Reflections:

In AIW, I was mainly responsible for the design of garbage monster characters in the project, including character modeling, mapping, rendering, bone binding, bone controller, skin and animation. Of course, not only this, but also completed the preliminary research, project promotion, stage layout, process record and so on with the members.

On the day of the performance, I personally felt that the degree of completion and cooperation of the group was very good. At that time, there was also a sudden situation, everyone basically solved well. For example, I was responsible for projecting the monster in Part 2. But at that time, vibna's projector logo could not be turned off, and there were only three projectors with relatively high picture quality at that time. There's a small spare, but it didn't work well when we tested it earlier. Due to the urgency of time, I gave my projector to vibna and she controlled all the videos in part2. At that time, I had about 7 videos in my laptop. In order to reduce the difficulty of operation, I merged all the videos into one piece. The whole clip of the video was derived from the best effect of the previous test. Because of the tacit understanding before, the whole part2 video blends well. Of course, there were also unexpected surprises with audio. During the second performance, I noticed that when the last garbage of my garbage monster was synthesized, the sound effects had checked the spot at that time. Since the monster video had been integrated into a whole segment, it was impossible to temporarily operate the video content, and only the sound effects could cooperate with the video.

In the study of the whole process, I mastered the transformation of two-dimensional human body knowledge structure into three-dimensional model, and designed the role image. One of the more valuable lessons is that by smoothing out the previously obscure animation controller's control of the model, for example, to turn the character's arm, you can create a circular controller to control the model. I also experienced the charm of animation rhythm. If the character steps forward, the weight of the whole model will shift downward. Some futuristic applications are also considered. For example, after the establishment of the character skeleton controller, it can be imported into the video it shot, and AI algorithm can be used to replace the characters in the real scene. Last but not least, I also learned and understood live performance videos, which was cool.

In the early stage of the project determination, we did spend a lot of time to conceive and determine the topic. It is also a pity that because people were not sure whether they could make it or not, and no one insisted on their own ideas, some good ideas were forgotten, or they were overturned because they were trying to integrate other people's ideas, which I think is worth reflecting on. This is an inevitable situation in the group. In order to consider the group, we compromised ourselves with a lot of difficult and creative ideas. If we have group work later, we may need more adventurous spirit and courage to undertake the subject proposed by ourselves.

Topic pre-collection preparation:

real garbage scene shooting：

According to the topic, the literature related to environmental pollution was consulted, and some conceptual maps were synthesized by AI.

After group discussion, I was mainly responsible for the appearance and animation of the garbage monster in the theme. At the beginning, I also tried the concept synthesis of AI technology, but the effect was not ideal. AI still could not accurately express the effect of the garbage monster produced by the pile of garbage. , and can only generate pictures and cannot perform model modification animations. So in the end, I can only choose the most original way, from designing character images, modeling, textures, rendering, bone binding, adjusting weights to final animation production.



Trash Monster is officially produced:
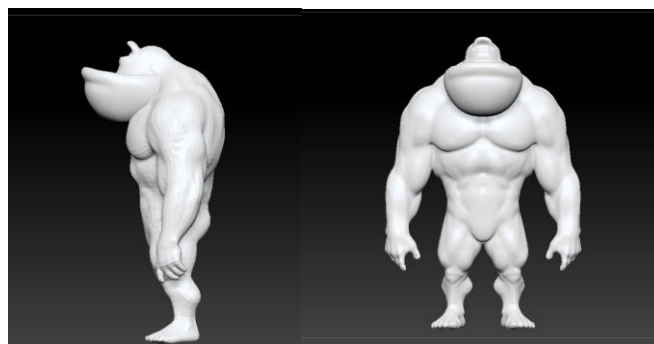
Because monster characters are not in conventional forms, such as some mechanical models. So I prefer to use Zbrush instead of maya for modelling. Although I have some experience in avatar modelling and can grasp the

shape of the model, the model built in the early stage looks very weak and weak. The feeling of garbage piled out. So I went to watch some videos of human body modelling, as well as learning about body sculpture. I found that there is a very key point between this and my early learning of sketching, which is the learning of human bones and muscles. If the muscles or bones are in the wrong position, the garbage monster will look powerless. At the beginning, I didn't pile up the garbage, because I was afraid that the garbage pile would be very bloated again. So first determine the basic character core. The learning of skeletal muscles includes shaping. It took me nearly three weeks to refer to "Bridgman: Sketching of human body structure". Many skeletal muscles will be drawn according to this book, such as calves. The soleus muscle on the muscle can be highlighted, and some muscles can not be drawn.

