ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

REVIEWER'S OPINION OF FINAL THESIS

I. IDENTIFICATION DATA

Thesis name:	**Visualization of human's body internal tissues using shaders in simulation medicine**
Author's name:	**Nikolai Spiridonov**
Type of thesis:	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Computer Science
Thesis reviewer:	Salimov Farid Ibragimovich
Reviewer's department:	Kazan Federal University, Institute of Computer Mathematics and Information Technologies, Department of Theoretical Cybernetics

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **extraordinarily challenging**

Evaluation of thesis difficulty of assignment.

In the master's thesis of Spiridonov N.V., the problem of visualization of human internal tissues is considered. As the main idea of developing algorithms, was the maximum usage of the video card as a coprocessor in the calculations. The diploma thesis main goal was to develop and provide a way for developing such algorithms to use free resources (graphics card) for calculations used in the visualization process

Satisfaction of assignment **fulfilled with minor objections**

Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.

In the introduction, the author determines the object of the study, justifies the relevance of his work and gives the main provisions made for defense. In the first chapter, a brief review of the literature is made, the necessary information from the field of application of algorithms is given, namely a reference on medical operations and processes visualized in the work. Also, here was given information about the features of the graphical pipeline. In the second chapter deep analyses of tasks and issues was provided. Also, there were described algorithms. The last chapter dealt with the main problems and the most interesting moments that arose at implementation of algorithms in practice. It includes large number of illustrations, which helps in the perception of information in computer graphics filed. The work as a whole is performed at a high level, however, when reading the thesis, a number of questions and remarks arise. The issue of choosing a specific technology for implementation is not disclosed in the work. Why it was chosen technology HLSL, rather than GLSL or, for example, CUDA?

Method of conception **correct**

Assess that student has chosen correct approach or solution methods.

Existing approaches to the solution of problems were analyzed. It is shown why they are not suitable for effective problem solving. A number of solutions were developed to solve the tasks. The task itself need a lot of information outside the scope of the field of study.

Technical level **A - excellent.**

Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.

The task is very hard and requires a lot of knowledges from medicine, computer graphics.

Formal and language level, scope of thesis **B - very good.**

Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.

Text of diploma thesis contains some typographical errors. There are too many sophisticated and long sentences complicating the perception of information in the text.

REVIEWER'S OPINION OF FINAL THESIS

Selection of sources, citation correctness	**B - very good.**
Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.	
There is not too much sources were used. But, it is worth noting that in the literature there is very little information about what really algorithms are used in the basic medical simulators on the market, as they are developed within the framework of commercial development and the creators do not disclose any details of the software. This fact itself significantly complicates the work on this topic and increases the value of the master's thesis.	

Additional commentary and evaluation
Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.
A very difficult and ambitious task was set. Judging by the results, it was completely solved and deserves an excellent evaluation. However, the text itself is decorated with shortcomings. Perhaps this is due to lack of time. Considering these facts, the value of this work is somewhere between excellent and very good

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

1. *The disadvantages of the approach with volumetric simulation of the smoke in subparagraph 2.1.1 are not considered in detail.*
2. *The issue of choosing a specific technology for implementation is not disclosed in the work. Why it was chosen technology HLSL, rather than GLSL or, for example, CUDA.*

I evaluate handed thesis with classification grade **B - very good.**

Date: **4.6.2018**

Signature: