

CreativeVenture M7X01792

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Executive summary

This report provides an analysis and evolution on how I was able to demonstrate my self exploration, growth, methodology and strategy when working on my final module, creative ventures. Each process that I carried out while working on this production was clearly documented so those who wish to create something similar could follow the steps. For creative ventures, I believe I was able to expand and explore new skills, which I can hopefully implement to my future work practice. When compared to the previous year, I was trying to expand areas where I was very familiar with or had more interests in. These were animating, vfx, colour grading etc. However for Masters, I wanted to try and expand my skills and practical skills in areas where I believed I lacked in. These areas were mainly environment modelling and texturing.

PRODUCTION:***Environment:***

For this semester, my first priority during the production stage of our short film was to fully complete the desert environment. Since the desert sequence contained a lot of animation, time management was crucial so I needed to add all the necessary small touches needed before Ben could start animating within the desert as soon as possible. However once I began working within the desert file, I realised this wasn't a quick task because the textures I created for the dunes didn't quite give it that photorealistic look that I was after. One of the biggest problems with this texture was the fact you couldn't see any bumps or grains during the close up shots, as well as the dunes looking smooth from the further away shots. Since this was unacceptable to mine and our group's standards, I decided to spend a week working on the texture. I only gave myself a week to work on the texture because I knew the longer it took, the later Ben would get the environment to animate. The possible outcomes of this is running out on time when it comes to render because rendering is also another key aspect of time management. During the one week, I played around with the texture nodes changing the values to see what the outcomes were. Even though this allowed me to get different variants of the texture, each variant gave off a glossy, caramel style look on the closeup shots, as you can see from the image on the right. Due to these problems I decided to abandon my texture and acquire a PBR texture from a resourceful website. I came to this decision because of the time management factor, I needed to finish the environment so animations could be started. The final texture that was used to transform the desert into a realistic shot was acquired from an Epic Games website; <https://quixel.com/megascans/home/>. This website provided various 3D assets to realistic textures, the website provided loads of different sand variant textures. The

image on the right was the final outcome when the texture was added to the environment.

Furthermore this image only looked this good because an HDRI lighting was used instead of the previously used sky dynamics tool. The only changes I had implemented to the texture was adding a mapping node so I could play around with the scale as well as rotation. Personally, I thought this texture was perfect because unlike my version this contained all the bumps and grains as well as little stones within the texture to give the dune more life. One other thing I did later into the production was adding an untiling node to make the texture seem like it's a seamless texture. This was done late into the production specifically when Ben was animating.

Once texturing was complete the next task was to rearrange as well as scale the dunes and the mountains to their correct proportions. This

was another important area because without the correct proportion the robot wouldn't suit the environment. When it came to scaling up the environment, I used the robot model as an indicator to see whether the dunes were too small or too big for the robot. One of the references I used to get an understanding of the size of a typical dune next to a small vehicle was through an episode of the grand tour.



During one of their episodes they drive through the dunes of Namibia in small buggy's and through some of their wide shots of the Namibian desert I was able to understand how big dunes really are up close. For example as the vehicles drove towards the dunes, from a distance the dunes were not that big and they seemed like you could easily get across them. However as they get closer to the bottom of that dune you can clearly see how small their vehicles were when compared to the vast size of each dune.

With this in mind, I scaled the environment carefully, making sure the robot model doesn't seem too big in scale for the dune. Some dunes have been deliberately scaled to be steep so that the robot will find it more difficult to travel through the desert. Since the dunes are not all the same size, I had to remodel some of the dunes so they were shaped differently as well as being small.



Once scaling was complete the next task was arranging them around the environment, so during our story the robot will fall down a steep dune and crash into the wall below it so to compensate this I had to place the steeper dunes next to the wall and place all the other ones behind.

To give the desert more of a depth of field I created and added more dunes and mountains in the foreground so in certain shots with the depth of field on you can make out some blurry mountains in the distance to give the audience an idea of how vast and

deserted the environment was. This was an easy task to complete because all I did was duplicate the mountains and the dunes, then shape each of them slightly differently. Since these were far away objects I decided to use less detailed textures so that we can save data as well as render time because the details wouldn't be seen anyway. I thought adding the mountains in the distance allowed the desert to look even bigger than it already was as well as giving it an abandoned feel.