Brush making in garbage form:
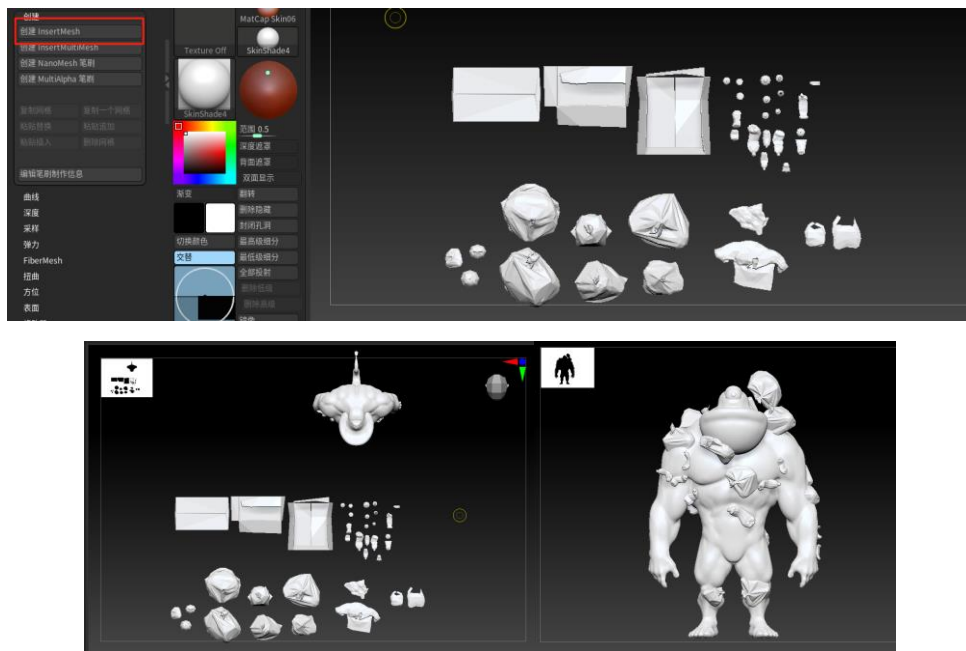
Since the garbage monster is composed of hundreds of pieces of garbage, it would take a lot of time to model each piece of garbage one by one, so I first sculpted about 30 pieces of garbage in ZBrush, And make it into a brush, so that the model can be selected and drawn directly on the surface of the garbage monster. This will also solve the problem of texture. The same model appears in the same scene and only occupies the position of one texture, which will reduce post-texturing and rendering times.
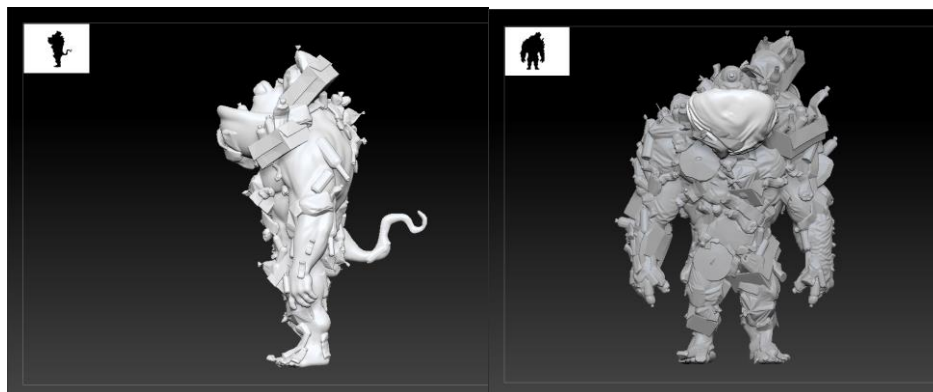
When stacking garbage monsters, another problem that needs to be considered is that if they are all made up of small garbage, it will not be able to perfectly display the character image designed at the beginning, so in the

later modification, reduce the muscle at the key position The appearance of small garbage was replaced by large garbage bags. Unfortunately, this ingenuity also left a hidden danger for subsequent animations.

