

Posudek bakalářské práce

Matematicko-fyzikální fakulta Univerzity Karlovy

Autor práce Antonin Teichmann
Název práce Real-time Visualization of Chaotic Functions
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Studijní program Informatics **Studijní obor** Programming and Software Systems

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K celé práci lepší OK horší nevyhovuje

Obtížnost zadání

X

Splnění zadání

X

Rozsah práce ... *textová i implementační část, zohlednění náročnosti*

X

Komentář This is a work that deserves full commendation and I don't hesitate to say also to be a yardstick for future theses.

First, Antonin worked diligently on the thesis for nearly a year. In spite of the somewhat exotic topic, he took the work seriously and gave thorough consideration to any input I had. At the same time, he did not just blindly follow what I told him, but made his own mind and his own choices. This is clearly visible throughout the thesis, as all these choices are acknowledged and where needed, justified. As a result, Antonin did not only gain knowledge: he took ownership for his own decisions. I cannot emphasize enough how valuable that is.

Second, the original assignment has been to develop an efficient fractal renderer. However, during the work it soon became clear there is a deeper layer to the topic: the generalization to chaotic functions. Antonin did not hesitate to dig deeper, understood this conceptual distinction, and did his own reading in order to conduct the work on this level. He worked beyond the requirements of a regular thesis and I myself have gained new understanding from reading the the text and the whole process towards it.

Textová část práce lepší OK horší nevyhovuje

Formální úprava ... *jazyková úroveň, typografická úroveň, citace*

X X

Struktura textu ... *kontext, cíle, analýza, návrh, vyhodnocení, úroveň detailu*

X

Analýza

X

Vývojová dokumentace

X

Uživatelská dokumentace

X

Komentář The thesis is written in a very solid English, rigorously but with certain playfulness. The structure flows and facilitates easy understanding of the topic. The story of the work is captured as well -- this obviously expands it a little, but I'm happy to take that extra time. Admittedly some formulations are a bit unrefined and there are a few typos here and there, but the fact that this is the only piece of criticism I can offer says a lot about the overall quality of the thesis.

The documentation is complete and thorough; especially the developer part covers not only the codebase, but also the necessary technical basics of GPGPU development. I'm confident the software can be published on github (or such) pretty much 'as is' thanks to this, and the community will be able to extend it both in terms of new fractals and their coloring schemes, and in terms of new functionality.

The experimental evaluation is well rounded also: performance measurements are supplemented by an actual empirical user study. Even though there are some small design flaws in this study (like the

discrepancy in the reference palettes), it is basically sound and the fact that it has been conducted with high-school students (who are not yet burdened by technical bias) was a very good choice.

Implementační část práce

	lepší	OK	horší	nevyhovuje
Kvalita návrhu ... <i>architektura, struktury a algoritmy, použité technologie</i>	X	X		
Kvalita zpracování ... <i>jmenné konvence, formátování, komentáře, testování</i>	X			
Stabilita implementace		X		

Komentář Java in high-performance applications has pros and cons, but here it affords portability while the heavy lifting is done by the GPU via Cuda. This is a fine choice too. In general the design is justified pretty well. I'm happy with the code as well, it's written neatly, frugally and with plenty of comments.

The software itself is easy to run just as the documentation describes and natural to interact with. Occasional stability issues and funky rendering artifacts when fiddling with too many knobs (like the 'paintbrush' sampling, quite fun actually). Combining so many sampling strategies while keeping them configurable is no joke on a GPU and I fully acknowledge that. In the end I ended up playing with the software quite a bit and it was enjoyable, I got a bunch of fractal art out of it.

Celkové hodnocení 1 (vyborne)

Práci navrhuji na zvláštní ocenění yes

Datum 21. 8. 2019

Podpis

