

Workshop-Proposal: Human Factors in Information Visualization and Decision Support Systems

André Calero Valdez¹, Philipp Brauner¹, Martina Ziefle¹, Torsten Wolfgang Kuhlen², Michael Sedlmair³

Human-Computer Interaction Center, RWTH Aachen University¹
Visual Computing Institute, RWTH Aachen University²
Visualization and Data Analysis Group, TU Wien²

Abstract

This is a half-day workshop proposal that focuses Human Factors in Information Visualization and Decision Support Systems. Participants should submit articles that present research data and derive novel research agendas for human factors or usability aspects in both fields. Presentations are 20 minutes long. Submissions will be published in the workshop addendum.

1 Introduction

Data is everywhere. The amount of collected and generated data every year exceeds the amount of all years before (McAfee et al., 2012). Through the pervasiveness of information and communication technology, data is created in almost all commercial and non-commercial processes, whether known by the user or not. Every step leaves a digital footprint, ready to be processed. But not only the amount of data is unprecedented. According to McAfee et al. (2012) three V's characterize what Big Data is. *Volume* as we have already is the most obvious driver of a need for new methods to handle Big Data. *Velocity* refers to the speed of how fast data is generated and how fast it needs to be processed. Real-time stock data needs evaluation now. Lastly, *variety* implies that data comes in various (un-)structured formats, but is at the same time heavily interconnected. Mobile phone users not only generate data from surfing the web, but also generate location data, app data, and health data. Sensors are ubiquitous and their data needs to be integrated. In face of the Internet of Things, Industrial Internet, or Industry 4.0 and increasingly pervasive digitalization a tsunami of data will revolutionize our everyday lives. Can we use Big Data to tackle global challenges?

Various approaches have been developed to grasp Big Data. *Machine Learning* addresses Big Data by using algorithmic approaches to tackle the sheer size and complexity of data. On the other hand, *Visual Analytics* is a field that tries to combine information visualization – the science of visually displaying quantitative information – with nearby fields, such as knowledge discovery, cognitive and perceptual sciences, statistical analysis. Bringing those two approaches together is the aim of Human-Computer Interaction and Knowledge Discovery in Databases (HCI-KDD, cf. Holzinger, 2013). The overall aim is to support decision-making on the basis of data. Or, how do we get from large amounts of data from the digital world into actionable knowledge in the mental world?

Many of the hard questions have been approached, yet remain partially unanswered. Where is the place of the Human in the Loop (Holzinger 2016)? How do we design interfaces that support the users in making decisions (Sedlmair et al. 2012)? How do we technically create visualizations that represent hard scientific problems (Childs et al. 2013)? How much does a visualization tool need to be tailored the specific problem, how much generalization is possible (Wickham, 2010)? What insights can be drawn from a specific visualization, and by whom (Yi et al. 2008)?

The aim of the proposed workshop is to identify a research agenda for the intersection of Big Data, human-computer interaction and information visualization. What are the most pressing research topics?

2 Workshop concept

The workshop is planned as a half-day conference with two sessions. Each session should have between 4-5 presentations each 20 minutes long (plus discussion). A plenary session is planned after the second session.

The target audience of the workshop is researchers and practitioners that deal with visualization of data and investigate the effects on the user. Intended language of contributions is English.

2.1 Submissions

Submissions are welcome from any sub-field of visual analytics and decision support systems with a focus on evaluating the influence of the human factor or usability. Every submission should report on research findings and derive the need for further systematic investigation. Other participants should learn something new and see opportunities for collaboration.

Submissions should be 4-8 pages long and will be published in the workshop addendum of the conference proceedings (open-access). Submissions will be submitted to an easy-chair system before May 30th.

Platzhalter für DOI und ggf. Copyright Text. (Bitte nicht entfernen).

Name, Vorname (2016): Titel. Tagungsband Mensch und Computer 2016. Gesellschaft für Informatik. DOI: xxxxxx

Reviews are double blind and conducted by at least 2 reviewers from the workgroups of the authors of this proposal or trusted colleagues. Acceptance notification is June 15th. Revised Camera Ready submission deadline is June 30th.