Texture production:
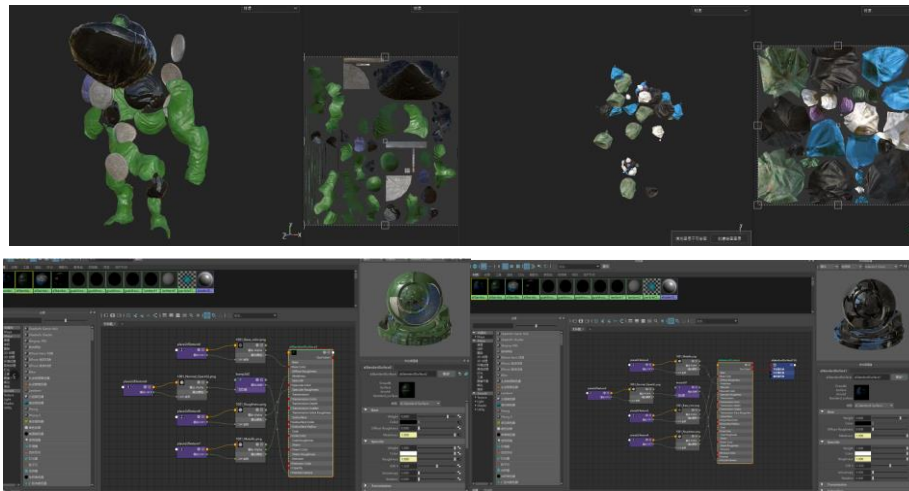
Textures are mainly made in Photoshop and substance painter. Like some small plastic bottles, I will go to the Internet to find some high-definition scanned floor plans as references, then draw and stitch them in PS, and then import them into SP for texture drawing and production. Coarseness, reflection and other related textures, the main parts of the monster are directly in the SP to make 6 related textures for different materials. Similarly, in order to save the production of post-rendering nodes, all small garbage textures are drawn on the same UV surface.

Early animation attempts:

At the beginning, there was no related production of complex animations, because the post-production effects were not good, and debugging was carried out. So first I tried to make some special effects directly in the renderer through some small changes to the garbage model. In fact, the picture effect of this wind is still good, but it is not up to the standard of animation. So in the later stage, in order not to waste the production of the model and to maximize the display of the model, the learning of bone binding and skinning was carried out.
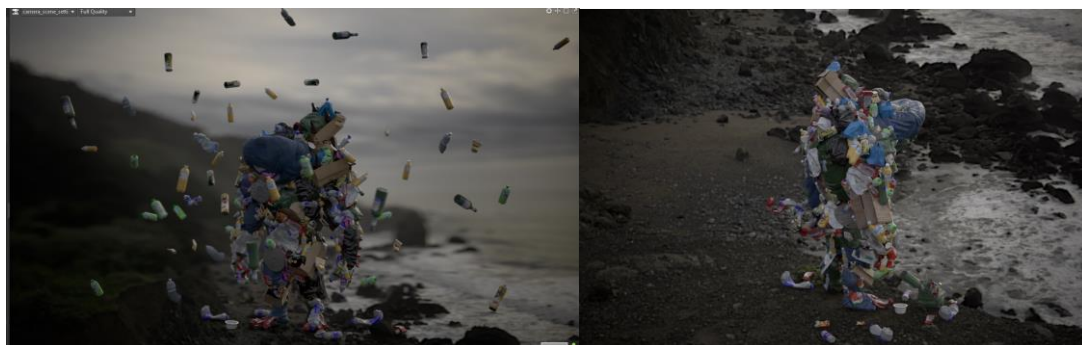
Particle effects to try::

Before skeletal binding, considering that the model is not a single model, it is necessary to control hundreds of small garbage, which may cause a very large time consumption, so at the beginning, I considered converting to particle effects to complete the animation. But it is still a problem with the model. The number of faces is too large. When imported into the particle editor, it cannot be rendered and keeps crashing. I also tried to solve this problem by retopology to reduce the number of faces of the model, but this is not a single model, so retopology into one model is not practical. So I had to give up the newly downloaded and learned particle effects and had to go back to Maya to make them. It is one of the few software that can carry this model.

