Posudek diplomové práce

Matematicko-fyzikální fakulta Univerzity Karlovy

Autor práce	Dario Lanza		
Název práce	Deriving Suitable Surface Shader and Displacement Map Information from Terrain Erosion Simulations		
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Studijní program	Informatika	**Studijní obor**	Počítačová grafika a vývoj počítačových her

Autor posudku	Mgr. Martin Mirbauer	**Role**	Oponent
Pracoviště	KSVI		

Text posudku:

The goal of the thesis was to model detailed surface appearance of landscapes generated by erosion simulation, using displacement and texture shaders which exploit data from the simulation.
The proposed solution first loads a coarse mesh representing a rough shape of the initial landscape. Then a simulation of wind erosion and sedimentation is run, changing the terrain shape and storing local measurement data such as flow direction vector. The following *classification* step detects different phenomena to select suitable shaders and computes their parameters. The final level of detail is generated procedurally in texture and displacement shaders during rendering, based on the pre-computed parameters.
The author did a significant amount of work on designing, implementing and testing the simulation and shader code. The author used suitable tools and technologies for sub-tasks, e.g. modified an OpenGL-based viewer application for use as a real-time visualisation tool, and RenderMan as a renderer interface extensible with various types of custom shaders.
The design choices are justified in the text. More work could be put into polishing the text and improving the code quality and documentation.
The text has occasional language and typography mistakes and missing or late explanation of abbreviations. The framework description section was harder to follow due to high level of abstraction being mixed with technical details.
In the code I missed a clearer distinction between original, adapted projects and author's own changes. Also the evaluation could include comparison to the results of the original simulation code before the modification – to better highlight author’s contribution.
While the *true-to-life* fidelity of the simulation and rendering results are not easy to evaluate objectively, in my opinion the achieved results are impressive and fulfil the set goals well. In addition, the high-level design of the framework allows for modification of individual steps such as adding more erosion simulation types, or enables possible future integration with existing modelling/sculpting software.
Overall, the thesis is sound and, despite the mentioned drawbacks, shows that surface appearance can benefit from erosion simulation results.

Práci doporučuji k obhajobě.

Práci nenavrhuji na zvláštní ocenění.

Pokud práci navrhujete na zvláštní ocenění (cena děkana apod.), prosím uveďte zde stručné zdůvodnění (vzniklé publikace, významnost tématu, inovativnost práce apod.).

Datum 4. 9. 2020 **Podpis**