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2015

2015 - 10

The beginning - 2015-10-19 12:56

My name is Neil Donald and I am a student doing Computer Games Technology course at Abertay University in Dundee Scotland. As part of one of my Technical Arts module I will be rigging and scripting for my chosen model of the "Spy" from the online multiplayer game "Team Fortress 2". This model was taken as a free asset from TF3DM.com from the user called "3dregenerator" who has submitted several well made models from the same game.

I chose it for the quality of the model having appropriate topology for

animations as well as having a "mouth sock" which is desired for mouth and facial animations.

Throughout the up coming weeks I will be rigging and creating assisting script to benefit the manipulation and animation of this model.

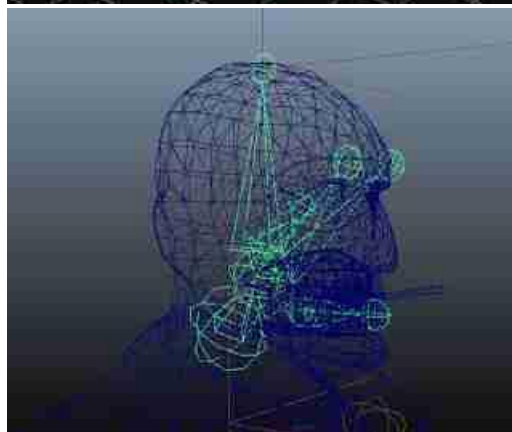
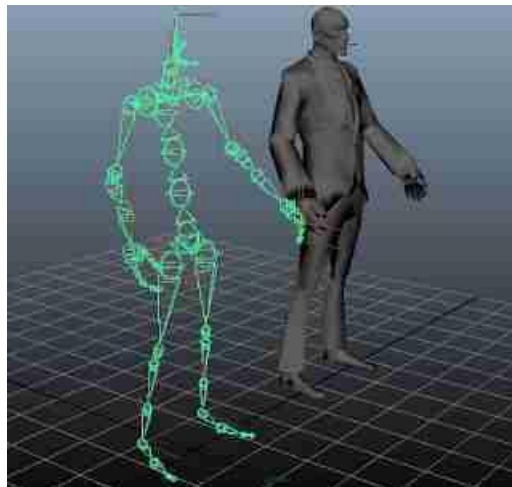
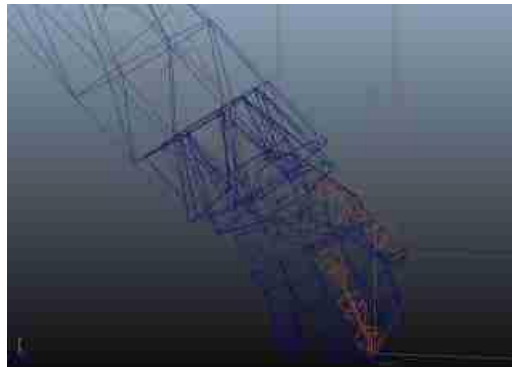


Stage 1 complete - 2015-10-19 13:35

This week I have created the base skeleton rig for my model, the "spy" from the game "TF2". I have also went on and set up my rig's Inverse Kinematics handlers which will allow the skeleton to move and act in a more humanoid fashion. These are the initial stepping stones before I begin the next stage which will be to implement my script to automate the creation of control shapes that will allow the user to manipulate the joints more easily.

From these image you can see the wrist and basic hand rigging, the whole skeleton side on with the model and the skull of my model and the rig I have implemented for it. For the initial stages of development I have only created joints for the main thumb and middle

fingers of both hands. Once I join the model mesh with the rigging I will be able to assign control of the other less used finger to these to allow for basic movement and animation. For the head I have put in the main joints from the neck straight to the top of the head. Joints for the bottom jaw will be used to allow the animation of the mouth so for speaking and grimaces, and joints for the brows will allow basic manipulation of the eye brows. At a later period I will aim to put in more components to allow for better facial manipulation and expressions.



