.

The fabric simulation of Vam can be divided into single-layer and double-layer fabrics.

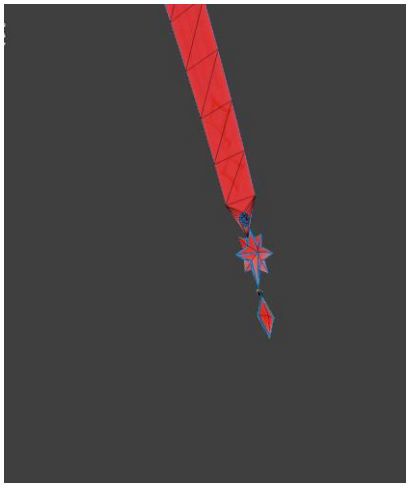
When should we use the single-layer fabric? For example, long-sleeved pants, areas wrapped around joints, loose-fitting clothes to avoid simulation, it can also create a semi-unbuttoned effect to enhance sexual interest, or make things like ribbons.



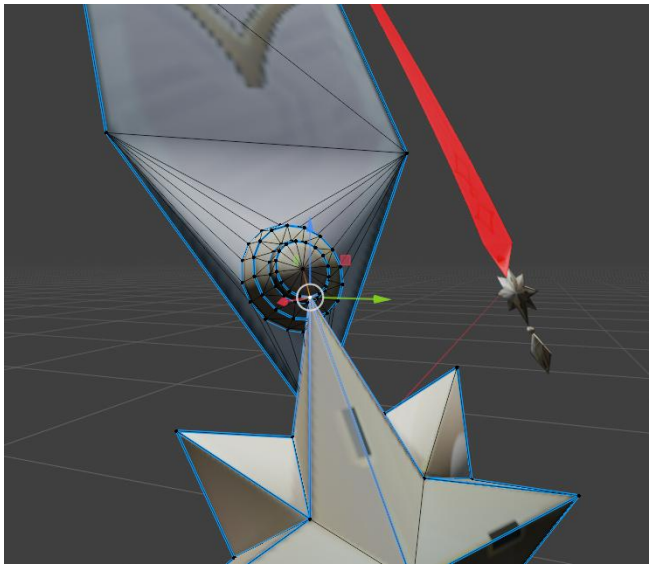
Next, I will introduce the simulation of single-layer fabric using ribbons.
As you can see, the pictures on both sides of the ribbon are exactly the same. Therefore, we remove the grid on the back side and conduct a single-sided simulation.



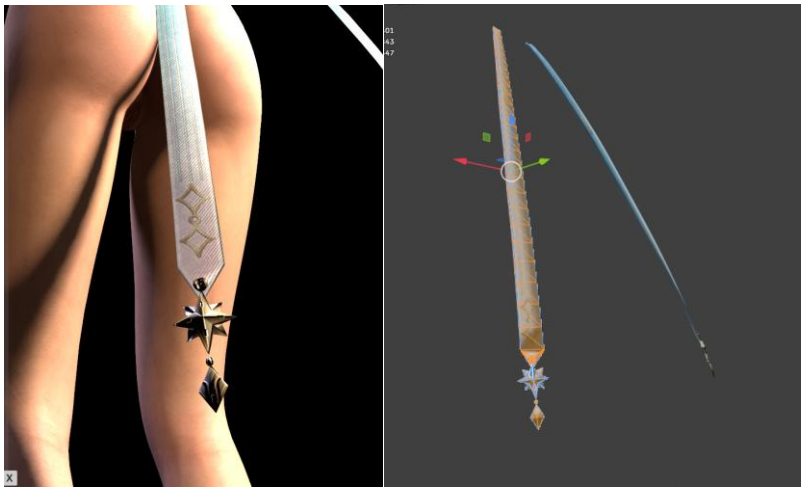




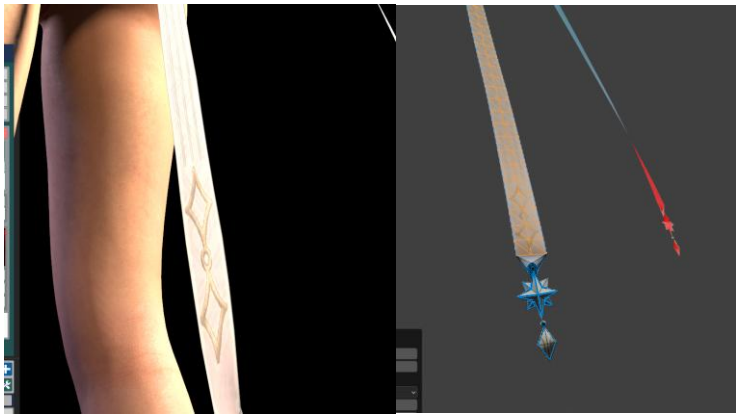
We need to ensure that all the grids on the fabric are connected together, even if it's just connecting one vertex. Otherwise, during the simulation, some parts will break off and become disconnected.

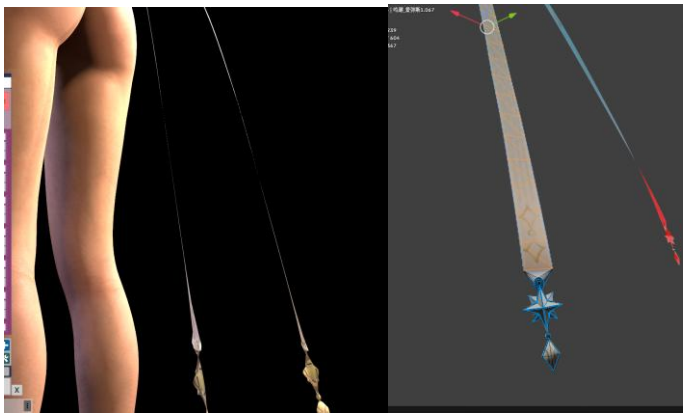


It can be seen that at the bottom of the ribbon there is a metal component. I hope to achieve the effect where the strap descends due to the dragging of the metal at the bottom end.
In the VAM physics system, after enabling the simulation, the number of faces affects the weight. The overall weight of the same piece of clothing can be adjusted on the VAM physics interface, but the weight distribution of different components of the same piece of clothing is achieved through the number of grids.



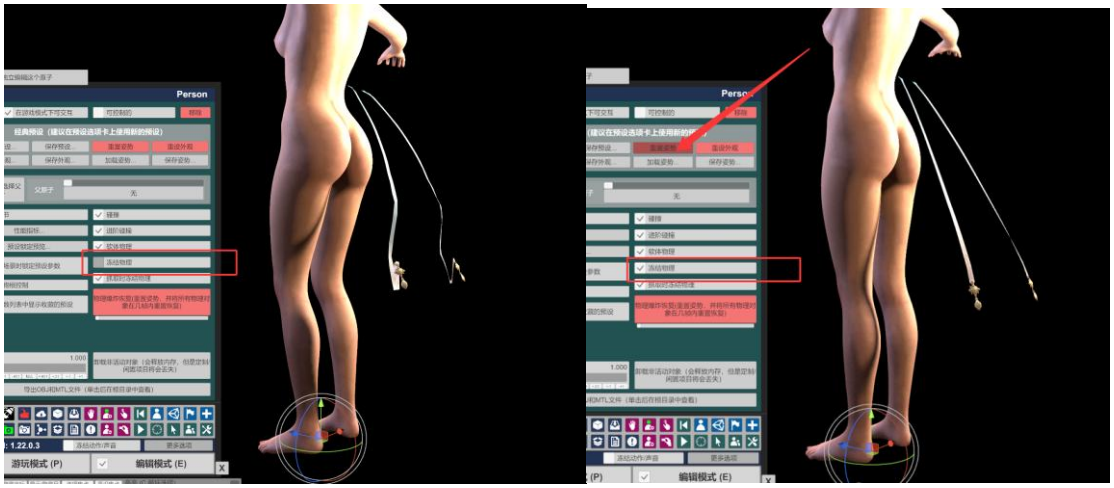
Next, load the brushed simulation texture onto the clothing.
The impact of the number of faces on the simulation can be seen in the following comparison.
The number of faces also affects the mesh tension; more faces result in less stretching.
Clothes with fewer faces will be stretched into long strips because the number of faces on the metal mesh below is greater and heavier.



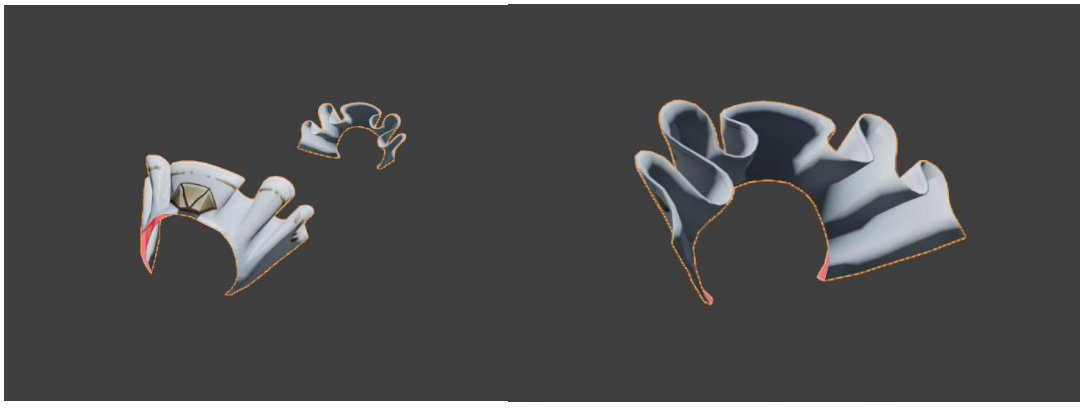


Therefore, for the areas with severe stretching, more subdivisions can be added to make the mesh more uniform.

Additional note: All the clothing meshes will be imported into VAM based on the human body binding. However, for the simulation meshes located below the buttocks on the back, the impact is particularly significant.
Due to the fact that the legs bend backward quite a lot, it is normal to have bending when the physics is frozen. After starting the simulation, this distortion effect can be well counteracted.

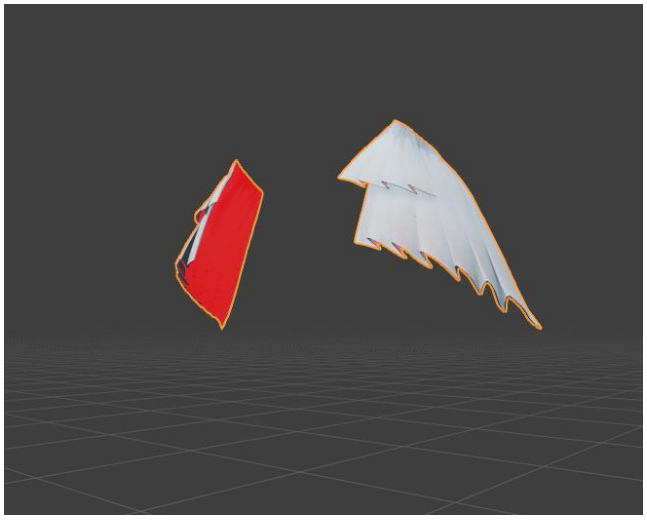


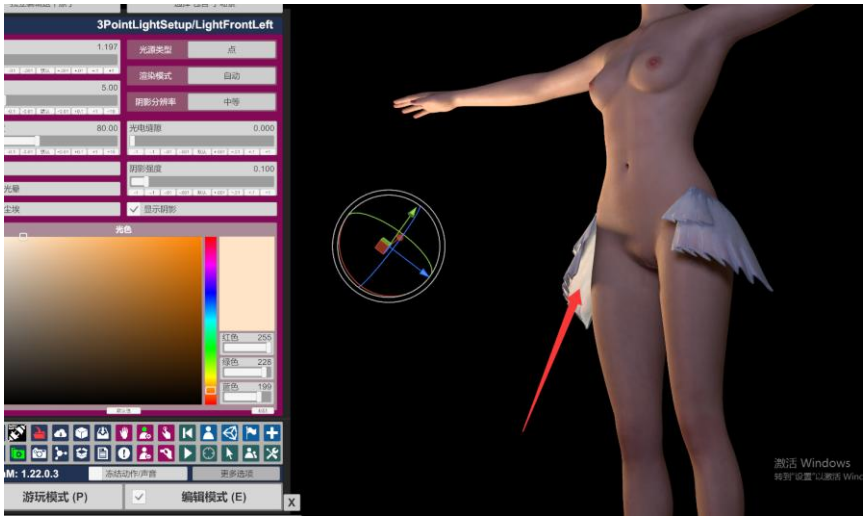
Next, let's talk about double-layer fabric.
It is mainly used in cases where the colors on both sides of the fabric are different, or where there is severe light leakage.
In situations where the textures on both sides are different, a double-layer mesh must be used.



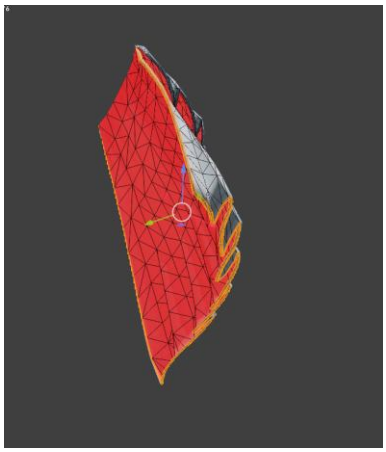


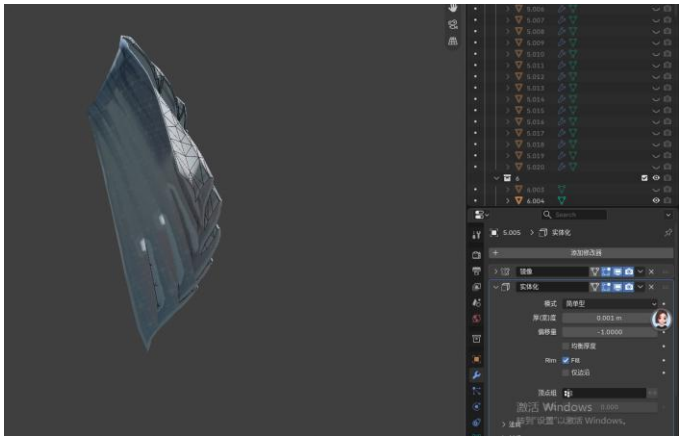
Light leakage usually occurs in single-layer fabrics without a body providing back coverage, such as the hem of a skirt or the sleeves. If it happens at an obvious angle, it significantly affects the effect. It is very easy to tell the difference; even though the light is coming from the front, the back of the fabric is illuminated. Now, I will introduce how to handle light leakage by taking the hem as an example.





So I made the following adjustments: I removed the raised edges of the border and added an entity modifier.





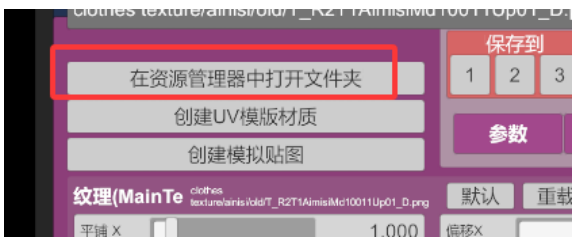
When re-importing into VAM, you can see that the light leakage effect has been improved.



3-2

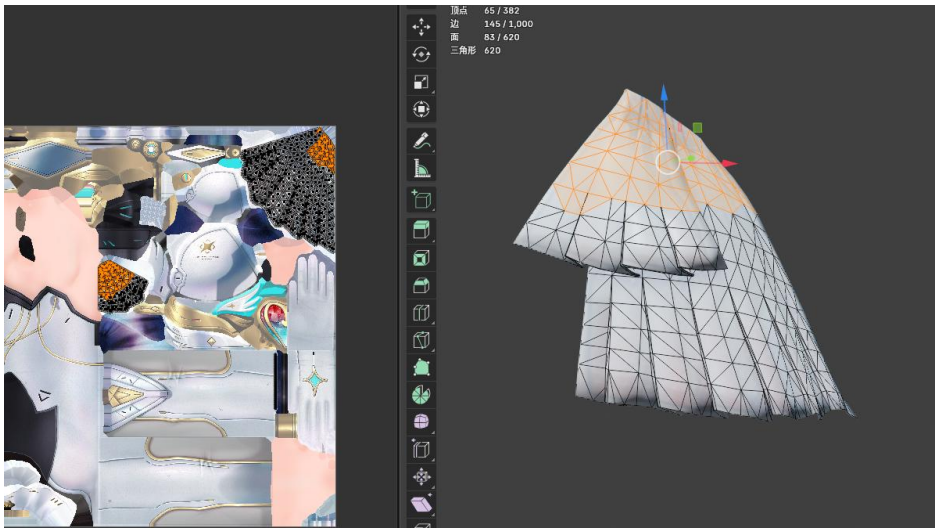
Then we enable the simulation of the dress and let it move due to physical forces.
In the creator, create the simulation texture and open it in the folder.

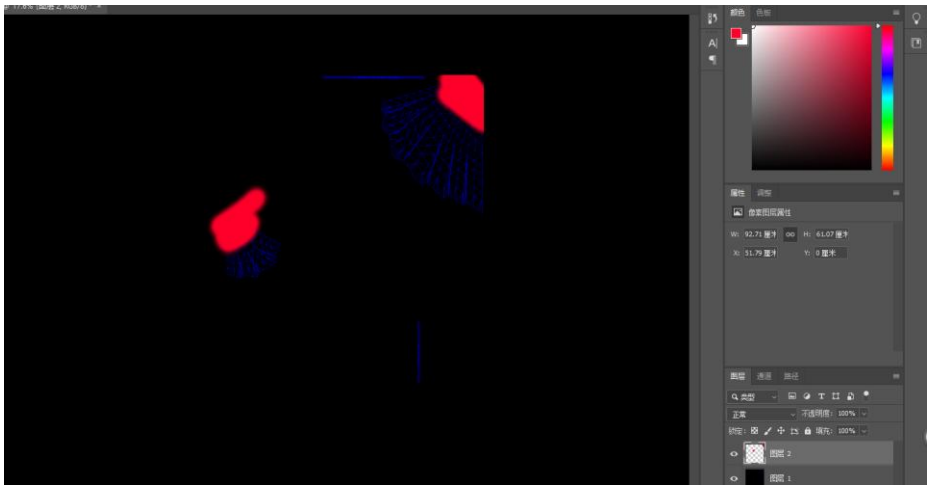




在 ps 里面按照网格 uv 在图象中位置，把需要固定的地方画上红色，在模拟贴图中蓝色代表 0,（不被固定），红色代表 100（被固定住跟随人物移动）

In Photoshop, based on the grid UV positions in the image, draw red on the areas that need to be fixed. In the simulation texture, blue represents 0 (not fixed), and red represents 100 (fixed and following the movement of the character).

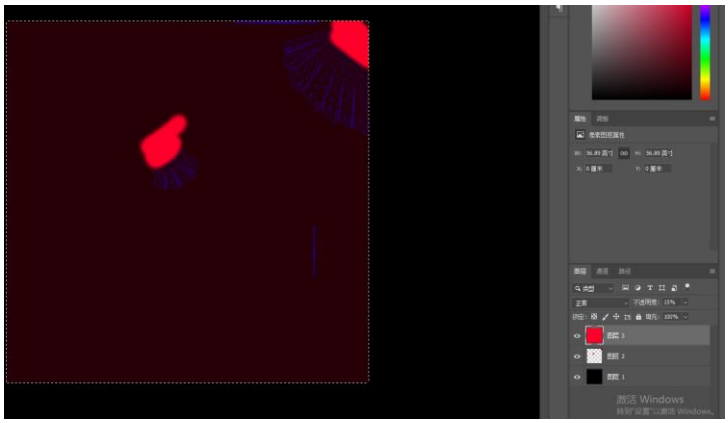




3-3

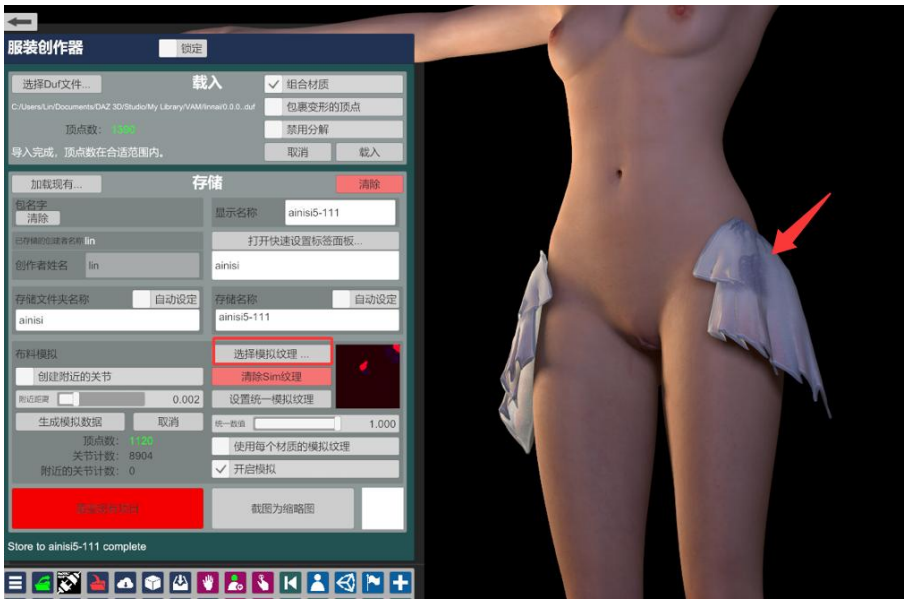
I also need a skirt to support the farthest end part to prevent it from drooping.

Therefore, a second layer of red background filling is needed, with the transparency reduced.



3-4

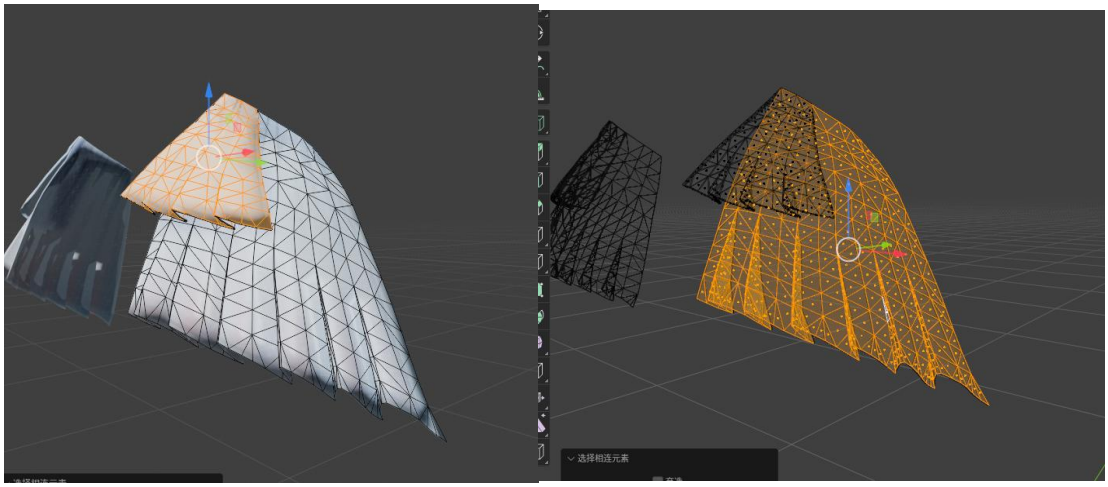
After saving, add it to the texture button in the creator. You can see that the clothing mesh has a skinning effect with itself.



This is because the inner and outer layers of the double-layer fabric mesh will interweave due to the different forces acting on them.

Moreover, our clothes have two separate mesh layers. The outer layer, affected by gravity, will penetrate the inner layer, causing the inner and outer fabrics to overlap.

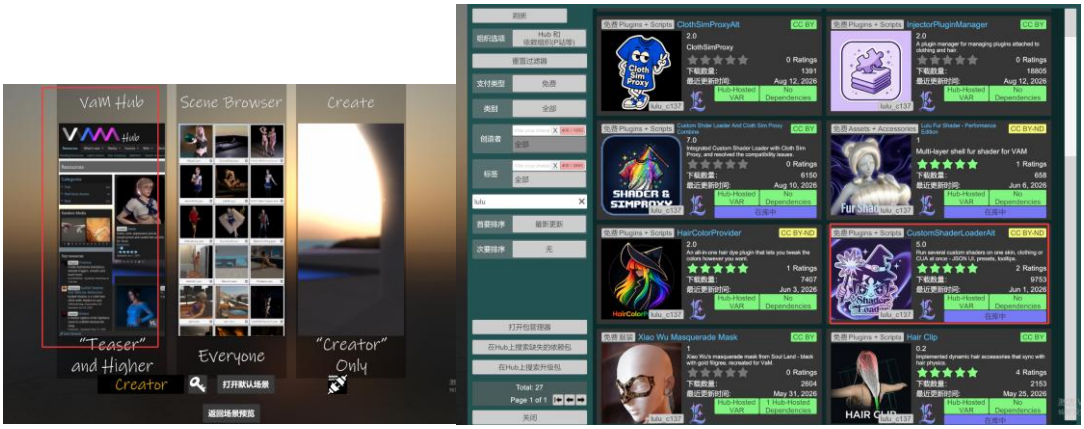
Now let's solve this problem.



Enter the hub community of VAM to search for plugins, find Lulu's CustomShaderLoaderAlt and install it.

This plugin can use single-layer fabric as the simulation target, replacing the movement of double-layer fabric.

Thank you very much for the resources provided by lulu_c137.
https://hub.virtamate.com/resources/custom-shder-loader-and-cloth-sim-proxy-combine.64402/



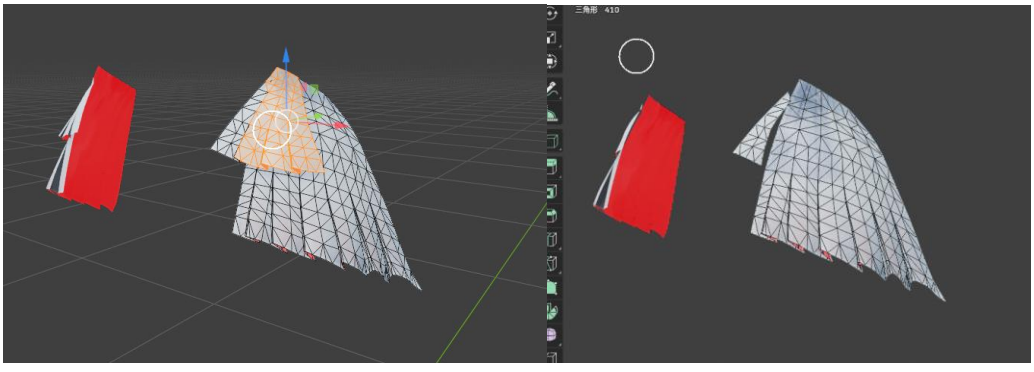
Open the clothing plugin, and you will see that here you need to specify a piece of clothing as the target for adhesion.



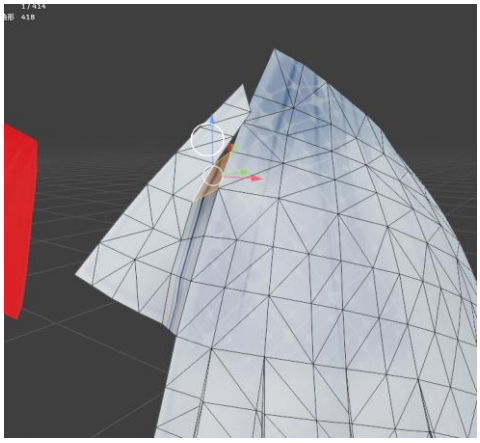
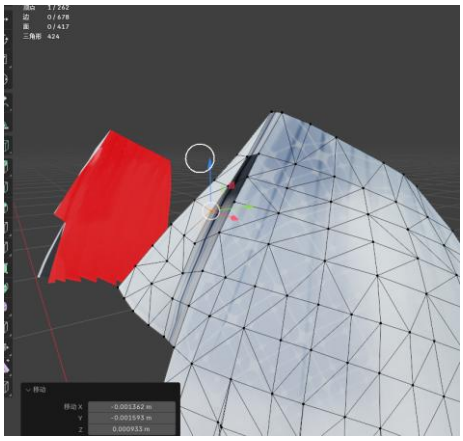
Therefore, at this point, we need to create a single-layer fabric for the simulation. Let's go back to Blender to proceed with the creation.

