Interactive Real-Time BRDF Editing under Environment Lighting

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Motivation

How do we edit an object’s BRDF?

BRDF: 
(Ashikhmin-Shirley)

\[
\rho_{AS} = \frac{\sqrt{(n_u+1)(n_v+1)}(\cos \theta_h) n_u \cos^2 \phi_h + n_v \sin^2 \phi_h}{8\pi \theta_d \max (\cos \theta_i, \cos \theta_v)} F(\theta_d)
\]

Ben-Artzi et al., 2006
Goal:

- Real-time interactive BRDF editing system
- Paint edits directly on material
- Show objects under environment lighting
- Edit intuitive material properties
- Give artistic freedom while maintaining photorealism
**Background:** Interactive BRDF Editing

Colbert & Pattanaik, 2006

Ben-Artzi et al., 2006

Pellacini & Lawrence, 2007
**Implementation**: Real-time editing

- Pre-render images of a sphere under environment and point source lighting
- Vary values of $k_d$, $k_s$ and $\sigma$
- At runtime, add pre-rendered components together
- Interface to interactively edit diffuse colour and specular properties
Demo
Next Steps

What other editing options should the user have?
Next Steps

Proposed editing modes:
- Diffuse colour
Next Steps

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- Diffuse colour
- Specular colour

Ben-Artzi et al., 2006
Next Steps

Proposed editing modes:
• Diffuse colour
• Specular colour
• Sharpen / blur

Ben-Artzi et al., 2006
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- Diffuse colour
- Specular colour
- Sharpen / blur
- Stretch highlights

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Options for all modes:
- Brush
- Fill
- Clone
Thank you!

Questions?