Perceptual and Artistic Principles for Effective Computer Depiction

Frédéric Durand
Laboratory for Computer Science
Massachusetts Institute of Technology

Introduction

- Different views on picture making
  - Perception & cognition
  - Artistic practice
  - Computer graphics
- Connections between these fields
- Not directly an “how-to” course
- Not a reduction of Art

Art and Science

- Music
  - Psychoacoustics, harmony, musical scales, etc.
- Language
  - Grammar, linguistic, etc.
- Do not ruin the beauty of symphonies & poems
- Science provides insights, structure, context,
  - But there is always some remaining magic and genius.

One-way image generation

- From 3D to 2D
- Optical simulation or recording

Depiction is actually more complex

Perception & Cognition
Message, goal

Real scene
(possibly imaginary)

Picture

Real scene: 3D geometry
Material
Light

Image
Speakers
• We are computer scientists
• We use perception & cognition knowledge
• We try to learn from artists
• Maneesh Agrawala, Stanford University
• Frédéric Durand, MIT
• Bruce Gooch, University of Utah
• Victoria Interrante, University of Minnesota
• Victor Ostromoukhov, University of Montreal
• Denis Zorin, New York University

Overcoming the limitations of the medium
• 8:40 Limitations of the medium (Durand)
• 9:25 Perception & representation of shape and depth (Interrante)

Color and Perspective
• 10:35 Color (Ostromoukhov)
• 11:25 Perspective and perception (Zorin)

Picture composition and organization
• 1:30 Focus and gaze (Durand)
• 1:55 Gestalt and composition (Durand)
• 2:35 Neurological theories of aesthetic (Gooch)

Beyond projection
• 3:35 Computational vision and pictures (Durand)
• 4:25 Effective visualization and illustration using cognitive science (Agrawala)

Please share your knowledge
Coming soon…

- Web page: http://gfx.lcs.mit.edu/ArtScience02/
- Latest version of slides

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An example: color

- Blue & yellow are opponent in the visual system
- Van Gogh’s painting uses this effect
- The existence of color opponents has implications in visualization and color technology