

CITS3003 Project Part 2

Jake Nelson 20752958

June 1, 2017

1 Overview

The required functionality for the second element of this project has been implemented and tested comprehensively, and there are no known errors in our implementation. Raj Sembi and I worked on implementing the animation together including the walking back and forth and modifying the speed of walking, our models separately, and I implemented freezing the animation for my individual functionality.

2 Implementation

2.a Texture Scaling

Implementing texture scaling was done by simply replacing the value of 2 in the appropriate position of the fragment shader with the texScale variable which was already being set.

2.b Modelling and Animation

My model, of a rough analogue of a cowboy, was created by following the tutorial supplied, and then sourcing further tutorials and material to learn how to create a slightly more advanced model, as well as a large amount of trial and error. I did not experience any difficulty with the steps or process to create the armature rig nor mesh, and was able to build a reasonable model.

2.c Exporting

Once the model was created it was exported as per the instructions prior to adding animation, which was useful to ensure that settings had been used correctly within Blender. At this stage there were minor issues that needed to be fixed, although none that were not anticipated by the project brief, and all these minor issues were able to be resolved by following the various steps listed.

2.d Coding Animations

The steps supplied were followed in order to add initial animation support, and with a little trial and error and debugging efforts, this was implemented. The supplied model of a monkey head was added to the scene at this point in order to ensure the animation was implemented correctly.

The process by which the model is animated along a walking path back and forward is through a simple translation which is applied after accounting for the objects current rotation. The speed is configurable via the menu, as is the distance, both of which determine the perceived walking of the models. The speed can be toggled through pre-set values, and the distance can be increased or decreased by a flat multiple or reset to the initial value. The boolean ahead keeps track of whether the model is in its forward or backwards walking movement phase.

```
vec4 xyz;
if (sceneObj.meshId >= 56){
    xyz[0] = 0.000; xyz[1] = 0.000; xyz[3] = 0.000;
    if (north){
        xyz[2] = -speed * steps;
    }
    else {
        xyz[2] = (-speed * numSteps) + (speed * steps);
    }
    if (animated){
        steps++;
    }
    if (steps >= numSteps){
        steps = 1; ahead = !ahead;
    }
}
xyz = rotation * xyz;
mat4 model = Translate(sceneObj.loc + xyz) * rotation * Scale(sceneObj
    .scale);
```

A new variable was added to the sceneObjs struct to enable models with varying numbers of animation frames to be displayed correctly. The frames variable is used to determine the frame to display at a given time and is taken from the number of frames in the animation.

2.e Individual Functionality

The freeze time (pausing or unpausing) effect feature was added by only updating the frame to display from the animated model if the animation boolean is set to true, and adding a function to the menu to toggle this value.

```
if (animated){
    frame = glutGet(GLUT_ELAPSED_TIME)/20%sceneObj.frames;
}
calculateAnimPose(meshes[sceneObj.meshId], scenes[sceneObj.meshId], 0,
    frame, boneTransforms);
```

```
glUniformMatrix4fv(uBoneTransforms, nBones, GL_TRUE,  
                   (const GLfloat *)boneTransforms);
```

3 Reflection

Overall I found the second part of this project was manageable, although further resources on both Blender and the process to implement animations at the beginning of this second stage would have been useful with regards to figuring out what to change, or the exact process to build. The modeling was not as technically challenging, however I did find this process very time consuming as I had no experience with Blender. I was surprised by the amount of planning and thinking required for what seemed to be simple, and overall the project was valuable.