Overview

Aspects of Visual Computing

- Aesthetic
- Geometry
- Imaging
- Animation
- Deep

High-pass Quantization

Positive error – vertex moves outside of the surface
Negative error – vertex moves inside the surface

Cartesian quantization 8b/c
δ-quantization 7b/c
4 anchors
δ-quantization 7b/c
20 anchors
δ-quantization 7b/c
2 anchors

"High-pass Quantization for Mesh Encoding", Sorkine et al. 03

Quantizing differential coordinates

- Find the differences between the horses...

Quantizing differential coordinates

- This is the model after quantizing δ to 8 bits/coordinate
- There is one anchor point (front left leg)

Quantizing differential coordinates

- Original model
Quantizing differential coordinates

- This is the model after quantizing \( \delta \) to 7 bits/coordinate, one anchor

Some results

- Original
- \( \delta \)-quantization, entropy 7.62
- Cartesian quantization, entropy 7.64

We compare to Touma-Gotsman predictive coder that uses Cartesian quantization.

Least-squares Meshes, 2004

Differential Surface Editing

iWIREs:
Intelligent Shape Editing

Solid texture synthesis
Korp et. al. SIGGRAPH 2007

Surface Reconstruction

Interactive Topology-aware Surface Reconstruction, SIGGRAPH 2007
Reparameterization-Free Projection, SIGGRAPH 2007
Fit and Diverse: Set Evolution for Inspiring 3D Shape Galleries
Decomposition for 3D Printing
Connected Fermat Spirals for Layered Fabrication
Imaging
Feature-aware Mapping [Gal et al. EGSR 2006]
Retargeting
Image Completion
Drori et. al. SIGGRAPH 2003

How to recolor a photo?

Synthesizing a New Variant

Navigating in a Gallery

Color Harmonization
SIGGRAPH 2006

Digital Face

Digital Face
RingIt
- Compute full all-pairs dissimilarities.
- Refine the KNN and remove the larger distances.
- Perform spectral analysis to recover the ring-order.

Unorganized Image Collections
The challenge: Finding the camera orientation relative to the object.

Screening Inliners

Outliers are random

Body ReShaping
Model-based editing

3Sweeps

Texture Weathering

Deep into Geometry and Imaging

The challenge:

Finding the camera orientation relative to the object.