Another task I worked on while fixing this environment was adding boulders and rocks scattered around the desert. Even though this was a great little detail, this approach was scrapped due to the fact it'll firstly use up too much data and render time.

Furthermore, the rocks didn't suit the dunes quite like I hoped. After looking at the final desert environment, I believe there are areas where I could have added more details such as the mountains right next to the robot. If I had more time I could have updated the texture slightly so that it's surface looked rugged and had uneven surfaces like a typical mountain terrain. However as explained earlier, time was a big factor and I had to get this to Ben so he could start animating.

Wall

Once the desert was complete and up to how I wanted, I began to move onto the next key aspect of this environment and this was in fact the large wall in the center of the desert separating the two terrains from our story. So in our story the wall separates the desert environment with the start of the countryside. Furthermore this would be the point where most of the emotional animation takes place between the two robots, so getting this wall to look perfect was very important. Before I began designing out the wall, I used Ben's version which was a rough mock out for the animatic as reference to give me an idea of how tall the wall could potentially be. Even though Ben's version of the wall was very useful, I used another relevant piece that provided references for the materials and structure. After carrying out some extensive research I found that the Jurassic park high fences were a perfect example of what we were after because they were robust, high in height and the design was simple. The design was simple but it still had the functionality to keep two sides separated, and this was exactly what I was after. When designing the wall, I did make a few tweaks because even though the Jurassic park fences were very helpful, its design was to stop dinosaurs from crossing the otherside and ours was just a little robot. So with this in mind I did design some of the top sections to be less sharp and less complicated because all I was checking was whether there weren't any gaps for the robot to easily fit through. Once the modelling was complete, I moved onto texturing the wall. To obtain further knowledge on what materials to use for the wall I carried out a simple research on materials that are used today to build high walls. From the research I was able to narrow down to two materials that were perfect for the wall, these were reinforced concrete for the base and then steel for the pipes/beams that go up the wall. Rather than including another texture from the

internet I decided to create a procedural texture for both the concrete and the steel. For reference I used pictures of both reinforced concrete blocks and steel beams to get an understanding of how they looked and behaved to the light. Creating the texture for the steel pieces was quite straightforward with the help of the nodes. The concrete texture on the other hand was slightly difficult to make it look like concrete but playing around with the values of the nodes finally got me the outcome I was after. Once the texturing was complete the next task was to import the wall into the desert file so that I could see how it looked next to the desert, especially next to the robot. After the wall was imported it definitely looked the part, but I did notice that the steel texture did look a bit too shiny and clean. To compensate for this I added some bumps to the steel texture to show this wall has been built a while back. When I placed the robot next to the wall, I was happy and satisfied by the size and how high the wall was. Even though both Ben's and the Jurassic park fences were really high in height, I opted not to make my wall similar because the robot isn't going to easily jump over the wall. This meant I only needed to create a wall that looks high but not as high as the reference style walls, furthermore this wall perfectly does the job of locking off two terrains (Desert and Countryside). When it came down to the final design of the wall I was very happy with the final outcome, especially the design of the bottom section which allows the robot to reach its arm through to the other side. It was important that I specifically spaced out the bottom beams because in our story the robot will need to put its arm through to the otherside so it can easily pass the object to the robot on the other side of the wall. Once I was happy with the scale, height and look of the wall, the next stage was to expand the wall so it looks like the wall went on for miles to give it that locked in look. It was during this stage where I had to deal with my next big problem after the dune textures. The original idea when it came to expanding the wall was to duplicate the modelled out single wall piece several times and then manually placing them next to each other. However there were several issues with this approach, one was this would take up a lot of time that I didn't have. Secondly each duplicate will become its own object which will lead to a lot of data being used. However none of these were the biggest problem of using this approach, if I wanted to make any changes to the wall later on, for example texture or the model itself, I'd have to manually do these changes to each duplicate meaning it'll take up more of the valuable time. Since this approach was time consuming, I decided to try out a new approach and this was through the use of the Array modifier provided by Blender. This approach was suggested by Ben after I had previously let him in on the problems of the previous approach. The array modifier was a valuable tool that created an array of copies of an object with each copy being offset from the previous one in many number of ways. Before I could use this tool, I merged all the separate wall meshes as one singular object. The array modifier was then added to the object, allowing me to acquire duplicates of the wall. Since this tool used the offset factors X,Y,Z; I needed to include two separate array modifiers, one

