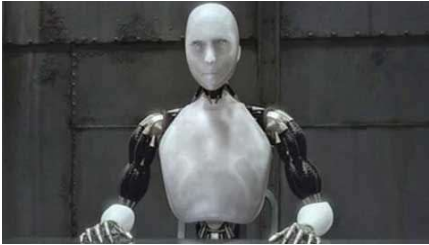


# Character and Set Design – Texturing, Lighting, and Rendering

## Introduction

When planning the final design of my Olympoid character, I decided that I wanted to portray an expensive, futuristic, yet robust look. Inspiration for this aesthetic was a combination of the appearances of the iRobot character, Sonny, and the T-800 from Terminator. The robustness and exposed internal components were taken from the T800, while the futuristic and high-end design was inspired by Sonny. Along with this, inspiration also came as a result of the thought process made as a result of the initial design brief; If a



country is going to be represented by a single robot, then that country will want to show off and give a good impression to the rest of the world. Having materials such as chromed metals, metallic paint, and carbon fibre will give an expensive and futuristic look to the Olympoid. Portraying a robust look will give off the aura that the Olympoid is able to compete in all events without worry of taking critical damage. I hoped to achieve this by having exposed metal pieces, with some of showing signs of wear through scuffing or denting.

For the lighting I wanted to have the character singled out in the scene, to draw all attention to it. I also feel that creating almost a spotlight effect and having a high contrast between the character and the background will highlight and show off metallic sections of the Olympoid due to the high specularity. The inspiration and motivation for a spotlight effect came from the brief, detailing that the final render is for movie promotion. I believe that a shot with said spotlight effect will create a dramatic and engaging promotional shot. With the lighting, I also wish to cast multiple shadows on the flooring below the character, mimicking the shadows cast at sporting events held inside arenas and sports halls.



Due to the lighting of the scene creating a dramatic mood for the shot, I wished to carry this into the final render. My idea for the render was to have: the robot in centre frame, carrying out a jump shot with the shuttlecock just out of frame, and with the camera looking up upon to the Olympoid. As well as adding to the dramatisation, a shot portrayed in this way would be more engaging due to the robot being mid-action, as well as giving powerful connotations to, presumably, the protagonist of the movie being promoted.

I also wished to have foreground elements blurred to give the shot depth, rather than producing a flat image with no perceivable depth especially as most of the scene will be very dark.



## Challenges and Highlights

### Badminton Net, Court, Flooring

To make up the backdrop of the scene, I wanted to model a badminton net to place in the frame. I composed a simple net structure from prefab squares for the stands, and a plane for the net, modelling off real Olympic nets for reference. Given that the stands in real life are painted metal, I tried to mimic this effect by increasing the metalness and roughness factors, while decreasing the specularity to under half. This meant that while there are some close reflections, the surface itself is fairly diffuse. Increasing sheen to 0.3 then gave the final desired look, along with the blue colour used.



Modelling the net on a plane needed to be done in a way so that the net was transparent between the netting threads. Initially, I had planned to use the *Cloth* prefab instead of the

*Grid* prefab, as I would have been able to achieve a much more realistic cloth effect mesh; interweaving threads with a slight wave to them. Whilst this worked in the preview screen, I was still not getting a netting effect in the render view. To achieve this, I looked online and found that I had to set the Transparency Algorithm to Alpha cut inside the render settings. However, due to the gradient colour change of the cloth lines at line intersections, I was unable to get a complete netting at render time. Through experimentation I achieved the desired effect when changing to *Grid*. Adding the *Grid* preset to the colour attribute of the standard shader and increasing the repetition factors to get the correct mesh density gave me the look I desired. I then applied the same *Grid* preset to the opacity node, adjusting the settings to exactly match those I had set in the colour attribute field. Using this method yielded a perfect netting effect. The plastic top of the netting was set to a white colour with specularity substantially reduced. To give it a more 'pure white' effect I slightly increased the emission value of the shader.



After looking into Olympic badminton courts, I observed that: there were banner placards on each side of the court, the flooring surrounding the court had very low specularity often with worn, uneven colouring, and that the court itself had a rough surface, but some reflective properties.

Creating the court was achieved by allocating an image I found online to the colour attribute, then reducing the specularity to 0.4, and increasing the roughness to 0.5 in order to achieve the desired reflective properties. Unfortunately, this cannot be seen in the final render due to the Olympoid's distance from the court.

The floor itself was modelled using a plane and attributing the desired colour to it. Again, roughness was substantially increased, and specularity the opposite. To get the desired

worn effect, I changed the colour attribute to the *Noise* node. This enabled me to create patches of lighter and darker orange experimenting with the *threshold*, *amplitude*, and *frequency ratio*, to mimic some mild wear.

The court-side banners were diffuse but had some minor light reflections on them in pictures found online. To mimic this, I decreased specularity, increased roughness, and increased the sheen attribute of the *aiStandardShader*. This produced the desired effect of being diffuse yet showing the lighter areas where the light was being reflected off of the banner's sheen.



### Olympoid Arms and Shoulder Plates

To link my Olympoid back to the Olympics, I decided to make the shoulder plates show the Union Jack – showing that it was representing Great Britain. In order to allocate the union jack to the plates, I found an image online, and allocated this to the colour field with a *file* render node attached to it. Whilst I was happy with how the image was wrapped around the shoulder plate, I only wanted it to be present on the outside of the shoulder plate. Initially, I looked at the UV editor to see how the UV shells had been constructed, and thought it to have been one single shell meaning it would have proved challenging to map the image to just a few faces in a fashionable manner. So instead, I manually selected all the outer faces of the shoulder plate's geometry and assigned a new *aiStandardShader* to just these faces. This then allowed me to achieve the desired look – as though the Union Jack had just been painted on the exterior. To then achieve the metallic look I wanted, I used the *Car Paint Metallic* preset on the shader; slightly reducing the specularity, and slightly increasing the roughness. Once I had lit my scene, I achieved the high-end, painted effect I was after.