3 - 5

Select the outer overlapping grids for deletion, leaving only a portion that is close to the interior. This is necessary for it to participate in the collision of the human body model.

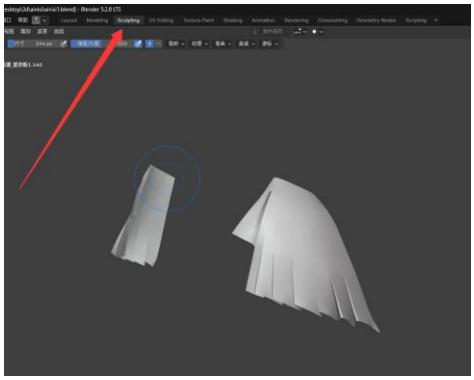
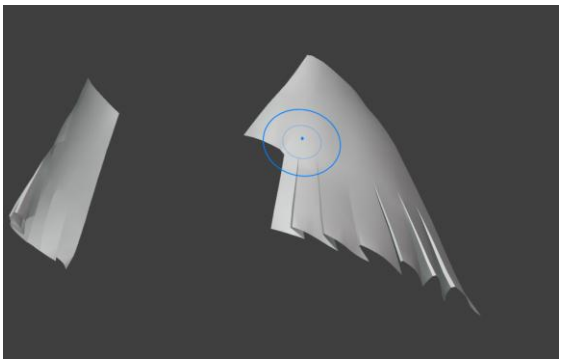


Connect the remaining grids, select the F key on both sides to generate a new face. After connecting them, drag the vertices with the mouse to stretch them evenly to make the grid more uniform.

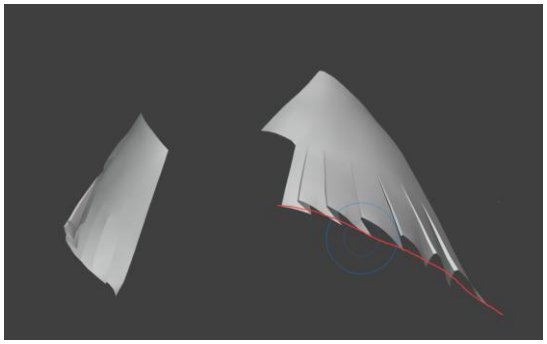
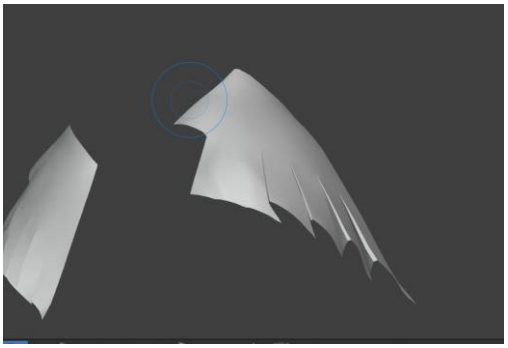



3 - 6

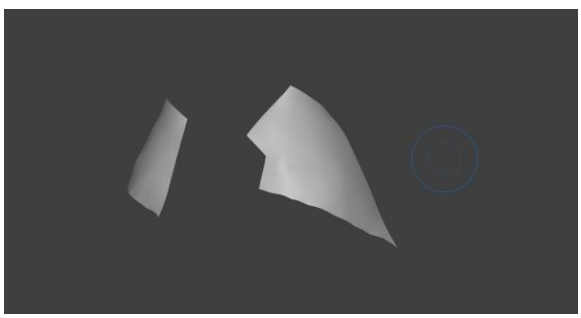
Enter the sculpting mode and use the Shift key to drag to smooth the mesh.

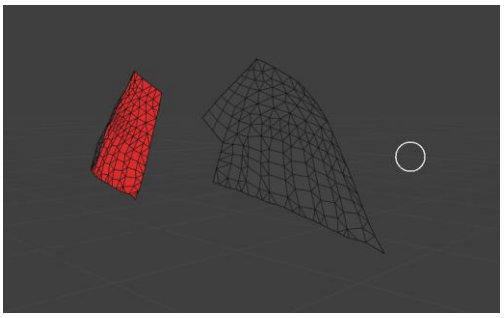



The following series of wrinkles will also affect the simulation. When the character lifts their leg or twists, there will be interlacing. Therefore, we also need to smooth them out. We only need to keep the bottom circle, and just smooth out the protruding parts on the top.

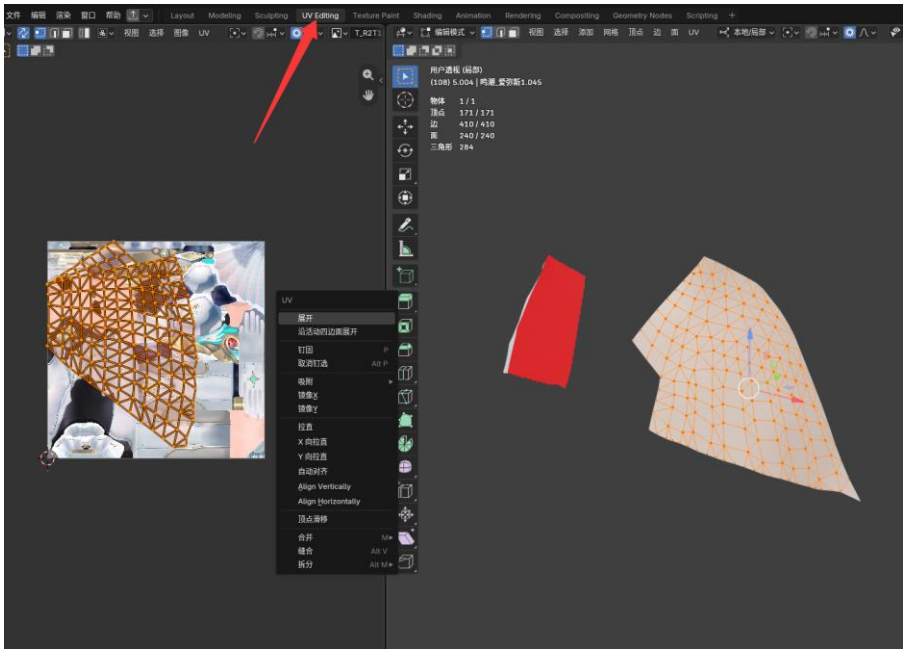
The final result is as follows





3-7

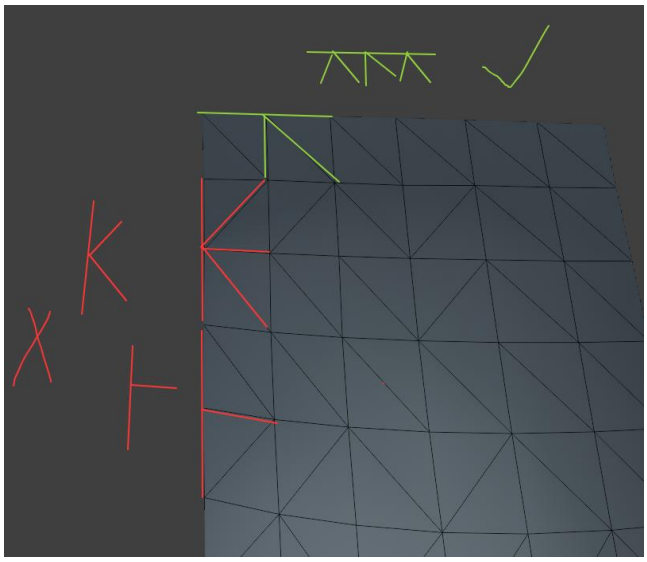
Switch to UV mode. Select all the meshes in A. Right-click to expand the UVs, and press S to scale them uniformly to avoid the meshes overlapping with the image border.

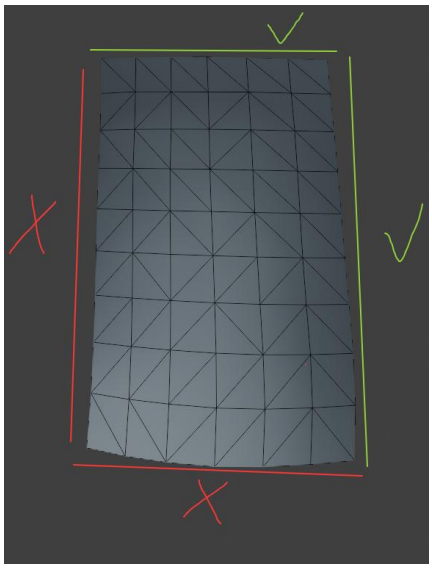


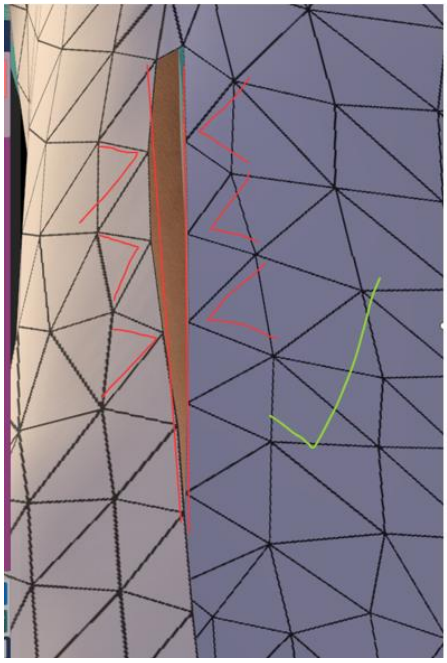
3-8

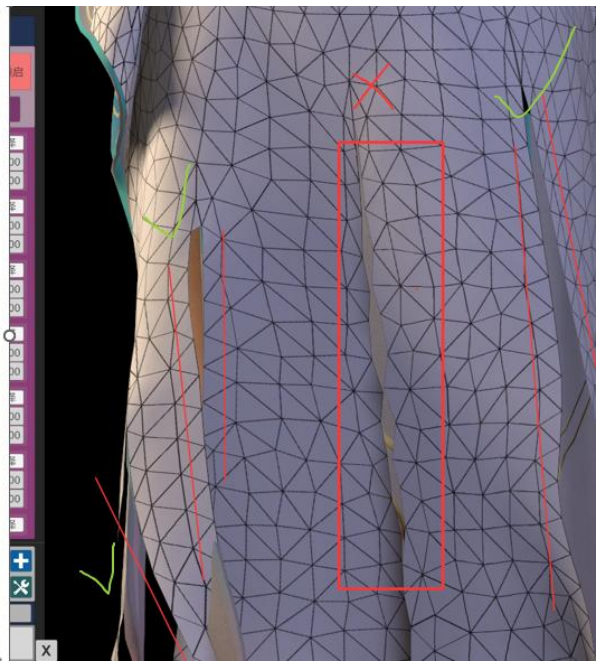
Next, we need to modify the grid wiring. We must ensure that the flow direction of the triangular faces in the outermost circle is consistent.

In the VAM simulation, the wiring at the edges needs to follow a certain standard: there must be two inner sides connecting to an edge vertex. Only then can the edge maintain its original smooth shape. Otherwise, it will look ugly like the inside of a frame with jagged edges.

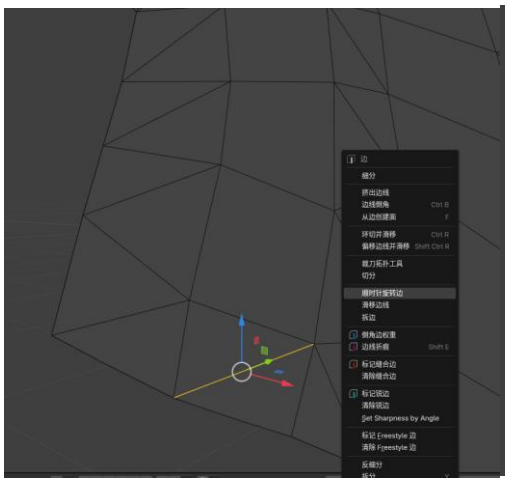


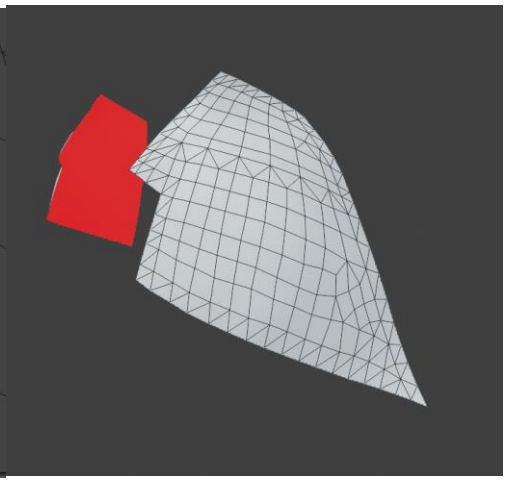




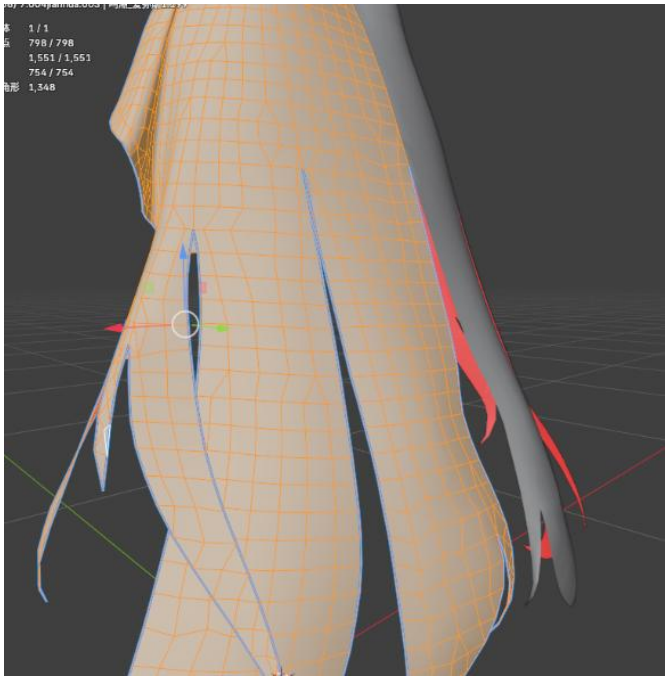


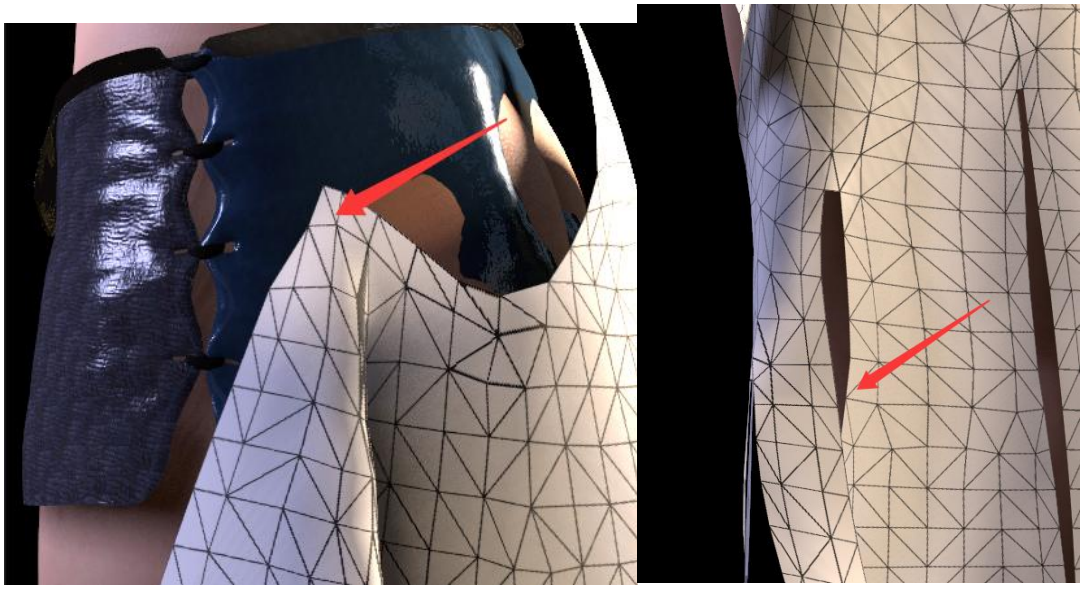
Therefore, we modified the grid lines to ensure that the flow direction of the edge triangles is consistent. Using the "rotate edge" command, after adjusting the edges once, it will be ready.





Let me remind you again: even if the model you export in Blender has four-sided faces, when it enters VAM, all of them will be converted into triangular faces. To avoid rework, we need to fix the edge flow direction in Blender beforehand.

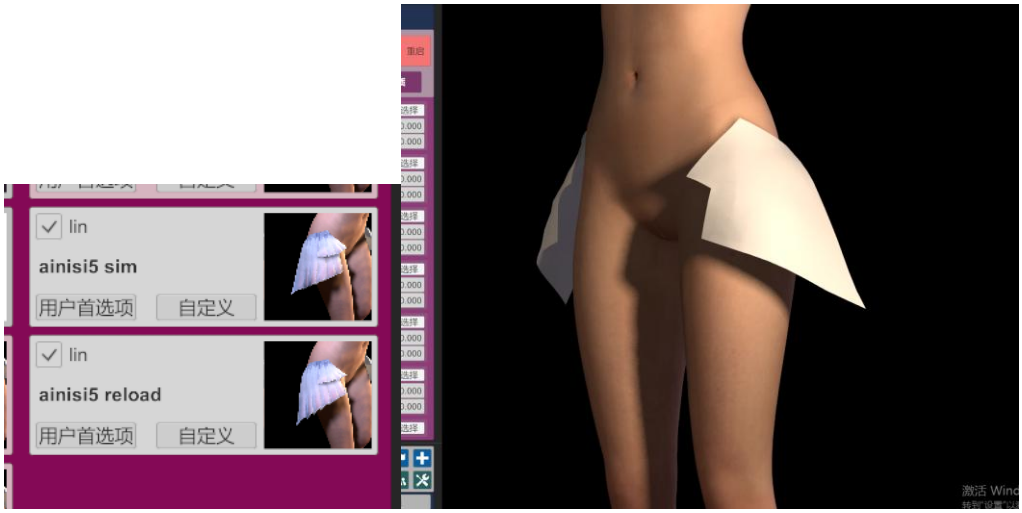




3-9

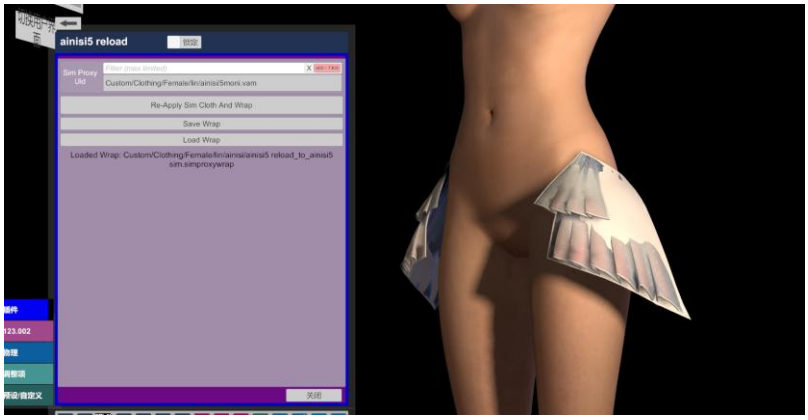
At this point, we can import this single-layer simulated fabric into VAM and perform smoothing and repair processing.

I usually call a single-layer simulated fabric "sim", and a double-layer appearance fabric "reload". You can refer to the naming requirements.



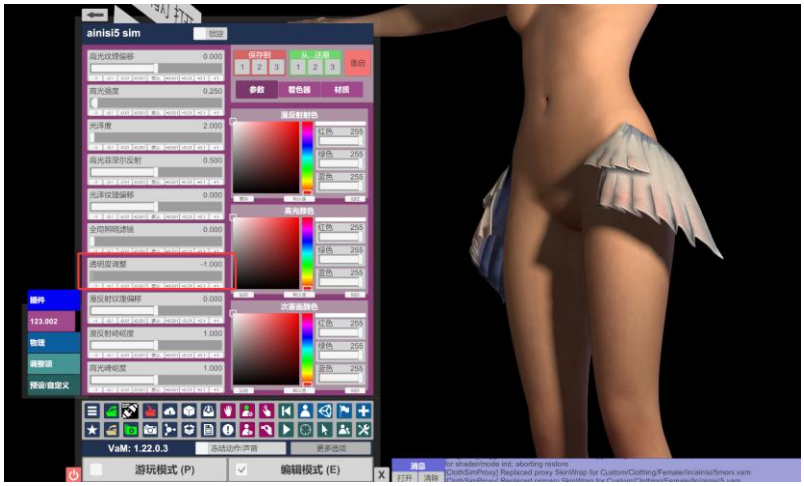
It looks very good. We then move on to the double-layer fabric and continue with the operation we previously specified for simulation.

Twisting the character will allow you to see a natural movement without any occlusion.



3-10

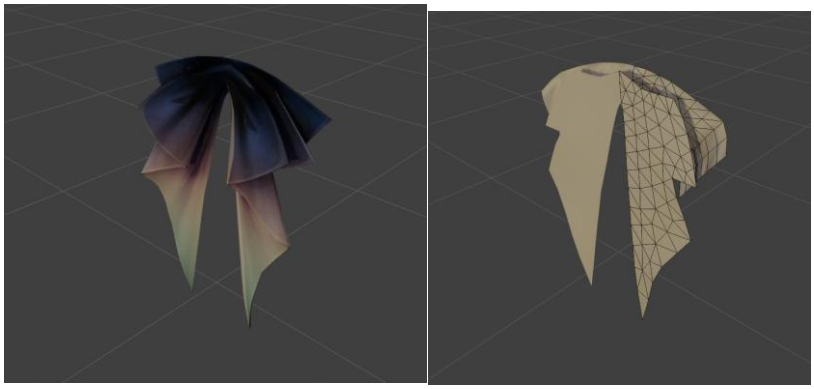
Next, reduce the transparency of the simulated fabric, and you can now display the appearance separately - the opaque double-layer fabric.



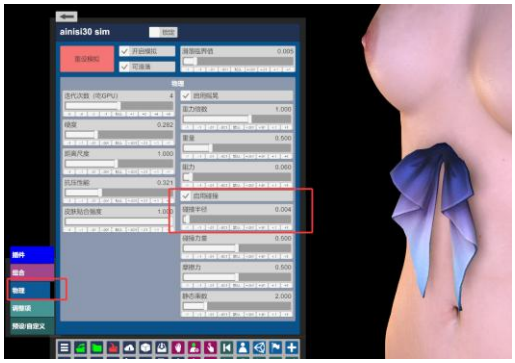
The swinging effect is as shown in Video 2.

The process of making other fabrics is roughly the same.

Additional note: There is a double-layered fabric bow on the chest of the character. Normally, when it moves, it will deform. However, due to its excessive thickness, the effect of adhering to the thin sheet will be very strange, and the protruding part will be significantly distorted. We need to pay attention to three steps in this situation.
1: Divide it into two parts for grid simulation, and keep a distance between the front and back to avoid overlapping during swinging.

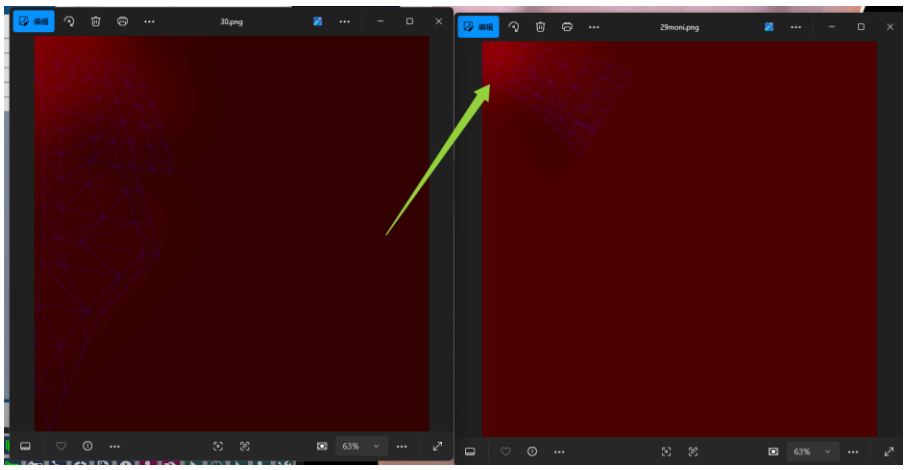


2: Set different collision radii. Utilize the character's collision body to position the outer simulated fabric in front.



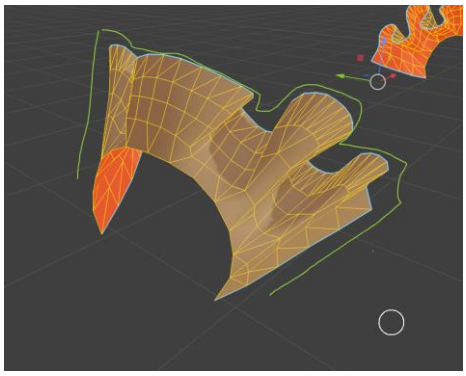


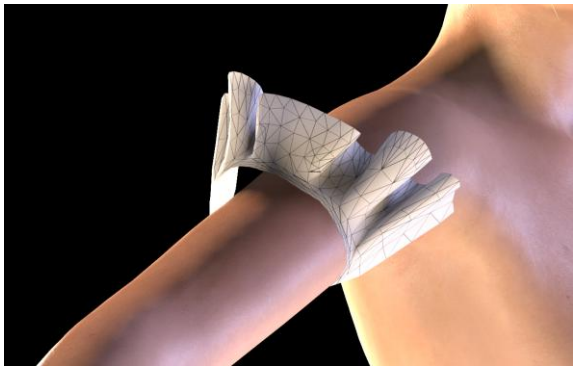
3: Set different simulation textures
The outer fabric can tolerate larger swaying, while the inner layer should closely follow the movements of the character's body. Distinctions need to be made on the simulation textures, as you can see that the right part is the inner small bow. Overall, it is more red and is more influenced by the human body mesh binding.



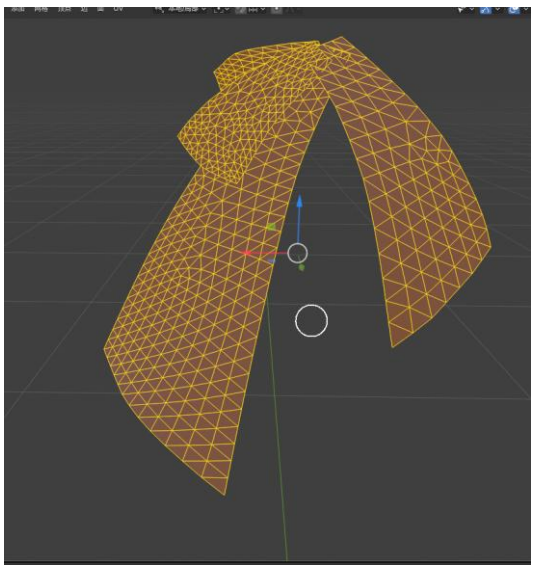
The final result is as shown in Video 3 of the presentation.

The sleeve part only requires the simulation of the pleated area, so I didn't modify the root of the mesh, as it doesn't matter.



