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# Human-Computer Interaction – INTERACT 2015

15th IFIP TC 13 International Conference  
Bamberg, Germany, September 14–18, 2015  
Proceedings, Part II

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# Foreword

The 15th IFIP TC.13 International Conference on Human–Computer Interaction, INTERACT 2015, was held during September 14–18, 2015, in Bamberg, Germany, organized by the University of Bamberg. The city of Bamberg is proud of its more than 1,000-year-old center. It has more than 2,400 historically listed buildings and became a UNESCO World Cultural Heritage Site in 1993. With 70,000 inhabitants, Bamberg is a small town in the heart of Europe.

The theme of the 2015 edition was “Connection, tradition, innovation.” In its relatively short history, the human–computer interaction (HCI) area has experienced impressive development. Theories, methodologies, procedures, guidelines, and tools have been progressively proposed, discussed, tested, and frequently adopted by academia and industry. The protagonists of this development created in a short period of time a scientific and technological tradition able to produce high-quality interaction systems. However, the evolution of the computers and networks pose new challenges to all stakeholders. Innovation, based on tradition, is the only way to face these challenges, even if innovation often requires breaking the tradition. In order to make this process possible, INTERACT 2015 provides diverse and abundant connection opportunities. A multidisciplinary approach is characteristic of the HCI field. INTERACT 2015 aimed to connect all the matters able to contribute to the quality of the future interactions among people and computers.

The series of INTERACT international conferences (started in 1984) is supported by Technical Committee 13 on Human–Computer Interaction of the International Federation for Information Processing (IFIP). This committee aims at developing the science and technology of the interaction between humans and computing devices.

IFIP was created in 1960 under the auspices of UNESCO with the aim of balancing worldwide the development of computer technology and Science. Technical Committee 13 is fully conscious of the social importance of information and communication technologies for our world, today and in the future. Therefore, INTERACT 2015 made efforts to attract and host people from all over the world, and to pay attention to the constraints imposed on HCI by differences in culture, language, technological availability, physical, as well as sensory and cognitive differences, among other dimensions of interest.

INTERACT 2015 gathered a stimulating collection of research papers and reports of development and practice that acknowledge the diverse disciplines, abilities, cultures, and societies, and that address all the aspects of HCI, including technical, human, social, and esthetic.

Like its predecessors, INTERACT 2015 aimed to be an exciting forum for communication with people of similar interests, to foster collaboration and learning. Being by nature a multidisciplinary field, HCI requires interaction and discussion among diverse people with different interests and backgrounds. INTERACT 2015 was directed both to the academic and industrial world, always highlighting the latest developments

in the discipline of HCI and its current applications. Experienced HCI researchers and professionals, as well as newcomers to the HCI field, interested in the design or evaluation of interactive software, development of new technologies for interaction, and research on general theories of HCI met in Bamberg.

We thank all the authors who chose INTERACT 2015 as the venue to publish their research. This was again an outstanding year for the conference in terms of submissions in all the technical categories.

We received 651 submissions. Of these, the following were accepted: 93 full research papers; 74 short research papers; eight demos; 30 interactive posters; four organizational overviews; three panels; six tutorials; 11 workshops; and 13 doctoral consortium papers.

The acceptance rate for the full papers was 29.6 % and 26.8 % for short papers.

In order to select the highest-quality contributions, an elaborate review system was organized including shepherding of 38 full research papers that went through a second and sometimes a third round of review. That process was primarily handled by the 32 meta-reviewers who willingly assisted and ensured the selection of high-quality full research papers to be presented at INTERACT 2015.

The final decision on acceptance or rejection of papers was taken in a plenary Program Committee meeting held in Tampere (Finland) in February 2015, aimed to discuss a consistent set of criteria to deal with inevitable differences among the large number of reviewers who were recruited and supported by the meta-reviewers. The technical program chairs and the track chairs, the general chairs, and the members of IFIP Technical Committee 13 participated in the meeting.

Special thanks must go to the track chairs and all the reviewers, who put in an enormous amount of work to ensure that quality criteria were maintained throughout the selection process. We also want to acknowledge the excellent work of the co-chairs of the different sections of the conference and the meta-reviewers of the full research paper track.

We also thank the members of the Organizing Committee, especially Mirko Fetter, local organization chair, who provided us with all the necessary resources to facilitate our work. Finally, we wish to express a special thank you to the proceedings publication chair, Marco Winckler, who did extraordinary work to put this volume together.

September 2015

Tom Gross  
Julio Abascal  
Simone Barbosa  
Philippe Palanque

## IFIP TC13

Established in 1989, the International Federation for Information Processing Technical Committee on Human–Computer Interaction (IFIP TC13) is an international committee of 37 national societies and nine working groups, representing specialists in human factors, ergonomics, cognitive science, computer science, design, and related disciplines. INTERACT is its flagship conference, staged biennially in different countries in the world. From 2017 the conference series will become an annual conference.