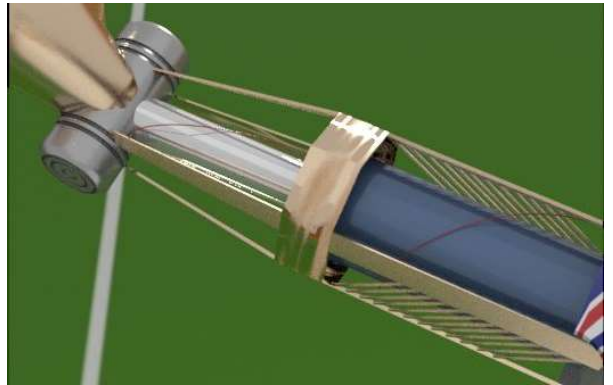
The inside face of the shoulder plate, along with the shoulder and leg ball joints, was made to be a muted, dark grey as to not draw attention to them, but also as these parts are not visible in the rendered frame.



Joining each arm to the torso are four piston rods. Modeling off of real life pistons, I used the *Chrome* preset for the shader. The result gave me the desired look straight away, and so required no further modification.

The upper arm is composed of a piston, a wire, and the protective exoskeleton. Detailing the upper arm proved challenging as during the modelling phase, I had used *boolean union* to combine the piston, wire, ball joint, and connecting rods. In hindsight this was a big mistake, and made texturing the upper arm much more difficult and time consuming than it should have been.

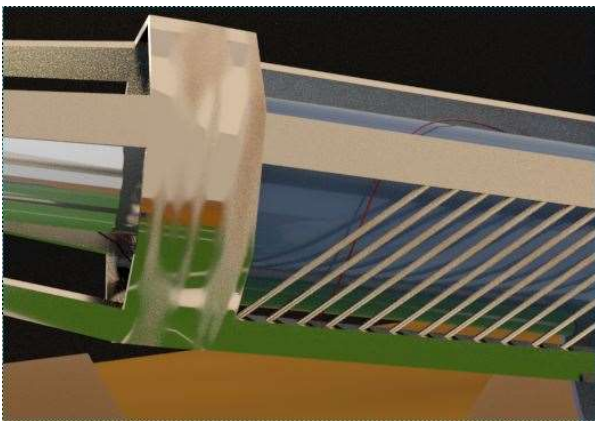
As a result of combining all the objects, their UV geometry was hideous and virtually unusable. Whilst I could have re-modelled this section of the geometry (as using separate didn't work due to the history being deleted) I instead chose to select all faces, and then deselect the faces I didn't want texturing, before adding a new shader. Although tedious at times, it didn't prove as time consuming as I thought remodelling would have taken.



For the wire detail, I simply reduced the specularity to 0 on the *aiStandardShader*, and then assigned the colour red. The only challenge faced here was selecting the faces as described above.

For the piston, I used two shaders; one for the piston arm, one for the piston housing. As with the connecting rods, the piston arm was assigned the *Chrome* preset as this gave me the look I wanted, perfectly mimicing a real life piston. For the housing, I used the *Car Paint Metallic* preset once again, but this time only slightly reducing specularity to 0.8.

I had attempted to create a cracked paint effect on the piston housing, to give a weathered effect. I found an appropriate image online, and tried to create a specularity map in order to have areas of different specularity on the shader. However, once applied I didn't feel as though this fit with my design plan, and so instead went with the polished, painted appearance that was described above. An alternative could have been to use a *Ramp* render node along with noise and other various techniques, but I am very pleased with how the arm as a whole turned out.



One of the more challenging, but rewarding, sections of the texturing process was that of the protective exoskeleton. I wanted to have this piece to have a worn and slightly battered appearance in order to add some character to the model and improve realism. I played around with the presets available for the *aiStandardShader*, and after some experimentation decided on the *Copper* preset due to the way it catches the light, and produces attractive specular highlights. This material preset gave me a metallic, high-end looking material which fit in perfectly with the current materials, and my design plan proposed in the introduction. Once I had decided on this I set about adding in wear and

tear effects. To accomplish this I created a black and white specularity map in Gimp 2.0. Applying this map to the specularity field of the exoskeleton's shader gave the desired affect and can be seen in the render with varying levels of difusion on the arm. After playing around with the map, controlling how much wear I wanted and where I wanted it to appear, I settled on what is currently presently on the model.

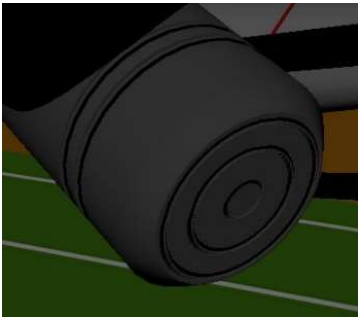
To adhere to continuity, the forearm was assigned the *Copper* preset also, however the metalness was decreased slightly, and the roughness increased slightly to give a worn and used effect. The claw shader was assigned the *Brushed Metal* preset, with the colour slightly





darkened as to what is given in the preset. Combining these with the rest of the arm gives a coherent and attractive look to the arm as a whole. This is the part of the model I am most proud of – both looks wise also giving off a high-end, rugged impression, but also due to the challenges overcome in order to achieve the roughened finished look.