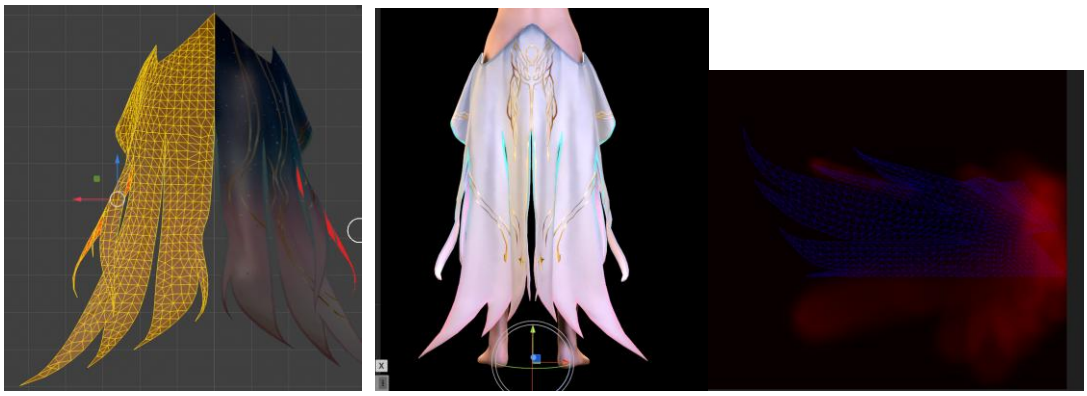


Then handle the trailing fabric at the back of the buttocks.





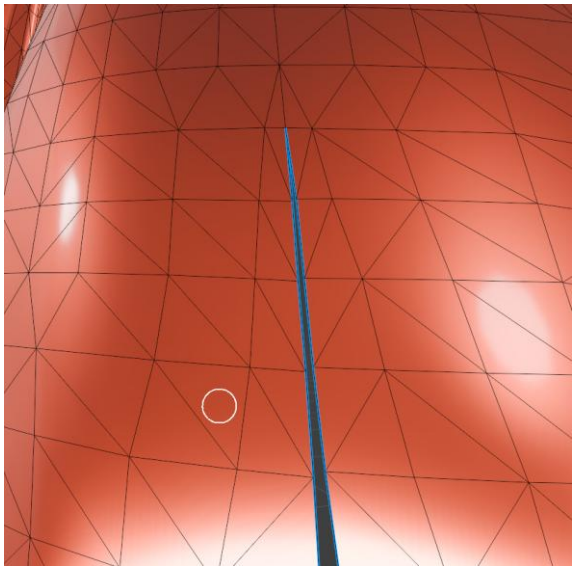
And there are also extremely complex and elaborate skirts.

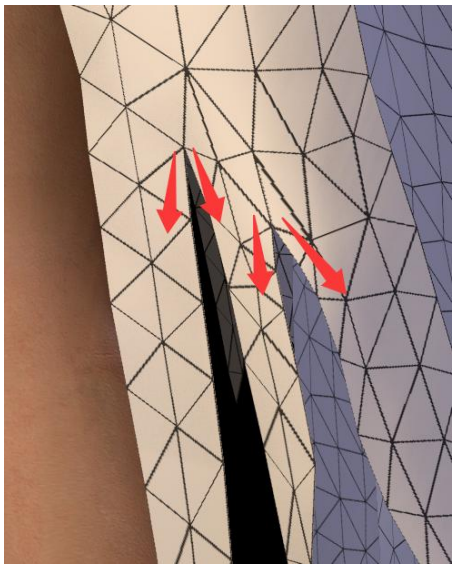


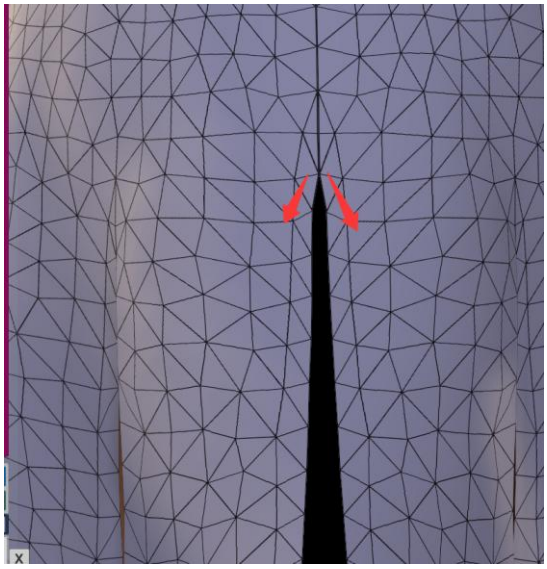
The most challenging part for me is creating the simulation textures. It requires continuous adjustments to avoid occlusion. One has to make trade-offs between physical swinging and occlusion. Applying too much makes the model stiff, while applying too little causes the fabric to overlap.

Normally, the plugin will run only after loading the simulation appearance fabric. Then, it loads the simulation fabric and performs the binding.
The powerful features of the plugin allow you to simultaneously activate two outfits, eliminating the need to worry about loading sequence issues.

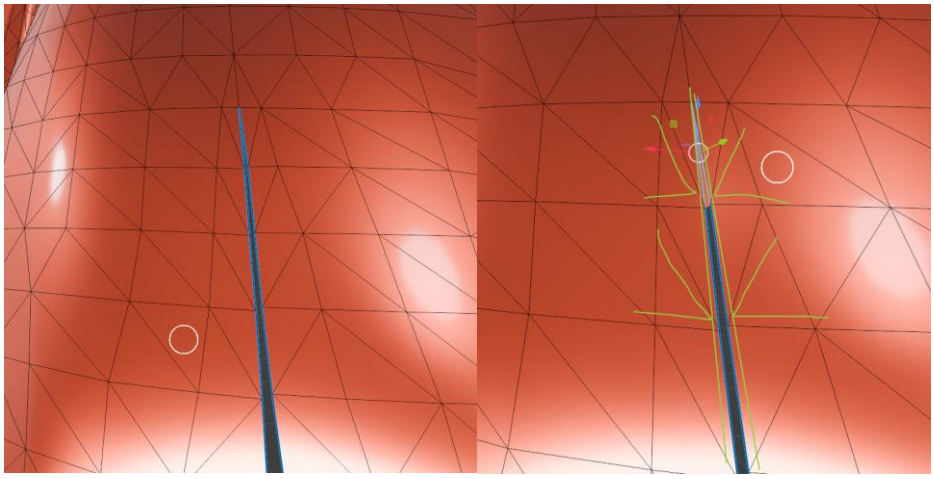
Additional note: What if there is a situation like this, where the split-generated model mesh occurs? The edge transitions can no longer maintain a connection between two lines, resulting in a strange force pulling the fabric towards both ends.

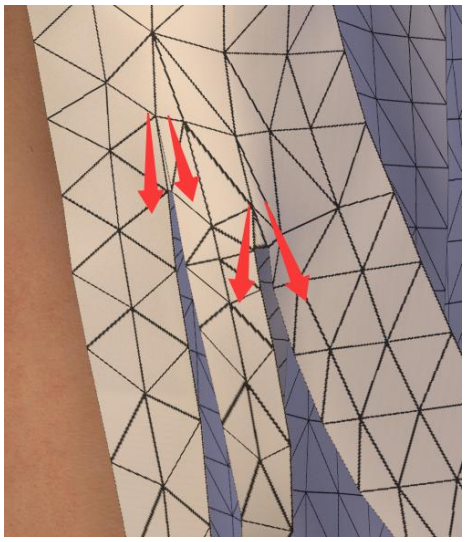


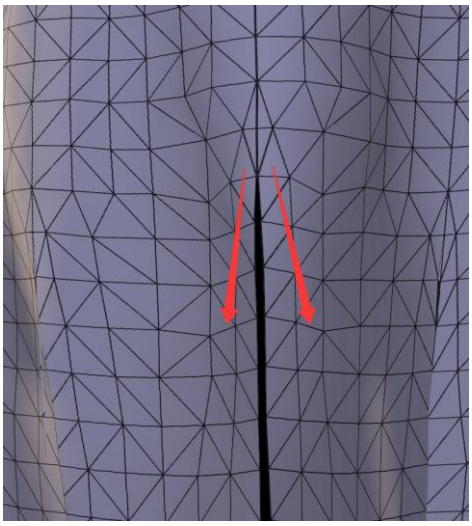




We stitch up this middle edge, and everything is perfectly resolved. There are still two inner edges connecting to one edge vertex.
Since the simulated fabric is hidden, the extra meshes will have no effect on the appearance.







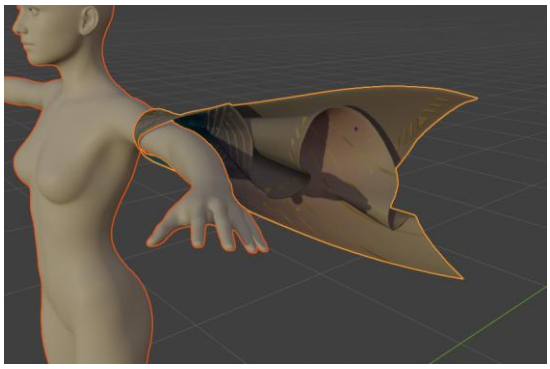
Next, we will follow the same procedure to handle the other fabrics. We have already completed more than half of the work.

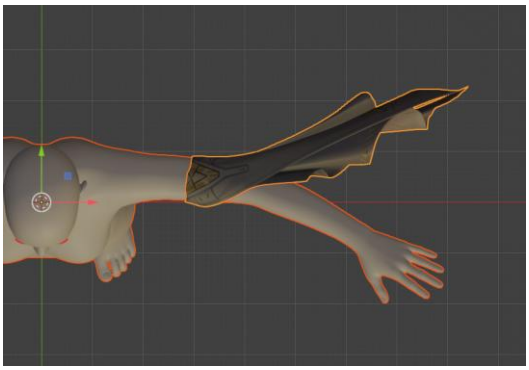


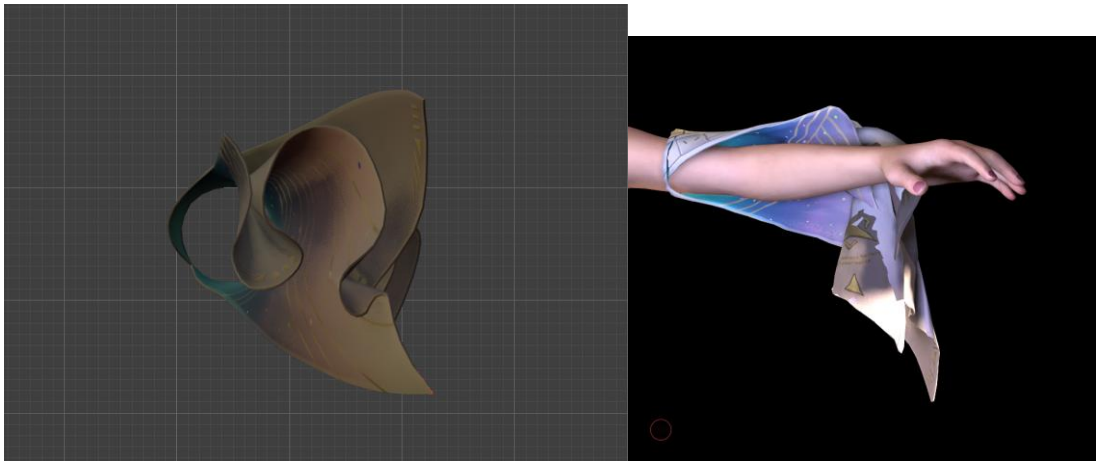
3-12

In addition, there is another sleeve that needs to be handled separately.

This sleeve is too wide and large, and the inside and outside colors are different. It needs to be made as a double layer. Moreover, it contains various distorted model meshes. When made into fabric, it will be affected by gravity after enabling the simulation, and the morphing effect will be very severe.



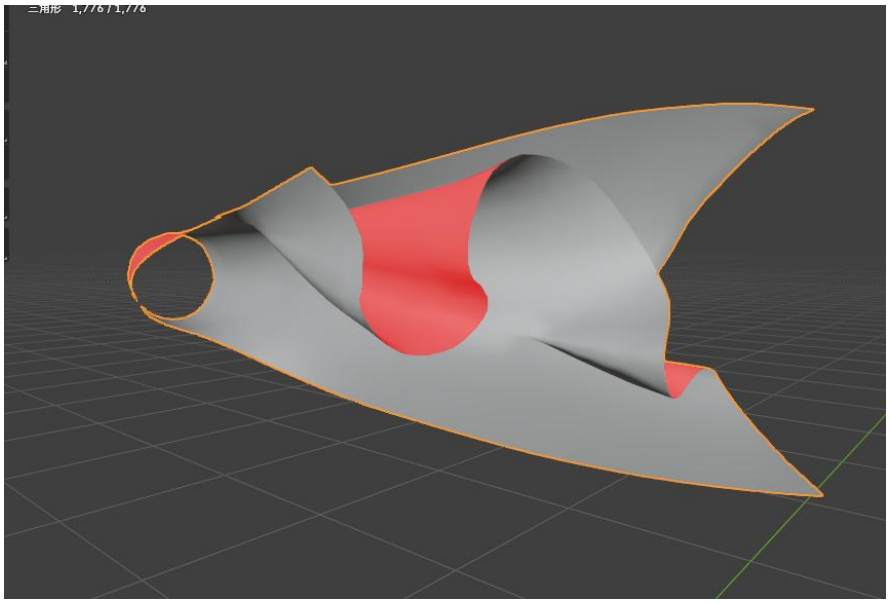




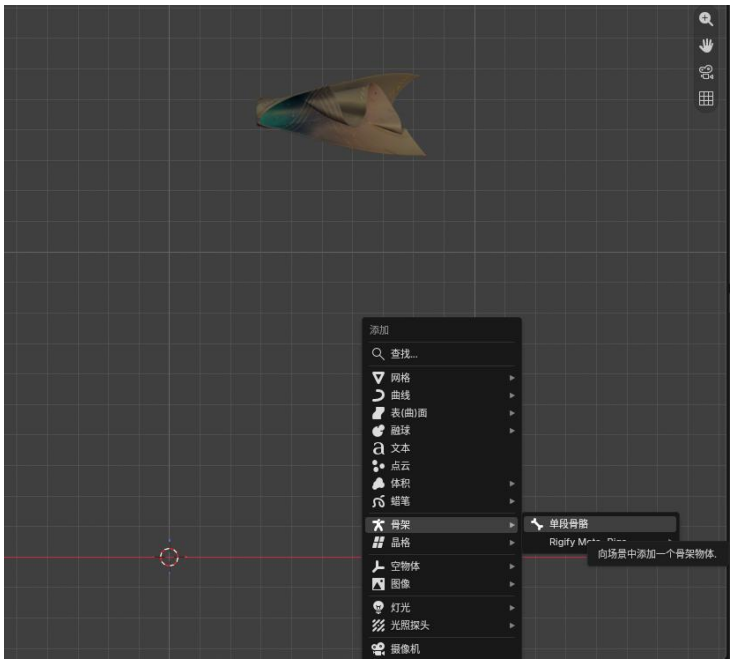
The effect is as shown in the demonstration video 4.

I can use bones for binding and add a flexible swinging effect. The clothes swing along with the arm movement, creating a delayed wobbling effect.
This sleeve doesn't require collision because this sleeve extends from the arm. The character's own poses basically won't come into contact with this sleeve. Therefore, I used the ezsoftbone process to create it, making the sleeve a collision-free CUA resource (CUA = Custom Unity Asset, Custom Unity Asset).
If you need to create CUA resources with collisions, such as a CUA resource with a tail that has collisions, you can refer to my other guide:
https://hub.virtamate.com/resources/flexible-physical-tails.67324/

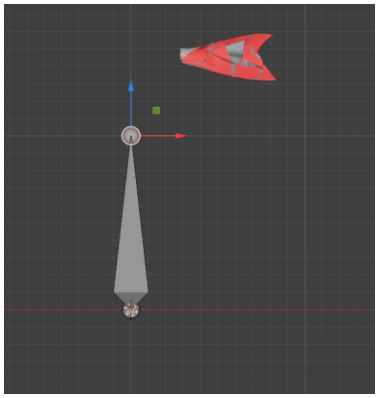
3-13
First, I'll copy and extract the single-layer fabric mesh to facilitate the brushing of binding weights. Then, I'll transfer it to the double-layer clothing later.

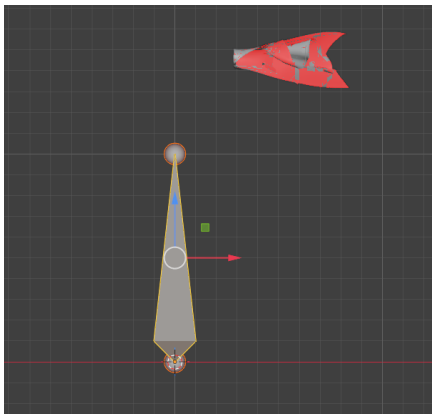


Press "Shift + A" to create a new skeleton.



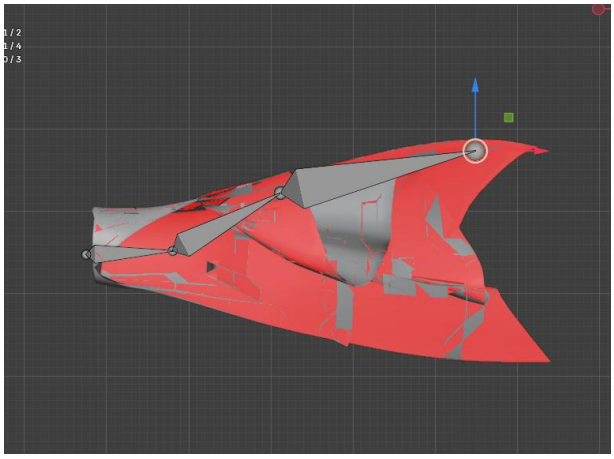
Selecting the circular ball on one side of the bone allows you to move that side. Selecting the middle one enables you to move the entire bone.



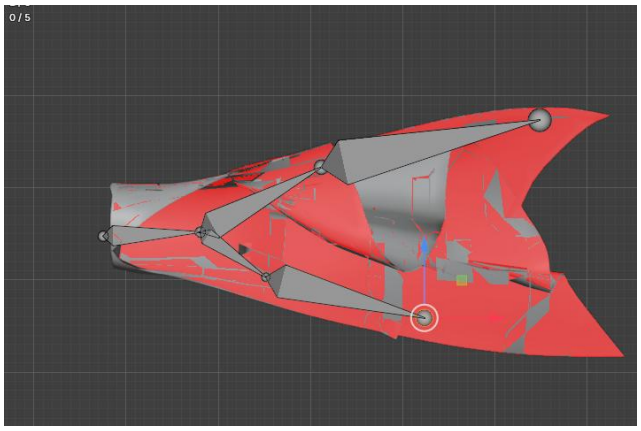


3-14

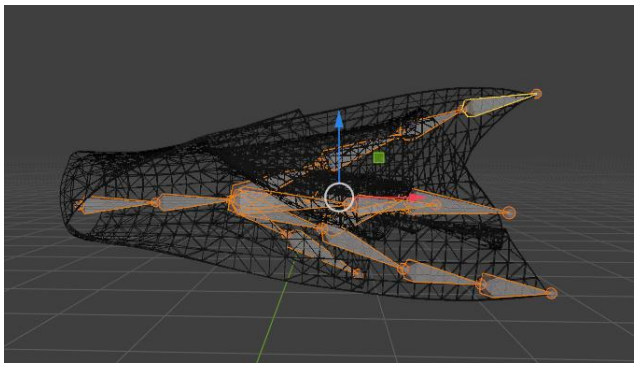
Enter editing mode, move and rotate to align with the root of the clothing. Press the 'e' key to create new bones. More segments will make the swing more flexible.



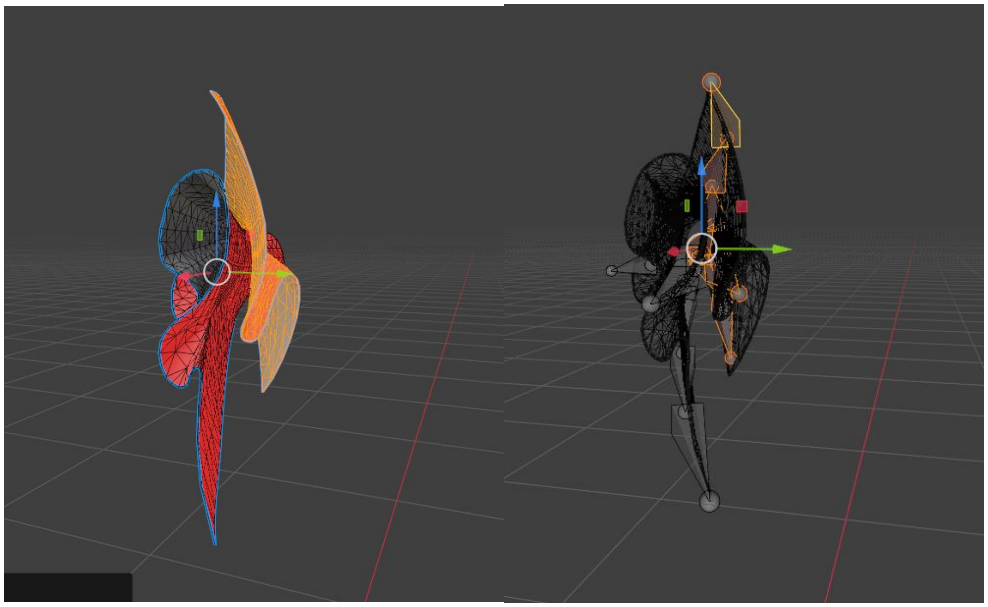
At the fork, squeeze out the second section, the third one.

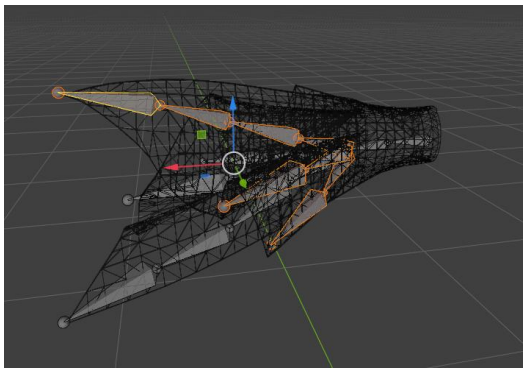
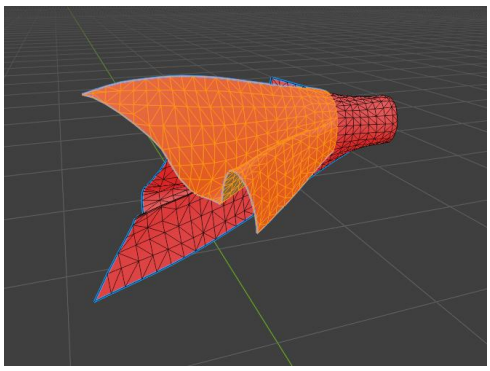


The final adjustment effect is shown in the figure.

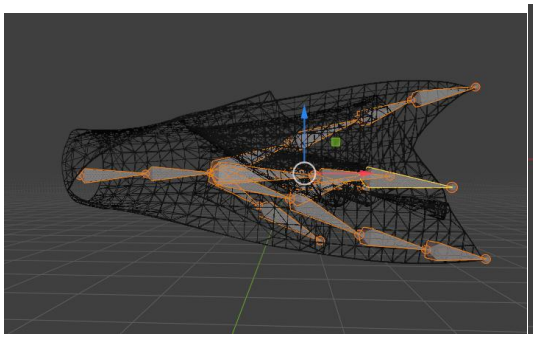
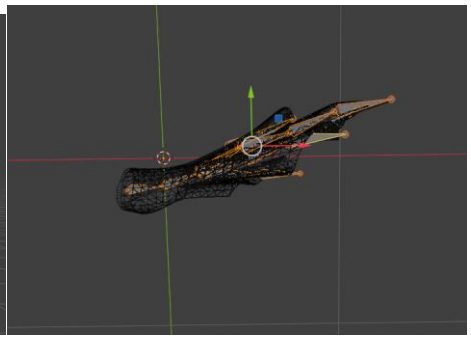


The thickness of the model is quite large, and the mesh can be divided into two parts. Therefore, my skeleton is also divided into two layers.



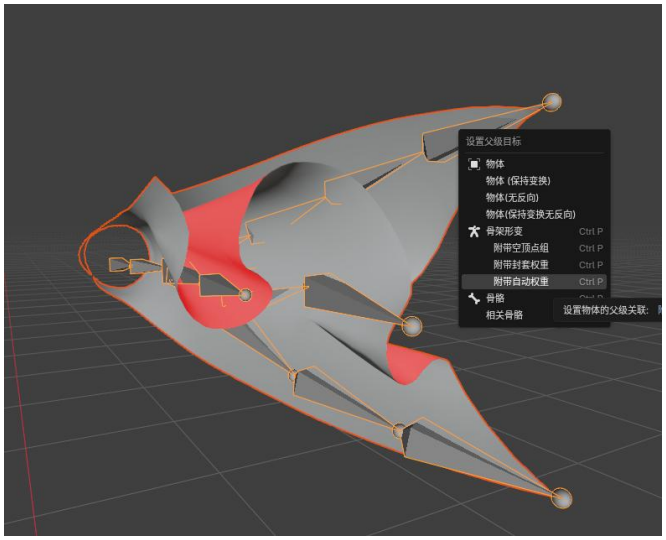



Also correct the position on the top view

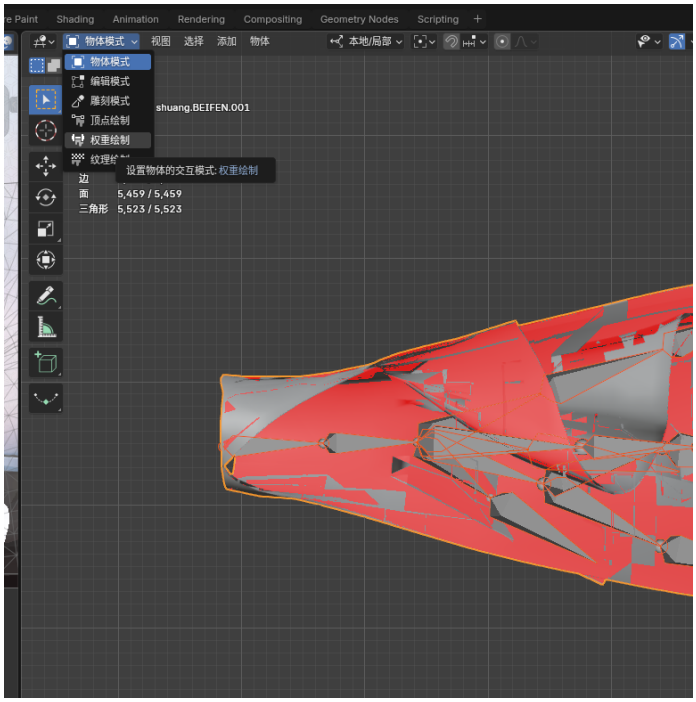



3-15

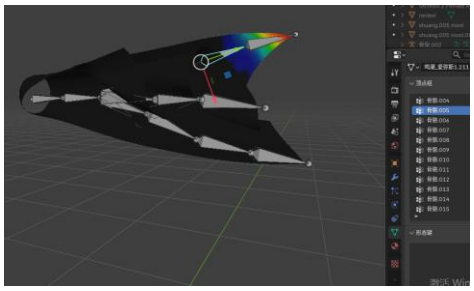
Hold down the Shift key, select the model first, then select the bones, and right-click to generate automatic binding.

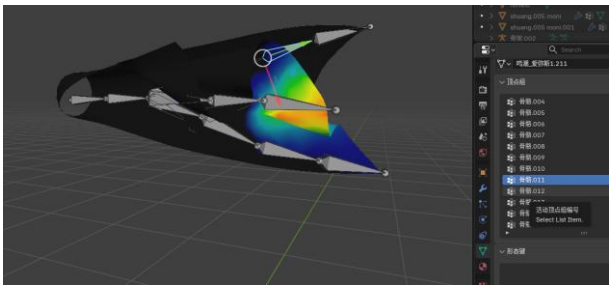


SHIFT key is used to select the bone first, then the model. Press the upper left button to enter the weight painting mode.