IFIP TC13 aims to develop the science and technology of human–computer interaction (HCI) by: encouraging empirical research, promoting the use of knowledge and methods from the human sciences in design and evaluation of computer systems; promoting better understanding of the relation between formal design methods and system usability and acceptability; developing guidelines, models, and methods by which designers may provide better human-oriented computer systems; and, cooperating with other groups, inside and outside IFIP, to promote user orientation and humanization in system design. Thus, TC13 seeks to improve interactions between people and computers, encourage the growth of HCI research and disseminate these benefits worldwide.

The main orientation is toward users, especially non-computer professional users, and how to improve human–computer relations. Areas of study include: the problems people have with computers; the impact on people in individual and organizational contexts; the determinants of utility, usability, and acceptability; the appropriate allocation of tasks between computers and users; modeling the user to aid better system design; and harmonizing the computer to user characteristics and needs.

While the scope is thus set wide, with a tendency toward general principles rather than particular systems, it is recognized that progress will only be achieved through both general studies to advance theoretical understanding and specific studies on practical issues (e.g., interface design standards, software system consistency, documentation, appropriateness of alternative communication media, human factors guidelines for dialogue design, the problems of integrating multimedia systems to match system needs and organizational practices, etc.).

In 1999, TC13 initiated a special IFIP Award, the Brian Shackel Award, for the most outstanding contribution in the form of a refereed paper submitted to and delivered at each INTERACT. The award draws attention to the need for a comprehensive human-centered approach in the design and use of information technology in which the human and social implications have been taken into account. 2007 IFIP TC 13 also launched an accessibility award to recognize an outstanding contribution with international impact in the field of accessibility for disabled users in HCI. In 2013, IFIP TC 13 launched the Interaction Design for International Development (IDID) Award, which recognizes the most outstanding contribution to the application of interactive systems for social and economic development of people in

developing countries. Since the process to decide the award takes place after papers are submitted for publication, the awards are not identified in the proceedings.

IFIP TC 13 also recognizes pioneers in the area of HCI. An IFIP TC 13 pioneer is one who, through active participation in IFIP Technical Committees or related IFIP groups, has made outstanding contributions to the educational, theoretical, technical, commercial, or professional aspects of analysis, design, construction, evaluation, and use of interactive systems. IFIP TC 13 pioneers are appointed annually and awards are handed over at the INTERACT conference.

IFIP TC13 stimulates working events and activities through its working groups (WGs). WGs consist of HCI experts from many countries, who seek to expand knowledge and find solutions to HCI issues and concerns within their domains, as outlined here.

WG13.1 (Education in HCI and HCI Curricula) aims to improve HCI education at all levels of higher education, coordinate and unite efforts to develop HCI curricula and promote HCI teaching.

WG13.2 (Methodology for User-Centered System Design) aims to foster research, dissemination of information and good practice in the methodical application of HCI to software engineering.

WG13.3 (HCI and Disability) aims to make HCI designers aware of the needs of people with disabilities and encourage development of information systems and tools permitting adaptation of interfaces to specific users.

WG13.4 (also WG2.7; User Interface Engineering) investigates the nature, concepts, and construction of user interfaces for software systems, using a framework for reasoning about interactive systems and an engineering model for developing user interfaces.

WG 13.5 (Resilience, Reliability, Safety, and Human Error in System Development) seeks a framework for studying human factors relating to systems failure, develops leading-edge techniques in hazard analysis and safety engineering of computer-based systems, and guides international accreditation activities for safety-critical systems.

WG13.6 (Human–Work Interaction Design) aims at establishing relationships between extensive empirical work-domain studies and HCI design. It will promote the use of knowledge, concepts, methods, and techniques that enable user studies to procure a better apprehension of the complex interplay between individual, social, and organizational contexts and thereby a better understanding of how and why people work in the ways that they do.

WG13.7 (Human–Computer Interaction and Visualization) aims to establish a study and research program that will combine both scientific work and practical applications in the fields of HCI and visualization. It will integrate several additional aspects of further research areas, such as scientific visualization, data mining, information design, computer graphics, cognition sciences, perception theory, or psychology, into this approach.

WG13.8 (Interaction Design and International Development) are currently working to reformulate their aims and scope.



WG13.9 (Interaction Design and Children) aims to support practitioners, regulators, and researchers to develop the study of interaction design and children across international contexts.

New Working Groups are formed as areas of significance to HCI arise. Further information is available on the IFIP TC13 website: <http://ifip-tc13.org/>

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