2015 - 11

Researching and amendments - 2015-11-09 22:12

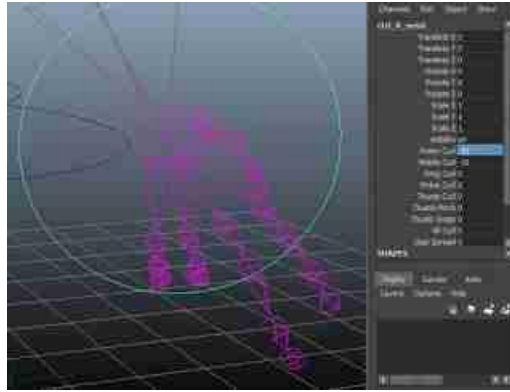
Since my last update I have had discussions with my lecturers and researched into different techniques and strategies that would be best towards creating a suitable character rig and animation tools. With cut scene animations for my "Spy" model in mind I have been looking into various 'TF2 Machinima' videos and tutorials, since this is ideal for what I had in mind. Although the majority of the videos created were done so on software other than Maya, which is what I am using, they are very much along the same lines and use rigging techniques optimal for animations.

I found this tutorial series - <https://www.youtube.com/watch?v=iEz7TslI-fs> - on "Pose to Pose Animation" by the Youtube publisher 'Source Filmmaker' useful because even though it didn't go through the steps of creating the rig it highlighted understand many useful features that could be implemented to make the animators job easier as they were discussed in lectures. Features such as partitioning facial features with easy modification through user interface and controls for the spine and limbs to create a sense of weight and realistic movement. It helped me understand and plan better for what I intend to have in my final submission.

This video by the same Youtube publisher - <https://www.youtube.com/watch?v=GcYOq6bqK-M> - gave me a few pointers into user interfaces that are widely used

One of the resources that was recommended by our lecturers was this video by Judd Simantov, co-founder of Game Character Academy - <https://www.youtube.com/watch?v=myZcUvU8YWc> . In this video he goes into depth about the entire rigging functionality of the characters from the game "The Last of Us". He describes the techniques for facial rigging and the animation controllers attached to the rig, as well as the reason behind the large amount of joints and control shapes used. Even though my models art style means that it doesn't require as much resources in animating it the video was a great benefit in describing how professional artists create fluid animations and realistic feature manipulations.

With these and my lectures in mind I have made amendments to my initial rig the first stage. I have taken out the IK handles for my head and spine, replacing the spine with a more appropriate "spline" feature. I have implemented control shapes for key joints such as the wrists, shoulders, neck and waist and have added options for manipulating the hands as well. With these in place I hope to progress with a whole rig controller and applying facial manipulation.

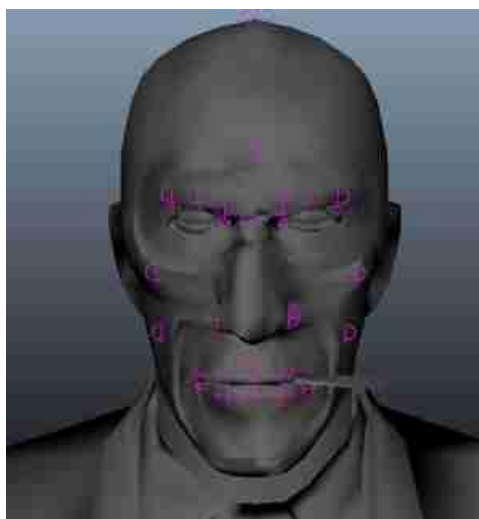


Facial Construction - 2015-11-17 17:14

This week I have been concentrating on my model's face rigging. Aiming for cut scene animation I've been following some generalized tutorials. Such as -

<http://cgi.tutsplus.com/articles/game-character-creation-series-kila-chapter-7-facial-rigging-with-joints--cg-32181> - by "envanto tuts+" user Antony Ward, and - <https://vimeo.com/11596378> - by vimeo user Alexander Ivanchev.

Both these tutorials were very beneficial towards pin-pointing how many joints were needed for minimum facial simulation and the necessary placement to replicate simple but crucial muscle movement. The later of the videos was based off of a character from the same game as my model, so seeing placement and manipulation of the joints for the same animation style was very beneficial for my rigging. These tutorials also highlighted helpful user interface features the I could adapt and use to help future animators of my rig.