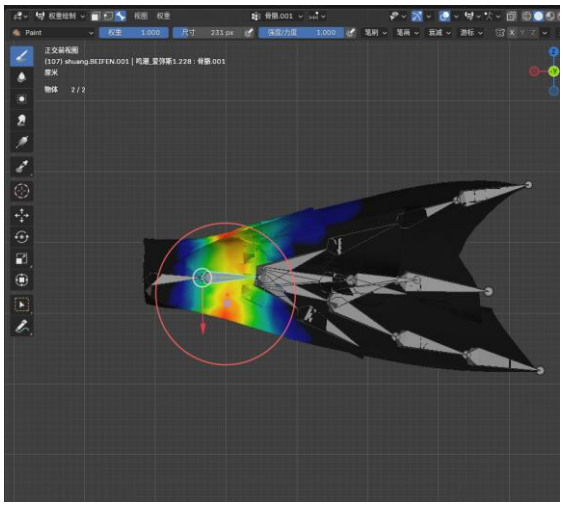


The automatic binding just now will automatically set the vertex groups for the model. By selecting the corresponding vertex group, you can see the influence range of the current skeleton. Red represents 1, black represents 0, and other colors represent the intermediate transitions.

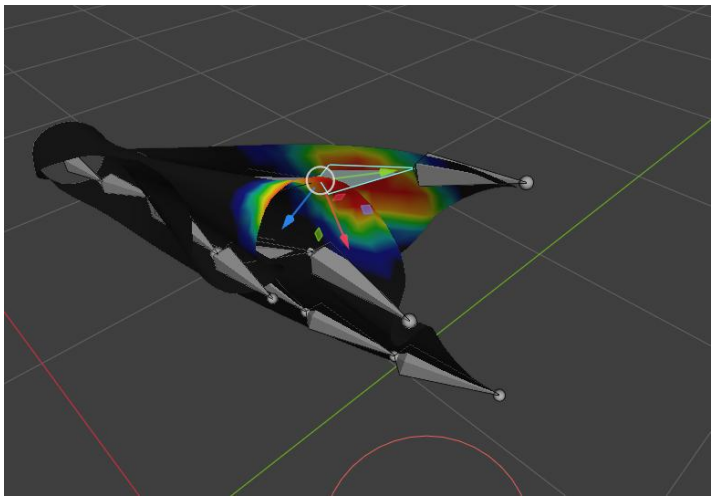




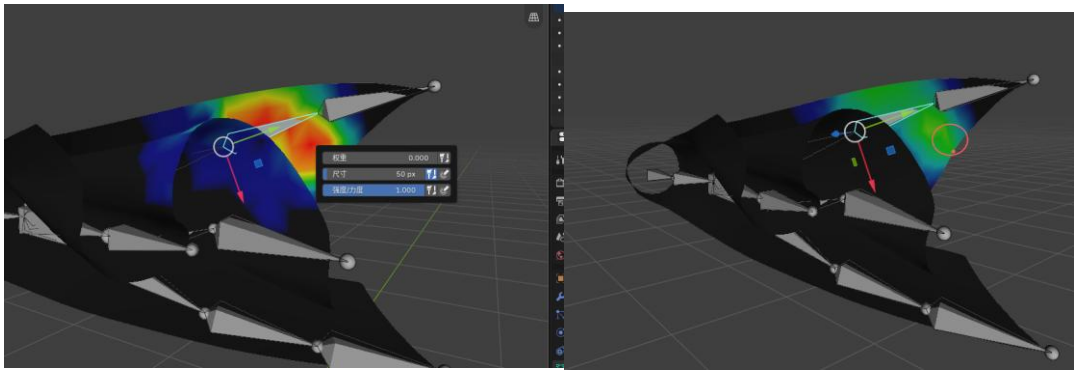
Selecting the bones will also allow you to view the corresponding weight influence situation.



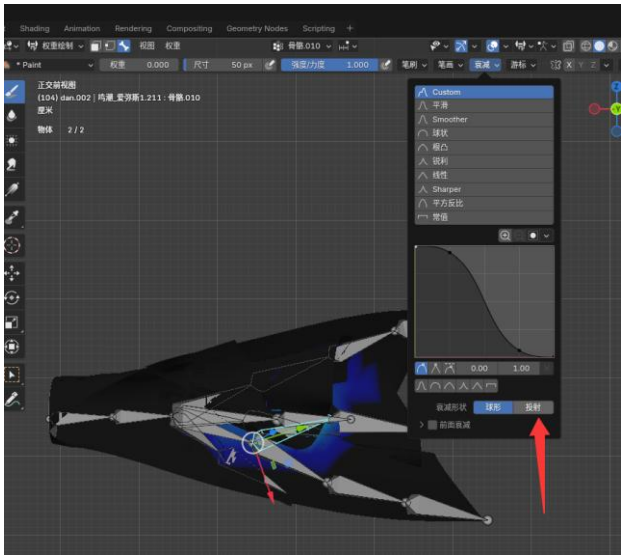
Next, manually modify the weight range. You can see that the automatically bound part will connect the nearby grids with weights. This is something I don't need. The connected weights can prevent interpenetration, but I want the two layers of clothes to move independently because there is already enough space in the middle of the grids for the clothes to swing.



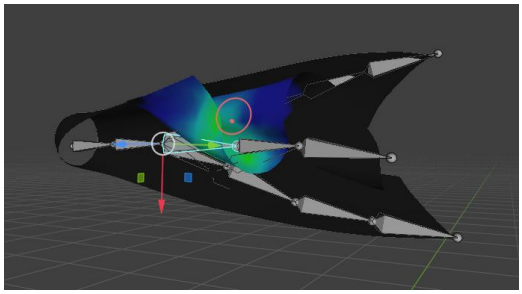
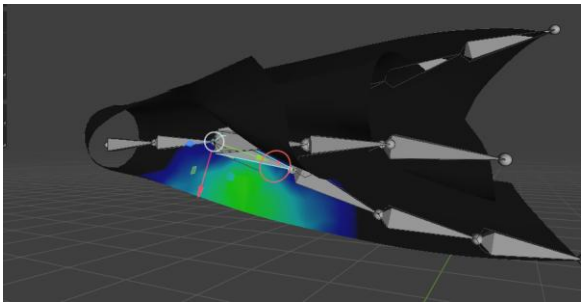
Adjust the brush to a weight of 0, reduce the size, apply the painting, and remove the excess weight parts.



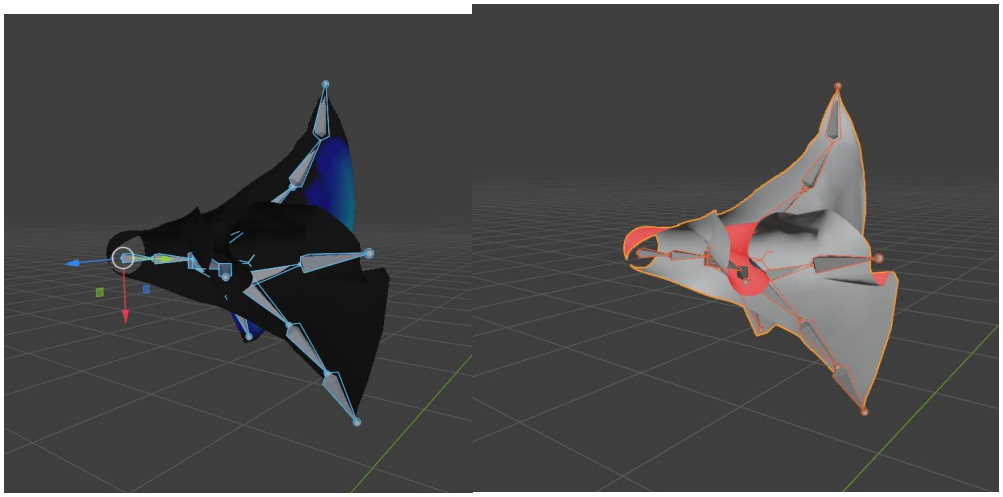
If you want to edit the background part at the same time, that is, the perspective smudging, you can click to enable projection. This will also affect the grid weights on the background.



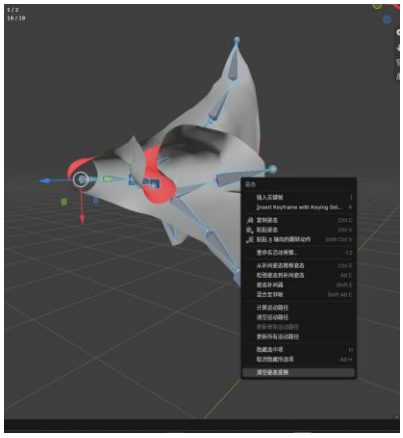
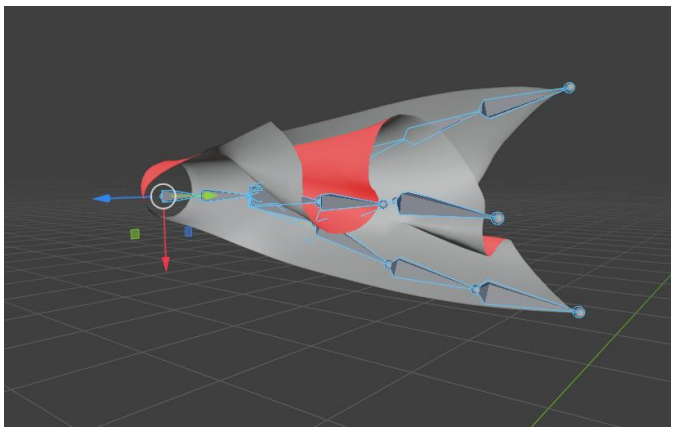
Shift + x is the selection tool. If you need to quickly obtain the weight color from the perspective view, you can use it (it's more convenient than adjusting the weight slider).
Make sure that the weights of each bone have been set properly, without any adhesion or penetration.

3-16
After weighting is completed, adjust a spread-out posture in the pose mode to simulate a large swing.
Check if there are any intersections in the grid to avoid any issues later when swinging.



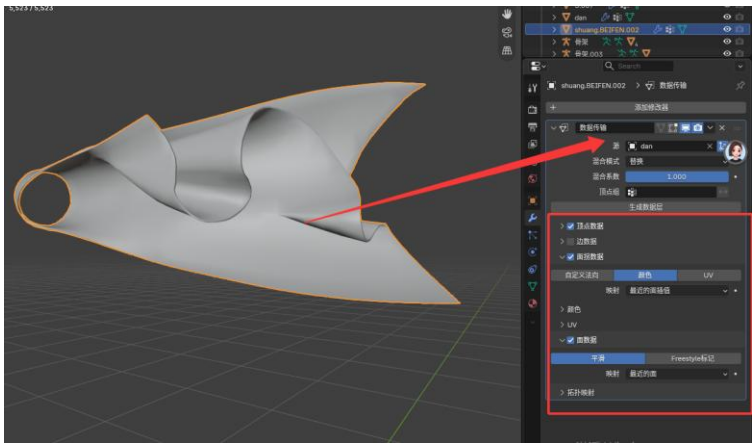
After the inspection, select the bones and enter the pose mode. Right-click and clear the transformations. Then it will return to its original state.

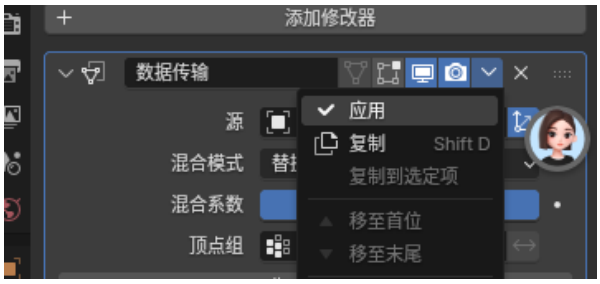
3-17

Then, the weights are transferred to the double-layer mesh, and the previous double-layer fabric is found. The data is loaded and the modifier for modification is applied.

The source is specified to the previous single-layer mesh, and the parameters are modified as shown in the figure below. The algorithm will transfer the weights based on the closest distance.



Note: For single-layer and double-layer fabrics, the number and names of the vertex groups must be consistent for the weights to be transferred. Make a backup before confirming and applying the modifier.



3-18

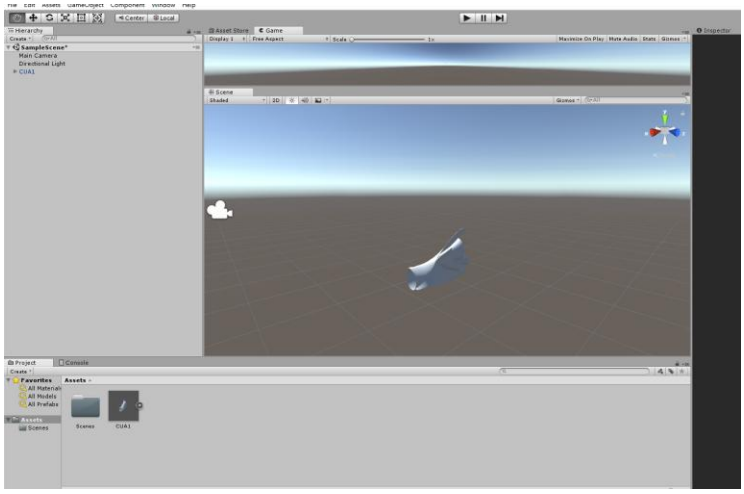
Add the skeleton modifier and specify it to the skeleton that binds the single-layer mesh to the front. This will enable the skeleton to control the current weights.



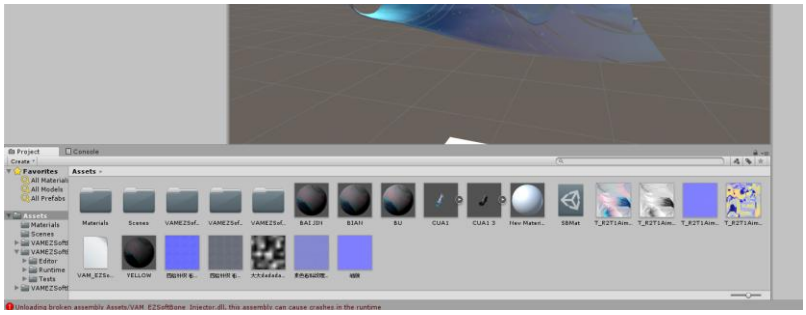
3-19

Then we select the double-layer clothing and export the skeleton as fbx. We then proceed to Unity.

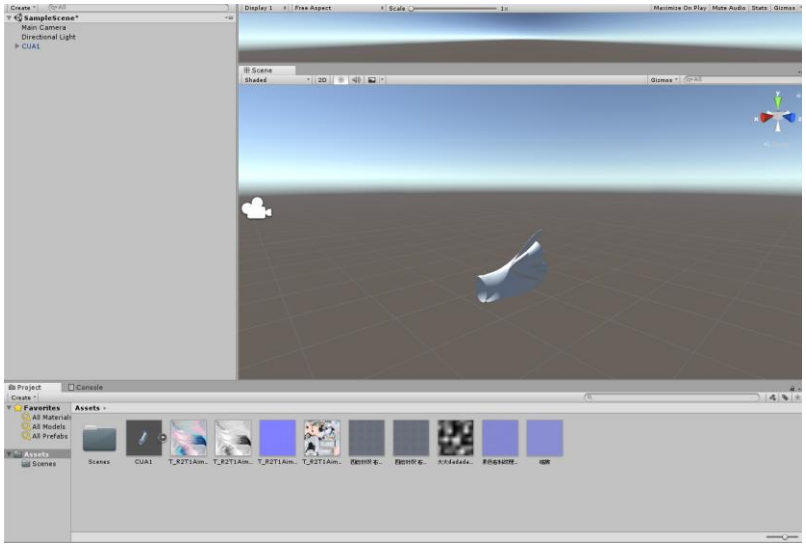
Create a 3D project, download and drag in the previously downloaded sleeve file



Drag the texture of the sleeve and the texture generated on the website to the file column below.

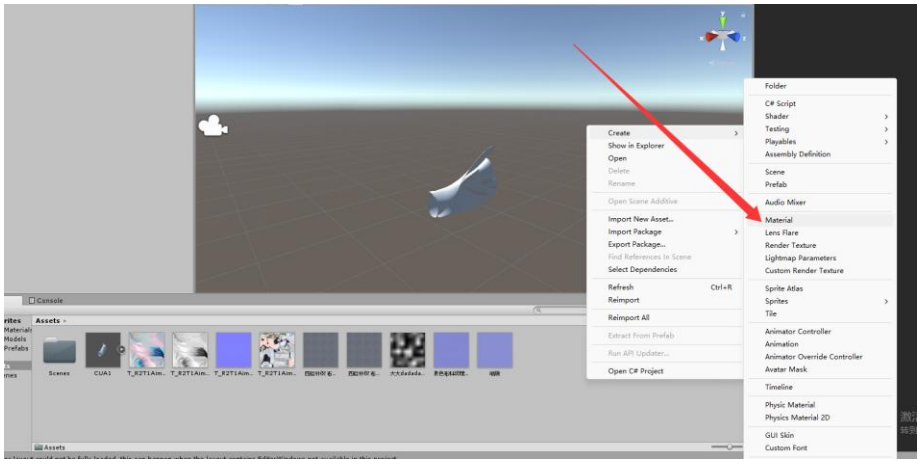


Drag in the texture file.



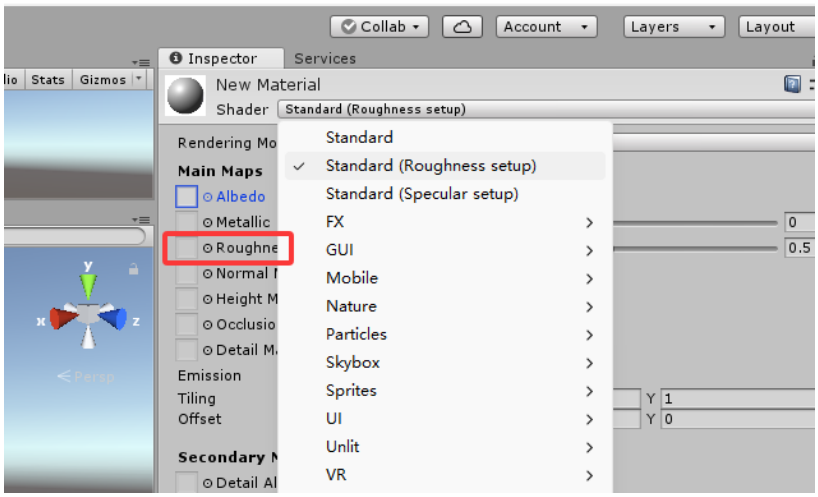
3-20

Right-click to create a new material

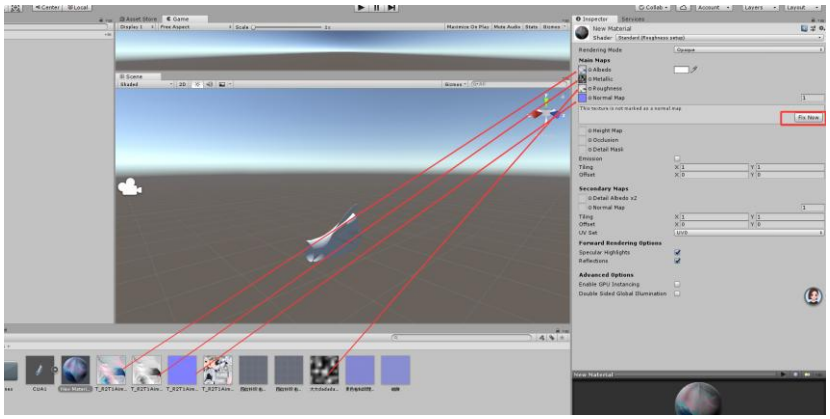


Select the material sphere and drag the texture into the box.

Select the material sphere. I prefer the second mode because it has an additional adjustable roughness channel.

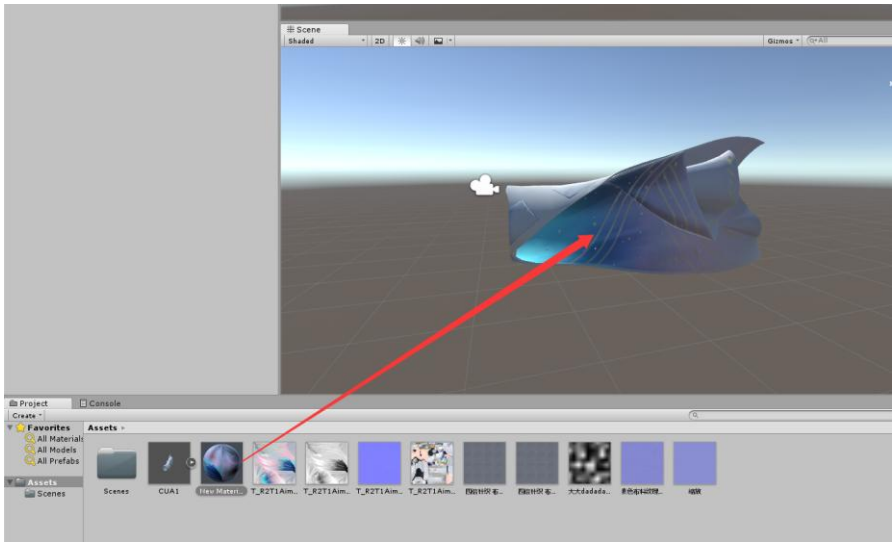


Drag the material sphere into the box. If the displayed normal map needs to be repaired, click the "Repair" button.

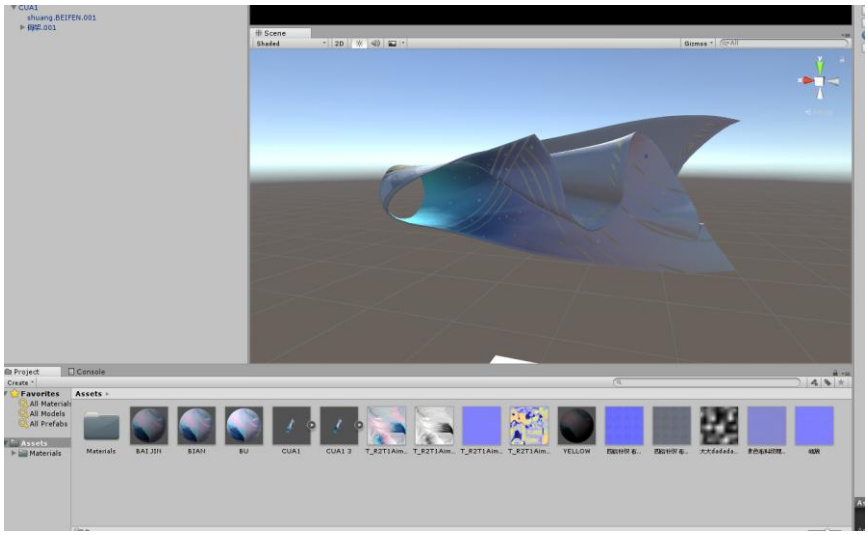


3-21

Drag the material sphere onto the model.



Rename the material and duplicate it several times to match different parts of the model.



3-22

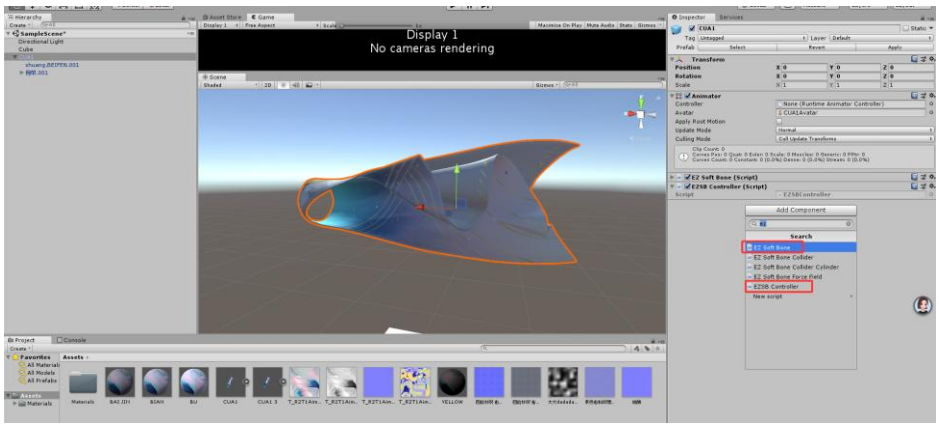
Drag in the ezsoftbone component

The principle part of this ezsoftbone can be referred to in another tutorial. The download link is also provided there:

https://hub.virtamate.com/resources/ezsoftbone-library-creator-tutorial.66310/

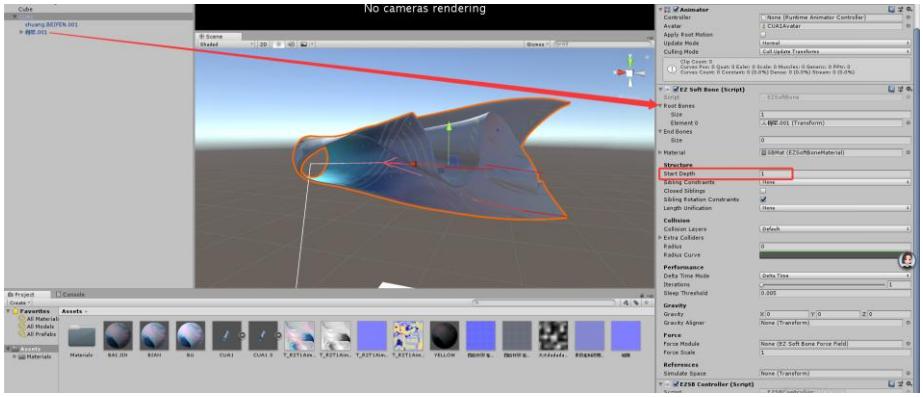
Thank you for the guide provided by hazmhox

Select the outermost layer of the grid and add the ezbone plugin

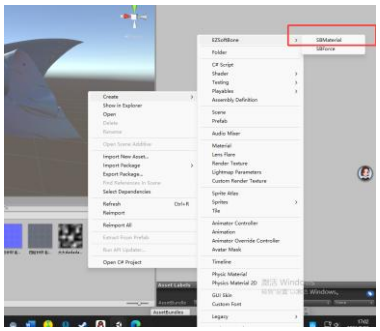


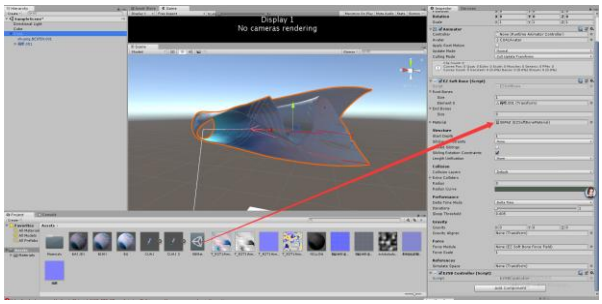
3-23

Open the ezsoftbone plugin, drag the first bone into the rootbone, and set it to start after the first bone, because the first bone does not need to move.

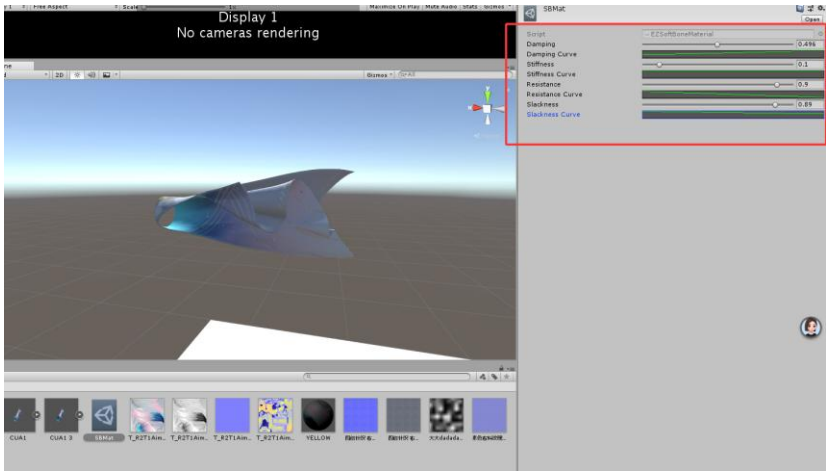


Create a new sb material and drag it into the materials section of ezsoftbone. This is used to control physical properties such as joint elasticity.



