Visualization of Large and Unstructured Data Sets – Applications in Geospatial Planning, Modeling and Engineering

IRTG 1131 Workshop, March 19–21, 2010, Bodega Bay, U.S.

Edited by
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Preface

The International Research and Training Group (IRTG) Visualization of Large and Unstructured Datasets 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. In July 2009 the second 4.5 years phase of the IRTG started. The primary research goal of this graduate program is the enhancement of scientific and information visualization techniques applied to large and unstructured datasets. 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 datasets is the state of the art. Large and unstructured datasets 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 the issue of OASIcs - OpenAccess Series in Informatics we present the results of the annual workshop of this IRTG held in Bodega Marine Laboratory, Bodega Bay, California, U.S, March 19th to March 21st 2010. Aim of the workshop was to bring together all project partners, PHD students and advisors to report on the different research projects. After three 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.

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