I've placed 24 joints in my face at this stage, 6 for the eye brows with one at the top of the nose and

another in the forehead to replicate wrinkling. I've placed 10 in the mouth with 5 for the top lip and 5 for the bottom lip connected to another that acts as the jaw pivot. With the remaining 6 joints I used 2 for the cheekbones, 2 for the cheeks and 2 for the nostrils. Each of these joints I will allow to be adjusted individually so the animator can precisely alter them, but as part of my user interface which will be my next stage in this project I will implement control shapes for main features such as each brow and the lips. These I am aiming to be referred to and selected from an overall control picker.

My eyes I will implement later on in the process as I wish to ask my lectures on tactics for my specific rig.

2015 - 12

Progression and Skinning - 2015-12-13 13:49

Recently I have been looking into what I can do for the eyes of my model, as I have realized that there are not any separate eye shapes but a continuation of the whole mesh where the eyes would be. As this means the conventional method of creating individual eye shapes with a separate eye texture and rotating them to create the eye would not be possible, my lecturer suggested have an animated texture to use for each eye.

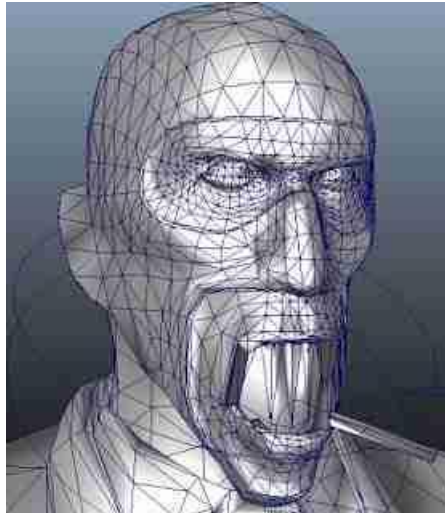
With reference to videos such as these videos by youtube users Brendan

Gallagher <https://www.youtube.com/watch?v=2r3apnAiyI0>

and Cody Little <https://www.youtube.com/watch?v=WSLyA7eQWOU>

I have gained a basic understanding of setting up the multiple eye position, but not necessarily how I could apply it to my model. I have worked on this in a different maya scene but have not been able to progress past a single eye position, so I felt I would return to this after finishing what needed to be done with the rest of the model and then continue later.

Coming back to my model and rig I decided I had reached a stage where I could join the two together and have begun mesh blending or "skinning". Influencing the vertices of the mesh under the joints of my skeletal rig has been a beneficial experience, with being able to see my model move as I had intended them to have and come alive in a sense.



It had even allowed me to apply attributes such as heel and ball rolling for the feet, and see a simulation of walking.



There are some problem areas that have been highlighted as well, which was to be expected. The most troublesome at the moment is at the models shoulders. As the arm raises, the mesh folds into itself and deforms the shoulder causing deformation.



Being unable to solve this problem with modifying the weighting around the influencing joints I believe I will need to experiment with blend shapes or other techniques to maintain the volume of the shoulders.

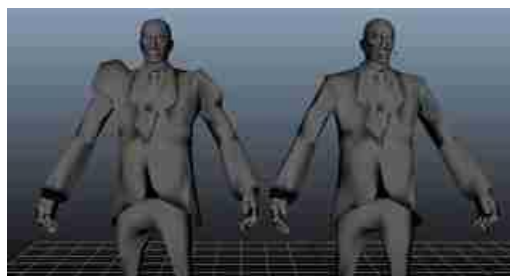
Problems with blend shapes and leg movement - 2015-12-15 20:25

I have been aiming towards amending key problems that have arisen recently with my rig and model since I applied "skinning" onto the joints. Key problems have been the shoulders and the legs.



For the shoulders I have been looking into corrective blend shapes, separate examples of the mesh affected at the vertex level and referred to by the main mesh so to amend deformations and the like. In particular I have followed a tutorial by youtube user "trav2186" - <https://www.youtube.com/watch?v=sfT46fMPCoA> - which described the steps and procedures simply and clearly allowing me to easily interpret how to go about this.

Unfortunately going through the steps highlighted that my skeletal rig was not acting as intended and not in the same way for both shoulders, resulting in blend shapes that were disagreeable and ugly.