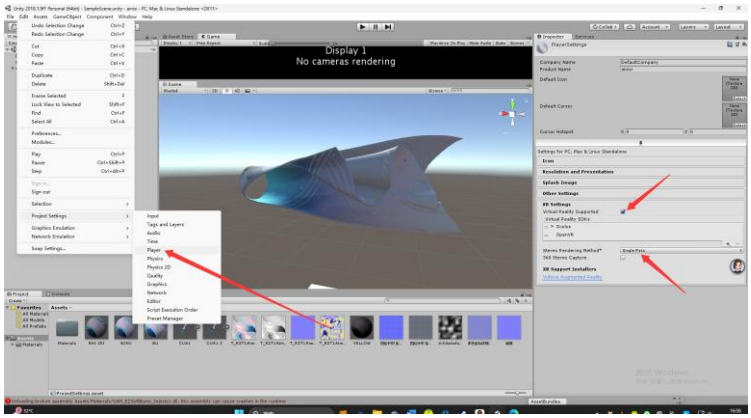


The four adjustment sliders correspond to:
Damping (the attenuation coefficient for inertia),
The restoring speed of deformation (hardness),
The resistance to external forces such as gravity,
Relaxation degree (the stretching degree during movement)



3-25

Settings for VR perspective



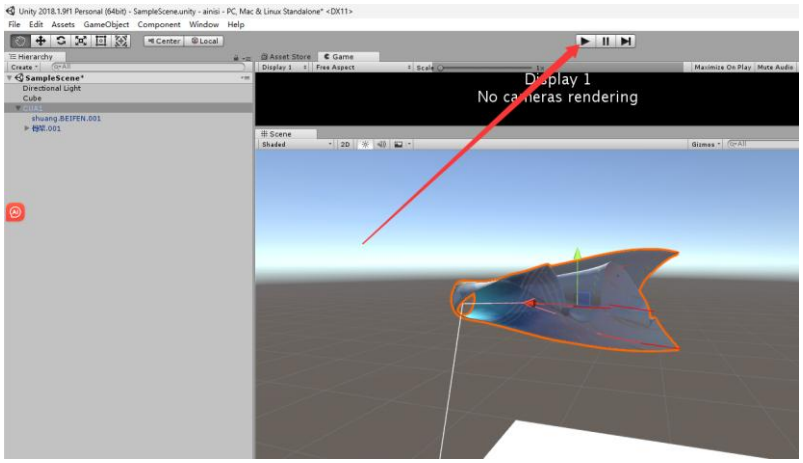
也可以看 Spacedog 的教程

You can also refer to the tutorials by Spacedog.

https://hub.virtamate.com/resources/make-customunityassets-that-work-in-vr.64791/

3-26

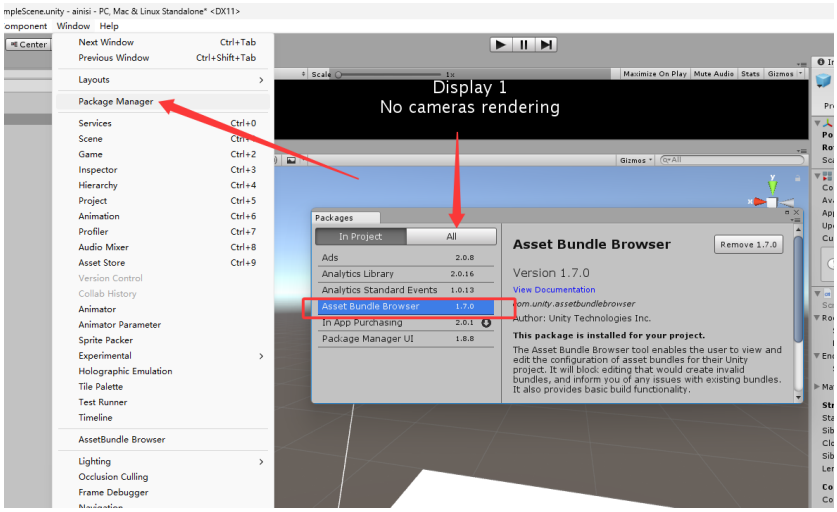
Next, check the movement. Press play and drag the object to observe the movement effect.



The effect is as shown in the demonstration video 5.

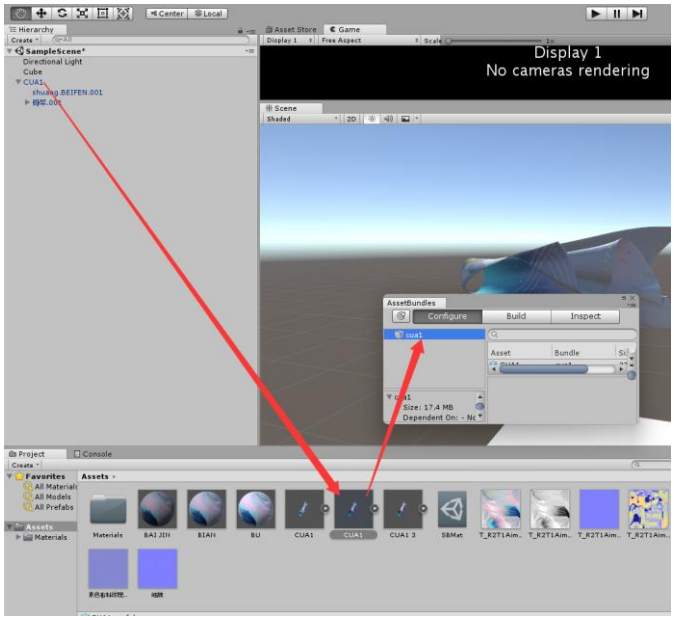
3-27

Load the packaging plugin. If it's not installed, click the "Install" button at the top right corner. In my case, it has already been installed.

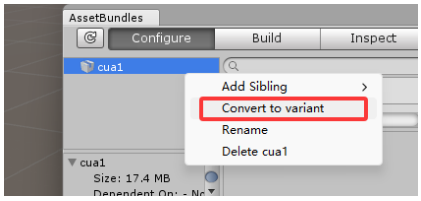


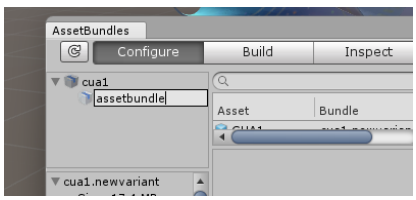
3-28

Drag the entire confirmed and error-free model back to the file folder, and then drag it into the pop-up packaging window.

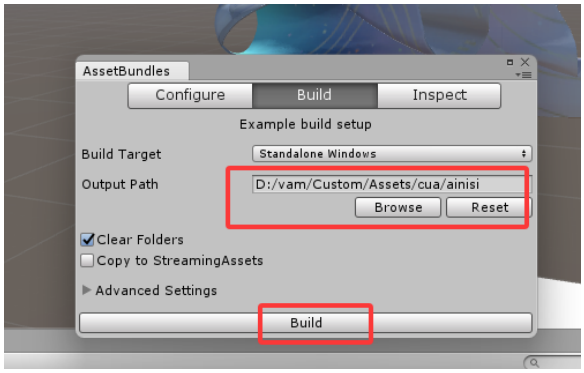


Right-click to change the file extension to "assetbundle"



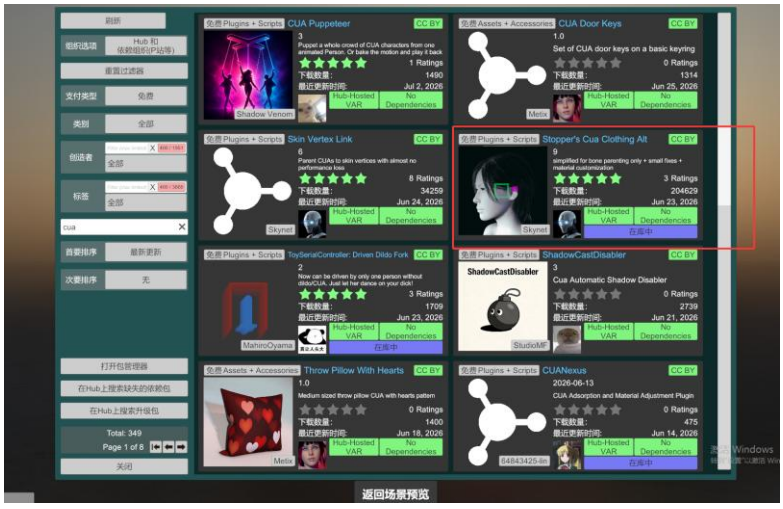


Go to the "Build" interface, confirm that the output address is correct, and then click "Build" to package.



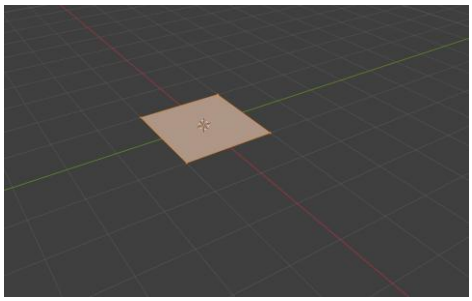
3-29

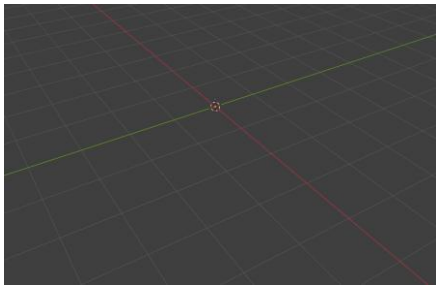
Then go to the VAM, load the EZSoftBone plugin. Here, I use the Cuaclothing plugin from Skynet to import CUA as the clothing.



I need to create an empty piece of clothing, then load the cua.

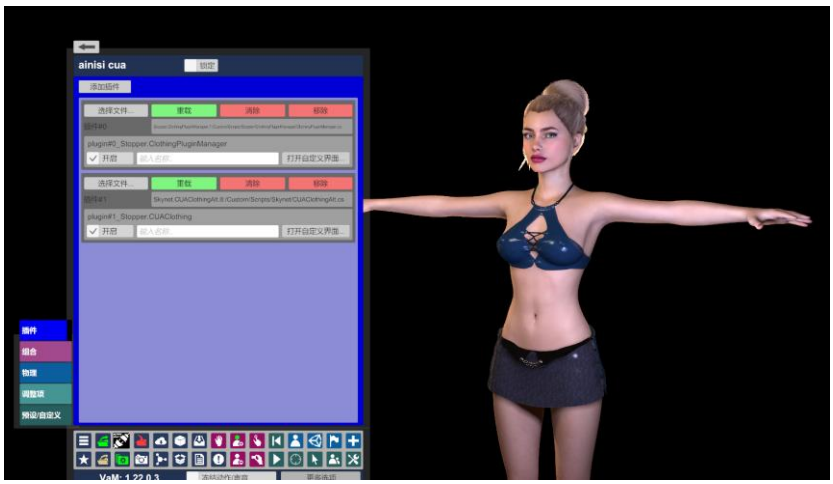
In Blender, create a plane, merge all the vertices, and import it into the VAM as the clothing.





3-30

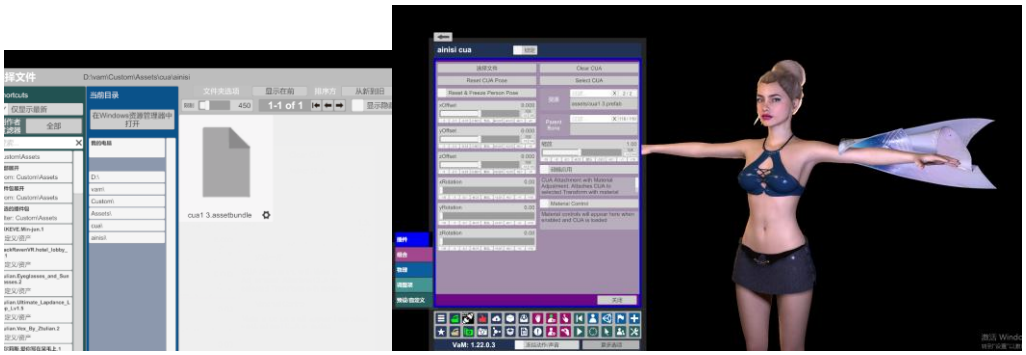
Load the Cuaclothing plugin for this vertex clothing.

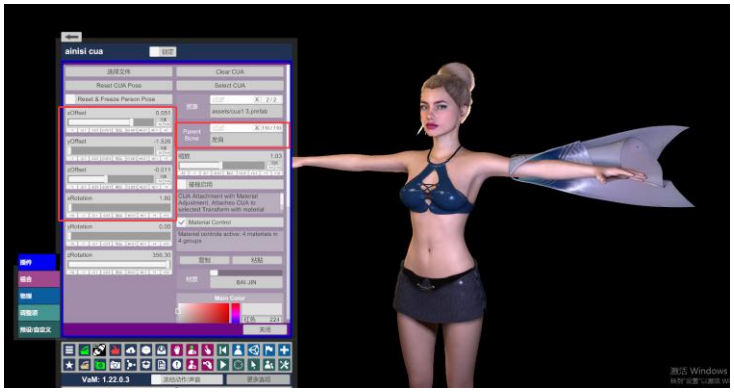


3-31

Select the cua file we just packaged, select the bound bone positions. Here, I'm using the left shoulder.

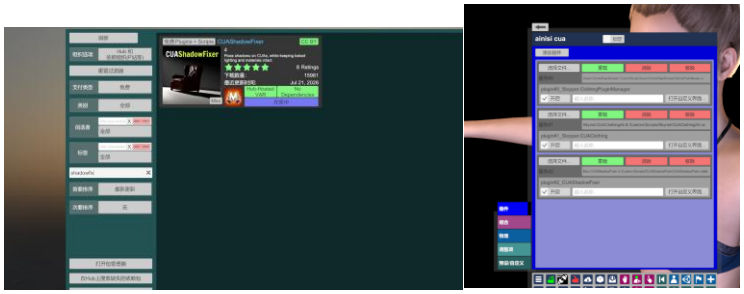
Adjust the positions to match the shoulder.



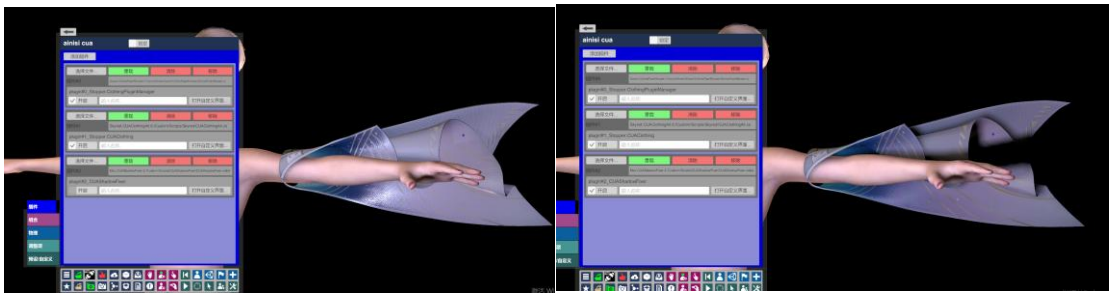


3-32

Then import the next plugin to help us fix the shadow issue of cua - the shadow fixer.



It can be seen that the differences are quite significant. The reflections and shadows have all been corrected.



Save the preset in the plugin manager, and the clothes will automatically invoke it the next time it is started.



3-33

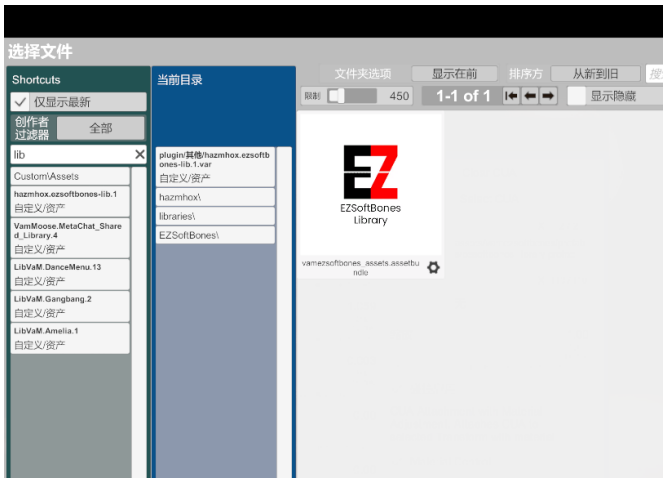
Then, import another single-vertex garment. This is to create the support library for ezsoftbone. The ezsoftbone system requires this to function correctly.

Once again, we would like to express our gratitude to hazmhox for providing the guide.

https://hub.virtamate.com/resources/ezsoftbone-library-creator-tutorial.66310/



The selected resource is ezshoftbonelib



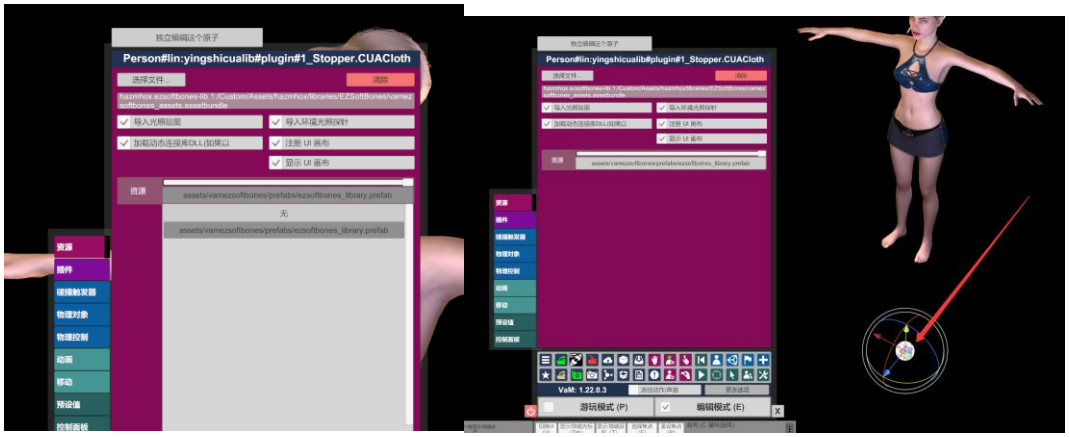
3-34

Now let's move on to the CUA atom



3-35

Make sure that the ezsoftbone support library has been selected. The appearance of the glowing ball beneath indicates a successful load.



Just keep it safe and you can use it next time. Save the ezsoftbone support library and the cua clothing in the same clothing preset. When calling the preset, they can be loaded together. The effect is as shown in Video 6.

Then we move on to the fourth part, hair.

Part 4

At this point, we have completed the clothing. Now let's start making the hair.

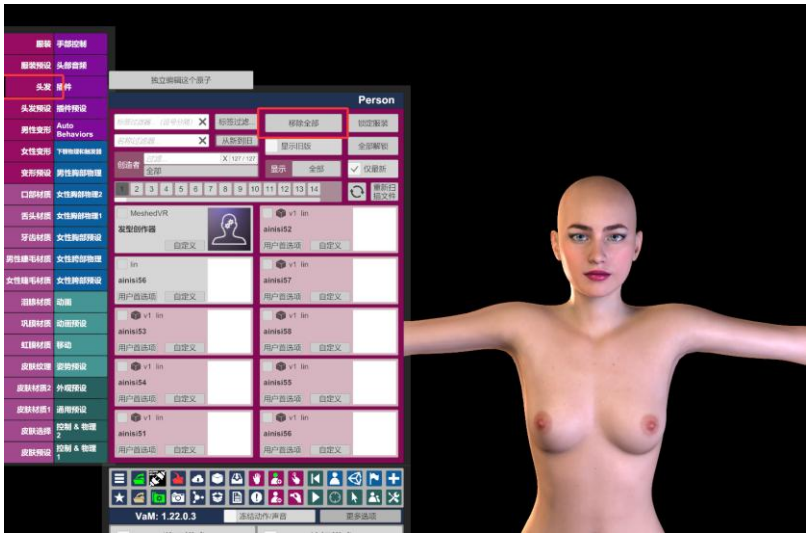
4-1

Select the hair grid model, separate it along with the headband, and import it into VAM as a clothing item.



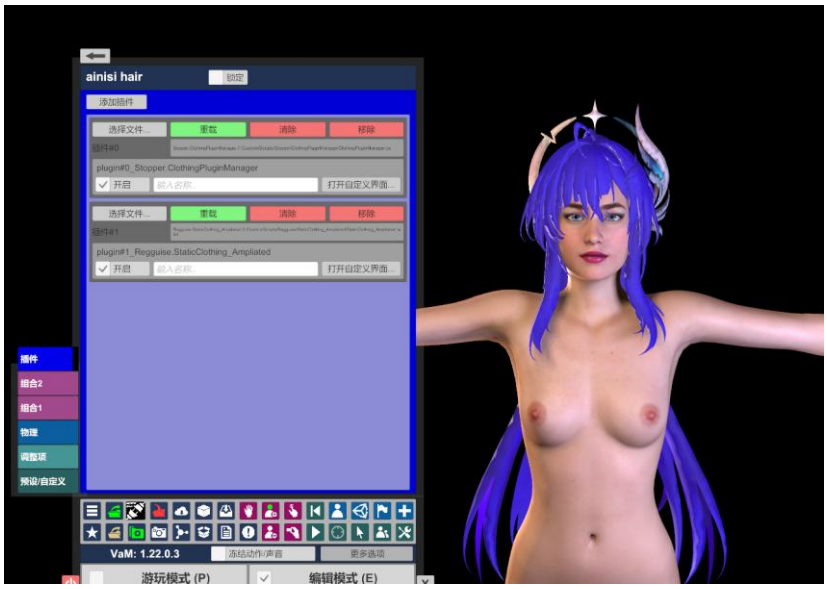
4-2

Remove the default hair in VAM



4-3

Load the hair mesh that was just exported and use the "Static Clothing Amplified" plugin to attach it to the head.



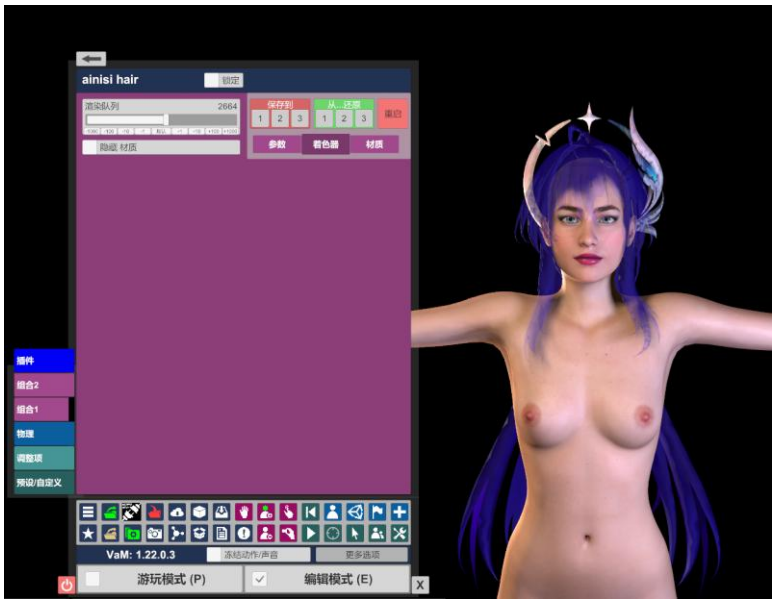
4-4

Enable the previously created headband equipment to determine the position and size of the hair, and adjust the size to fit properly in the plugin.



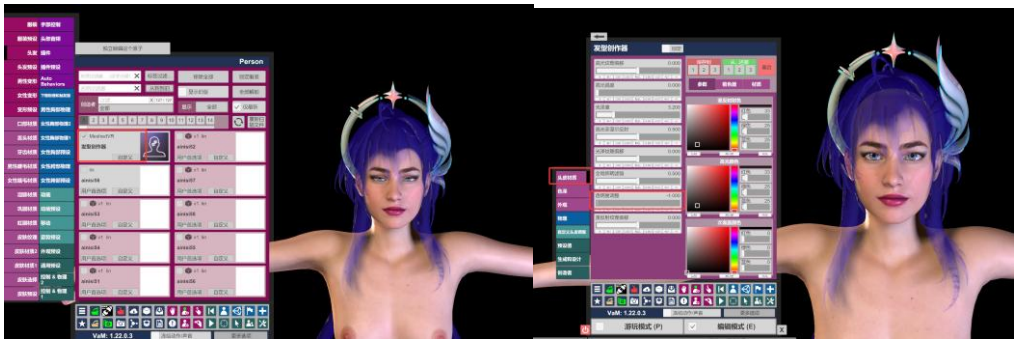
4-5

Reduce the transparency of the hair mesh and lower the rendering sequence to ensure proper transparency display.



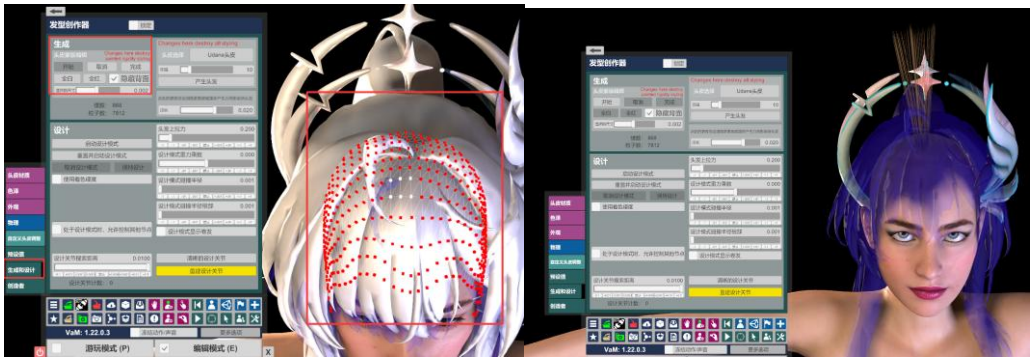
4-6

Start styling the hair, enter the editor, and first hide the scalp



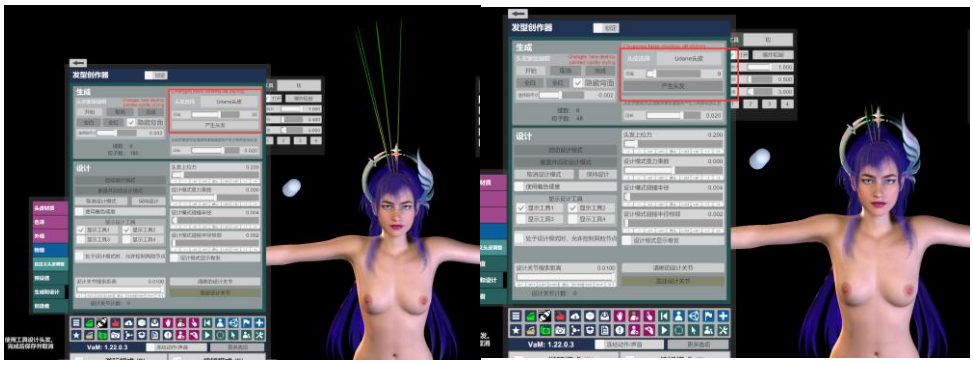
4-7

Select the scalp and generate the hair. Click with the mouse to select the area where the hair will be generated. Press Ctrl + left mouse button to deselect. The white areas will generate the hair. Click "Finish" to see the hair grow out.