### Limb Hinges



Found at the elbow, wrist, and knee joint positions on the Olympoid are cylindrical joints. At the time of modelling, the decision was made to leave them blank and add appropriate detail during the texturing stage of the pipeline. Taking inspiration from the T800 from Terminator, I chose to assign the *Brushed Metal* material to the *aiStandardShader*.

To create the recessed details seen on the hinge, I took a copy of the UV map setup and, in Adobe Photoshop, created a bump map (see Appendix) with black in the areas I wished to be recessed. This bump map was then applied to the *Bump Mapping* field in the *Geometry* tab in the shader. This

gave the desired subtle detailing I wished for in a far simpler way than if I had modelled it.

One challenge I did face was with the bump map creation. After creating the initial mapping, the geometry didn't change despite black areas being present. After some trial and error I found that this was because I had a transparent background on the bump map instead of white, and so the map wasn't being applied correctly. After fixing this issue, the bump map worked perfectly and to great effect.

### Legs and Running Blades

Inspiration for the thighs of the Olympoid was taken from iRobot right from the beginning of the modelling process. Seen on the robot Sonny, there are many synthetic muscles made from a collection of rubber pipes. In order to try and replicate this aesthetic, I added some indentation lines into the geometry in order to give the object depth once modelled. Whilst the effect I achieved is fitting with the character and the effect I was going for, I did also try to map a texture onto the thigh shader, although it did not result in the right look. I have used the *Rubber* preset, and set the colour to black, with the result looking as though it can contract like a muscle.



Achieving a look like that found in *iRobot* would have been easiest by remodelling the thigh to be comprised of multiple pipes, however I chose not to pursue this due to time constraints.

For the lower half of the leg, I had modelled this off a Para-Olympian's prosthetic leg. Due to this, when it came to texturing, I also wished to mimic the likeness of current day prosthetics. The upper portion uses the *Plastic* preset in order to convey the appearance of fibreglass or plastic. The blade section of the leg has had its specularity increased to give a somewhat glossy appearance, as well as having an image of carbon fibre material attached to the colour attribute. Initially when the carbon fibre texture was applied, the image was stretched and so the effect of carbon fibre was distorted. To combat this, I set the image to be repeated 4 times in the U direction; resulting in the close knitted effect that carbon fibre has.

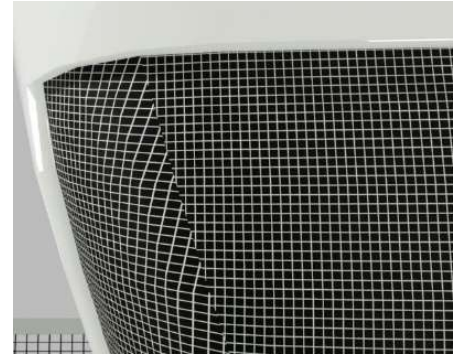
### Front and Rear Venting

Seen on the front and rear lower third of the torso are recessed sections created in the geometry. As seen from the initial design drawings, these areas were designated for cooling vents, or to even show some exposed internals. Some piping was modelled to express this aspect of the design.

Again, due to combining all geometry in the modelling phase, shading the pipes became a time-consuming task in order to select the correct section of the torso's geometry. I did attempt to select the faces of all the pipes and separate them into a separate object, however doing so created some distortion on connected areas of the torso and so this route was not pursued.

Applying the appropriate shader to the front and rear vents was also achieved through selecting the appropriate faces, however, due to their much simpler geometry this was not as tedious or time-consuming as other sections of the model.

The rear panel, from initial designs, was seen to be a cooling vent for the robot. Therefore, the *Grid* render node was attached to the colour attribute of the *aiStandardShader*. From here the repetitions in both the U and V directions was increased substantially to create a very fine mesh appearance. In order to give this area of the model some more depth, I tried to implement a bump map and a displacement map (independently of each other) to try and raise the grid texturing from 2D to 3D. Whilst the effect was achieved (to a limited capacity) with the displacement map, I did not feel that the texturing added anything to the overall look of the model due to the small scale of the grid, and so decided against a raised grid surface. Additionally, due to the distance the robot is from the camera, such a detail may not have been seen in the final render.



Emphasising the metal composition of the cooling vent, a chromed effect was added onto the *Grid* texture node via the *Chrome* preset. Again, however, the result is barely visible due to the miniature scale of the grid.

For the front recessed panels; these were initially textured with the *Rubber* preset in a dark black. However, experimentation into different looks was taken as the aesthetic didn't seem to fit quite right. Eventually, the front sections were textured in the same way as the rear panels; with fine grid texture representing venting or intake panels. With the front meshing set to a darker, non-chromed finish, the front panels seemed to meld better with the rest of the torso, and Olympoid as a whole.

One issue apparent on the front and rear grid patterns is the evident transition between UV shells, where inconsistencies can be seen. Whilst an attempt was made to re organise the UV shells to produce a more coherent flow of the grid lines, I was not able to do so within the UV editor. One solution to this would have been to create my own grid texture in Adobe Photoshop and apply it in the correct formation to allow for flowing grid lines once applied, but again this was not pursued due to time constraints.

