StyLit

Illumination-Guided Example-Based Stylization of 3D Renderings

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2 Adobe Research
The Holy Grail of NPR

Passing a “Turing Test” for CG Imagery (David Salesin, NPAR 2002)
Image Analogies [Hertzmann et al. 2001]
Example-Based Approach

Render of 3D Model  Style Exemplar  Our Result
Image Analogies [Hertzmann et al. 2001]

Stylized Source

Stylized Target using Image Analogies

Our Result
Motivation for Better Guidance

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Decomposing Illumination Effects

Light-Path Expressions (LPEs) [Heckbert et al. 1990]

Direct Diffuse

Indirect Light

Direct Specular

$1^{st} + 2^{nd}$ bounce
Image Analogies using LPEs

Source

Target

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Image Analogies using LPEs

Source scene

Style exemplar

Target scene
Image Analogies using LPEs

Source scene

Style exemplar

Target scene

Synthesis using original greedy algorithm

[Hertzmann et al. 2001]
Image Analogies without LPEs

Source scene

Style exemplar

Target scene

Synthesis using original greedy algorithm
[Hertzmann et al. 2001]
Image Analogies using LPEs

Source scene

Style exemplar

Target scene

Synthesis using original greedy algorithm [Hertzmann et al. 2001]
Image Analogies using LPEs

Source scene

Style exemplar

Target scene

Synthesis using energy minimization
[Wexler et al. 2007; Darabi et al. 2012]
Motivation for Better Synthesis Algorithm

Texture Synthesis

Wash-Out Effect
[Newson et al. 2014]

Texture synthesis with uniform usage of exemplar patches

Exemplar

[Wexler et al. 2007]
[Darabi et al. 2012]

[Kaspar et al. 2015]
[Jamriška et al. 2015]
Uniformity Enforcement [Jamriška et al. 2015]
Uniformity Enforcement [Jamriška et al. 2015]

Source scene

Style exemplar

Target scene

Synthesis of target scene with uniform usage of exemplar patches
Results
Applications

Animation
Applications

Interactive shading study
Pushing the Limits

Changing light source position
Pushing the Limits

Changing view point
Conclusions

Take-home messages:

1) **Illumination-specific guidance**
   for faithful style transfer

2) **Adaptive uniformity**
   for exemplar’s richness
Demonstration