COMP5411 Programming Assignment 1

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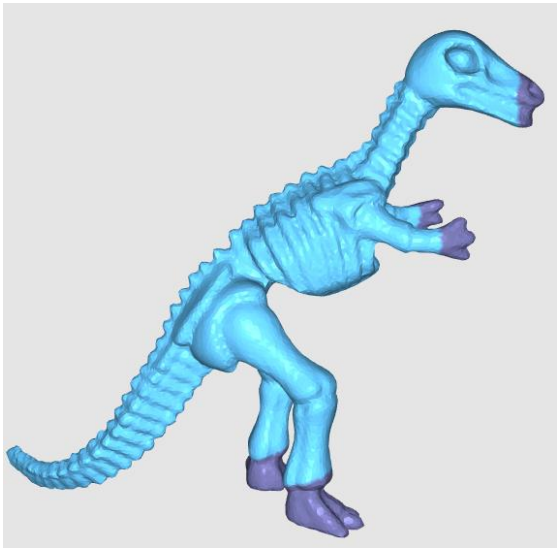
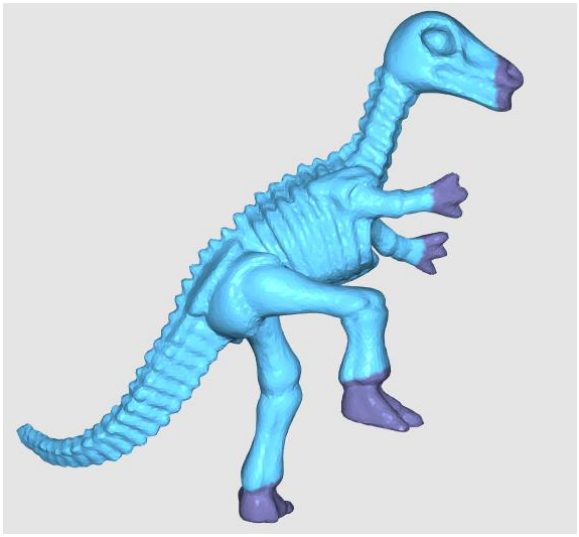
1) Screenshots of the meshes before and after naïve Laplacian editing

Test-case mesh: dinosaur.obj



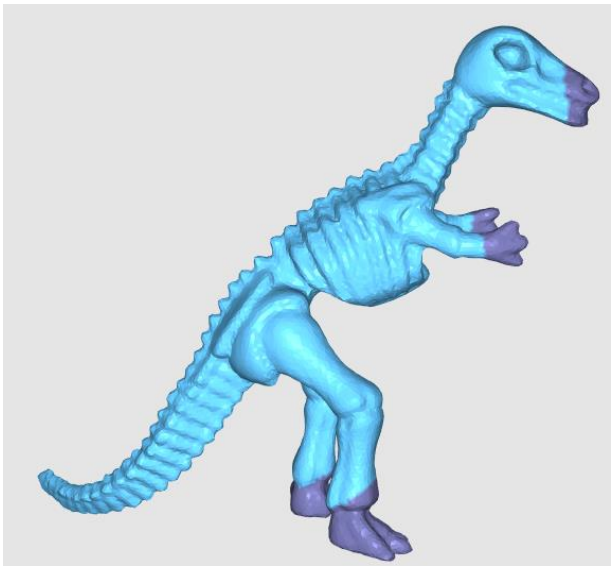


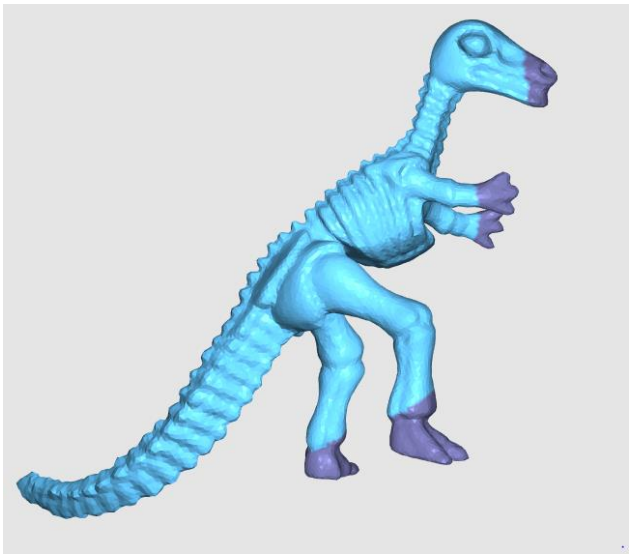
Test-case mesh: feline.obj

Test-case mesh: knight.obj

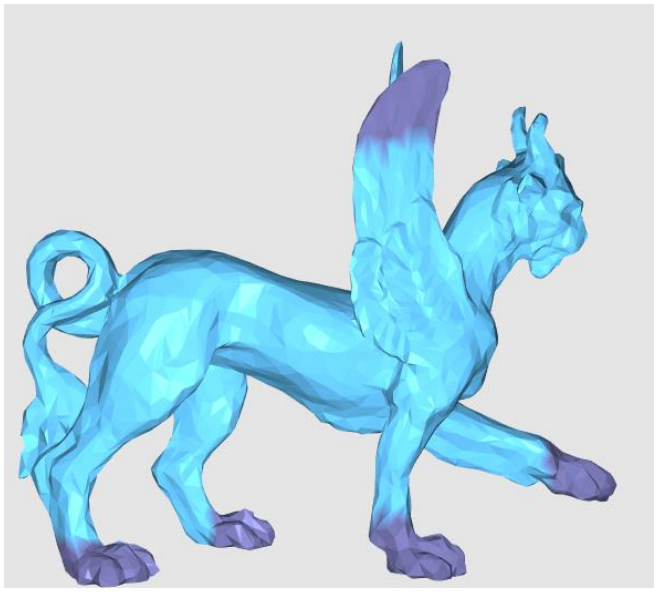
2) Screenshots of the meshes before and after Laplacian editing with the approximated local rotations.

Test-case mesh: dinosaur.obj





Test-case mesh: feline.obj



Test-case mesh: knight.obj

3) Discussion and Conclusion.

a. It's obvious that the naïve Laplacian editing computes faster than the editing with local rotations.

b. The naïve Laplacian editing is sensitive to the rotation. Given the large scale deformation, the performance is not good. The Laplacian editing with local rotations does the computations based on the transformed Laplacian coordinates. It achieves better performance.

c. The implementation needs to deal with lots of linear system computations. I paid much attention to the matrix generation and calculation. When implementing the naïve Laplacian editing, the sizes of the matrices A, V', B are (N+M)*N, N*3, N*3 respectively. However, due to the algorithm of generating the T matrix in the Laplacian editing with local rotations, the sizes of the matrices A, V', B are changed to be (3N+3M)*3N, 3N*1, 3N*1, respectively. It can be easier for computation with the x, y, and z coordinates on the same column in this case.

d. Finally, I provide two executions, one for naïve Laplacian editing, the other for the editing with local rotations. Detailed code comments to the core functions used in my program are added in the source codes.