Project 2 Stage 1

Computer Graphics - Group 1

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TC3022.1 Computer Graphics
Sergio Ruiz-Loza, Ph.D.
Final Project. Second partial.
Final Project teams

Research-based Learning: "from an opinion-based approach to an evidence-based approach"
RBL technique: **Research-led**, where students learn about current research in a given area or discipline. Students write the theoretical framework integrating the main ideas that explain a topic of their discipline.
Topic: Computer Graphics / Global Illumination.

Stage 1. Collecting reliable sources (20%)
Due: Friday, April 30th 2021.
Evidence: a written document with the following structure:
1. Cover
   a. Institutional logo.
   b. Name of the course
   c. Names and IDs of the team members.
   d. Date.
2. Global Illumination
   a. Define **Global Illumination**, using reliable sources.

Global illumination refers to a class of algorithms used in 3D computer graphics which, when determining the light falling on a surface, takes into account not only the light which has taken a path directly from a light source (local illumination), but also light which has undergone reflection from other surfaces in the world. This is the situation for most physical scenes that a graphics artist would be interested in simulating.

   b. Cite using the APA format.
      Carlson, W. (2019). *Computer Graphics and Computer Animation: A Retrospective Overview*. 1st ed. Ohio: Ohio State University.

3. Ray Casting
   Roth, S. D. (1982). Ray casting for modeling solids. Computer graphics and image processing, 18(2), 109-144.

   Bronsvoort, W. F., van Wijk, J. J., & Jansen, F. W. (1984). Two methods for improving the efficiency   of ray casting in solid modelling. Computer-aided design, 16(1), 51-55.

4. Ray Tracing

   Cook, R., Porter, T., & Carpenter, L. (1984). Distributed ray tracing. *Proceedings Of The 11Th Annual Conference On Computer Graphics And Interactive Techniques - SIGGRAPH '84*. doi: 10.1145/800031.808590

   S. Panghal, D. A. Bilung, N. Gupta and G. Kumar, "Enhancing Graphic Performance Curve using Ray Tracing," 2020 12th International Conference on Computational Intelligence and Communication Networks (CICN), 2020, pp. 55-59, doi: 10.1109/CICN49253.2020.9242622.

5. Photon Mapping

Knaus C., Zwicker M. (2011). Progressive Photon Mapping: A Probabilistic Approach. Bern, Alemania. ACM Transactions on Graphics.

Ogaki S., Hachisuka T., Jenssen W. H. (2008). Progressive Photon Mapping. Nottingham. ACM Transactions on Graphic

6. Radiosity

Keller, A. (1997). Instant radiosity. Proceedings of the 24th Annual Conference on Computer Graphics and Interactive Techniques - SIGGRAPH '97.

Hanrahan, P., Salzman, D., & Aupperle, L. (1991). A rapid hierarchical radiosity algorithm. Proceedings of the 18th Annual Conference on Computer Graphics and Interactive Techniques - SIGGRAPH '91.

Stage 2. Discussion (20%)

For each technique, answer questions regarding:
- Overall description of the technique.
- Algorithm.
- At least two examples of its use in software.

Stage 3. Report (60%)
Format: IEEE Brief, Short, or Communications Article.

For the document format, you can get a Word template here
It's also a great opportunity to learn how to write professional documents using LaTeX:
- Free tool: overleaf https://www.overleaf.com/login
- Tutorials: https://www.latex-tutorial.com/tutorials/

The objective of your article, is to:
- Report the definition of Global Illumination in Computer Graphics, using your own words, citing reliable sources.
- Describe, in your own words, citing reliable sources, the way these techniques for GI work (their algorithm):
  - Ray Casting
  - Ray Tracing
  - Photon Mapping
  - Radiosity
- Report the most recent uses of each of these techniques in actual applications.

Global Illumination State of The Art Report	Level 5 (90-100)	Level 4 (80-89)	Level 3 (60-79)	Level 2 (40-59)	Level 1 (10-39)
	Excellent	Proficient	Acceptable	Needs Improvement	Unacceptable
Presentation and English (**20%**)	The paper follows the IEEE brief format and the use of the English language is appropriate	The paper follows the IEEE brief format but the use of the English language needs improvement	The paper doesn't follow the IEEE brief format entirely and the use of the English language needs improvement	The paper doesn't follow the IEEE brief format or the use of the English language is deficient	The paper doesn't follow the IEEE brief format and the use of the English language is deficient
Is the paper technically sound? (**30%**)	The Global Illumination topic and its four techniques are addressed consistently	The Global Illumination topic and three of its techniques are addressed consistently	The Global Illumination topic and two of its techniques are addressed consistently	The Global Illumination topic and one of its techniques are addressed consistently	Neither the Global Illumination topic and its four techniques are addressed consistently
Is the coverage of the topics sufficiently comprehensive and balanced? (**25%**)	Yes	Important information is missing or superficially treated	Treatment somewhat unbalanced, but not seriously so	Certain parts significantly overstressed	One part significantly overstressed, while the rest are ignored
Is the list of references appropriate? (**25%**)	Yes	One or two paragraphs need references	One of the topics does not have a relevant reference	References are insufficient or the reference format is incorrect	References are insufficient and the reference format is incorrect