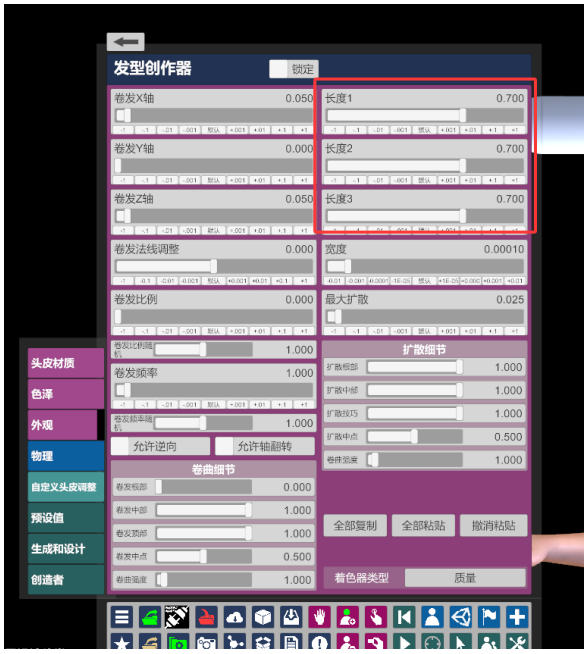
4-8

The right button is used to set the initial length of the generated hair.



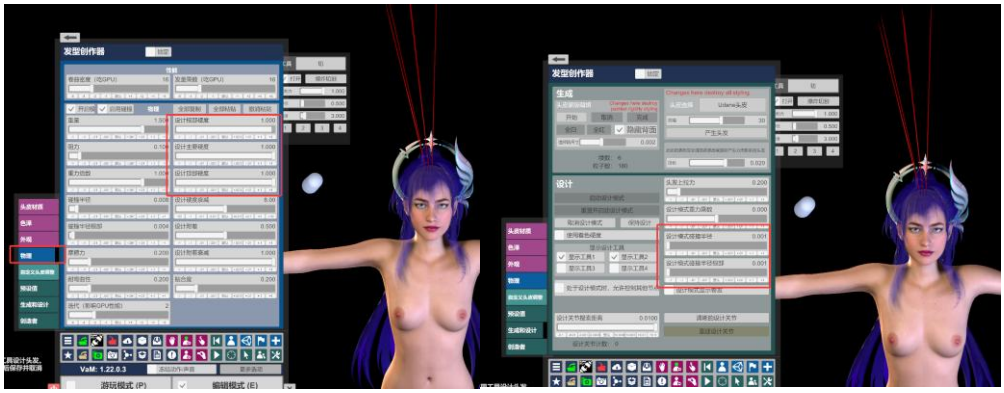
4-9

Modify the hair length ratio to 0.7. Leave room for further adjustments later.



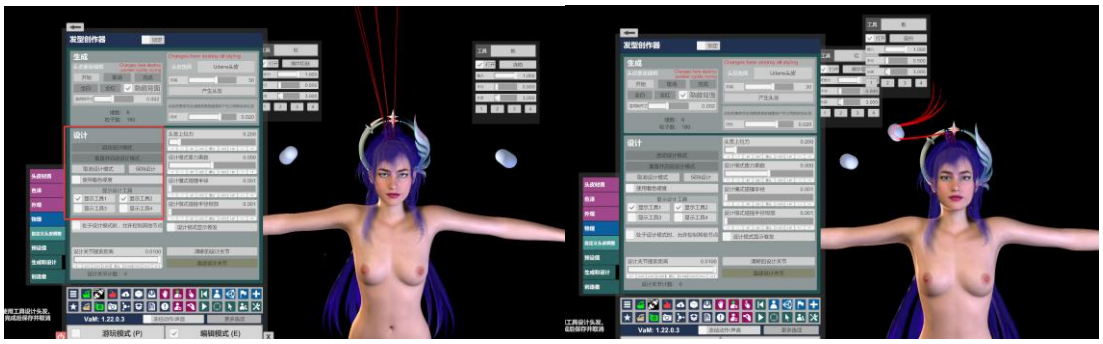
4-10

Next, adjust the hair settings. To keep the hair in place during the production process, I will set the collision to the lowest level and the hardness to the highest level.



4-11

Then activate the design mode. You will see several additional brushes appear. Drag and touch to modify the hair, which is similar to using a comb.

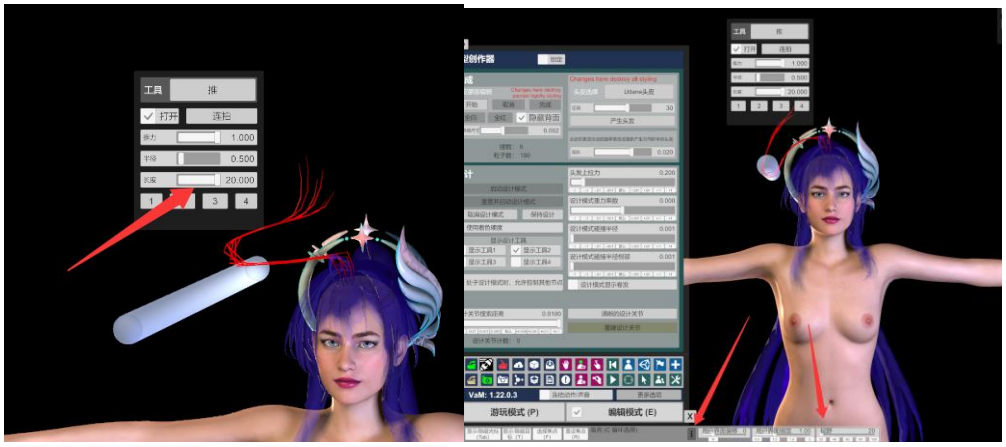


Canceling the design mode allows you to revert to the previous state before the modification. This is your only chance to undo the mistake.

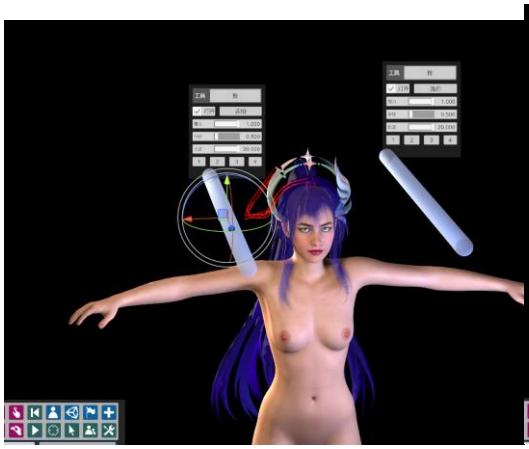
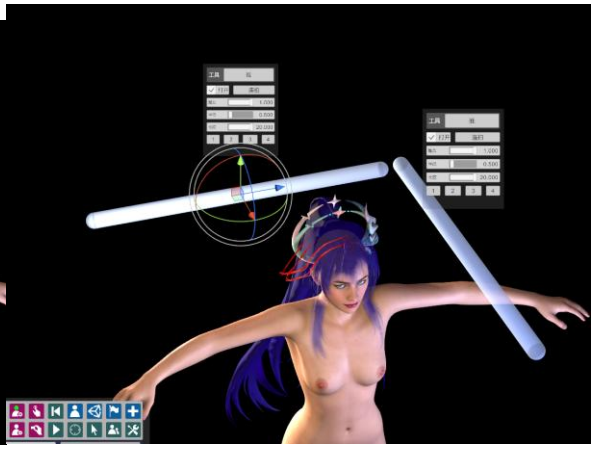
Maintaining the design, on the other hand, is to solidify the modification.



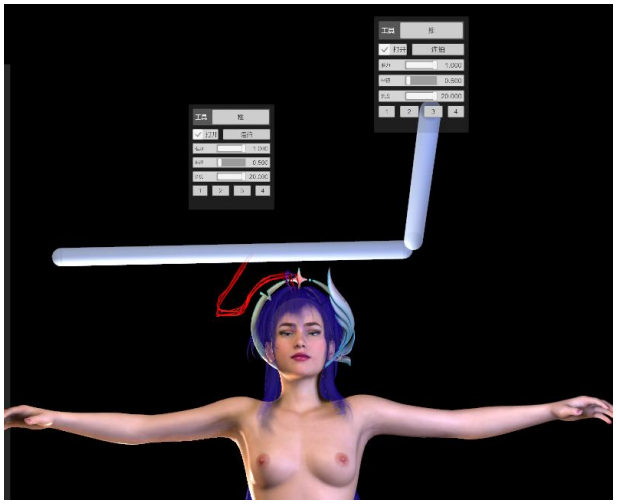
I usually stretch out the comb and adjust the view to the lowest 20 degree setting. This way, I can approach a parallel view to edit the hair.



Press the Tab key twice, then select the comb, and you can enter the coordinate editing mode and perform axial rotation and movement. Thus, we have two combs, one horizontal and one vertical.

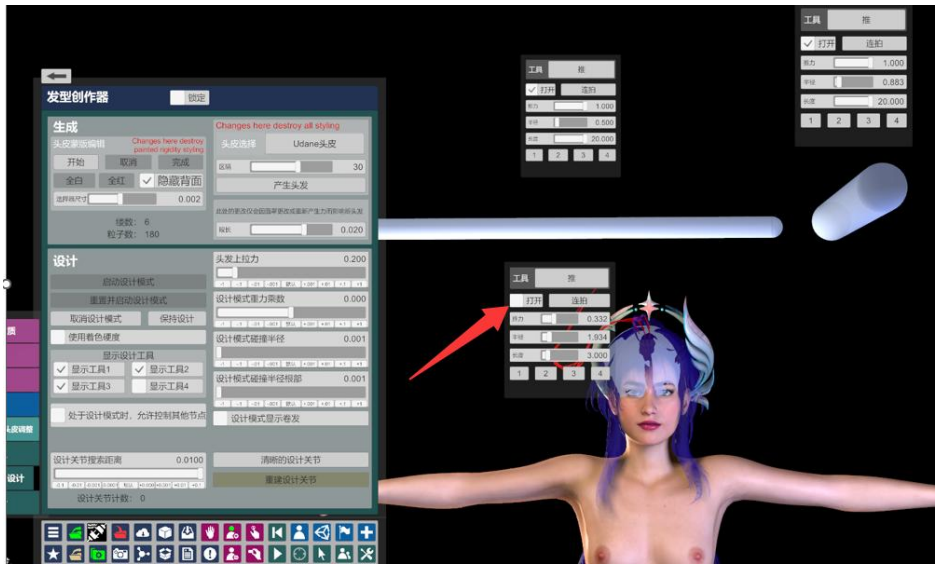
Raise the comb above the person's head to prevent accidental operation.



I like to use the "grabber tool" the most. It's just like adjusting the grid, where the vertices are shifted.



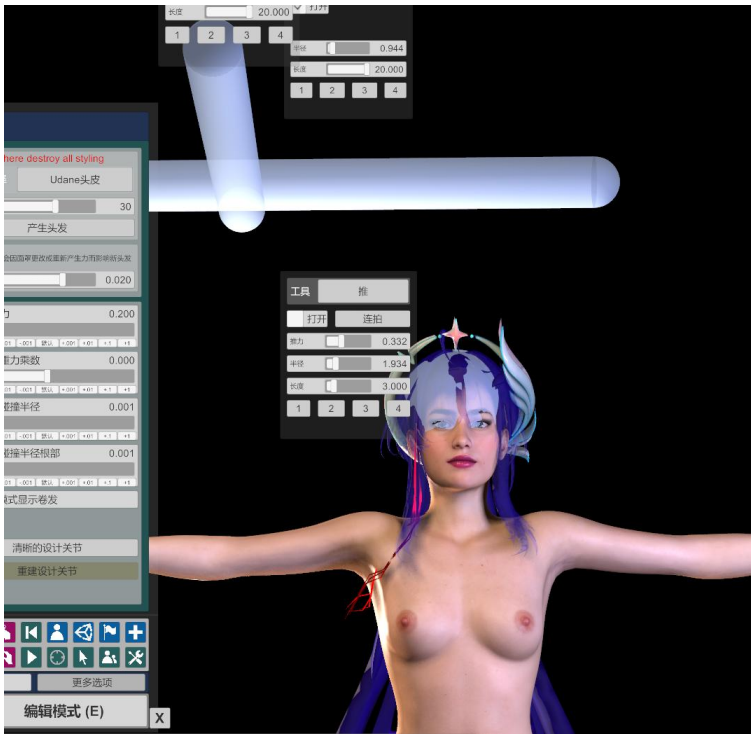
You can add up to four combs. For the third one, we choose the push type.
It is placed on the person's head to match the curvature of the head. You can lift the hair at the back. This needs to be turned off by default. It can be enabled when needed.



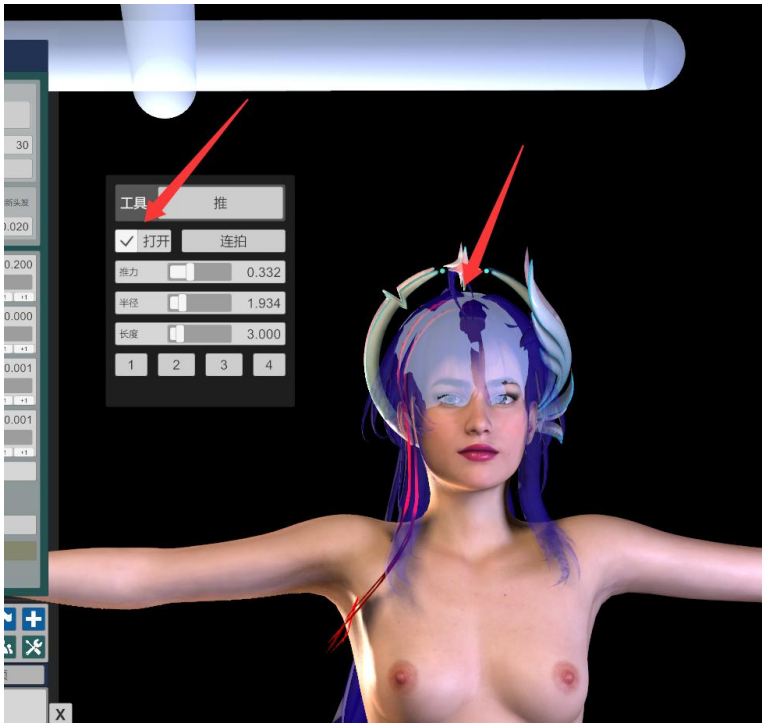
Next, I will explain the hair-making process.
First, create the curvature from the front, and then draw the angle from the side.



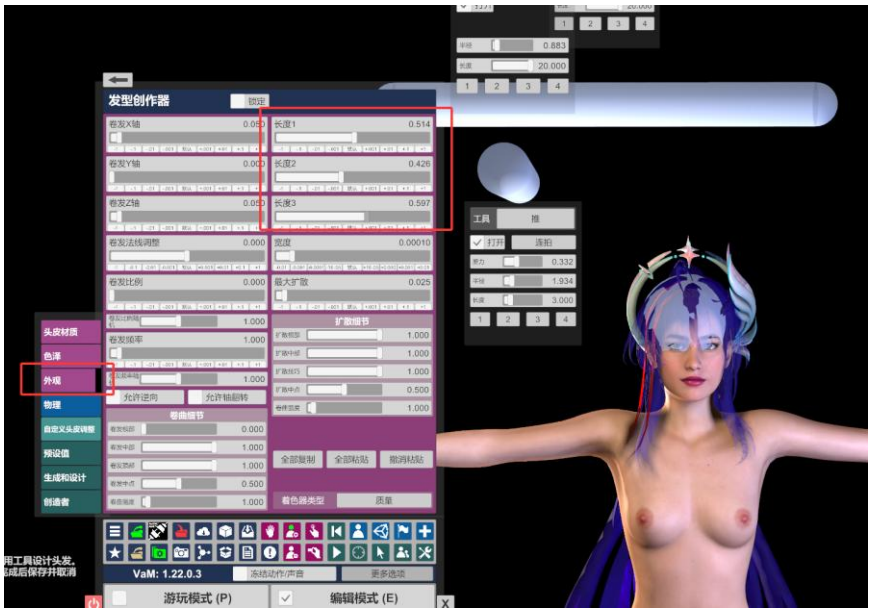
After each use, hold the comb high above your head to avoid any accidental movements. Use the round ball push-pull comb.



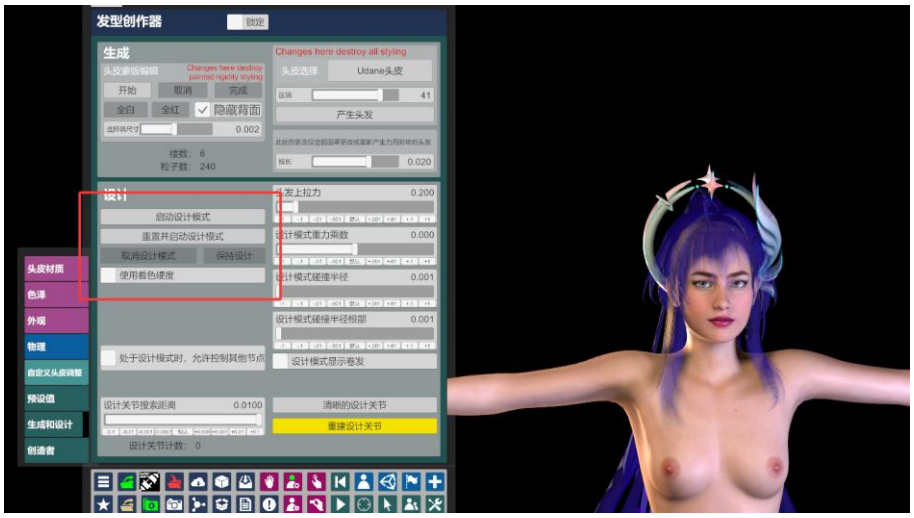
Start the round ball comb, and you can see the hair being lifted up.



Adjust the length of the hair in the interface display and it has been matched with the grid shape.



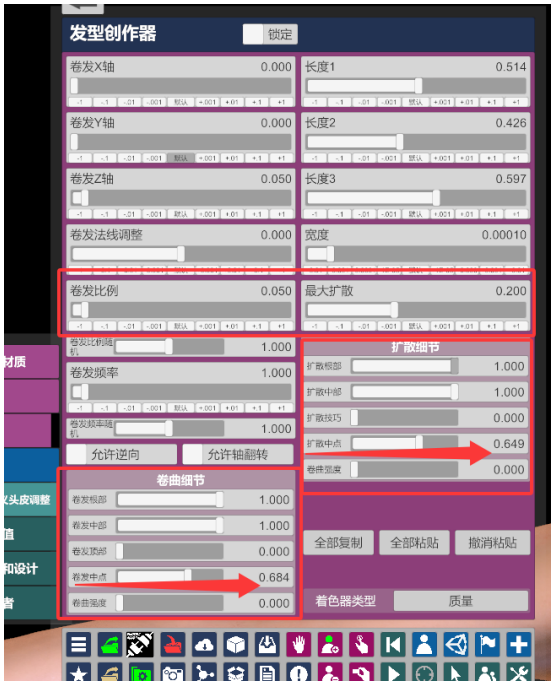
Then keep the settings



The effect is as shown in Video 6.

If you want to have fluffy hair, you need to increase the proportion of curly hair.

The curl and diffusion sliders can be operated as follows: only adjust the midpoint option, and keep the others as they are.
The curl ratio is 0.05, the maximum diffusion is 0.2. I think these are very suitable values. Just do this every time you style your hair.
For the curl details and diffusion details, the midpoint slider gradually increases from left to right. You need to gradually check the effect and control the others as they are in my picture.



The center point of diffusion is the node that controls the dispersion of each cluster of hair. Pulling to the right will extend it to the hair tips.

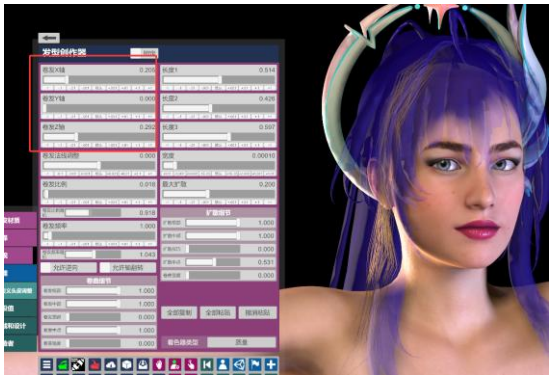
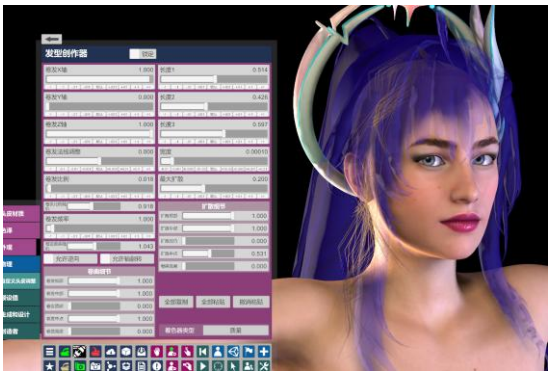




The curling center point is where the curling process begins. Pulling to the right will extend the curl all the way to the tip of the hair.




Each of these axial adjustments determines the direction of the curl stretch. For example, if you want exaggerated wavy curls, this setting will be applied.

The curl frequency refers to the frequency of curling the hair. If you need multiple large waves, just increase the setting.

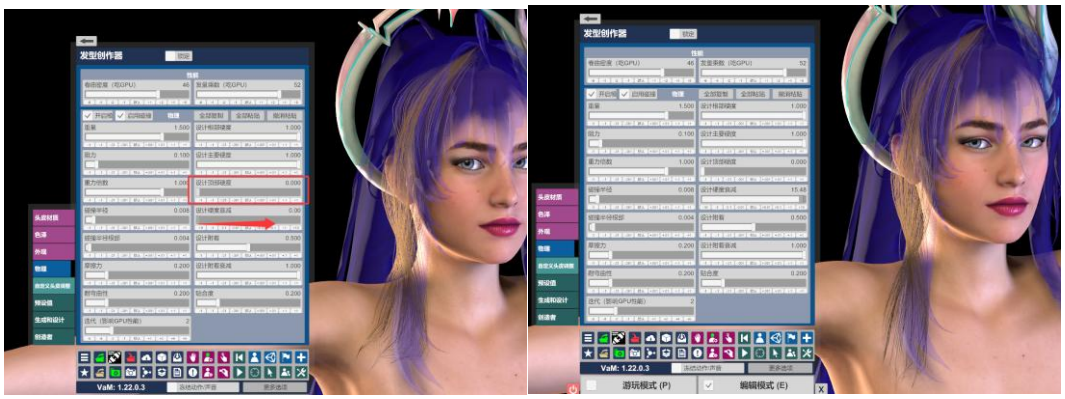
The random frequency slider is used to rotate your curls. When the curl direction is not what you want, turning it will often yield good results.



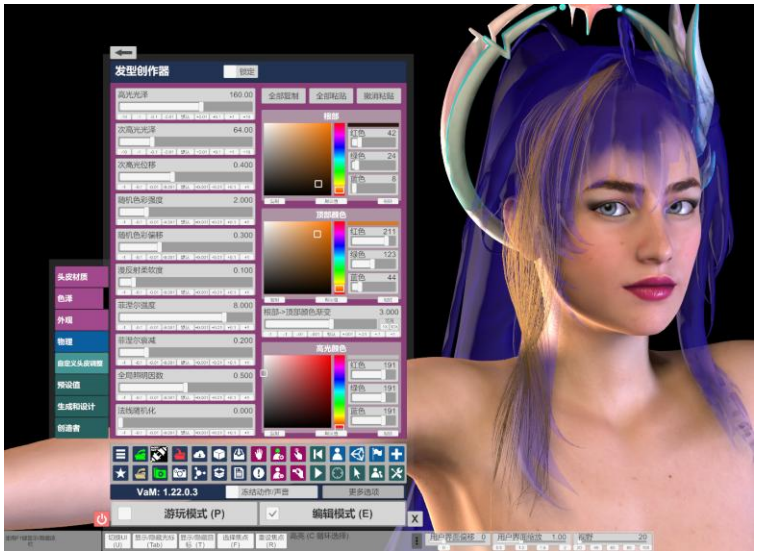
If the hair is too sparse and has too many spikes, we can adjust the number of hair vertices in the physical interface. Increasing this will make the hair denser and more visually appealing, but it will also affect performance.




After the hairstyle was finalized, we applied the soft physical effect on the hair, setting the top hardness to 0 and adjusting the attenuation value. The aim was to make the parts further away from the hair roots become soft.



Then, the hair color is changed. Generally, the roots are darker, the tips are brighter, and the highlights are lighter in color.

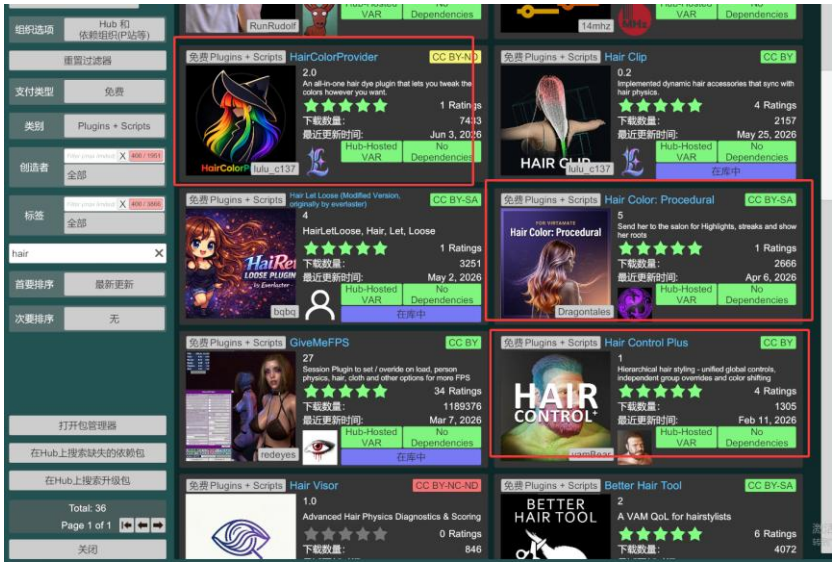


If you want lighter or darker hair, you can adjust the sliders below.





We can change the color of individual hairs first, or we can use the plugin to make the changes after all the hair has been processed. There are many plugins on Hub that allow for batch hair color modification.



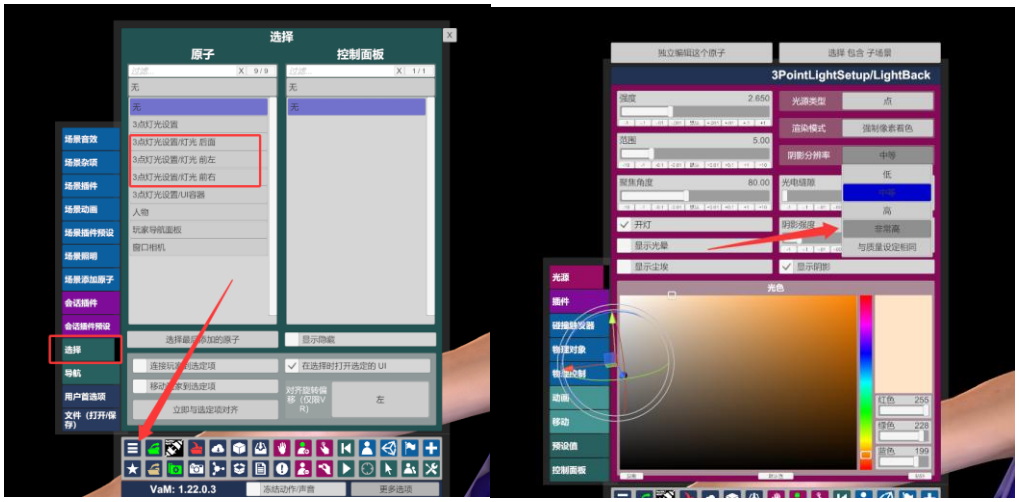
The same process can be applied to other hair as well.

