

# Preface

This volume contains the full papers presented, discussed, extended, and revised in the context of the 13<sup>th</sup> Conference on Advanced Visual Interfaces (AVI) 2016 during the Workshop on Road Mapping Infrastructures for Advanced Visual Interfaces Supporting Big Data Applications in Virtual Research Environments held on June 7 in Bari, Italy.

The workshop initializing the work was organized by a collaboration of my fellow colleagues, Marco Xaver Bornschlegl, University of Hagen, Germany, Tiziana Catarci, La Sapienza – Università di Roma, Italy, Andrea Manieri, Engineering Ingegneria Informatica SPA, Italy, Paul Walsh, Cork Institute of Technology, Ireland, and myself in my capacity as Chair of Multimedia and Internet Applications at the Faculty of Mathematics and Computer Science at the University of Hagen. The workshop was produced in the context of the EDISON project that has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No. 675419. However, this workshop reflects only the author's view and the European Commission is not responsible for any use that may be made of the information it contains.

Handling the complexity of relevant data requires new techniques about data access, visualization, perception, and interaction for supporting innovative and successful information strategies. In order to address human–computer interaction, cognitive efficiency, and interoperability problems, a generic information visualization, user empowerment, as well as service integration and mediation approach based on the existing state of the art in the relevant areas of computer science as well as established open ICT industry standards has to be achieved.

Therefore, this workshop has addressed these issues with a special focus on supporting distributed big data analysis in virtual research environments (VREs). In this way, the purpose of this research road-mapping workshop was threefold. Firstly, it aimed at consolidating information, technical details, and research directions from the diverse range of academic and industrial R&D projects currently available. Secondly, based on visions of future infrastructures, gaps in the current state-of-the-art reference models were determined and thirdly, a new reference model was derived and validated. To achieve these aims the workshop brought together researchers and practitioners who are able to contribute to and aid in the research road-mapping, in the deriving and validating of a corresponding reference model, and in supporting a corresponding set of publications based on their work as well as on a reflection of their own work along the road-mapping results represented by means of the derived reference model for the target infrastructure. The results of this road-mapping activity and the corresponding reference model can be used to inform, influence, and disseminate ideas to the wider research community.

In consequence, the Call for Papers of the workshop invited contributions from academic and industrial researchers and practitioners working in the area of big data

visualization. The ten initial submissions of position papers from five different countries were carefully reviewed by at least three Program Committee members.

Based on submitted position papers and existing research, the workshop outlined the current baseline of infrastructures for advanced visual user interfaces supporting big data applications in VREs. Furthermore, it outlined research gaps that need to be filled for achieving the targeted research and development ambitions. Achievement of the goal of the workshop was supported by the presentation and discussion of research aiming at delivering advanced visual user interfaces for VREs, e.g., supporting researchers and organizations in applying and maintaining distributed (spatially, physically, as well as potentially cross-organizational and cross-domain) research resources for big data analysis. These advanced visual user interfaces can, e.g., provide a basis for managing access to VRE features and services through open standards and they can be materialized through an open architecture and components derived from state-of-the-art research results being able to deal with big data resources and services at scale. In this way, the resulting research road-mapping and the corresponding derived reference model can pave the way toward collaborating on the development of a visual user interface tool suite supporting VRE platforms that can host big data analysis and corresponding research activities sharing distributed research resources by adopting common existing open standards for access, analysis, and visualization. Thereby, this research road-mapping and corresponding validated reference model helps realizing a ubiquitous collaborative workspace for researchers, which is able to facilitate the research process and its big data analysis applications.

The workshop was performed during a full day and was structured in four sessions to provide maximum time for group discussion and brainstorming. In the first session the participants briefly introduced themselves with short five-minute talks. Following this, the workshop presented a series of invited industry and eScience-infrastructure research community perspectives. In the third session, a gap analysis and validation were completed on the basis of each research domain perspective presented and on the basis of the derived reference model. In the fourth session the group summarized the gaps and set forth the timeline and areas for completing their corresponding full publications in order to reflect the gaps and fully validate the derived reference model. The workshop ended with a detailed discussion to define immediate next steps for completing the corresponding validation of the reference model based on transforming the initial position papers into full publications capturing the results of the road-mapping discussions in the workshop. In addition, comments of several external reviewers for these full publications of the workshop outcome were also sought.

I would like to thank all the authors for contributing high-quality research position papers to the workshop and full papers as well as for the revisions of these full papers after an additional review to establish the content for these proceedings. I would also like to express my sincere thanks to the Organizing and Program Committee, to the members of my Editorial Board, as well as the all the additional external reviewers for reviewing the papers within a very short period of time. We also thank Springer for publishing the proceedings in the *Lecture Notes in Computer Science* series.

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