DH2323 Computer Graphics and Interaction

Project specification

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Description

We are aiming to create a nice looking 3D cloth material that renders in real time, using SDL and maybe (if we can make it work) some Open GL for GPU acceleration, or try to use a couple of threads on the CPU. We will take inspiration from the one found here, and try to do a similar one in 3D space. You should be able to interact with the cloth in real time with the mouse.

We are aiming to get an A, so we would be happy to get some feedback if we need to add more advanced features to meet the criteria.

Background

The physics of cloth rendering takes a lot of computation power to get right. This is a big challenge to do in real time when you ramp up the polygon count of the cloth surface. Most of the models that we found used nodes with three different types of springs. It seems like the bests results have been implemented with the GPU.

Technology overview

IDE:

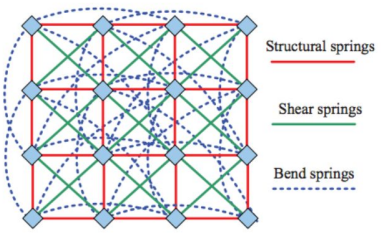
- Visual Studio 2015
- Xcode

Renderer:

- Rasterization using the raytracer from lab3, based on SDL in C++
- (maybe some Open GL for GPU acceleration)

Implementation

Implement the structural model with 3 types of springs that looks something like this:



Expected outcome

The goal of our project is to implement an interactive real time cloth in 3D. The cloth will react realistically to movement when dragged by the mouse.

Links

Unite 2016 - GPU Accelerated High Resolution Cloth Simulation
https://www.youtube.com/watch?v=kCGHXlLR3l8&t=1825s

A GPU-based Streaming Algorithm for High-Resolution Cloth Simulation
http://gamma.cs.unc.edu/gcloth/cloth.pdf

Deformation Constraints in a MassSpring Model to Describe Rigid Cloth Behavior
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.84.1732&rep=rep1&type=pdf

Accelerating Cloth Simulation with CUDA
http://www.andrew.cmu.edu/user/iheath/418/cloth/CUDAClothSimulatorFinalReport.html

Tearable Cloth
http://codepen.io/dissimulate/pen/KrAwx/