Bachelor Thesis Review

Faculty of Mathematics and Physics, Charles University

Thesis author	Silvie Paprskářová
Thesis title	Design and Prototypical Implementation of a Radiometrically Calibrated Light Source to Perform Darklight Adaptation Measurements of the Human Eye
Year submitted	2023
Study program	Computer Science
Specialization	Computer Graphics, Vision and Game Development
Review author	Matúš Goliaš Reviewer
Department	Department of Software and Computer Science Education

Overall

	good	OK	poor	insufficient
Assignment difficulty		X		
Assignment fulfilled	X	X		
Total size *... text and code, overall workload*		X	X	

Assignment fulfilment: The student's assignment was to create a temporal model of the human eye's dark-light adaptation, conduct experiments with a suitable apparatus and apply the results to show the model's plausibility. The student accomplished the main goals admirably, and I think her proposed approach is very clever, and the results show that the model is plausible.

Theoretical nature of the thesis: This assignment is more theoretical and doesn't require extensive implementation. That being said, the student hadn't submitted the implementation into SIS before deadline. Similarly, the student didn't include documentation in the thesis. I consider this situation acceptable for a theoretical thesis. Still, I also consider it unwelcome because a bachelor thesis should be a complete piece of work that includes such attachments, even if they are not the primary goal of the thesis. As a result, I am marking the documentation in the next section as "poor", rather than "insufficient" to show that omitting it for this theoretical topic is acceptable but unwanted.

The size of the thesis: Further, the whole thesis has 40 pages (28 pages of the text itself), which is pretty short. Overall, I feel that the thesis is composed more like a journal paper rather than a thesis. That means the text excludes some definitions, illustrations or information that would make it more self-contained. Most of the missing things can be found in the references, but I believe one shouldn't need to read the referenced literature to find an explanation for the student's writing. For instance, on page 26, there is a mention of optical power and 40D/60D, so the thesis should briefly describe a dioptre and focal length. Next, on page 29, the description of the first mentioned factor doesn't make sense without digging through the referenced book - it is unclear what rod and cone branches are. Also, section 2.4.3 could use an illustration of the $V(\lambda)$ function. In general, the text should include more details for people unfamiliar with computer graphics.

Evaluation of the thesis: I do not oppose giving the student "Excellent" grade, provided that she gives reasoning for the reduced size of the thesis and a brief discussion about future work if one wanted to improve upon her work.

Thesis Text

	good	OK	poor	insufficient
Form *... language, typography, references*		X		
Structure *... context, goals, analysis, design, evaluation, level of detail*		X		
Problem analysis	X	X		
Developer documentation			X	
User Documentation			X	

Language and references: The thesis is easy to read, and it is well-separated into chapters and sections. The student's English writing is at a high level. However, some grammatical and syntactic mistakes are noticeable, e.g. "build-in/built-in", "of/at", "capturing/captured", or "in the Figure/in Figure". The text also includes 21 well-placed and relevant references. The student also uses "we" when describing the referenced algorithms instead of "the authors," but I don't consider that a problem.

Structure: The structure of the thesis is very good. The only problem I found was that the description of the human visual system (section 3.2.1) shouldn't have been in the results chapter but in the introduction or methodology.

Missing discussion and future work: One part I found missing was the discussion of alternatives, extensions or future work. What would it take to get more accurate results? Would a better camera, light meter or using RAW images instead of processed ones help? Is there a way to incorporate HDR imaging (composition of multiple LDR images at different exposures into an HDR image) into the model's pipeline? I understand that such composition might break exposure-dependent parts of the model, but is HDR inclusion in the model difficult, impossible or useless?

Problem analysis: The problem of dark-light adaptation and mathematics of the proposed model are very detailed and well explained.

Missing documentation: The documentation is missing from the thesis, but it is acceptable for this theoretical topic, although I would like both the documentation and implementation to be included.

Thesis Code

	good	OK	poor	insufficient
Design *... architecture, algorithms, data structures, used technologies*		X		
Implementation *... naming conventions, formatting, comments, testing*		X		
Stability		X		

Code for a theoretical thesis: I consider the implementation adequate for a theoretical thesis where it serves the purpose of verifying the plausibility of the proposed dark-light adaptation model. I commend the student for her implementation of the two referenced (camera response function recovery) algorithms from their respective journal papers.

Implementation not submitted: An important note is that the student had not submitted her implementation into SIS before the deadline. I got access to it later by asking the student. Fortunately, her project is in a git repository, and I verified that the project's state before the deadline was in proper order.

Overall grade Very Good (better)

Award level thesis No

Date 24. 08. 2023 **Signature**