Corrections

# Recommended corrections by Michael Manzke

The Abstract is very long

* It’s shorten from 3 pages to 1.5 pages.

Related Publication could be moved into the contributions

* The relationships between the chapters and related publications are clarified in the Summary of Chapters section in Chapter 1.

The list of Figures should use short captions

* The captions of Figures and Tables are shortened.

Section 1.1 could provide more related work.

* Related work on feature visibility, saliency maps and saliency fields are added to Section 1.1.

Section 2.1.1 and 2.1.4 should provide more recent citations.

* Added 3 recent citations to Section 2.1.1 and 2 recent citations to Section 2.1.4.

Many of the images are too small, they are difficult to read

* Images in Chapter 4 and Chapter 5 are replaced with larger images.

Chapter 4 should provide a formal definition what a feature is

* Section 4.3.1 is added to provide a formal feature definition

Section 5.4 should evaluate how the algorithm executes on 1,2,4,8… CPUs

* Results of the optimization on 1,2,4,8 CPU threads are added to Section 5.4

# Recommended corrections by Pere Brunet

The last paragraph on page 1

* The relationships between the chapters and related publications are clarified in the Summary of Chapters section in Chapter 1.

1st paragraph on page 2

* Clarified Wang extended the previous work: “Wang et al. extended the previous work on visibility histograms and proposed a feature visibility metric, in order to measure the influence of each feature to the volume rendered image.”
* Captions of Figures 2.6 and 2.7 are extended to explain the images in the subfigures.

2nd paragraph on page 2

* Section 4.3.1 is added to provide a formal feature definition

3rd paragraph on page 2

* Added an explanation of the choice of transfer functions with tent-like shapes and a related citation to the last paragraph in Section 3.3.1: “Although many shapes can be used in transfer function design, tent-like shapes are often sufficient to model the user’s intent [7]. In this chapter, results of both transfer functions of tent-like shapes and continuous transfer functions are used as input of the optimization.”
* Edited the last paragraph in Section 3.3.1 to clarify the goal of the optimization: “The global optimization in our approach aims at reducing this kind of occlusion by modulating the opacity of the transfer function based on the entropy of volume data, which is described in the next subsection.”

4th paragraph on page 2

* Added a paragraph in Section 3.4.2 to provide a performance test and removed the maximum iteration count at the end of Section 3.5.1.

“In our implementation, the optimizer terminates when the energy function becomes stable, i.e. further iterations do not change the resulting transfer function. For the sample data sets we have tested, we observed that there is no further change to the resulting transfer function after 500 iterations.

In addition, we measured the computation time of the optimization on two data sets with a continuous transfer function and a transfer function of tent-like shapes respectively.

The tests in Table 3.2 all finished within 0.01 seconds, which shows that our approach is very lightweight.

This suggests that, in practice, it would be viable to let the optimization continue to a conservatively high iteration count to ensure reasonable chance of convergence, without affecting interactivity.”

5th paragraph on page 2

* Added a citation to clarify equation (4.3)

6th paragraph on page 2 and 1st paragraph on page 3

* Revised the description of the experiment in Section 4.5.1 and Section 4.5.2.
* In Section 4.5.1, added how we changed the transfer functions for generating images in the experiment:

“For these, we empirically modulated the transfer function to achieve varying degrees of emphasis on individual features. It should be noted that relatively simple transfer functions were used in order to simplify the explanation of the task to participants; for instance, in order to associate a feature with an easily identifiable color.”

* In Section 4.5.2., details are added to the experiment description:
* “In each trial, a screen identifying the feature of interest using a textual task description e.g. ``How clear and distinct is the RED feature?'' was first shown to the participant for 3 seconds, followed by a screen displaying a volume rendered image for 17 seconds (See Appendix B for a sample questionnaire of the experiment). The duration of the full experiment was approximately 20 minutes.”
* Section 4.5.4 Feature Visibility (FV) for the completeness of the comparison of the experiment results.

2nd paragraph on page 3

* Results of the optimization on 1,2,4,8 CPU threads are added to Section 5.4
* Rename Section 5.3.5 to Line Search and Parallel Line Search
* Added a sentence in the Parallel Line Search subsection to clarify how the parallel line search chooses adaptive step sizes: “Instead of sequentially searching for a desirable step size, parallel line search simultaneously evaluates the candidate step sizes and choose the best one for the current iteration.”

3rd paragraph on page 3

* Section 5.4.2 Generality of Transfer Functions is added to show the optimization results of 5 features and different initial transfer functions.

4th paragraph on page 3

* Removed the 2D view image in Figure 6.3 (b), so the 3D views in Figure 6.3 are not mixed with 2D views.
* Added volatility images over 5, 10, and 20 frames of cloud in Section 6.4.
* Added an alternative visualization in Section 6.4 where the variables X and Y are swapped.

5th paragraph on page 3

* A glossary page is added after the list of figures.

6th paragraph on page 3

* Fixed the typo in page 37. The sentence “the user can select an intensity value that they would like to enhance” is rewritten as “users can select intensity values that they would like to enhance”