Bone binding and controllers:
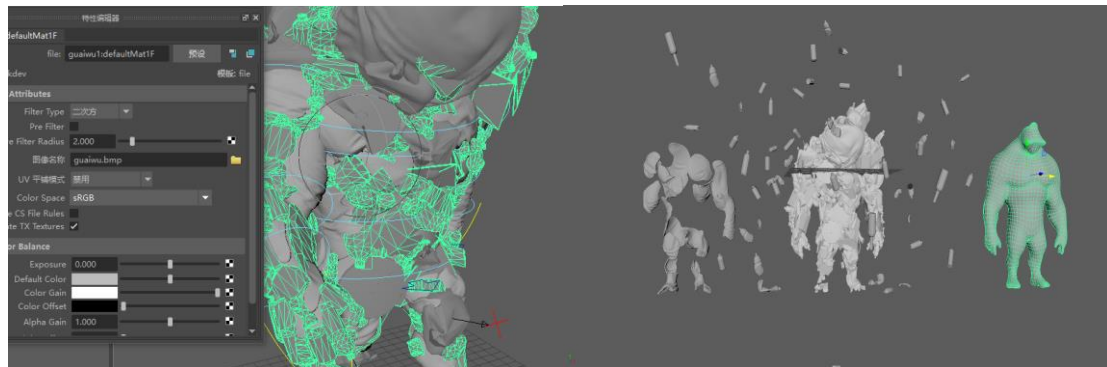
First add an overall character skeleton in the Human IK panel, and then continuously adjust and add joints and positions suitable for the monster according to the shape of the monster. At the same time, when creating a hand bone, you need to consider that the hand bone is divided into four fingers, and the finger joints between the fingers also determine the angle at which this bone needs to be rotated, so when creating bones and binding bones, Try not to modify its rotation, but the position information is ok. In the creation of fingers, the replacement of the monster's bone connection will always be slightly curved, so when we adjust it, we should try to avoid violating the first rule. When making the skin, the skin details that are automatically brushed up are often not good, and the weight of the monster needs to be adjusted additionally.
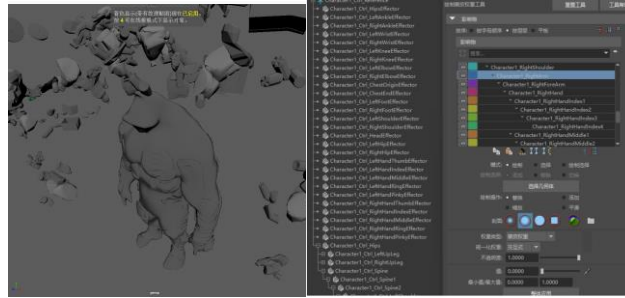
When I was learning to control the skeleton of the monster, I learned about inverse dynamics and forward dynamics in 3D animation. Forward kinematics is very desirable for creating detailed circular motions, as it requires a direct setup of each joint rotation of the Junk Monster. Inverse kinematics is very desirable for creating direct target motion because it only needs to set the final joint in the joint chain to reach the position and the direction of motion. When positioning the joint chain, each joint is rotated individually. For example, in order for a chain of joints to reach a specific position in space, each joint in the key chain must be rotated individually. To do this, the parent joint of the joint chain is rotated first, then the next joint, and so on down the joint chain. Among them, I often make mistakes about the parent-child joints, but this can be done through repeated tests to understand whether the position of the joint is at the position of the parent or the position of the child, so this part of the expression may not be clear. When animating bones using forward kinematics, Maya adds joint rotations starting at the root joint, then the root joint's children, and down the bone hierarchy.
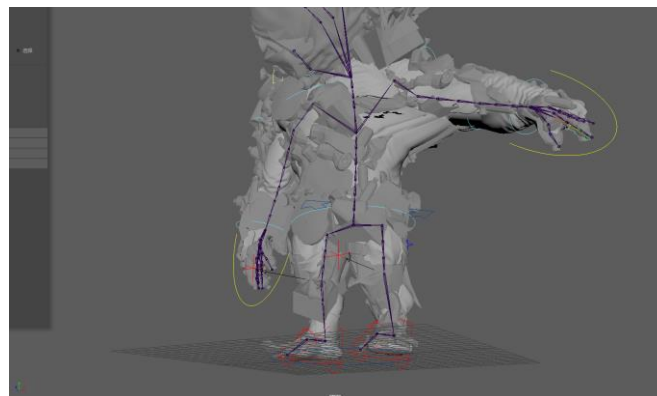
Due to the complexity of the monster model, to ensure smooth joint movement when animating curves, multiple joints were created close to each other (using short bones). Especially in the creation of the monster's foot bones, this is a very complicated system for me. I need to observe the position of the human body's foothold, and then create the controller for the feet. For example, when lifting the foot bones upwards, When walking forward or backward, the feet move back and forth alternately, and the pelvis is always located in the center of the two feet in the front-back direction, which is often easy to control mistakes. When creating the control joint of the left foot, for the convenience of operation, I first select the RightFoot joint and press Ctrl+h on the keyboard to hide it. Enter the Side view, select the main menu Animation>Skeleton>Joint Tool>Option to open the setting window, click Reset Tool to restore the default settings.
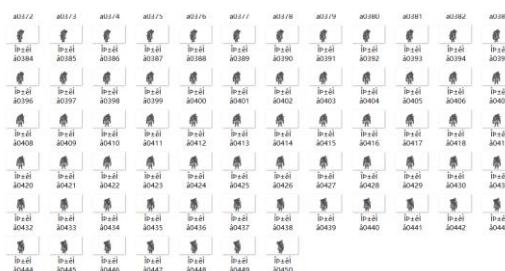
In the rendering animation, since a transparent layer is required to match the video, only a frame-by-frame image can be rendered in tif format when rendering. A few seconds of animation requires about 400 frames, and about 10 or so videos are produced. In line with the final performance, but in the end there was a problem with the projector, so all the videos were synthesized into a whole video. Each frame represents each action shape, which is probably the model position node that needs to be adjusted. Finally, these pictures are imported into PR for synthesis.

