Visualization of Large and Unstructured Data Sets

Applications in Geospatial Planning, Modeling and Engineering

Proceedings of IRTG 1131 Workshop
June 10-11, 2011, Kaiserslautern, Germany

Edited by
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Preface

The International Research and 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 Davis, Arizona State University and University of Utah. It is funded by the German research foundation (DFG) under grant DFG GK 1131/2, and is currently in the last of two 4.5-year stages.

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, our research integrates 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.

Until now, the state of the art has centered on the visualization of large and structured or small and unstructured data. Dataset that are both large and unstructured 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 produced either by data from field measurements like environmental observation stations, from experiments, and from simulation.

For example, 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, scaled-down earthquake laboratory experiments within a centrifuge improved sensor technology permit the measurement of an increased number of participants 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.

In this issue of OASIcs – OpenAccess Series in Informatics we present the results of the annual workshop of this IRTG held in Kaiserslautern on June 10–11, 2011. The aim of the workshop was to bring together all project partners, PhD students and advisors to report on the different research projects. After two days of presentations and discussions the graduates spent their time on writing papers that cover the outcome of the program and give surveys on related topics.

Kaiserslautern, April 2012

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