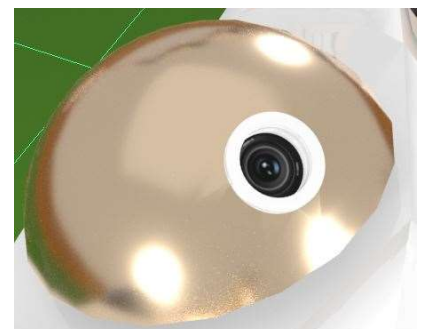


Also found on the front panelling are the exposed pipes. Initially, these were coloured red, the same as the wires on the arms. Whilst this aesthetic fit in with the character design plan, I decided to try the *Frosted Glass* preset which I inevitably resided with. The choice for the change came due to the more futuristic appearance that the frosted glass texture gives. Although the pipes themselves are not meant to portray that they are made of glass, the frosted texturing gives a more interesting end-product, in part due to their partial transparency.

The outcome of the front venting panels is one I am very happy with due to its simplicity, but high effectiveness of portraying the futuristic appearance I desired.

### Torso and Head

Deciding on the final textures for the Torso and head proved more challenging than initially thought. Due to this, I left shading these objects until very last to ensure the chosen textures fit with the rest of the robot. One area that was easier to design was the camera situated on the front of the dome. For this, I applied the *aiStandardShader* and kept the high specularity in order to give a glossed effect. I played around with what colour to use, from black through the greys and temporarily decided on a dark grey. However, after finalising my torso design later on, I came back and altered the colour to a white, increasing emission slightly to give a purer white colour.



For the camera lens itself, I found an image online and mapped this to a *File* render node on the four faces that make up the inner lens assembly. After doing so, the image was much too large for the surface it was being mapped to. Using the UV editor, I re-scaled the lens image to exactly match the dimensions of the oval UV shell the geometry had. Doing so produced a convincing result. Specularity on the lens shader was reduced to around 0.7 to mimic how a real camera lens would reflect light.

The domed head itself also went through many different colour iterations. Experimentation with *Brushed Metal*, *Glass*, *Copper*, *Frosted Glass*, *Metallic Car Paint*, and *Gold* was debated. Eventually I decided to match the head to the arms and use the *Copper* preset. The decision to do this was to keep a consistency throughout the futuristic, high-end design, but also the fact that as copper has a bright colour to it, it contrasts with the dark back-ground I was implementing and so helps the character pop out of the scene more effectively.

As seen from my development images in the appendix, the torso, shoulder mounts, and 'aero-fin' went through a transitional change late in the design and lighting process. I had initially had a brushed metal finish to the shoulder mounts and torso, with the aero-fin having the same image mapped onto it as the shoulder plates. The reasoning for this design was based from the inspiration from Terminator; a futuristic and rugged appearance. Whilst I was happy with the design, I felt that it could be improved. For one, due to the complex shape and geometry of the aero-fin, the image mapping was not satisfactory with it being distorted and un-aligned. Additionally, whilst the materials all adhered to the aesthetic I wanted to implement and fit well with the other textures parts of the robot, the character didn't pop from the screen as I would have expected or have liked it to.

Due to these reasons I decided to experiment with different materials and aesthetics for the torso. I had planned to make the aero-fin and main torso different textures in order to break up such a large area. However, once I had tried making them the same texture, I felt that the character as a whole had a much more appealing and classier look to it. I eventually landed on white metallic car paint. This material fit in perfectly with the high-end design I was trying to attain and, although it didn't portray ruggedness per se, the white colour seemed to unify the whole character together and provided an aesthetic I was extremely pleased with.



After an initial render with the white torso, shoulder mounts, and aero-fin, the latter two torso sections seemed to be lost within the main torso, with no visible distinction that they were present. To combat this, I increased the main torso's emission value to about 0.4 to give off a pure white (rather than a dulled white caused by the minimal lighting in the scene), and set the emission of the aero-fin and shoulder mounts to 0.3. This subtle difference in emission allowed easy distinction between the different torso sections, whilst still seeming as though they were all the same colour.

### Badminton Racket

Texturing of the badminton racket was the simplest of the whole process. Due to each geometric section being left separate, assigning shaders to different parts was easy. Alongside this was the fact that the racket had been modelled from an image found online, and so the appearance I wished to create in the shading process was that of the picture it was modelled off.

The handle section is simply the *Rubber* preset and the colour set to black. The metal stem and head frame of the racket use the *Car Paint Metallic* preset in red. Using the preset allowed me to achieve light reflections on the surface that I desired in the final render due to its high specularity. The wire meshing, which had been





created physically in geometry, was the normal *aiStandardShader* with the colour being white, and specularity at 0. In order to achieve a purer white, again, I increased the emission factor slightly which resulted in the desired end-product.

I had achieved a similar look by projecting the image of the racket I modelled from onto the model itself. This approach yielded higher detail in the handle grip, as well as being much quicker to achieve the result. However, I was not able to achieve the reflections I desired on the stem of the racket when projecting the image, plus, due to the handle's small size in the frame, detailing wouldn't have been easily viewable. I also felt texturing the racket manually gave me more accurate control over the final look, as well as the modelled racket mesh not exactly lining up with the mesh on the image, causing some unattractive texturing.

### Lighting

Lighting within my scene is something I spent a considerable amount of time experimenting with. In total I used six area lights of varying sizes and intensities to light my Olympoid, positioned in ways to cast the appropriate shadows and highlights on the character.

In order to spotlight the character, I had initially used the spotlight available in Maya, however felt that the shadow cast onto the badminton court was much too intense and the harsh edge between light and dark was also undesirable. Instead, I decided to leave this section until last.

As I added the rest of the lighting into the scene, the singled-out spotlight effect I was looking came about as a result of these lights. I managed to create a soft spotlight edge surrounding the character on the court, whilst also casing multiple soft shadows; like those found from the reference images of real-life badminton matches.