Difficulties encountered:

When the controller can control the movement of the bones, the bones and the monster model need to be bound. I tried this part for nearly 2 whole nights, and repeatedly tested a command. Because the model is complicated, I am not sure which command has the problem. Can keep trying. Because the monster model is composed of a lot of garbage, and secondly, when creating the model, it did not consider the subsequent need for animation, so the model is not as standardized as in the video teaching. For example, when making it, there is no standard T pose. Going back to zbrush to modify, I am afraid that some parts will stretch, so I can only try to bind first. If the binding is not successful, I will return to the original point at last. So 2 has repeatedly reported errors throughout the night, which is very tormenting, which makes me almost want to give up. It always appears that the skeleton is animating, and the controller can control the skeleton, but the monster's body does not move. At first I thought it was a problem with the controller settings. I found a simple character model on the Internet and tested it. Finally, I found that the model is actually difficult to skin. At the same time, the model often has stretching problems. In order to avoid this problem, at the same time in the model It needs to set a lot of blocks to describe the volume of the model, such as the position of the chest, to avoid the extrusion of this part.

Innovative attempts of AI technology:
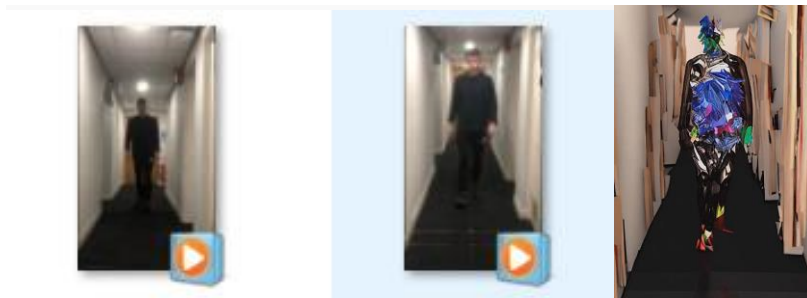
Finally, during the test model movement stage, the walking movements of the group members were filmed in real scene. I used the live video and my model seed to put it into the AI system for simulation, but unfortunately, the garbage monster can indeed appear in the video walking, but it does not restore the level of detail of the monster model. If the AI video can repair or upgrade this function in the future, after the bones are bound, the model seeds can be replaced with the characters shot in real scene. But because the final effect is not as good as the modeled character, after discussion, there is no replacement, otherwise the video can be made for a longer time, and there is no need to adjust the dynamics of the model frame by frame.