Seminar aus Computergraphik
186.175, WS 2018/19, 2.0h (3 ECTS)

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Register to course in TISS: to get news & updates

These slides will on the website after this meeting

Official registration: by submitting the literature list

Topics are presented and assigned here today
Seminar Goals

Practice selecting, reading and understanding
• Search and select papers relevant to your topic
• Summarize them as a state-of-the-art report
• Prepare a talk about your topic in the seminar

This permits in-depth familiarization with the topic

More in-depth/spezialized than Bachelor seminar!
If well done → can continue to master thesis ...
Tasks

- Submit a literature list (chosen with supervisor)
- Attendance of 3 lectures
- Meetings with supervisor: paper selection, discussion of papers, preparing talk slides
- Alternative: evaluate and compare algorithms
- Final talk in seminar
Literature List

- Analyze recent papers (select with supervisor)
- Study secondary literature to understand topic
- How to find relevant papers:
  - SIGGRAPH Proceedings
  - Google Scholar: find the right key words
  - Survey papers, often-referenced papers
- Submits a list of 10+ papers per email to supervisor & me → official registration
• 8 pages per student, preferably in English
• Format in the style of a scientific paper
• Use LaTeX template on course website
• LaTeX tools and guides also on the website
• Submit the draft in PDF format, per email to supervisor+organizer
• Draft has to be **complete and min. 8 pages!**
Scientific Review

- You will get a draft of another student to review
- Typical conference review form (Eurographics)
- This helps author to improve the manuscript
- Guides on review writing on course website
- You will receive 2 reviews (student, supervisor)
- Improve final report according to reviews
Seminar Talk

- Prepare slides in advance, using template
- Each student talks for 15 minutes, English pref.
- 5 minutes discussion after each talk
- Focus is on overview/comparison of methods
- Present so that other students will understand it
- Active discussion is mandatory and is graded
- Submitted slides are presented on seminar PC
• Lecture attendance 5%
• Review: 20%
• Seminar slides+talk: 30%, discussion 5%
• Final report: 40%

• Late submission: 15% off per day, max. 1 week (this also concerns the draft!)
Important Dates

- 24.10. 23:59 Submit literature list (per email)
- 07.11. 13:00-15:00 Lecture Prof. Wimmer
- 21.11. 13:00-15:00 Lecture Prof. Purgathofer
- 22.11. 13:00-15:00 Lecture Prof. Gröller
- 17.12. 23:59 Submit report draft
- 07.01. 23:59 Submit review
- 28.01. 23:59 Submit slides
- 29.01. 08:00-13:00 Seminar talks
- 29.01. 23:59 Submit final report
Now 15 topics will be presented
After the presentation, please mark down at least 3 in order of preference (1, 2, 3, …)
I will try to make a fair assignment of topics
Analyze parallel ray-tracing systems which are capable of reaching real-time framerates!

- What can be parallelized? And how?
- Which data structures are used (Bounding volume hierarchies)
- Analyze different approaches and frameworks
- Describe recently introduced APIs/frameworks (Nvidia RTX, DirectX12 Ray-Tracing)
2 GPU Voxelization Algorithms

- Voxelized representation of a 3D scene
- GPU algorithms (not offline algorithms)
- Different voxelization approaches
- Applications of voxelized 3D scenes
provide an overview of specialized ray-tracing hardware in research and industry
provide an overview of algorithms and models for rendering hair and fur
Survey of different approaches
- Procedural model-based
- Fluid-based
- …
6 Fracturing

- Destruction of objects
- Static methods
  - Fast
  - Careful preparation
  - Implausible
- Dynamic methods
  - More realistic
  - Simplifies model preparation
  - Compute-intensive
Conduct a survey on signed distance field rendering.
Conduct a survey on sound rendering techniques.
Applications

• Medical applications
• Behavioral science
• Foveated rendering, VR / AR

Algorithms / Methods

• fixation identification [1]

Hardware [2]

10 Locomotion in VR

- Player movement in VR
- Re-Routing
- Teleports
- Motion sickness
Investigate ways on how to create 3D-models from 2D-images

(a) 2D-image
(b) Wireframe-structure
(c) 3D-representation

Research most recent trends and developments

The survey should also include

- graph exploration
- on-site visualizations


Manfred Klaffenböck
13 Software Rasterization

- e.g. Rendering with C++ or CUDA
14 Compute Shaders in Rendering

- More flexible and powerful than regular shaders
- Research use cases and Algorithms, e.g.
  - Particles, Image Processing, Physics, Visibility Culling, Lights, Mesh Generation, etc.
Convolution on graphs+surfaces instead of images
Applications to: shape analysis, but also other fields such as social networks, finance, brain functions
• Please mark at least 3 topics in order of preference (1, 2, 3, …), with your name, email and student number

• Hand in the sheet

• Then I will assign the topics on the spot
Questions?

• Get in contact with your supervisor ASAP
• Discuss literature list with your supervisor
• Submit the list (to both me and supervisor) per email by 24.10.