Solving Problems with Visual Analytics: The Role of Visualization and Analytics in Exploring Big Data

Prof. Dr. Daniel A. Keim

Department of Computer and Information Science
Konstanz University
78457 Konstanz, Germany
keim@uni-konstanz.de

Abstract

Never before in history data is generated and collected at such high volumes as it is today. As the volumes of data available to business people, scientists, and the public increase, their effective use becomes more challenging. Keeping up to date with the flood of data, using standard tools for data analysis and exploration, is fraught with difficulty. Visual analytics seeks to provide people with better and more effective ways to understand and analyze large datasets, while also enabling them to act upon their findings immediately. Visual analytics integrates the analytic capabilities of the computer and the abilities of the human analyst, allowing novel discoveries and empowering individuals to take control of the analytical process. Visual analytics enables unexpected and hidden insights, which may lead to beneficial and profitable innovation. In the visual analysis process, it is not obvious what can be done by automated analysis and what should be done by interactive visual methods. In dealing with massive data, the use of automated methods is mandatory - and for some problems it may be sufficient to only use fully automated analysis methods, but there is also a wide range of problems where the use of interactive visual methods is necessary. The talk presents the challenges of visual analytics and exemplifies them with several application examples, illustrating the exiting potential of current visual analysis techniques but also their limitations.

Biography: Daniel A. Keim is full professor and head of the Information Visualization and Data Analysis Research Group in the Computer Science Department of the University of Konstanz, Germany. He has been actively involved in data base, data analysis, and information visualization research for about 20 years and developed a number of novel visual analysis techniques for very large data sets. He has been program co-chair of the IEEE InfoVis and IEEE VAST symposia as well as the SIGKDD conference, and he is member of the IEEE InfoVis & IEEE VAST as well as EuroVis steering committees. He is an associate editor of Palgrave's Information Visualization Journal (since 2001) and has been an associate editor of the IEEE Transactions on Visualization and Computer Graphics (1999 - 2004), Datenbank-Spektrum (2011 - 2009), the IEEE Transactions on Knowledge and Data Engineering (2002 - 2007), and the Knowledge and Information System Journal (2006 - 2011). He is coordinator of

the DFG German Strategic Research Initiative (SPP) ”Scalable Visual Analytics”, the BMBF research initiative on ”Visual Analytics for Security Applications2 (VASA), and he has been the scientific coordinator of the EU Coordination Action ”Visual Analytics - Mastering the Information Age” (VisMaster). Dr. Keim got his Ph.D. and habilitation degrees in computer science from the University of Munich. Before joining the University of Konstanz, Dr. Keim was associate professor at the University of Halle, Germany and Technology Consultant at AT&T Shannon Research Labs, NJ, USA.