Additional note: If the hair shows this ugly jagged appearance, there are three solutions:

1. Increase the hair density
2. Enhance the light intensity
3. Adjust the shadow quality



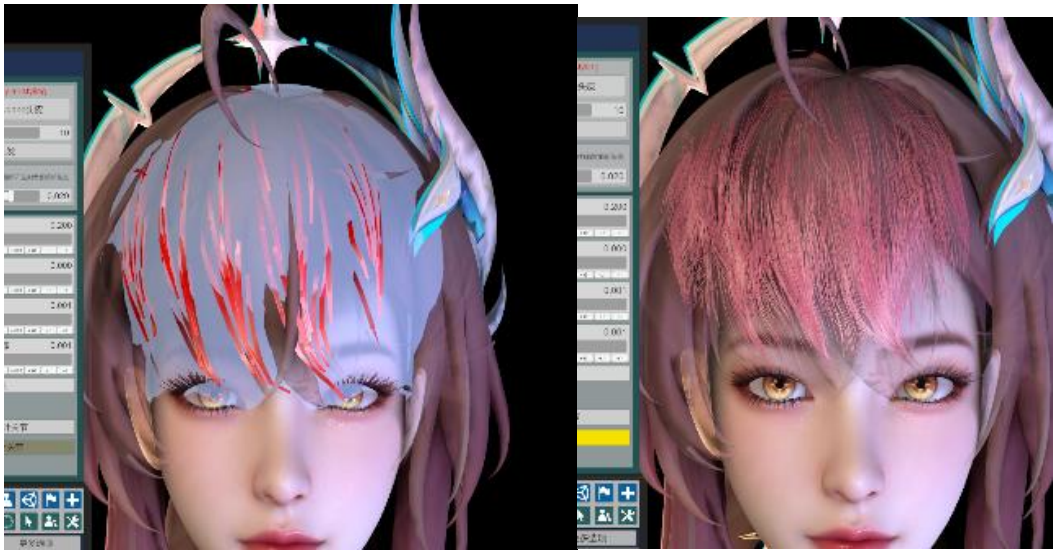
Enter the lighting control interface. Here, you can adjust the light intensity and the quality of shadows.



In VAM, hair is a resource-intensive component. A complex hair model can consume more than half of the computer's frames during runtime. To save resources in the hair department, the following two points should be noted:

1. Avoid creating too many hairstyles (that is, the number of hairs in the hairstyle editor). Although it may reduce the effect, it significantly improves performance.

As shown in the picture below, if multiple strands of hair are created for the same hairstyle. When diffusion is enabled, the hair roots will undergo uniform movement, and the hair tips will also be affected. This causes some misalignment between the hair and the actual red guide line. The impact is more noticeable on the short hair section.



Long hair, however, doesn't show much difference, so it is recommended to use combing tools to distinguish the hair strands in the long section.
Creating a split effect in the same hair strand using a combing tool requires a great deal of patience.



2 The curvature of each strand of hair and the total number of hairs should not be too high. For short hair, a number around 20 usually provides a good result.



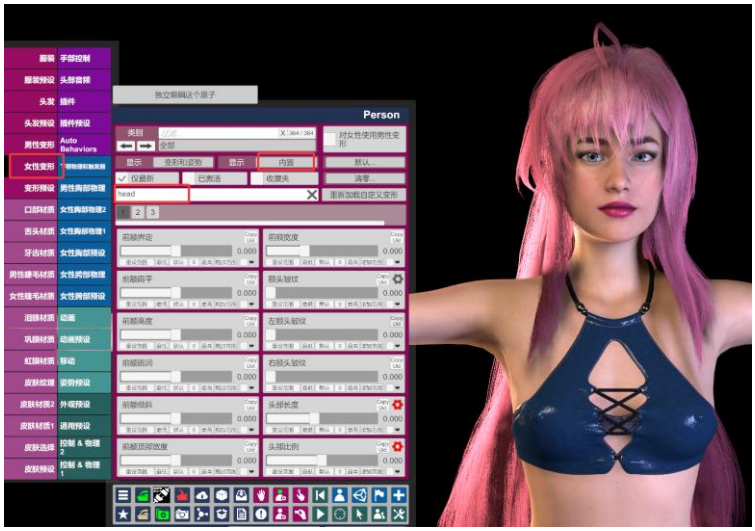
After going through many hardships, we finished getting our hair done.



Then proceed to handle the deformation and the skin parts.

4-12

Entering the female transformation section, you can see numerous built-in transformations.



Because I need to keep my body still and only adjust the upper part of my body, search for "head". First, reset all the deformations to zero, and then make the adjustments.



4-13

Multiple transformation combinations can be used to adjust the facial features of the character.

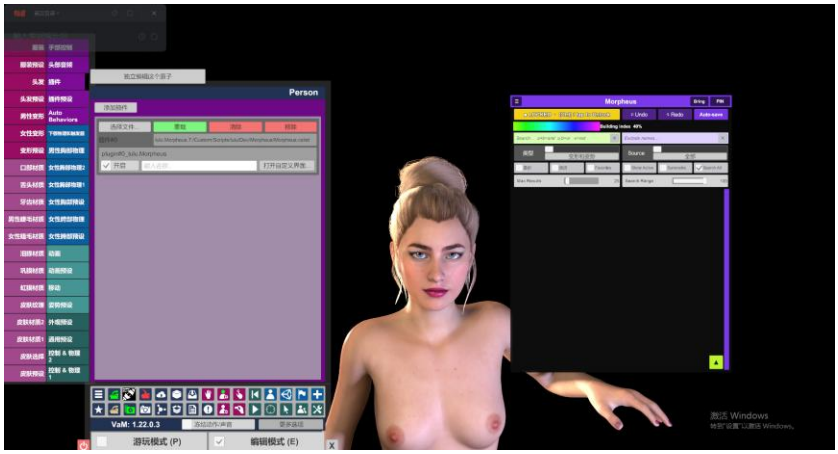
Or, pre-made transformations by others can be used for mixing and matching (if the original author does not allow it, issues may arise after publication).

The characters in VAM use the G2 template from DAZ (a character model specification). Therefore, the character mesh can be sculpted using 3D modeling software and then loaded into DAZ to create character transformations, and the transformations can be loaded into VAM for use.

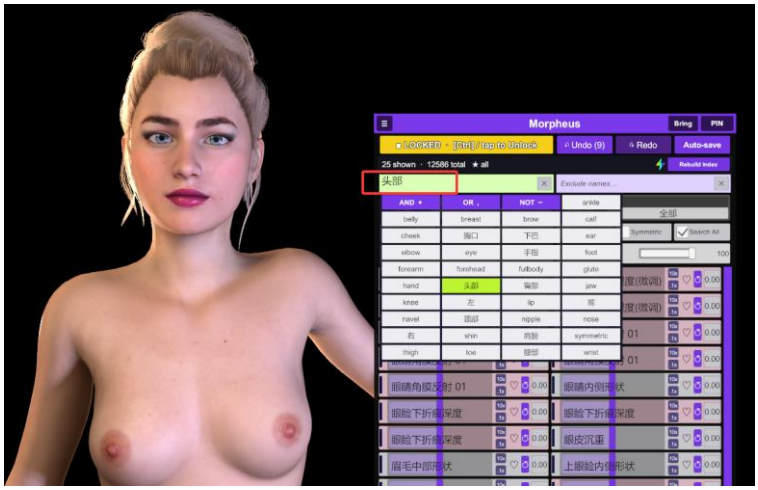


If you make the adjustment in VAM, I suggest using the Lulu_c137 plugin.
https://hub.virtamate.com/resources/morpheus.67547/

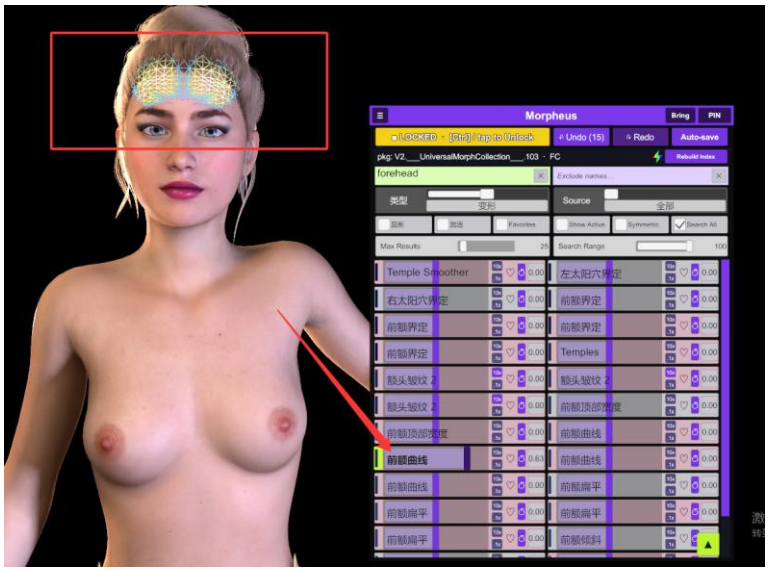
As a character plugin is loaded, then wait for the mesh to be fully read.



You can select specific parts of the character, and the plugin will display the corresponding transformation.



The slider adjustment plugin will display the corresponding grid modifications, which is very convenient.

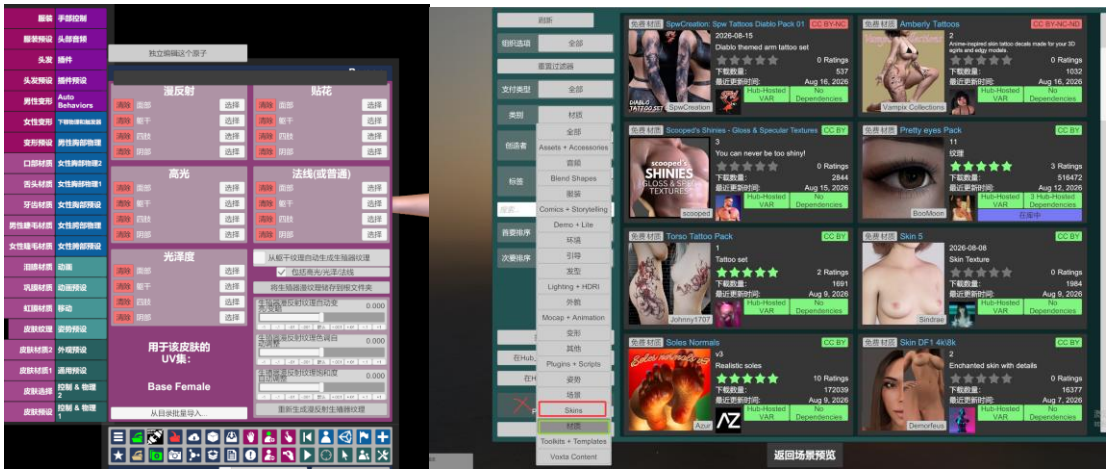


4-14

This is the modification of the skin texture

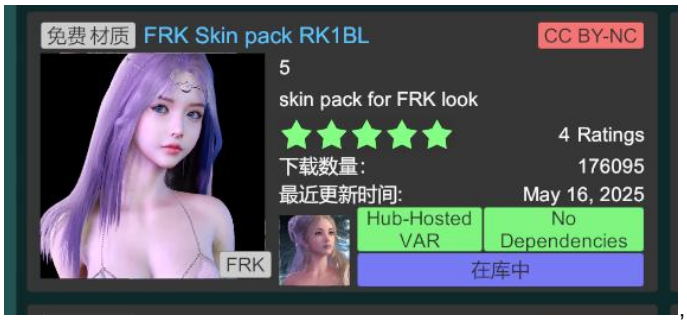


It can be seen that there are many presets, but the effects are not very good.
I suggest searching for skin textures on the hub community and selecting the nice ones to download and use. The type of search should be "Textures" instead of "Skin". There are a lot of free textures available for download on the community, but be careful about the license of the works. Not all textures are allowed to be re-distributed.



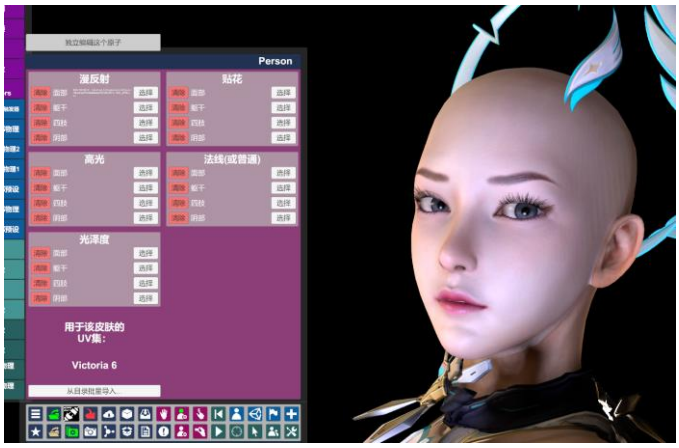
Once again, please be sure to pay attention to the copyright issues!!! Be extremely careful about other paid works by VAM authors or textures downloaded from other platforms such as Daz Mall. If they are detected during the review process or if they are successfully reported, the account will be punished or even banned by the VAM community.

The skin texture package I am using here is from FRK.
https://hub.virtamate.com/resources/frk-skin-pack-rk1bl.52127/

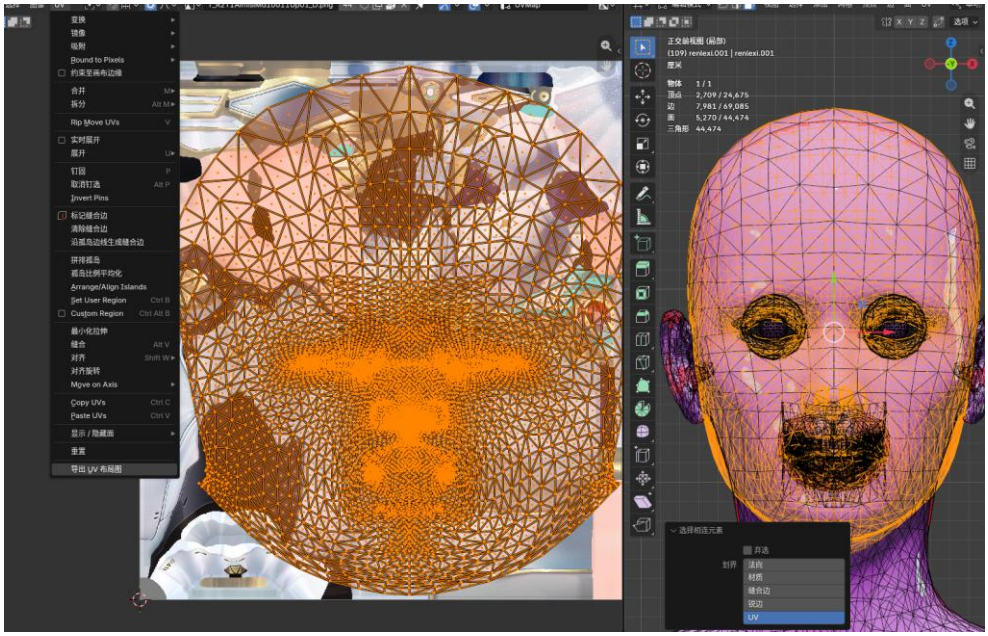


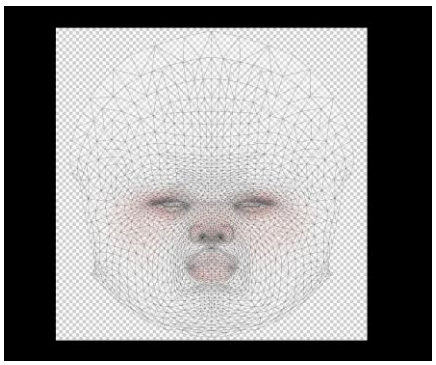
,

Note: The CC BY-NC in the upper right corner means that this license allows you to distribute, remix, modify and expand based on the original work for non-commercial purposes. Your new work must be non-commercial, and credit the original work, but you do not have to license your derivative works under the same terms.



Then I applied red eye makeup and lipstick colors to the characters. I exported the UV layout image of the g2 basic character from Blender, then entered Photoshop for drawing. Finally, I viewed the effect in VAM.

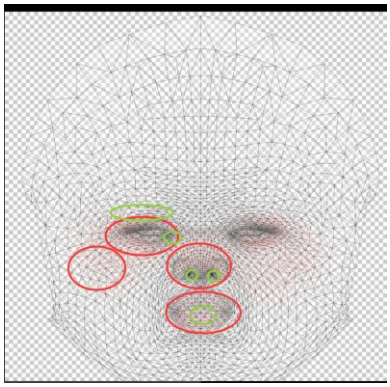
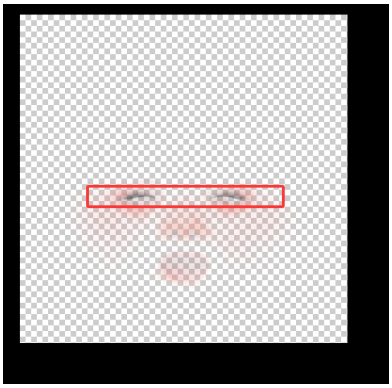






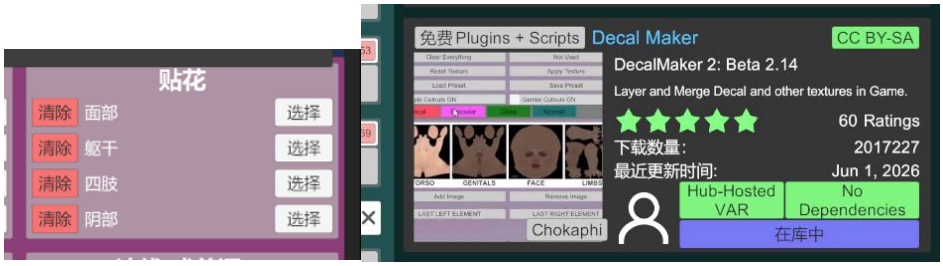
Mainly draw a circle around the edges of the eyes (avoiding the eyebrows and the middle of the nose), a circle around the edges of the nose (avoiding the middle of the nostrils), and a circle around the outer side of the mouth (the middle part can be slightly reduced). Some of the cheeks can be appropriately added a little, but I still hope to retain the white skin tone as

much as possible.
As shown in the picture, the face makeup within the green circle needs to be erased. Just apply it on the outer layer of the skin.
I like to add a faint black texture at the eyebrows to enhance the contrast.

This process often requires repeated adjustments to achieve the final attractive facial patterns. The decals, as the overlay layer, need to retain the transparent background and export as a png file with a transparent channel.

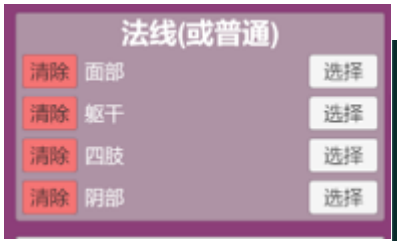
The decal function can also add sticker effects to the character's skin. Here, only one texture can be uploaded. If multiple stickers are needed, they need to be mixed and superimposed in PS. Or use the Decal Maker plugin, which is a plugin from Chokaphid.
https://hub.virtamate.com/resources/decal-maker.196/overview-panel

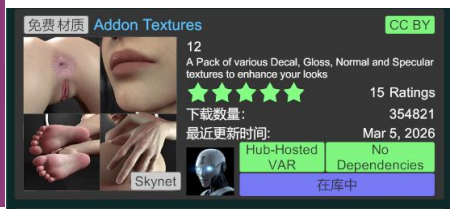


The stickers that can cover your entire face are shown below. This is a screenshot of the demonstration video.



The normal part of the skin can use the texture package of Skynet, which contains a large number of normal maps, adding detailed concave and convex effects to your character's skin.

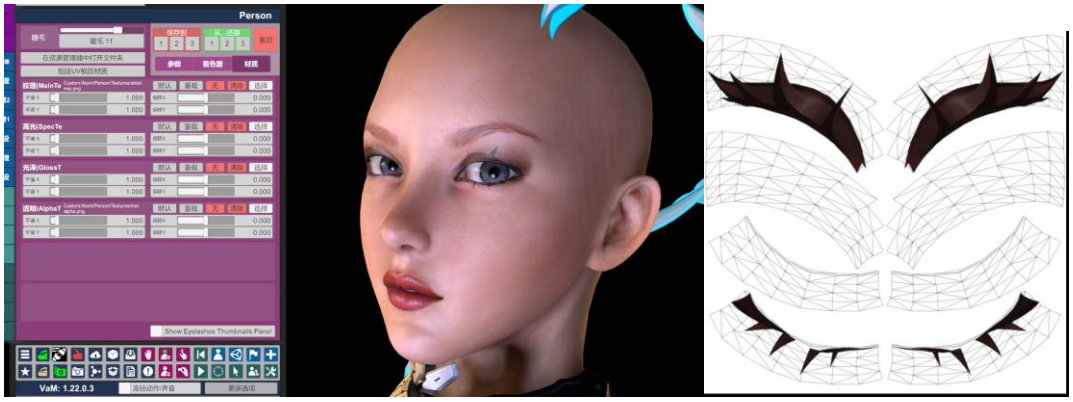


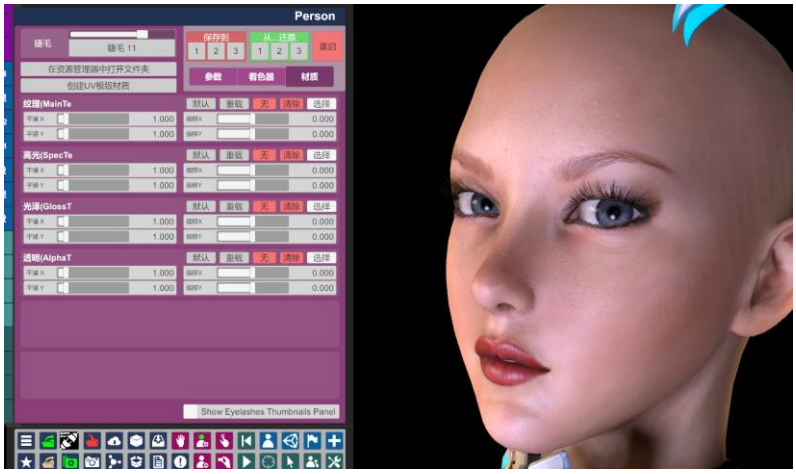


4-15

The eyebrows are the same. The eyebrows that come with Vam are already sufficient for me. If there are any additional needs, you can download free and licensed eyebrow resources from the Hub community.

You can also search for eyebrow photos or anime textures online, align them with the UV mesh template, and use the deformation tool to make adjustments.

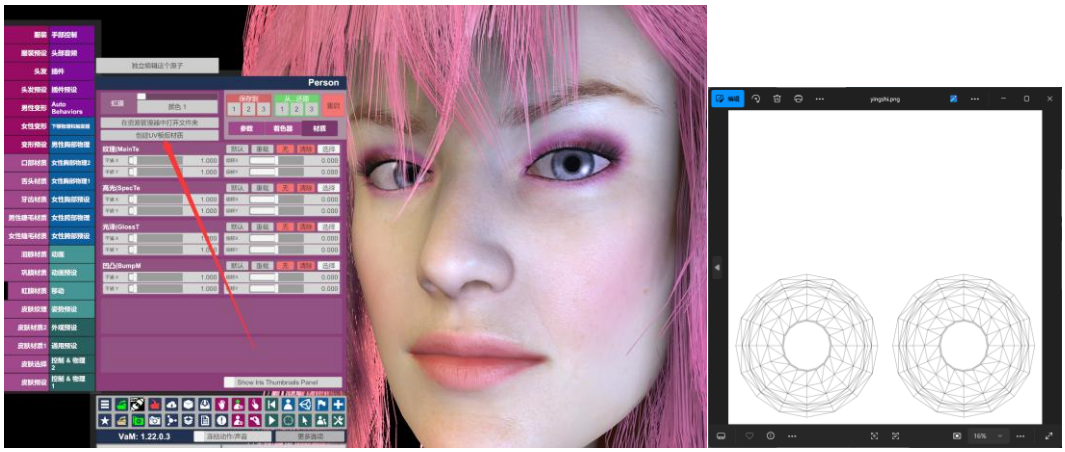




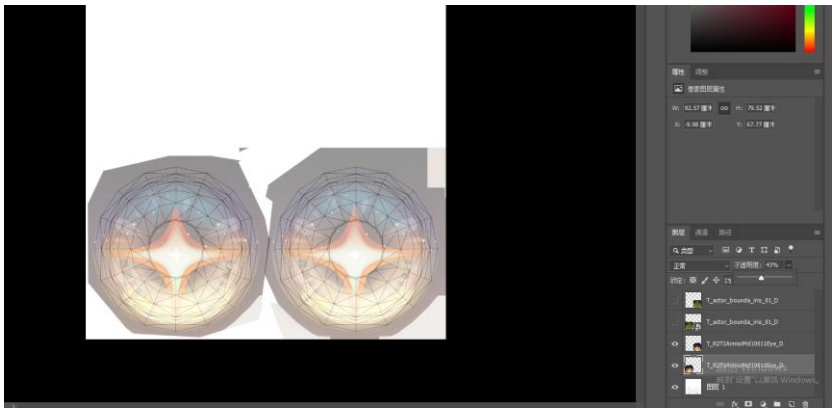
4-16

Then comes the eyes. The main part that is mainly adjusted is the eyeball.

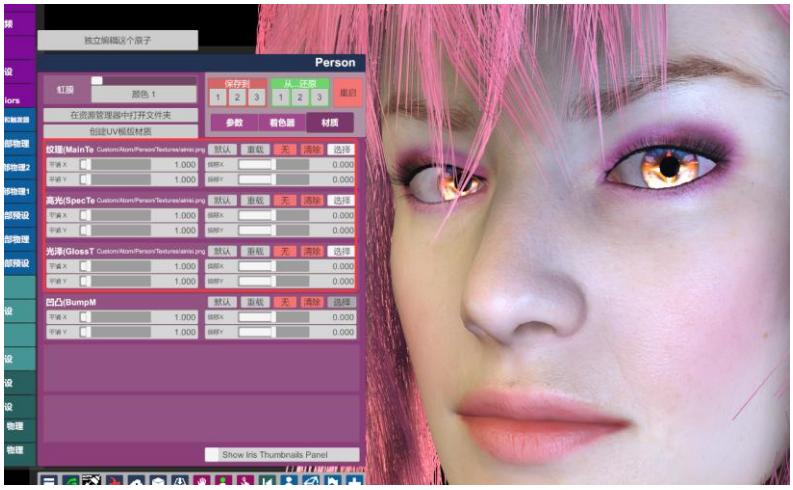
The Mmd model has the material for the eyeball. So I need to add it in and generate a texture template to match the position of the eyeball.



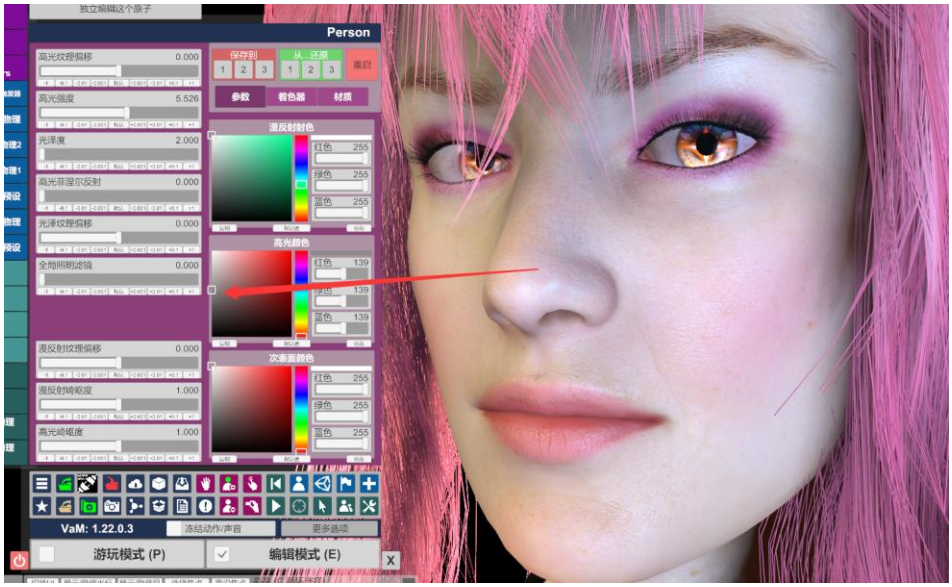
Then we aligned the positions in Photoshop and placed the eyes on the template. We first reduced the transparency, adjusted the positions, and then added it back.