After some experimentation, I decided that I didn't want the character to cast too many shadows onto itself; only in the joints of the shoulder and hips. This decision was made to allow the character to be clearly visible and stand out from the dark background of the scene. I otherwise felt as though parts of the robot were lost in the scene and may as well have not been there. Implementing this was achieved by having the following area lights:



- Small, upper left, angled downward towards arm and side
- Small, upper right, angled downwards towards arm and side
- Small, front on, positioned above head height angled downwards at head chest and torso
- Large, low intensity positioned overhead lighting all the character from above
- Small, low intensity pointing at badminton racket to give highlight on the metallic paint
- Small, low intensity pointing at upper legs and rear venting

Due to the highly specular materials used, mainly the copper, there are some nice highlights and reflections seen within the character, portraying the high-end aesthetic. The lighting used also allows the character to pop from the background, drawing attention to the upper body especially with the arms seeming to glow under the lighting used. I am especially proud of my implementation of the lighting within the scene, as I achieved exactly what I set out to do, casting appropriate shadows, as well as portraying the Olympoid in glowing, heroic manner.

One issue I did run into was on how to minimally light the foreground and background. I had used an Arnold skydome with extremely low intensity at first, but this didn't give me the exact effect I was looking for, and cast some unwanted shadows due to the high walls used in the far background of the scene (representing the walls of the court or arena). Instead, I applied an emission value of 0.02 to the larger of the two back walls. This gave enough illumination of all the background due to its massive size, whilst also giving a clear edge and corner between the two walls. This also eliminated the unwanted shadows cast by the walls. To illuminate the net in the foreground, I used two long, low intensity area lights pointed up at the white net

edge to light the net and stands. This subtle lighting produced no unwanted shadows due to the angle of the lights, whilst also making the net clearly visible in the foreground.

### Positioning and Rendering

Early in the rendering process, I decided that I wanted the Olympoid to be in a jump shot position. This was in the hopes of creating a dramatic shot, that engages the viewer into the scene. As seen in the appendix, the pose was the first thing that I finalised in the texturing and rendering stage of the modelling pipeline. I found this useful when it came to lighting the scene and choosing the position where the final render shot should be taken from.

In total I had a total of 15 camera bookmarks which show my transition from the initial thought of where I wanted the final render shot to be taken, to the very last one. Seen in the appendix is some of the experimentation I went through in choosing the perfect final shot, with it even being shown that I continually altered my render frame throughout the texturing process.

To give the scene some depth, and once I had decided that the badminton net would be in the corner of the render frame, I wanted to have the foreground blurred. This added realism to the rendered frame, providing it depth, as well as drawing attention to the Olympoid character in the frame even further when coupled with the lighting used.

Render settings themselves is something I toyed with in order to produce the perfect shot. From the Arnold preset, I had increased most sampling values by one or two marks to improve the anti-aliasing and the transitional areas between contrasting areas of light and dark (especially important in my frame due to the lighting choices used). However, with the final render produced, I noticed some strange orange artifacting caused by the floor textures on the back walls of the backing caused by insufficient sampling and the limited lighting in the background. To solve this, I increased all sampling sliders to maximum and left the render for 23 hours. Whilst this was extremely excessive considering the 1920x1080p resolution being used, the final produced image is crisp, with no signs of unwanted artifacting in darker areas of the rendered frame.

Once the definitive render had been completed, I saved multiple copies with varying exposure and gamma levels, enabling me to pick the best shot to showcase the texturing, lighting, and camera effects that I had implemented throughout the entire process.

### Discussion and Conclusion

Whilst I am pleased with how the final rendered shot turned out, there are still improvements that could be made to my final scene - namely the background objects in the frame. Although the scene is dark and so the backdrop of the frame is not easily visible, adding some images to the court side banners, or adding in arena seating instead of blank walls could have added some extra detail into the frame. Despite this detail not being needed, or easily viewable, it would tie the frame together and better complete the scene.

Given more time, I would make some adjustments to how I carried out certain stages of my lighting and texturing process of this project. Firstly, I would spend time in the UV editor and possibly Adobe Photoshop to make the venting grates on the front and rear of the robot flow better. As it stands, these areas have jarring lines between UV shells which are not desirable for close-up shots.

Another change I would implement would be to add a specular map to the badminton courts. As seen from images online, high use areas of the court have been smoothed by continual use by athletes, leaving them with a glossy and somewhat reflective surface. Whilst this isn't always the case, it would have added another layer of realism to the scene.

Additionally, instead of shading different areas by selecting the appropriate faces of complex geometry created by using *Boolean Union*, I would have instead liked to remodel some of these objects, especially the torso and aero-fin. In hindsight this would have allowed for much easier shading and allowed for more variety of textures on areas of the model (differently textured piping, having the leg mounts different from the torso).



Knowing what I do now from experiencing the full modelling pipeline, given the chance to do this project again I would make some changes. In the modelling phase, I created geometry that was needlessly complicated for what it was either by using *Boolean Union* on all the torso pieces, or by simply creating an over detailed part (aero-fin for one example). This complex and united geometry lead to many difficulties when it came to texturing the model, and I spent a lot of time working around this over complicated geometry.