2.2 Editorial and plenary session

The organizers will write an editorial as an overview of the accepted submissions. A third session is planned as a plenary discussion on a common research agenda.

Literaturverzeichnis

- Childs, H., Geveci, B., Schroeder, W., Meredith, J., Moreland, K., Sewell, C., ... & Bethel, E. W. (2013). Research challenges for visualization software. *Computer*, (5), 34-42.
- Holzinger, A. (2013). Human-Computer Interaction and Knowledge Discovery (HCI-KDD): What Is the Benefit of Bringing Those Two Fields to Work Together? In *Availability, Reliability, and security in Information Systems and HCI* (pp. 319-328). Springer Berlin Heidelberg.
- Holzinger, A. (2016). *Interactive machine learning for health informatics: when do we need the human-in-the-loop?*. *Brain Informatics*, 1-13.
- McAfee, A., Brynjolfsson, E., Davenport, T. H., Patil, D. J., & Barton, D. (2012). Big data. The management revolution. *Harvard Bus Rev*, 90(10), 61-67.
- Sedlmair, M., Meyer, M., & Munzner, T. (2012). Design study methodology: Reflections from the trenches and the stacks. *Visualization and Computer Graphics, IEEE Transactions on*, 18(12), 2431-2440.
- Wickham, H. (2010). A layered grammar of graphics. *Journal of Computational and Graphical Statistics*, 19(1), 3-28.
- Yi, J. S., Kang, Y. A., Stasko, J. T., & Jacko, J. A. (2008). Understanding and characterizing insights: how do people gain insights using information visualization?. In *Proceedings of the 2008 Workshop on BEyond time and errors: novel evaLuation methods for Information Visualization* (p. 4). ACM.

Autoren



Calero Valdez, André

André Calero Valdez studierte Informatik an der RWTH Aachen University Informatik und promovierte in der Psychologie ebenfalls an der RWTH Aachen University zum Thema Nutzerzentrierte Gestaltung von Diabetes-Kleingeräten. Er forscht zum Thema Wissensmanagement, soziale Medien, und Entscheidungsunterstützung durch Informationsvisualisierung. Ziel ist die Bewältigung von Informationskomplexität durch den Einsatz von Mensch-Maschine-Interaktion.



Brauner, Philipp

Philipp Brauner forscht am Human-Computer Interaction Center der RWTH Aachen zu Informationskomplexität und Entscheidungsunterstützung in komplexen cyberphysischen Systemen der Produktionstechnik. Ziel ist die Entwicklung von ganzheitlichen und nachhaltigen ICT Interventionen zur Steigerung von Effizienz, Effektivität und Nutzerzufriedenheit.



Ziefle, Martina

Martina Ziefle ist Professorin am Lehrstuhl für Kommunikationswissenschaft und Gründungsmitglied des Human-Computer Interaction Centers der RWTH Aachen University. Ihre Forschung adressiert die Kommunikation zwischen Mensch-Mensch und Mensch-Maschine mit den Forschungsschwerpunkten Technologie-Akzeptanz für verschiedene Technologien und Nutzungskontexte unter Berücksichtigung von Nutzerdiversität.



Kuhlen, Torsten Wolfgang

Torsten Kuhlen leitet seit 1998 die Virtual Reality Group am Rechen- und Kommunikationszentrum der RWTH Aachen und ist dort seit 2008 Professor in der Fachgruppe Informatik. Seine Forschungsschwerpunkte umfassen die Analyse komplexer numerischer Simulationen in virtuellen Umgebungen, den Einsatz von VR-Techniken in medizinischen Simulatoren und der Neuropsychologie, sowie 3D-Akustik in virtuellen Umgebungen.



Sedlmair, Michael

Michael Sedlmair studierte Medieninformatik an der LMU München und promovierte in Zusammenarbeit mit BMW Group Research and Technology und der LMU München in der Informatik zum Thema Visualisierung von Buskommunikation im Fahrzeug. Zur Zeit forscht er zu den Themen Visualisierung, Mensch-Maschine Interaktion, Nutzerzentriertes Design und hochdimensionale Daten.