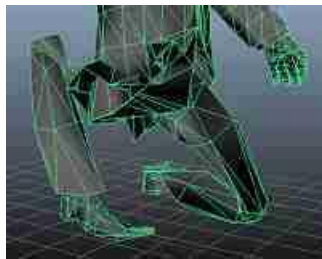


In this image the affecting blend shape for both shoulders is on the left, with the base mesh on the right. As I tried to apply the blend shapes to the base mesh they added together, twists that occurred in the arms throughout lifting the arm became obvious and created deformations. The leg mesh was also being affected unpleasantly, having the initial twist of the mesh due to the IK handle amplified.



With these obstacles I felt I would place them on hold and retry, after previous attempts, to re-correct the right leg.

There had been several hiccups with my legs throughout development, and I have applied different set-ups of Inverse Kinematic handles and attempted to modify rotations of specific joints. However as there is an effect from the joints on the mesh due to the "skinning" I had applied earlier the mesh has always been affected and usually ending up worse than it appeared before amendments.



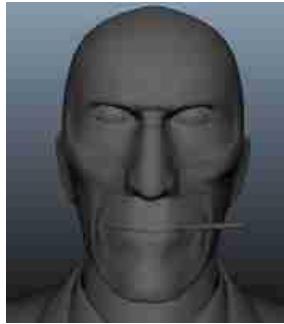
As shown even with a point constraint applied to the knee joints which tells them in which way to bend, throughout the bend of the knee the hip joint twists and turns flipping the leg in reverse.

Having had assistance from lecturers and other pupils I have been unable to fix these problems without correcting my skeletal rig. With submissions being within this week I fear that I would not be able to amend my rig without "skinning" and reapply the effects I have completed before then. Therefore I aim to continue past these setbacks and progress with my facial controls and my user interface with the intention to restart this particular task as a personal project and complete it at a later date.

Final Submission - 2015-12-17 19:32

Today I have been applying finishing touches to my model and rig and finalizing the script for my user interface in preparation for submission later today.

Unfortunately I have not been able to remedy my character's right leg, or apply blend shapes to amend deformations in my mesh due to the way my rig was created initially and how my Inverse Kinematics handlers work with the joints. This will regrettably affect the submission but I have taken all the factors into account so in any future project I will hope to be able to avoid these problems.



I have how ever apply skin weighting to my models face, which I feel can now allow any user to create the features and emotions I was hoping to achieve.

In these images I used the joints at my mouth, cheek bones and eye brows to try and replicate a sinister grin for an example.

I also created new eyes for my mesh, which can bee seen in the second image. I didn't have time to implement animated textures to recreate the eyes effectively though a class mate did point out that I could adjust the mesh vertices at the eyes to form a retina, and then separately create new sphere meshes to be used for the eyes.

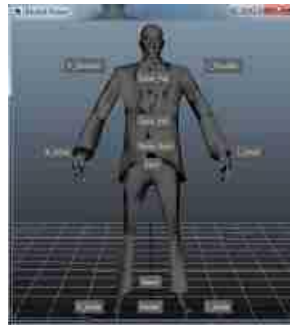


I created control shapes for the eyes, brows and jaw with appropriate constraints so as to allow any user to adjust these features as a whole without having to modify the individual joints in the face. For the rest of the joints I felt it was more appropriate to leave, for example the cheeks and nostrils individual so the animator could modify them precisely.

Earlier in the process I applied set keys for hand movement, and I just went back and tidied it up a bit to make it more fluid and stylized as I wanted it. Though the fingers may be a little miss aligned and not following realistic movement, I feel that these will be of benefit to animators and still create actions such as grasping an object or spreading the fingers out when resting on tables.



Overall my model has turned out as I had hoped it would with only a few understandable set backs. My script that I have created for this project, although not exactly colourful allows the user to select and reset the control shapes of the model. this I hope will be a boon for anyone especially as it allows for specific selection as well as maps out the controls around the model and the face in a seperate close up window.



This is going to be my submission as it stands, I would have liked to have achieved more however I have enjoyed the experience and understand what would need to be done with hindsight.