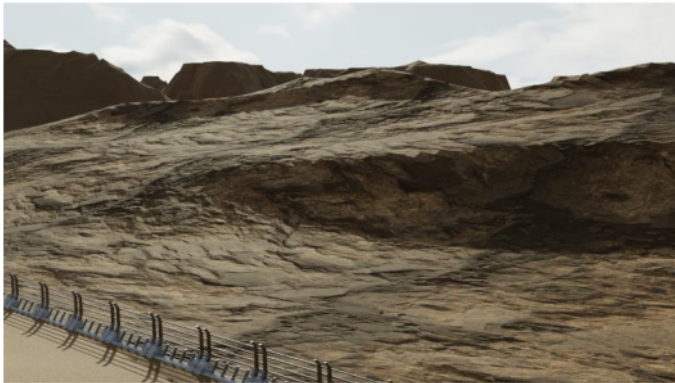
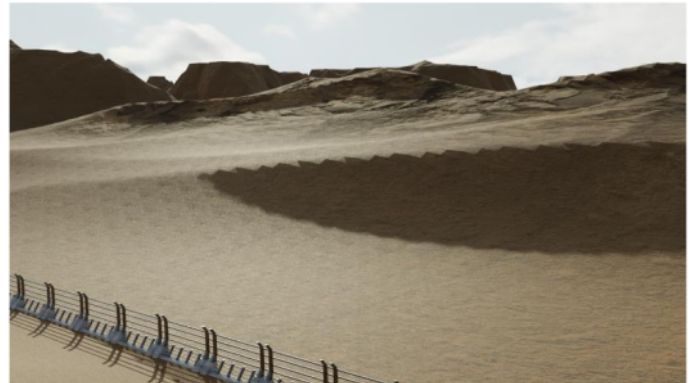
emitting duplicates to the right and the other to the left. Once the array was added I could easily change the number of duplicates allowing me to create a seamless wall that looked like it was going on for miles in both directions, giving that isolation feel. As explained earlier this tool was the perfect approach when it came to visualising this wall because now any changes that were needed could be applied to the main wall piece and these actions would be implemented to the duplicates very easily.



Otherside of the Wall

Once the wall was complete the next task before animation could begin, was the terrain on the other side of the wall. In the story, the wall is meant to block off two terrains, one was the desert and the other was the countryside. Initially the idea was to keep both sides of the wall to contain dunes because we didn't want the full countryside terrain to appear on the other side of the wall because it didn't seem natural. However after some lengthy discussions with the group, we realised we couldn't show the full countryside terrain but we could give it a slight rocky terrain. This idea was good because it would look more believable if the terrain looked like it was gradually changing from dunes to a rocky like terrain, implying the terrain is changing to the countryside terrain. My first step was to add another dune shape model because I wanted to show that the dunes are changing too. Once the dune was modelled and placed correctly on the other side of the wall, I moved onto texturing. Initially, the texture for this terrain was going to be created from scratch, but it was quickly dropped. The reason behind this was since all the dune textures were PBR textures, I realised without a PBR texture this terrain wouldn't match with the photorealistic environment. Once this decision was finalised with the group, I began searching for a suitable texture from the same website that was used to acquire the texture for the sand. Once again the website (<https://quixel.com/megascans/home/>) provided dozens of textures that had all the data, such as roughness, displacement and normal mapping needed to create a photorealistic texture. Once a suitable seamless texture was acquired, it was imported into the file and then was added to the object. A mapping node was separately added to the texture node so that I could change the

