Mesh Editing: Deformation

Idea

https://github.com/alecjacobson/geometry-processing-deformation
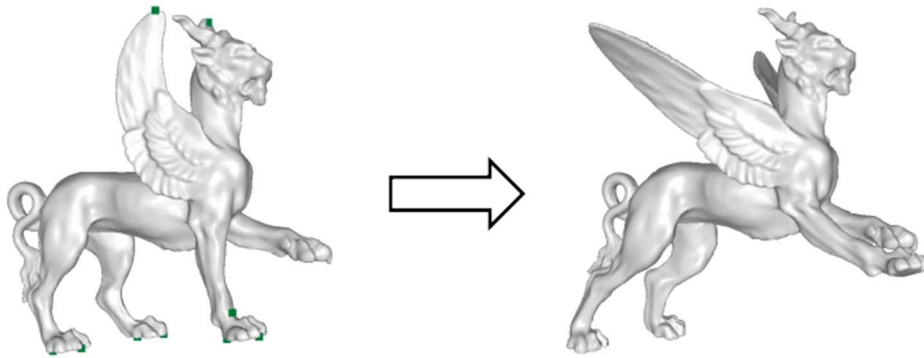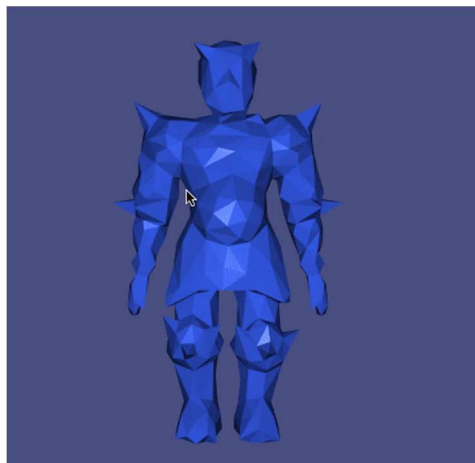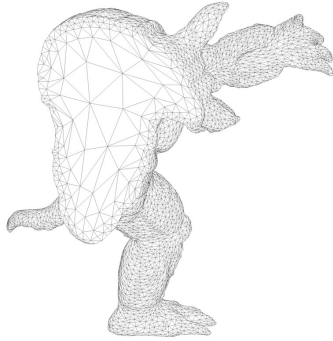
Physics Based Methods

-Use a Volumetric mesh

-Solve equations of motion with
-appropriate boundary conditions (handle verts)
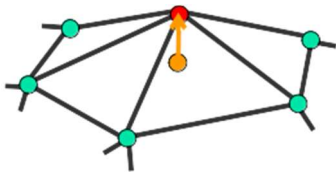- appropriate stress-strain model (P)

$$-\nabla P^T(u) = 0$$

Physics Based Methods

- Interactive rates

    Oak example: http://run.usc.edu/substructuring/

2/25/2019

Geometry Based Methods

- Only use surface information
- Example: minimize deformation surface Laplacian

$$L(x)_i = x_i - \frac{1}{d_i} \sum_{j \in \mathcal{N}(i)} v_j$$
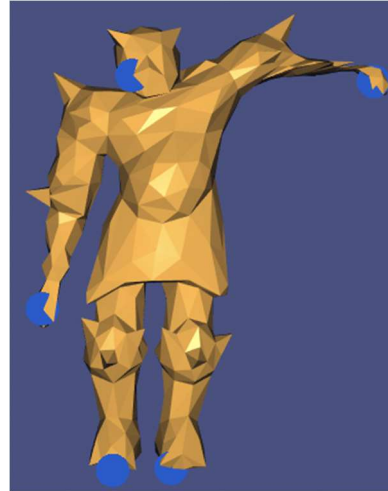
Minimizing Laplacian

$$L(x)_i = x_i - \frac{1}{d_i} \sum_{j \in \mathcal{N}(i)} v_j$$

$$x' = \min \|L(x') - L(x)\|_2$$
subject to specified handle positions

Minimizing Laplacian

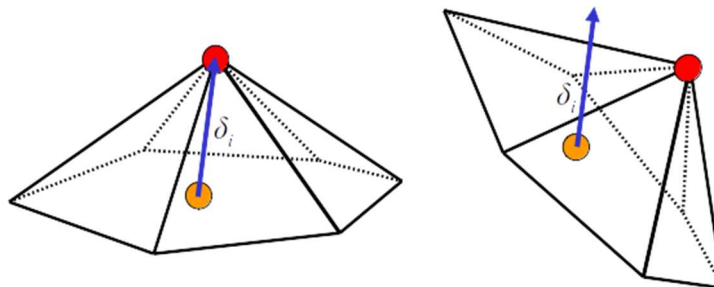$$L(x)_i = x_i - \frac{1}{d_i} \sum_{j \in \mathcal{N}(i)} v_j$$

$$x' = \min \|L(x') - L(x)\|_2$$
subject to specified handle positions

Minimizing Laplacian

Not rotation invariant
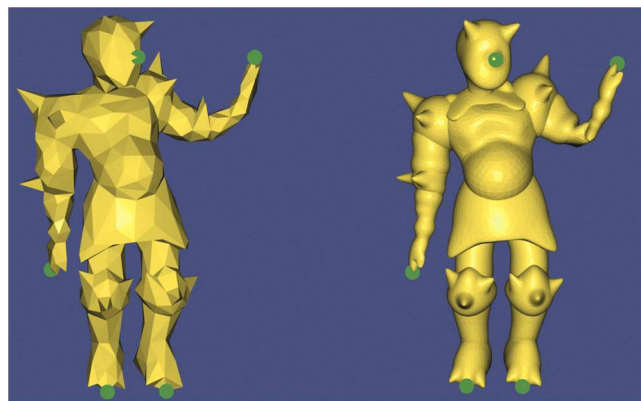
As-Rigid-As-Possible Energy

- Interactive Demo

https://github.com/alecjacobson/geometry-processing-deformation

As-Rigid-As-Possible Energy

- Drawback (depending on application)

https://github.com/alecjacobson/geometry-processing-deformation

As-Rigid-As-Possible Energy

- Equations: (whiteboard)