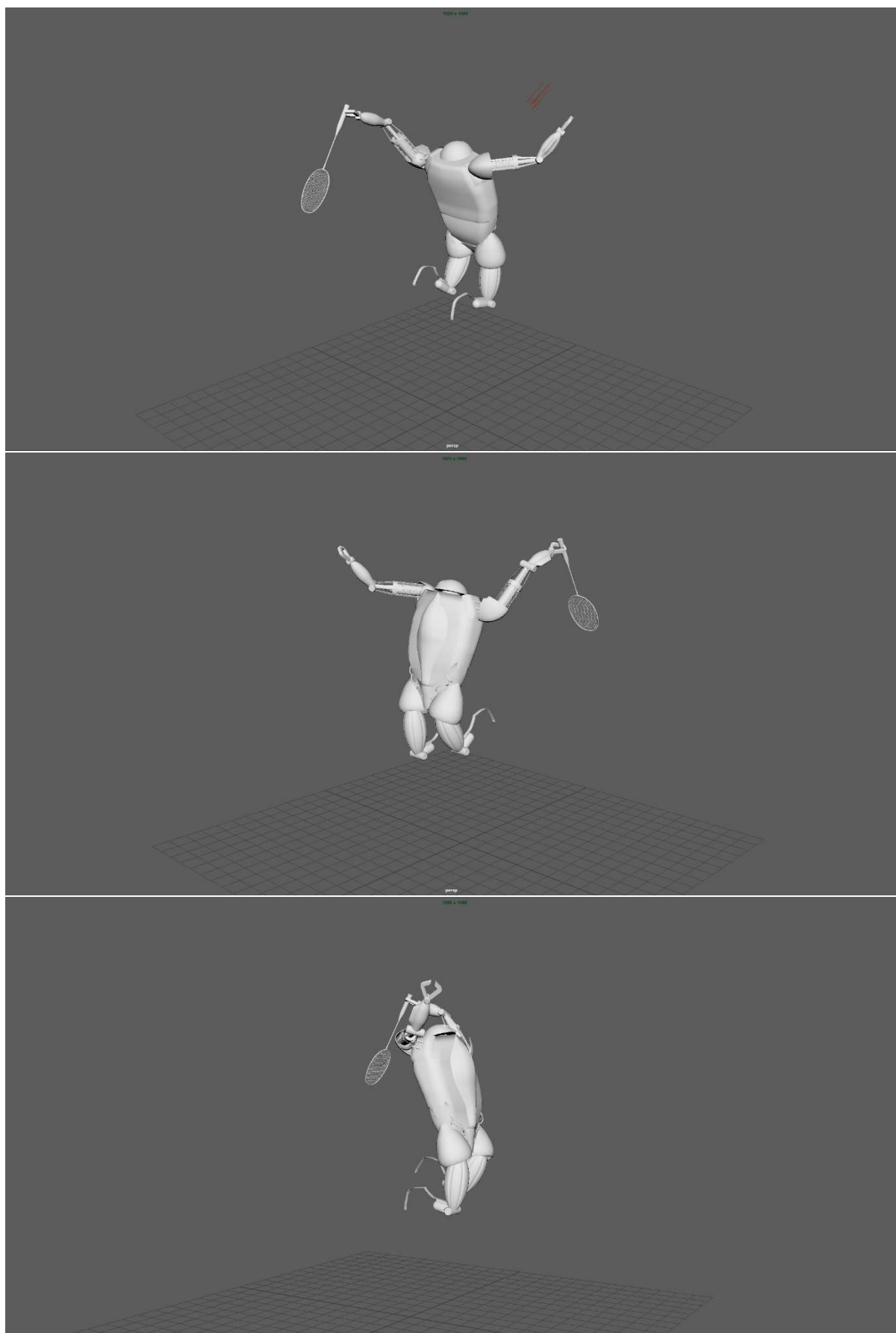
When it comes to the lighting and rendering stage, the only change I would make would be to implement the initial lighting setup before texturing. I feel as this would give a better indication as to what materials would then work in the scene, and give a more defined path forward rather than constantly experimenting with textures until finding ones that worked well together.

