COMP 5411 : Advanced Computer Graphics
Fall 2017
Programming Assignment 2
Released: Tuesday, October 10, 2017
Due: Saturday, October 21, 2017

In this assignment, you are required to implement a differential-based mesh editing technique. The technique you need to implement is the Laplacian editing technique based on the following paper:

Laplacian Surface Editing (in SGP'2004)

URL: http://igl.ethz.ch/projects/Laplacian-mesh-processing/Laplacian-mesh-editing/

The interface has been implemented to allow you to focus on the technique details. Below are the detailed specifications:

- Implement the naïve Laplacian editing without involving finding the local rotations, i.e., without T_i. Please use the cotangent-weighted Laplacian matrix instead of the uniform-weighted Laplacian matrix.
- *Extra credits.* Implement the Laplacian editing technique with the approximated local rotations instead, i.e., find the T_i. See a brief description in the supplemental slides. For more details, please refer to the paper.

The sample code used in the previous assignments contains an empty class called "Deformer". You need to implement this class for handling the surface editing. To solve the resulting large sparse linear system efficiently, you need to pre-factorize it using sparse Cholesky factorizations in the **Eigen** library. See the comments in the code for more details.

Submission

Please submit your zipped file with a name "COMP5411_[Your_full_name]_[Your_student_ID]" to CASS Submission System at `https://course.cse.ust.hk/cass`.

The following items are required in your zipped file: 1) compilable source code; 2) executable program; 3) a report in pdf format. Specifically, the report should contain the following information:

- Screenshots of the meshes before and after editing. At least you need to include these three test-case meshes: "data/dinosaur.obj" "data/feline.obj" "data/knight.obj"
- Your discussion and conclusion on the implemented Laplacian based editing method..

Please add detail code comments to the core functions used in your program, e.g., what does one piece of codes do, so that the TA can easily understand your code. If you use any special library, please state it in the report.