Preface

The International Research Training Group (IRTG) "Visualization of Large and Unstructured Data Sets – Applications in Geospatial Planning, Modeling, and Engineering" is a joint effort of the University of Kaiserslautern (Germany) and the U.S. partners University of California at its Davis and Irvine campuses, Arizona State University, and University of Utah. It is funded by the German Science Foundation (DFG) under grant DFG GK 1131.

The primary research goal of this graduate program is the enhancement of scientific and information visualization techniques applied to large and unstructured data sets. Every visualization task is based on application data. For providing these data, we integrate applications from the domain "Geospatial Planning, Modeling, and Engineering", which produce these huge amounts of unstructured data that are of interest for the visualization tasks at hand. This integration is necessary to allow a deeper understanding of the provided data due to the sharing of knowledge through the projects.

Up to now, visualization of large and structured or small and unstructured data sets is the state of the art. Large and unstructured data sets are still not very well understood, especially with respect to visualization. In order to address these questions, we have defined a set of projects aiming at solving these problems. In detail, we are handling visualization problems, with respect to modeling, feature detection, and comparison tasks. For doing this, both the extension of existing techniques and the development of new ones are investigated.

In the application areas there is an increasing need to handle huge amounts of unstructured data that are produced either by data from field measurements like environmental observation stations, from experiments, and from simulation. For example, nowadays environmental monitoring systems are capable of measuring data at a very high resolution and in a large number of frequency bands. On the other hand, in scaled-down earthquake laboratory experiments within a centrifuge improved sensor technology permits the measurement of an increased number of parameters at higher sampling rates. Finally, earthquake simulations produce more and more data because of more elaborate simulation techniques. All these improvements in measurement technology lead to large, high-dimensional data sets. Visualizing these data is very useful to get new insights into the problems involved. The visualizations themselves are based on improved or newly developed visualization techniques like volume modeling, feature detection and visualization, etc.

The current issue of GI's Lecture Notes in Informatics presents the results of the first annual workshop of this IRTG held in Dagstuhl, June 14–16, 2006. Aim of this meeting was to bring together all project partners, advisors, and of course PhD students as well as to report on the different research projects. After three days of presentations and lively discussions at Dagstuhl Castle, slightly more than three months were spent on writing papers that cover the outcome of the first year of the graduate program and give surveys on related topics. These papers were cross-reviewed internally as well as by the project's advisors. Note that the covered topics do not include all ongoing projects because not all IRTG members could attend.

We would like to thank all attendees for their contribution to this fruitful workshop. We are also grateful to Dagstuhl Castle for their support and hosting this event, and we thank the Gesellschaft für Informatik e.V. (GI) for publishing the workshop papers in the LNI series.

October 2006

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