Texture Synthesis

Presented by James Hays

Problem Statement
Problem Statement

- No easy fix
- Limited by texture memory and artist man-hours

Texture Spectrum
Real world texture

Tiling
Tiling

Texture Synthesis Result
Texture Spectrum

Another Justification
Approaches

• First approach – toy with some noise image until it matches the statistics of the input image.

Texture Spectrum
Approaches

• Newer approach – Copy pixels directly from the input. Search instead of model.

Texture Spectrum
Approaches

- Newest approach – Copy patches directly from the input and worry about stitching them together

Texture Spectrum
Approaches

• Newest approach – Copy patches directly from the input and worry about stitching them together while enforcing periodicity.

Texture Spectrum
Limitations

Neighborhood Based Methods

- This is what you will be implementing for homework 4.
Neighborhood Based Methods

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Neighborhood Based Methods

• There is one significant parameter

Neighborhood Based Methods

• Several meaningful extensions
  – Hole filling
  – Coherence Parameter
  – Targeted Synthesis
  – Multiresolution Synthesis
  – Analogy Based Synthesis
  – Acceleration
  – Your Brilliant Idea
Neighborhood Based Methods

- Hole filling
Neighborhood Based Methods

- Coherence Parameter

With C.P.  Without  With C.P.  Without

Neighborhood Based Methods

- Coherence Parameter
  - Targeted Synthesis
Neighborhood Based Methods

- Multiresolution Synthesis

![Multiresolution Synthesis Example](image)

- Analogy Based Synthesis

![Analogy Based Synthesis Example](image)
Neighborhood Based Methods

- Acceleration

Non-photorealistic rendering
Non-photorealistic Rendering

Paint by numbers
Colorization

Perspective synthesis
Perspective synthesis

Rotation invariant synthesis
Movies

More neat stuff

Near Regular Manipulation