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MASTER THESIS REVIEW

Author: Szabolcs Gróf
Title: Volume data fusions
Review by: Petr Felkel, Ph.D.

Szabolcs Gróf focuses on development of techniques for combined visualization of 3D data from different modalities and for simple mono-modal time series. He defines seven criteria for classification of such multimodal visualization methods. He describes 13 methods and discusses their usage for different data. He delivers implementation of these methods in MedV4D framework. The thesis also contains fundamentals of dataset registration and an implementation of a rigid body registration method.

The thesis is written carefully in English and has appropriate typesetting. The theoretical background contains necessary information in adequate detail. Main contribution of the thesis lays in Chapter 4 (Fusion), describing the proposed methods -- and in implementation of 13 fusion methods in MedV4D framework.

I have the following notes and comments to be discussed during the thesis defense:

- I do not understand the reason *why precisely these 13 methods were chosen*. It is also not clear from the text, who was the author of the methods (Was it Gróf or are there just missing references?).
- The author writes about the problem of *volume data fusion* (3D), but the methods perform a *2D slices fusion*. There is nothing wrong about the problem size reduction, but this information is not written sooner than in Conclusions, which is late.
- The images in Chapter 4 nicely illustrate the methods for static (3D) datasets. What is *missing are tests on the time series data*.
- Discussion (Chapter 4.16) definitely should be improved.
 - There are *missing references*.
[page 50] How did the author find that "RGB three channel fusion..., is used very often ..."?
[page 52] Who introduced the histogram alignment method?
 - [p. 51] "Special care has to be taken of *how the colors are assigned*..." Did anybody perform a user study on the proper color selection based on knowledge of human perception? Did you consider using a different color scheme which is more perceptually uniform than RGB?

I recommend the proposed thesis for defense and recommend grading it as **2 (velmi dobře)**.

Prague, 29.8.2009

Petr Felkel