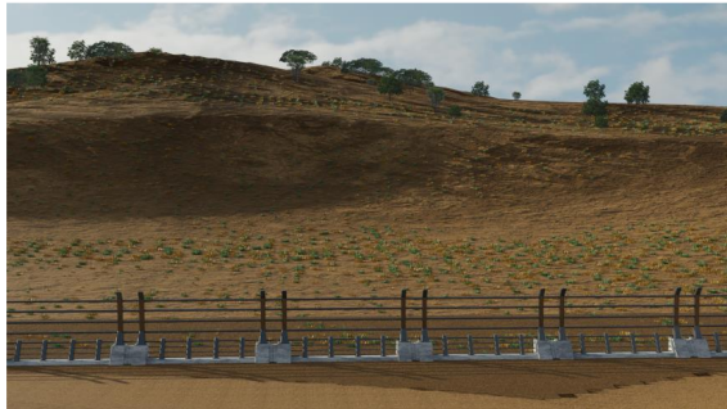
scale of the texture. Once complete, I showed the group who came back to me with valuable feedback and notes. Their suggestion was that the terrain looked like it was placed there and didn't look natural. To fix this problem, I decided to use the gradient node for this terrain. The gradient node allowed me to make the base of the surface to have the sand texture so that it looked like the terrain was slowly changing into the rocky terrain. This approach made the terrain look very realistic because of the way the sand texture blended with the base of the terrain. When it came to using this node, I used youtube tutorials to help me get more knowledge on how to make the gradient look more seamless. I thought this approach allowed me to acquire a new skill when it came to texturing because before this I was texturing objects without gradients, now this will allow me to make my materials look more realistic.

*Before**After*

Furthermore, the untiling node was also added to this texture so that it made the texture look like a seamless material. This was only implemented later into the production process when Ben noticed some tiling issues appearing on this texture while he was animating and test rendering. Since I had no previous knowledge on how to use an untiling node, I asked Dafydd to guide me on how to use this.

Once the texture was approved by the group, I began to move onto the next task which was adding grass and trees to the terrain. These were small details that were needed to show that the terrain after the wall was gradually changing. Initially both the trees and grass details started as test files so I could find all the less time consuming approaches. The first test I carried out was with the grass, since I needed patches of grass I realised the best approach would be to model a patch of grass using a simple mesh. Once I created a basic low resolution mesh that resembled a patch of grass, I duplicated this mesh 4 times and then changed the shape as well as size of each duplicate. These changes were implemented so that the grass didn't look like they were a uniformed set.

Once this was complete, all that was left was to add a hair emitter to the terrain using the particle system and then have the 4 patches of grass become each of the hair strands. After the hair quantity was ramped up, the vertex paint was used to add as well as remove the patches of grass to my desired look, I wanted the grass to appear more in some places than the other to show that inconsistency. For texture I used a basic procedural texture but each of the main 4 grass meshes had different tones of orange and green to show some in a dying state and some in a healthy state. The final product was exactly how I hoped, it fit the style of our story and it showed the gradual stage of the terrain. The next stage was applying the same approach to the trees. When I began with the trees I realised modelling out a tree was going to be a long process because I'll have to create leaves for the branches etc. These would make the file size more bigger and then it'll also make the render times longer, so a better solution was needed. In the end to compensate for this, I was able to find another strategic approach that could help keep the file size as well as render times down. The idea was to use image planes of real trees and have them emitted onto the terrain as a hair emitter similar to the patches of grass. To do this 3 different tree variants were acquired and then the next process was to make the 2d images into a 3D object. Luckily there was a simple technique for this, all I needed to do was duplicate the planes containing the images of the trees 4 times and then change each of the duplicates orientation on the z axis until the tree looked 3D. Once the final result was seen I was sure this approach was very successful and it looked like a 3d model. Once the trees were added to the hair emitter, I once again used the same approach as before which was ramping up the hair quantity and then the vertex paint was once again used to paint over where I wanted the trees to appear. I made sure trees were not added to areas where the camera couldn't see so that we could reduce time and data on the render. When both tests were complete I once again showed the group the results, they were happy with the way both were looking and suggested I implement both to the terrain. However they did ask if I could make the trees back into the 2d way because you could see some of the planes overlapping in certain angles. Since this was a problem I decided to revert back to the 2d planes but this meant the audience could clearly see that the trees were just an image plane. Luckily to solve this small issue Ben suggested the use of the constraints tools. This tool allowed me to add a rotation constraint to the camera and the trees, so when the camera moved the trees rotation would follow the camera meaning the trees looked 3D in all angles.



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visioned.

