

ERSP Peer Review Guide *

Proposal Group: Prof. Yan's Group
Readers' Name: Edwin Yee

1. Overview: Read through the entire proposal. Does this paper fulfill the assignment? Can you see what the writer's project is? Does it speak to its intended audience? Give your initial reactions here.

Yes, the paper fulfills the assignment requirements and I can see what the writer's project is. I have very little trouble understanding the paper and it speaks to its intended audience (ERSP class).

Context is very clearly stated and I understand the motivations behind the proposal of using a combination of ray marching with occupancy maps.

The problem statement section feels somewhat choppy, but I understand the problem at hand.

I think the related works section is very useful to my understanding of what the Signed Distance Function, Occupancy Map, Ray Tracing and Ray marching is. I was able to comprehend the explanations of all of these terms that I had never seen before.

The Proposed solutions section reads well and I liked how your group had two solutions with one being a naive step by step approach and the alternate solution being downsampling.

The evaluation section metric seems somewhat vague.

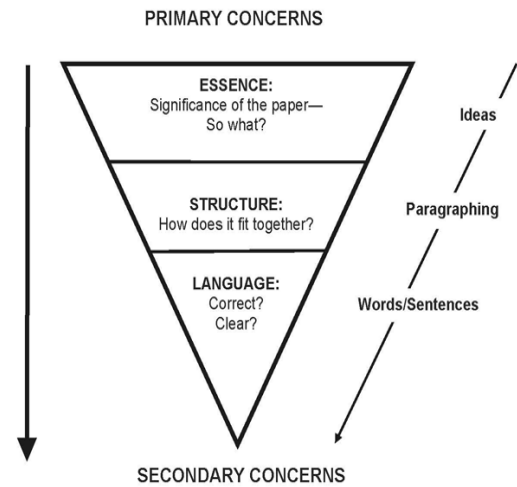
For Metric 1: What 3D animated objects are going to be rendered by tests? Would the shape of the object influence the time it takes to render it? What if the shape is very strange and has many dents? How many "different methods" will be tested in addition to the proposed solution?
For Metric 2: Is there an objective measure for quality of images?

2. Now, go back to the beginning of the proposal and identify the main research problem and main contribution of the proposed work, and write them below. This should be in your own words.

Main research problem:

Rendering good quality 3D objects quickly without expensive graphics card/hardware is not optimal since Ray tracing isn't as fast/efficient as it could be. Additionally, it is difficult to render objects quickly using ray marching because ray marching requires the tracing of many points to the light source.

Main contribution of proposed work:



*figure from College of Wooster Writing Center - www.wooster.edu/writing_center/documents/peercritiquerubric.doc
This document is adapted from a similar document developed for Harvey Mudd College's Writ 001 by Debra Mashek and Matina Donaldson-Matasci

Using a combination of occupancy maps as a 3D binary array and hierarchical ray marching to trace against the occupancy maps to create an efficient ray tracing technique. With the proposed solution, there would be less memory and time consumption and objects could be rendered at a relatively fast speed without the use of expensive GPU and hardware.

3. Next read the introduction and the approach section if needed (again) carefully for the motivation. Does the paper clearly motivate the problem and make you see that this is an important problem? Do you understand how the proposed work will build on previous solutions? Give feedback below.

Yes, the paper clearly states the motivation behind the problem and touches on why this problem is important. I understand how the proposed solution will build on previous works. The paper adequately explains why rendering realistic objects takes too much time and memory and that more advanced hardware that can be used to speed up this process can be expensive.

4. Next, read the proposed approach section and look for the technical details of the proposed work. Do you understand what the group will do? Do you understand how this work will solve the problem? Are technical details clearly motivated with the problems they will solve?

I understand what the group will do but there does not seem to be much technical detail explaining their implementation of ray marching and occupancy maps. I understood the naive approach but was a bit confused about the downsampling approach. I understand how the solutions will solve the problem, but did not know what a voxel looked like until searching it up. What does it mean to downsample the voxel grid to create a layered model of the scene? I have a rough understanding of what is happening from Figure 2, but was unsure if the figure was a representation of the naive or downsampling approach. Perhaps there could be a figure for the naive approach (under the text explaining what the naive solution is) and a different figure for the downsampling approach (under the text explaining what the solution is). In this way the readers could visualize what the similarities and differences are between the two approaches.

5. Next, read the proposed evaluation plan and timeline. Does it seem reasonable and appropriate? Do you have any concerns?

The evaluation metrics seem somewhat vague as I mentioned above. I will paste some of my confusions here:

For Metric 1: What 3D animated objects are going to be rendered by tests? Would the shape of the object influence the time it takes to render it? What if the shape is very strange and has many dents? How many “different methods” will be tested in addition to the proposed solution?
For Metric 2: Is there an objective measure for quality of images?

For the proposed timeline, I think the breakdown of time and time allocated to each of them is very reasonable. Perhaps there could be some more detail about how your team is going to be used to learn how to implement the ray marching algorithm and how to generate an occupancy map. Will your team learn from specific resources online (documentation, YouTube, online courses, websites) or will your mentors teach you or another method? Otherwise, I think this timeline is a good starting point.

6. In terms of style and mechanics, is the writing easy to read and follow logically? Are terms defined adequately? Are citations used correctly? Are there spelling, punctuation or usage errors? Is there a pattern to these errors? Feel free to mark some changes in the document.

The writing is easy to read and follow logically. The terms are defined well and easy to understand. There could be more citations used in the Ray Tracing and Ray Marching section of the Related Works Section. I noticed that there was some strange capitalization and missing punctuation throughout the text. In terms of style, I felt that some areas were choppy such as the problem statement section. However, these are very minor corrections to be made. The general idea and direction of the paper is very clear and concise. There is no excess information or irrelevant details and I think the proposal so far is very good. Some more details could be added about the solutions section, but other than that I enjoyed reading your paper and reading your research context and problem statement.

7. What are at least two things you think are particularly strong in this draft?

The Context and Problem statement is concise and clearly lays out the foundation of the research proposal and why the reader should be interested in reading about the team’s proposed solution.

The Related Works section is very well written and organized and helps the reader solidify their understanding of terms defined in the proposal.

8. What are at least two **specific** suggestions for changes you’d like to see in the next draft?

The solutions section is somewhat ambiguous and could be more clear. I suggest adding a figure for each proposed approach to help the reader visualize what is happening.

The evaluation metric is also somewhat vague and could be improved by having some standardized, objective measurement to evaluate the success of your team's approach. This is if there exists some kind of quality measure metric out there. Additionally, I think that spelling out exactly what kind of "certain 3D animated objects" and "different methods" your team used would help with reproducibility of your research. I also had a few questions on this section (see above).