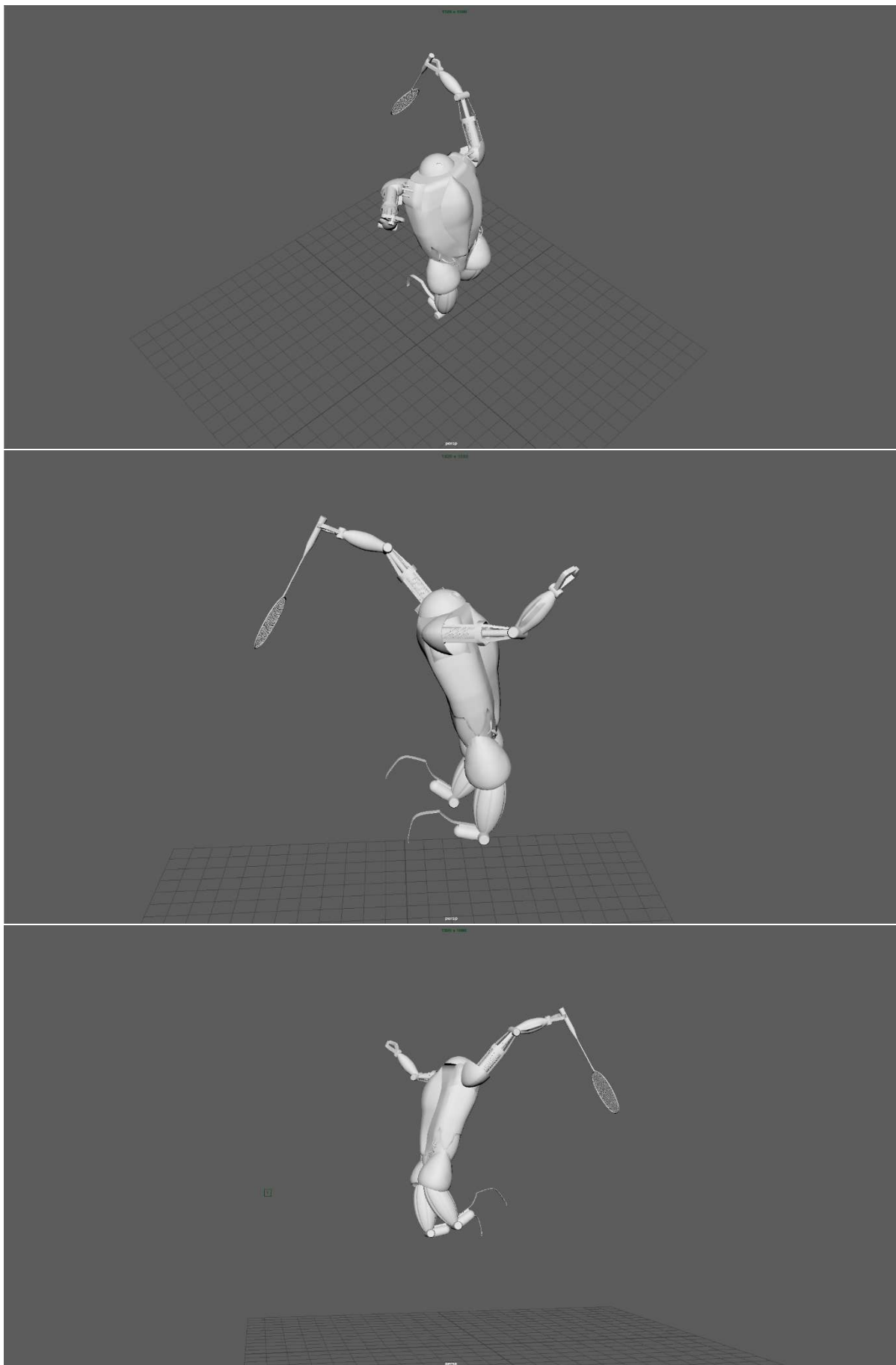
Texturing wise, there are a few changes I would make. I found myself duplicating shaders or effect by hand - creating two grid textures to create the transparent net. A more efficient way of doing this would be to create the shader or texture node once, and then link it to the correct objects or fields using the node editor. Additionally, when I mapped the Union Jack texture to the shoulders, I manually selected the faces I wanted it to show on. This process was needless as if I had looked more closely at the UV shells produced the outside faces were in their own separate shell, meaning I could have re-organised the shells to change where the Union Jack appeared.

Overall, I am extremely pleased with how my final render turned out, achieving what I set out to do by creating a dramatic action shot with a vivid and high quality Olympoid character. I have exceeded my expectations I had prior to taking this unit and have created a model beyond what I thought I could do. I believe I have used a wide range of techniques in order to create an interesting and imaginative model. There are defiantly some things that I could improve and do differently next time; simplifying my geometry would make my life easier when it came to the rendering and texturing stage. However, having taken this course I am now better equipped to tackle a challenge such as this again in a more effective and efficient manner.

