CSCI 6555 Computer Animation

**Lab 2 Report**

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**I. Brief description of the system**

The system use a set of control points and two kinds of interpolation splines as input, and output the animated view of the figure wandering across the world. Each control point is presented as 7 parameters in Quaternion format and defines the trajectory of the walking figure. The figure consists of one torso, two legs, two arms and one head, and the coordinates of all these components are transformed to the torso coordinate system. The user can choose the splines as Catmull-Rom spline or B spline. Also, the system allows speed control of the animation. For simplicity, use cuboid to present torso, legs and arms, use sphere to present head.

This lab is based on lab1, the main movement of torso used the quaternion interpolation, then use forward kinematic to add some joint to the torso and finally implement the hierarchical object motion control system.

**II. Description of code**

Firstly, use the code in lab1 to achieve torso movement, this step include quaternion interpolation, normalization and get corresponding quaternion transformation matrix. The functions are:

GLfloat ComputeQ(GLfloat T[4],GLfloat M[16],GLfloat G[4])

void Interpolation (GLfloat MatrixType[16],GLfloat Object[5][7],GLfloat Q[7])

void Normalize(GLfloat ParameterArray[7])

void getMatrix (GLfloat ParameterArray[7],GLfloat Matrix[16])

Based on lab1, there are some additional function:

* A function to calculate 4\*4 matrix multiplication. This function multiple two 4\*4 matrix M1 and M2, and store the result to the Result matrix.

void MultiMatrix(GLfloat Result[16],GLfloat M1[16],GLfloat M2[16])GLfloat

* Functions to achieve forward kinematic to transform the joints to the torso coordinate. For legs and arms, this step contains two translations and one rotation, for head, this step contains one translation.

These functions are:

void LeftLeg()

void RightLeg()

void LeftArm()

void RightArm()

void Head()

* Finally display the torso, legs, arms and head. This step contains some scales of the components.

void DisplayTorso()

void DisplayLeftLeg()

void DisplayRightLeg()

void DisplayLeftArm()

void DisplayRightArm()

void DisplayHead()

**Ⅲ. Summary**

The system implements the basic hierarchical object motion control. But there are some problems in the process of transform of the coordinate system, the direction of the torso is unpredicted, and the camera also rotates unpredicted. So the walking and the light are sometimes weird. For further work, there should be some promotion of the code to solve the problem.