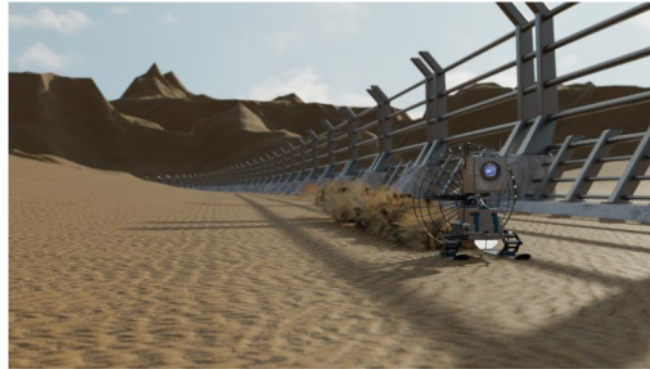
thought the
looked
I and the
group
However if i

could add any changes then it would be to the grass, even though it worked for our shot i feel like i could have made the grass mesh more detailed and worked on the texture further.

Effects

Once I was happy with the environment file and it was handed over to Ben to start animating, I swiftly moved onto the effects. Since Dafydd was carrying out all the water and ocean effects as it was a complex shot, I continued with the dust effects. Initially I was leaning towards using houdini to get the dust effects looking for more detailed and realistic. However this was also scrapped when I realised how it impacted render times because houdini uses CPU renders meaning a simple 10 second render could potentially take more than a day. Secondly Houdini was unpredictable when it came to reliability and this was mainly because I was using an educational version of Houdini. So with these in mind I decided to stick with blender but I wanted to find a simpler way rather than using the smoke effect I did last semester. Even though the smoke effect from last year looked very good, it did take up a lot of render time and with how much time we had left we couldn't have renders that took too long. In the end I thought I'll use an approach I used in the ocean effects last semester and that was with the particle system. So instead of emitting spheres I came to the idea of emitting images of a poof of smoke as the particles. So to do this I got a transparent image of smoke and then added that to a plane. The next step was texturing the smoke itself, for this I used a basic colour node and matched the ground colour with the smoke colour. The final step was to add the smoke plane as the primary particle system and then the emitter was tweaked slightly so that it emitted the particles to my liking. I thought this effect was very useful for the aerial shots and it took up less render times than the previous smoke

effect. I thought this approach effective, but for some of the close up shots this was not the best because you could see each smoke was an image in the close up shots.



Animation

My final role for this production was animating two of the travel shots within the desert sequence. I was given full permission to obtain visuals to my full potential, this meant I could set the shot to my liking. The first shot I created was an aerial shot of the robot traveling across the vast desert. The camera set up for this was quite simple, as the robot came into frame the camera would slowly go up before panning up to reveal the vast dunes up ahead. The animation for this shot was also quite straightforward because the camera was above the robot. The only animations that were needed was the fan movement and the robot going from one end to the other. Small touches were added such as little jolts and head movements as it travelled the desert. Since the robot was moving very quickly, I needed to include the dust trails to showcase its speed. The dust trail effect I worked on previously was implemented to this shot and after seeing the final clip I can say the effect suits the aerial shot very well.

The second shot I worked on was a bit more complex, as it was a drive by sequence. Once again the camera set up was very simple because it was a stationary camera placed very low to the floor. The idea was to have the robot slowly driving forward checking his surroundings before speeding past the camera. The complex part was definitely animating and also adding the same effects to this shot. Compared to the aerial shot the dust effect has been tweaked drastically for this shot so that it looked very much like dust was being collected. I opted not to use a similar dust effect from the previous semester because time was once again a key factor, sadly when I worked on these shots I only had 2 weeks until the deadline. When it came to animation I added small details after the basic motion was complete, this was with head movements to show his curious look. To bring the animation more to life, I animated the robot's head to lean forward when he speeds forward. This was heavily inspired by Ben's animation, I thought this gave the robot more emotion. The final task I carried out on this shot was

adding a camera shake near the end when the robot passes the camera to show how quickly he was moving across the desert.

Overall I thought this module allowed me to expand my knowledge in areas where I believe i had no previous experience in, i hoping these skills can be expanded further so i can apply them to my future work. The final product was only successful thanks to our group efforts, great communications & overall group friendship in and outside of class times.

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Untiling Tutorial: <https://www.youtube.com/watch?v=CzYZyeIKZ74&t=246s>

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