## Appendix

### Render Progress



















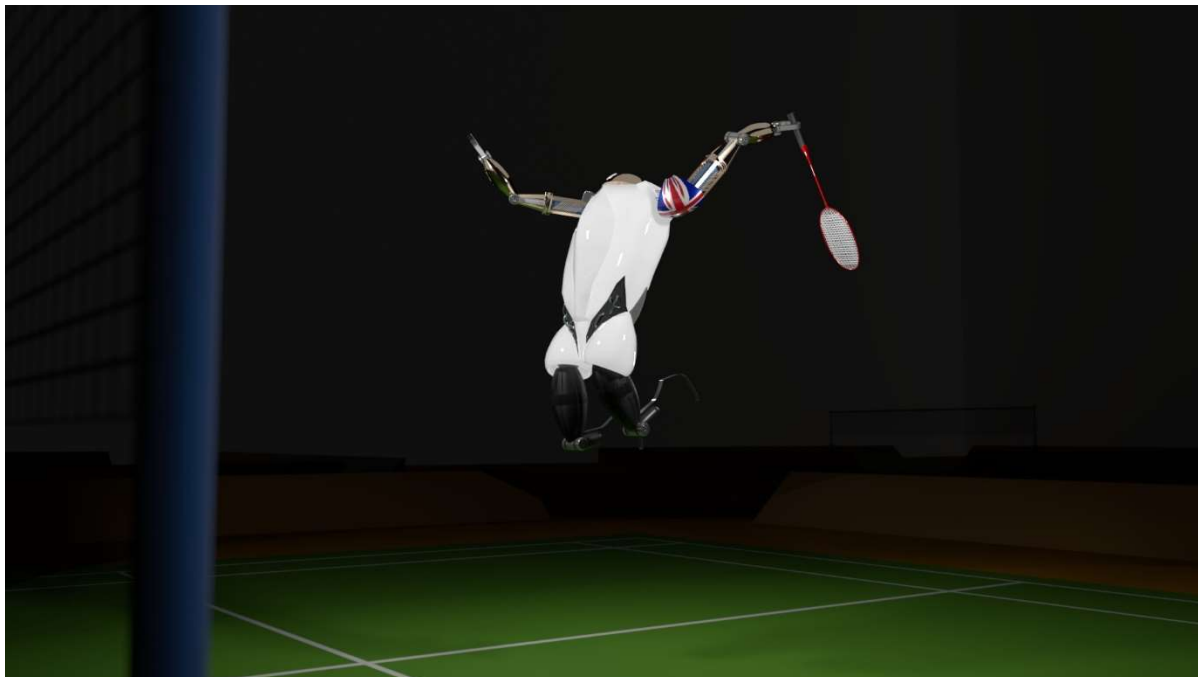
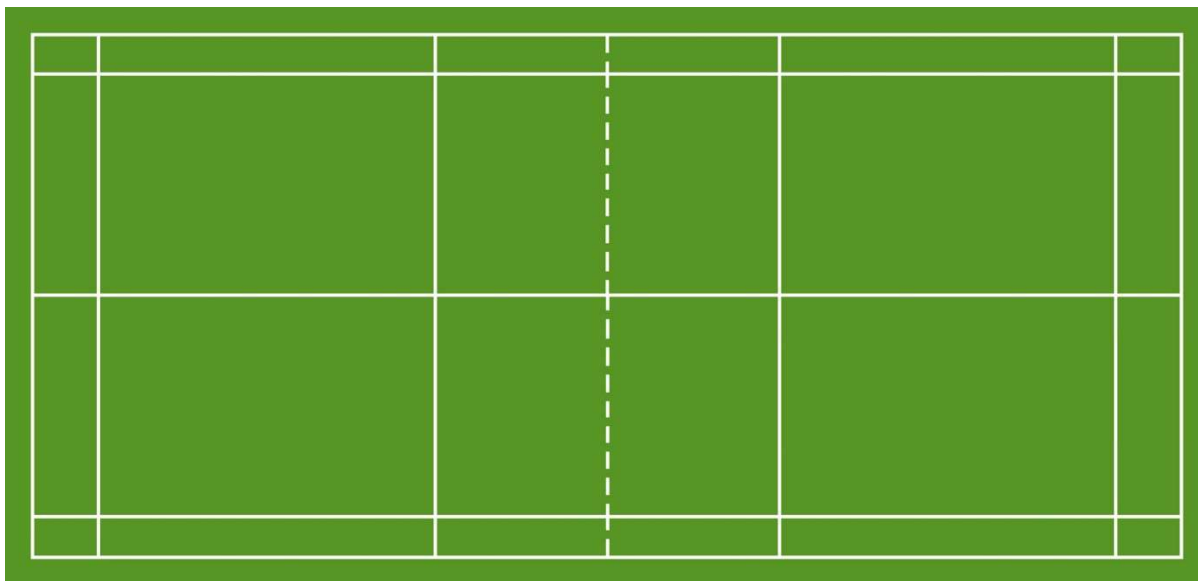


Image Resources Used in Scene

Badminton court

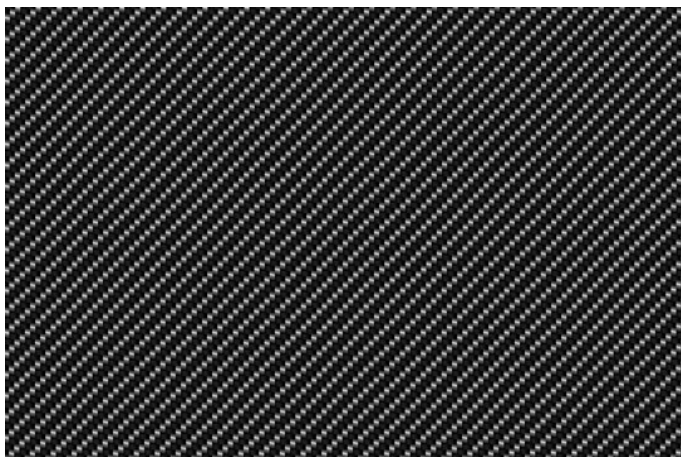


Camera Lens

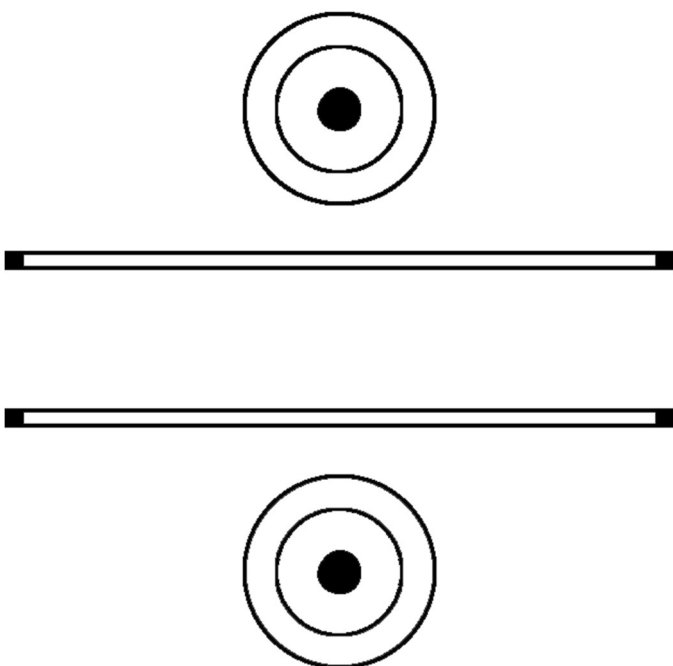




Carbon Fibre



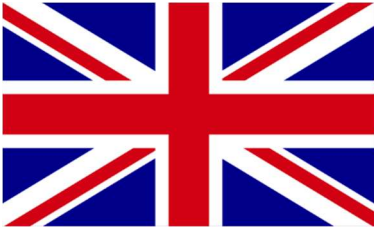
Hinge Bump Map



Exoskeleton Specularity Map



Union Jack



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