State of the Art in Photon Density Estimation

Introduction

SIGGRAPH Asia 2013 Courses
Friday, 22 November I 09:00 - 12:45 I Room S222
Why Photon Density Estimation?

- Versatile
  - Lots of illumination effects by one algorithm

- Customizable
  - Artist-friendly and adaptable to production pipelines

- Active research area
  - Difficult to keep up with advances
What you get out of this course

- Trends in photon density estimation
- Core ideas of recent technical developments
- Advanced course
- Covers both theory and practice
What you should already know

- Basics of rendering, ray tracing, path tracing
- Only cover photon mapping basics briefly
Lecturers

Iliyan Georgiev
Saarland University

Derek Nowrouzezahrai
Université de Montréal

Anton S. Kaplanyan
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Acknowledgements

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► Slide credits:
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  ▶ Mattias Zwicker
  ▶ Wenzel Jakob
  ▶ Ben Spencer
1) Regular Photon Density Estimation

Photon Mapping Basics [15 minutes]

Wojciech Jarosz (Disney Research Zürich)
2) Progressive Photon Density Estimation

- Progressive Photon Mapping Basics [15 min]
  - Toshiya Hachisuka (Aarhus University)
- Probabilistic Formulation of PPM [15 minutes]
  - Toshiya Hachisuka (Aarhus University)
- Progressive Photon Mapping Extensions [20 min]
  - Toshiya Hachisuka (Aarhus University)
- Adaptive PPM [15 minutes]
  - Anton S. Kaplanyan (KIT)
3) Density Estimation in Participating Media

- Participating Media Basics [15 min]
  - Wojciech Jarosz (Disney Research Zürich)

- From Photons to Beams [20 min]
  - Wojciech Jarosz (Disney Research Zürich)

- Photon Beams in *Tangled* [15 min]
  - Derek Nowrouzezahrai (Université de Montréal)
4) Beyond Density Estimation

- **Photon Relaxation + Extensions** [15 min]
  - Toshiya Hachisuka (Aarhus University)

- **Progressive EM** [15 minutes]
  - Wojciech Jarosz (Disney Research Zürich)

- **UPS/VCM and Regularization** [30 min]
  - Iliyan Georgiev (Saarland University)
  - Anton S. Kaplanyan (KIT)
http://cs.au.dk/~toshiya/starpm2013a
(updated course notes and slides)
Enjoy!