Just apply the eye texture, and there's no need to add the normal map.



The highlight color should be slightly reduced, and there is no need for overly intense reflection.



At this point, we have completed the explanation of the entire character process.
It can be seen that the entire process is not easy. Just writing this guide has already exhausted me.

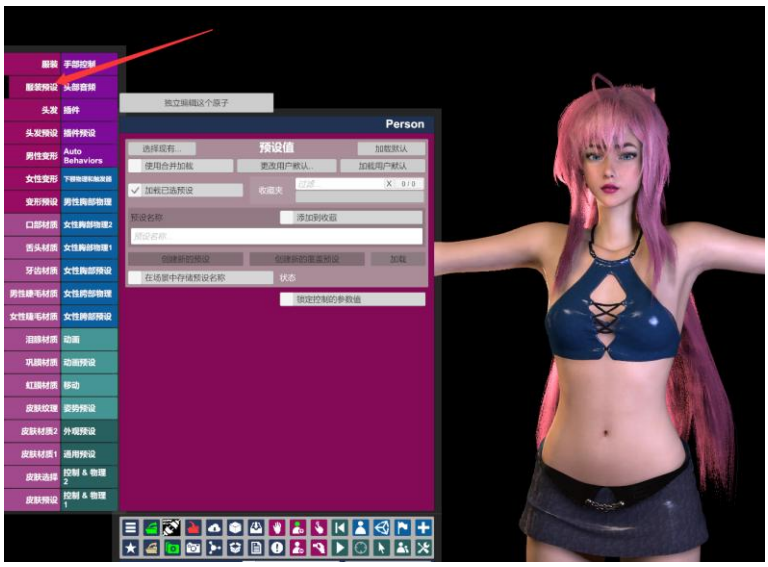
Some excellent works are the result of careful effort, even if it's just about re-creating characters. The process involved is so torturous that only those who have watched the tutorial can understand it.

Part 5: Saving and Publishing Works

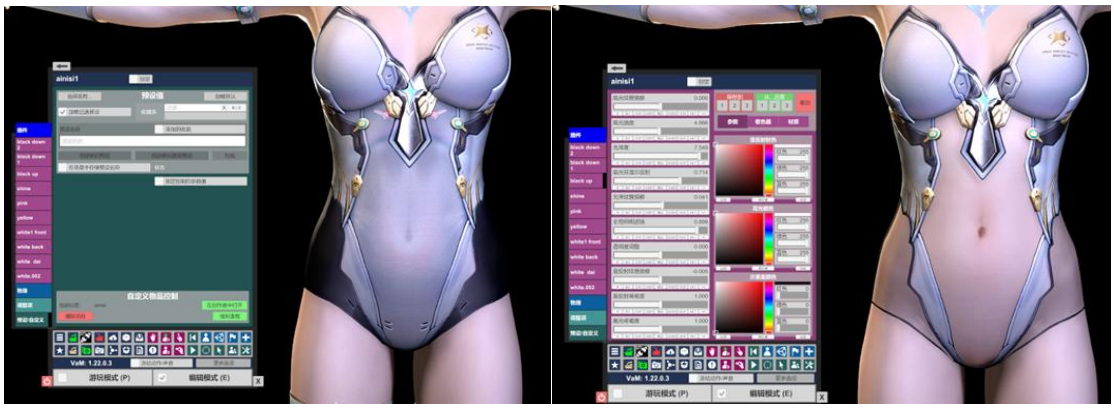
Part 5

5-1
Here are several saving functions I use when creating works:

1: Save Presets:
Saving the clothing presets will record the current clothes your character is wearing and the corresponding information. It will not modify the saved model files in the creator.

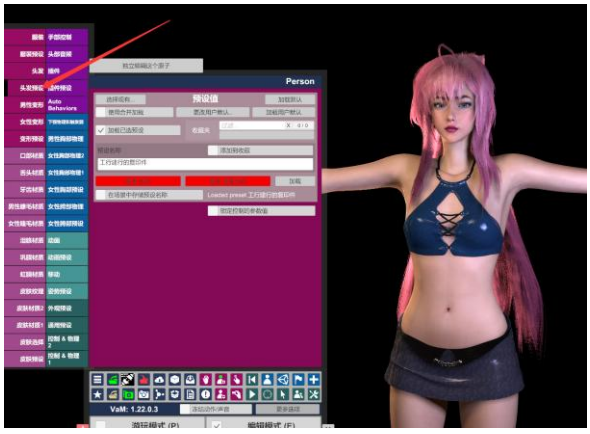


For example, if you modify the transparency of a certain part of the material in a piece of clothing, you don't need to save it as a new clothing file. Instead, you only need to save a preset. When you need it again in the future, you can simply load it from the preset.

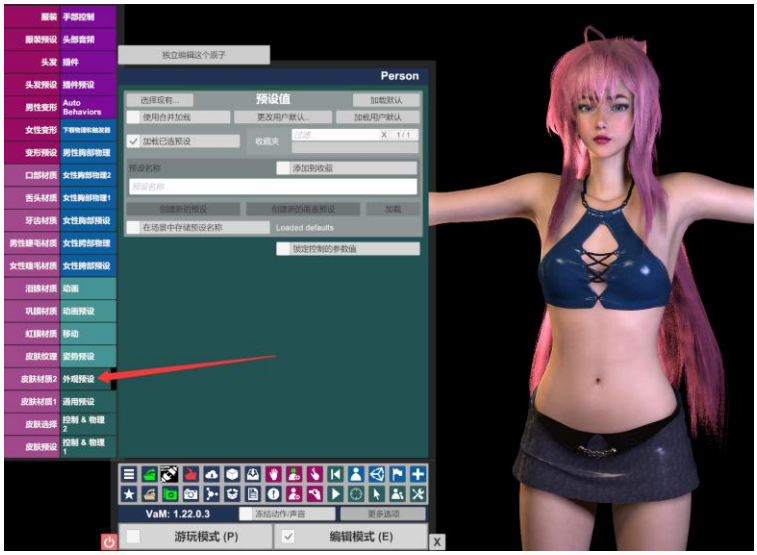


2: Hair Presets

You can modify the hair length, color, scalp color, etc. after saving, without having to modify the hair file.



3: If saved as an appearance preset, VAM will record all the information of your current character except for the movements, including transformations, clothing, skin texture, eye texture, etc. And it will load these information when the preset is called. :

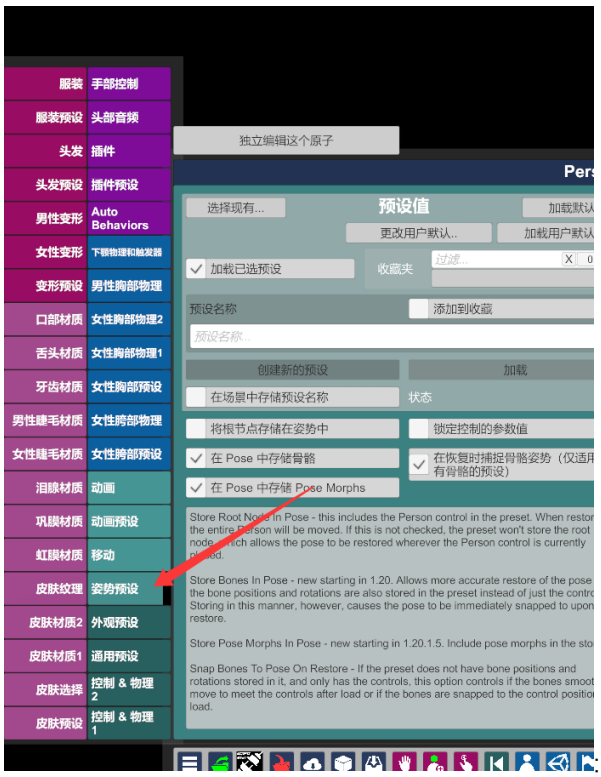


4: Plugin presets. The currently loaded character plugins and their cached data (such as clothing specifications in the lighting plugin, brightness adjustments, etc.) will be cached. When loading the preset, it will be directly recognized.



5: Pose Presets

It can save the current character's posture, including finger movements, expressions, and so on.



6: If saved as a scene file, it will record all the changes in the current scene, including all the characters' information, lighting, plugins, and even the storyline progress within the scene.

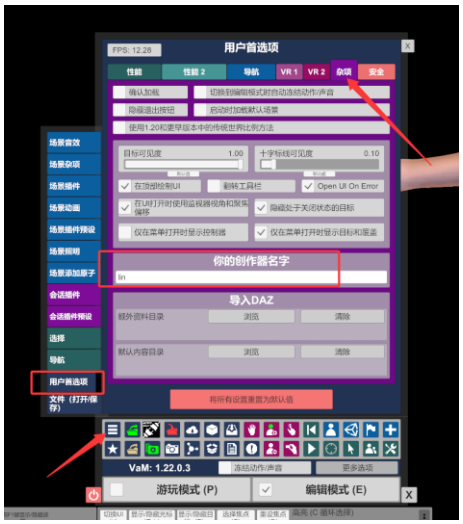


5-2

Model Packaging

Package the scenes you want to publish (including characters and clothes) into a scene file, and then you can publish it on the hub.

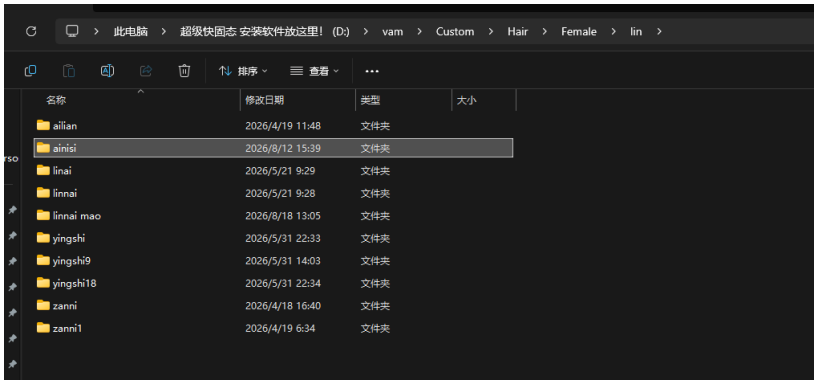
First, specify a creator's name. During the packaging process, this name will be included as well, so that everyone can know who created it.



Then, go to the packaging manager and specify a package name



Add the files you want to package. If it's a packaging scenario, select "Add Directory" and choose the entire folder. For example, my directory



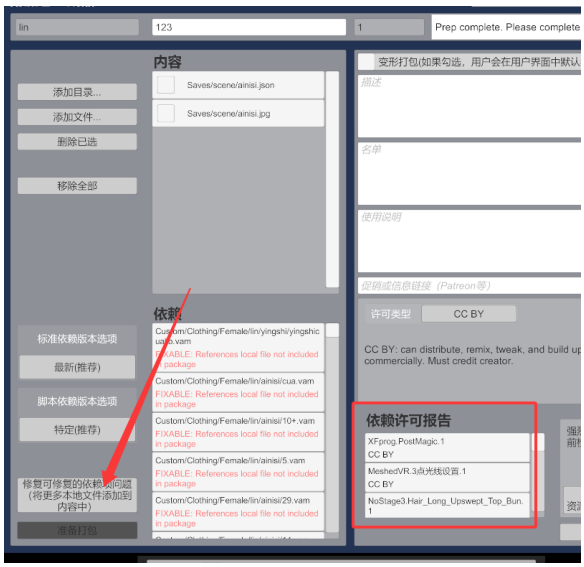
If it's packaging clothing or plugins, select "Package Files" and find your clothing or plugin files.



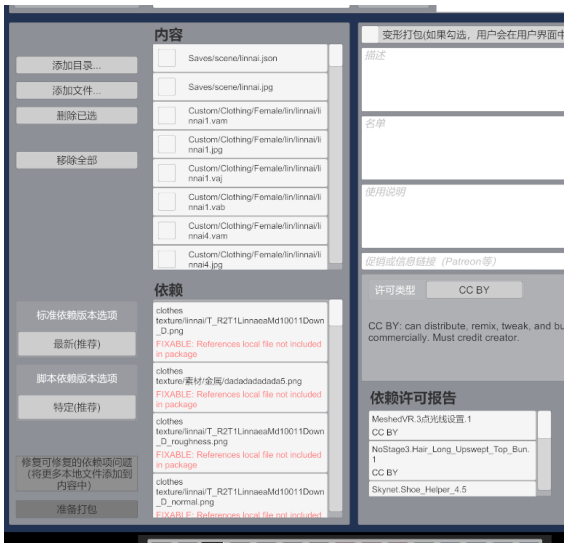
After selecting the files, click on "Start Packing"



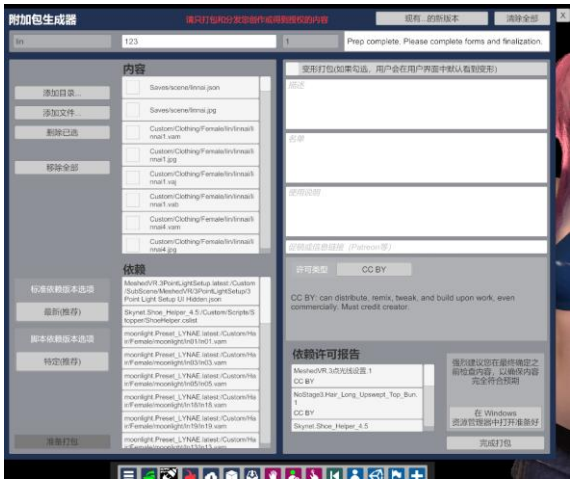
Pay attention to whether the dependencies circled on the right have any red error messages. If so, it might be the resources you referenced, and the author does not allow their re-release. If there are no dependency error messages, click on the "Fix Dependencies" option on the left.



It can be seen that the plugin has been fixed, but the textures still need to be repaired. Please click the "Repair" button again.

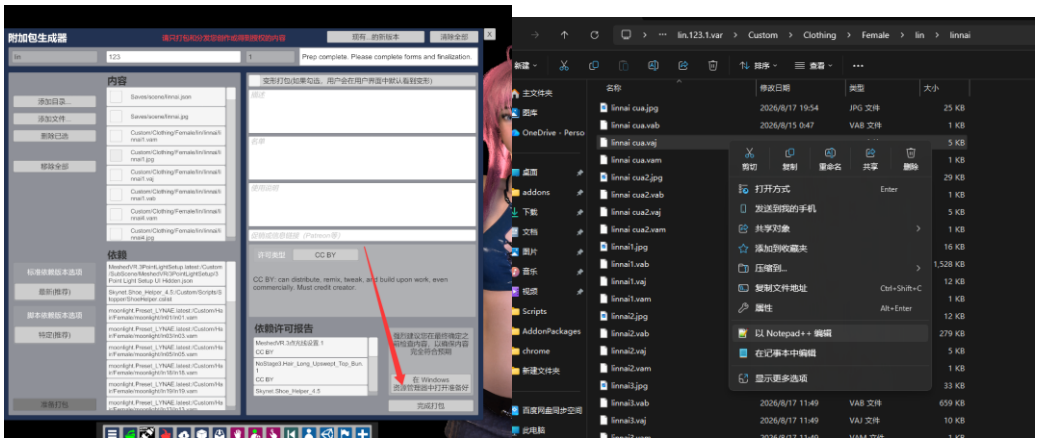


If there are no red marks, it means the packaging is completed.



Next, save the plugin.
You can also refer to this complete tutorial here.
https://hub.virtamate.com/resources/clothing-plugins.37636/

Thank you for the guide provided by Stopper.
Locate the folder for packaging preparation, and find the saved clothing vaj file



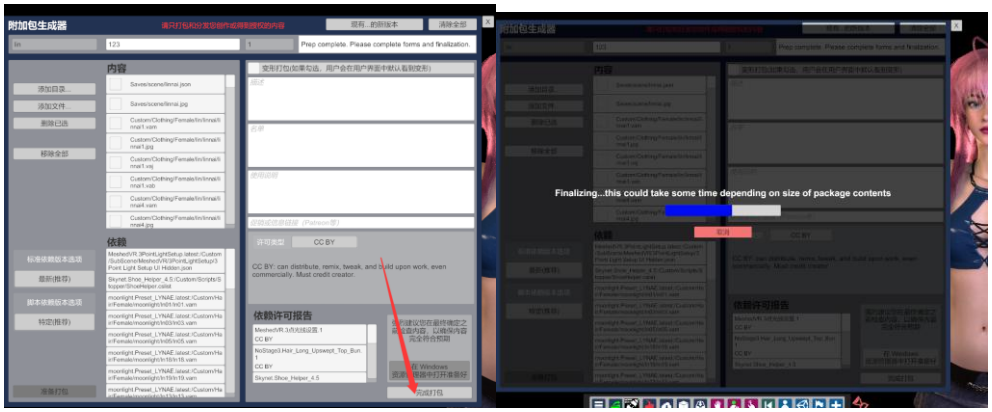
After opening, you can see that the clothing ID has been modified. It needs to be manually changed back. Just copy it from below and paste it on.



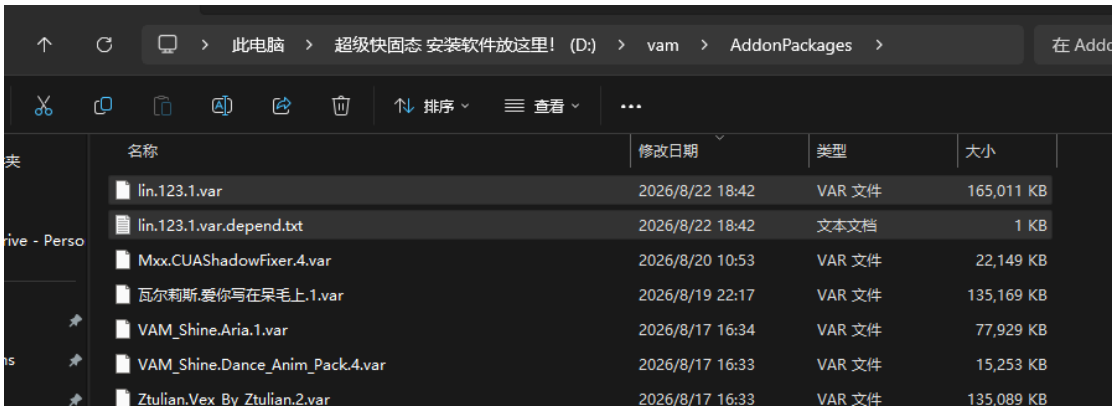
```
{
   "components" : [
      {
         "type" : "DAZMesh"
      },
      {
         "type" : "DAZSkinWrap"
      },
      {
         "type" : "DAZSkinWrapMaterialOptions"
      },
      {
         "type" : "MVRPluginManager"
      }
   ],
   "storables" : [
      {
         "id" : "SELF:/Custom/Clothing/Female/lin/linnai/linnai cua.vam",
         "plugins" : {
            "plugin#0" : "Stopper.ClothingPluginManager.7:/Custom/Scripts/Stopper/
         }
      },
      {
         "id" : "lin:linnai cuaWrapControl",
         "wrapToSmoothedVerts" : "false",
         "surfaceOffset" : "0.0003",
         "additionalThicknessMultiplier" : "0.001",
         "smoothIterations" : "1"
      },
```

```
      },
      {
         "type" : "DAZSkinWrapMaterialOptions"
      },
      {
         "type" : "MVRPluginManager"
      }
   ],
   "storables" : [
      {
         "id" : "lin:linnai cua",
         "plugins" : {
            "plugin#0" : "Stopper.ClothingPluginManager.7:/Custom/Scripts/S
         }
      },
      {
         "id" : "lin:linnai cuaWrapControl",
         "wrapToSmoothedVerts" : "false",
         "surfaceOffset" : "0.0003",
         "additionalThicknessMultiplier" : "0.001",
         "smoothIterations" : "1"
      },
```

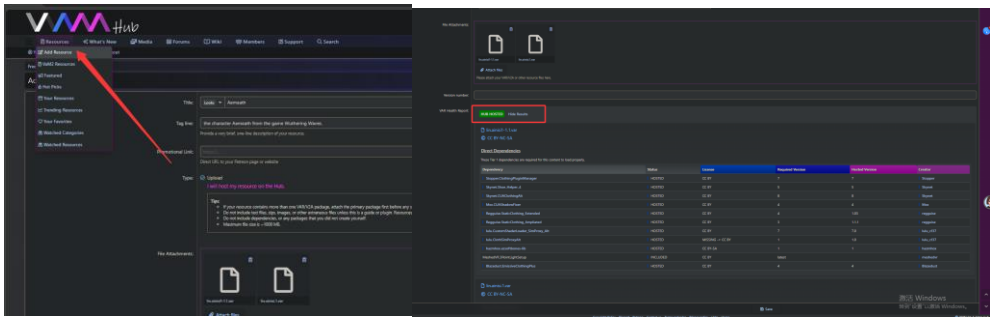
For all the clothes, I made this modification. I did it for about a dozen pieces. It was still quite troublesome to do it one by one. Then I returned to the VAM point to complete the packaging and wait for the loading.



After the packaging is completed, you will find that the root directory of VAM has the packaged "var" file.



You can also post it on the hub.



After uploading the var package, make sure to check if all the dependencies are available on the hub. Otherwise, after the upload, the file will show that not all the dependencies are on the hub.





Because by default, the search results in Hub show - all resources are hosted on the Hub. Others need to manually change the settings to display your resources. This will significantly reduce the number of views and downloads.



The compilation of this guide took a lot of time, during which many pitfalls were encountered and a lot was learned. As a sharing of the process and difficulties in creating VAM characters, I hope it will be helpful to everyone. You can see that the entire production process is very long. If you want to achieve a good effect, you need to repeatedly adjust and try. Once again, I salute everyone who spends time improving their own works. If there are any shortcomings, please point them out. I will continue to improve.

Thank you to all the people in the VAM community who provided help, whether it was providing production ideas, the guide, or plugins, all of which have become an indispensable part of my character creation process.

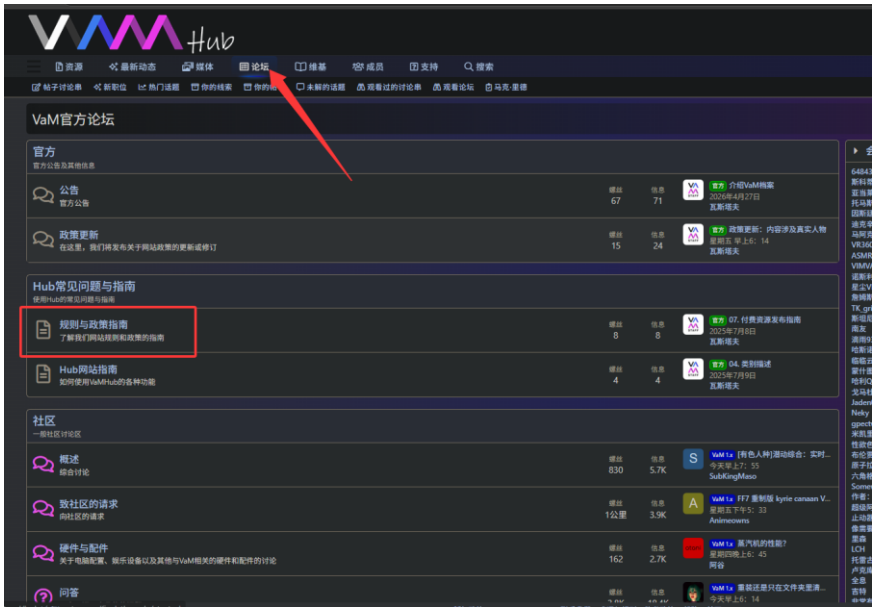
I also thank the careful review of the VAM community. I specifically checked and eliminated all possible areas that might cause infringement to avoid misunderstandings.

Addendum:

Many people, like me, learn VAM features through online videos, which often means the learning phase easily skips over reading the official VAM guide. However, I believe it's essential to at least review the official guidelines for content submission before starting any creation, to avoid posting violations.

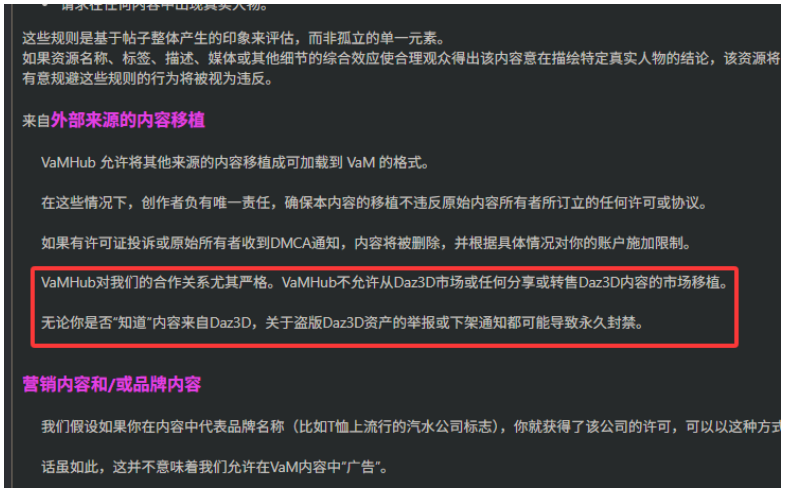
The detailed rules for determining whether a work is in violation are written in the forums section.

I usually don't bother checking the forum content because I never thought there was anything there that could help with my creation—until now.

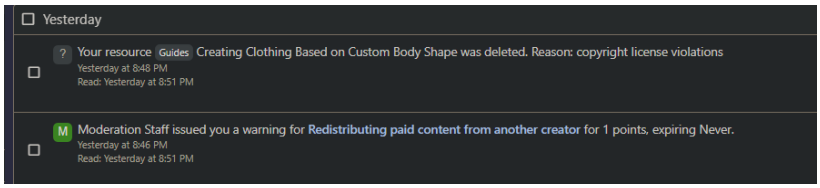


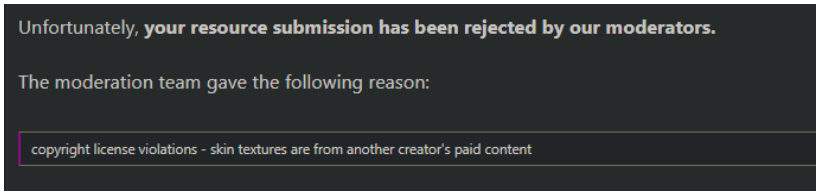


Although many people, including myself, have never accessed the forum section before, it's essential to understand the platform rules in order to successfully post content. The guidelines clearly outline what types of content are considered violations and explain the reasoning behind VAM team's decisions—for example, prohibiting the upload of assets downloaded from the Daz Store.



In fact, when this tutorial was first published, I even wrote: "If suitable textures are not available, consider using character texture assets from the Daz Store (although I myself haven't used them)." This directly led to the resource being deleted by the administrator and me receiving a warning. (It would have been better if I had seen this article earlier.)





At first, I was completely puzzled, but this also forced me to learn about the relevant regulations of the community. In fact, their judgments were all reasonable, and all the reasons were written in the guidelines (I just hadn't read them before). In fact, publishing daz content is actually a very serious infringement violation, which is a irresponsible act towards the community and the works. What I wrote in the guidelines before was even wrong guidance, and simply blocking my account wasn't enough.

I continued to check the other posts of the VAM team, and it was clear that they had made efforts to maintain the healthy development of the community. There are many talented creators in the community who share their techniques and resources to help others, and they are valuable assets of the community. I did not intentionally disrupt the community order, and I am sorry for this. During the entire learning process, many people in the community helped me, and I also hope to contribute to the community.

Once again, I thank the VAM community for their careful review. Being able to find and point out my mistakes means that they have carefully read this 20,000-word, 169-page PDF tutorial. Thank you for your contribution to maintaining the community. I have checked and eliminated all possible areas that might cause infringement to avoid misunderstandings.

