Character Skinning

Some terms...

- **rigging**
  - given a mesh model, the process of creating a skeleton and then adding and binding the skin geometry
- **skinning**
  - given a character skin model, how should it move with the underlying skeleton?
- **techniques**
  - model muscle and skeleton geometry, then add skin
    - linear blend skinning (a.k.a. SSD)
    - scattered-data interpolation

Linear Skin Blending

- model vertex in a number of local coord frames

\[ v_i = M_{iw_d}^{-1} v_d \]

Determine local coords from dress pose

\[ v' = \sum_i w_i M_{iw_i} v_i \]

Determine new world coords using a convex blend of transformed coords

[J.P. Lewis et al., SIGGRAPH 2000]
Linear Skin Blending

- hardware support
- choosing weights?
  - rules based on distances to joints
  - have an artist “paint” them on
- problems ...

\[ w_i \propto \frac{1}{d_i} \]

[J.P. Lewis et al., SIGGRAPH 2000]

Linear Skin Blending

- fixes
  - add extra “virtual” bones (frames)

Scattered Data Interpolation

- given example poses
  - automatically fit linear skin blend model
    - [ Mohr & Gleicher 2003 ]
  - radial basis functions, etc.
    - [ 5 other papers on handout ]

[Sloan et al., 2001]
Scattered Data Interpolation

- shape interpolation

Figure 6. Exploration of the space can reveal problems with the interpolation.

Figure 5. Pseudo-example (the upper right and left corner forms) can reparameterize the space, fixing up problematic regions.

[Sloan et al., 2001]

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