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Human-Computer Interaction – INTERACT 2019

17th IFIP TC 13 International Conference
Paphos, Cyprus, September 2–6, 2019
Proceedings, Part II

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Foreword

The 17th IFIP TC13 International Conference on Human-Computer Interaction, INTERACT 2019, took place during September 2–6, 2019, in Paphos, Cyprus. This conference was held at the Coral Beach Hotel & Resort. The conference was co-sponsored by the Cyprus University of Technology and Tallinn University, in cooperation with ACM and ACM SIGCHI.

The International Federation for Information Processing (IFIP) was created in 1960 under the auspices of UNESCO. The Technical Committee 13 (TC13) of the IFIP aims at developing the science and technology of human-computer interaction (HCI). TC13 has representatives from 32 countries, 2 international organizations, apart from 14 expert members and observers. TC13 started the series of INTERACT conferences in 1984. These conferences have been an important showcase for researchers and practitioners in the field of HCI. Situated under the open, inclusive umbrella of the IFIP, INTERACT has been a truly international in its spirit and has attracted researchers from several countries and cultures. The venues of the INTERACT conferences over the years bear a testimony to this inclusiveness.

INTERACT 2019 continued the INTERACT conscious efforts to lower barriers that prevent people from developing countries to participate in conferences. Thinkers and optimists believe that all regions of the world can achieve human development goals. Information and communication technologies (ICTs) can support this process and empower people to achieve their full potential. Today ICT products have many new users and many new uses, but also present new challenges and provide new opportunities. It is no surprise that HCI researchers are showing great interest in these emergent users. INTERACT 2019 provided a platform to explore these challenges and opportunities, but also made it easier for people from developing countries to participate.

Furthermore, hosting INTERACT 2019 in a small country with a small HCI community presented an opportunity to expose the local industry and academia to the concepts of HCI and user-centered design. The rich history and culture of the island of Cyprus provided a strong networking atmosphere and collaboration opportunities.

Students represent the future of our community. They bring in new energy, enthusiasm, and fresh ideas. However, it is often hard for students to participate in international conferences. INTERACT 2019 made special efforts to bring students to the conference. The conference had low registration costs, and thanks to our sponsors, we could provide several travel grants.

Finally, great research is the heart of a good conference. Like its predecessors, INTERACT 2019 aimed to bring together high-quality research. As a multidisciplinary field, HCI requires interaction and discussion among diverse people with different interests and backgrounds. The beginners and the experienced, theoreticians and practitioners, and people from diverse disciplines and different countries gathered together in Paphos to learn from each other and to contribute to each other's growth.

We thank all the authors who chose INTERACT 2019 as the venue to publish their research.

We received a total of 669 submissions distributed in 2 peer reviewed tracks, 4 curated tracks, and 4 juried tracks. Of these, the following contributions were accepted:

- 111 Full Papers (peer reviewed)
- 55 Short Papers (peer reviewed)
- 7 Industry Case Studies (curated)
- 3 Courses (curated)
- 9 Demonstrations (curated)
- 18 Interactive Posters (juried)
- 2 Panels (curated)
- 9 Workshops (juried)
- 1 Field Trips (juried)
- 17 Doctoral Consortium (juried)

The acceptance rate for contributions received in the peer-reviewed tracks was 29% for full papers and 28% for short papers. In addition to full papers and short papers, the present proceedings feature contributions accepted in the form of industry case studies, courses, demonstrations, interactive posters, panels, and description of accepted workshops. The contributions submitted to workshops were published in adjunct proceedings.

INTERACT 2019 innovated the reviewing process with the introduction of sub-committees. Each subcommittee had a chair and set of associated chairs who were in charge of coordinating the reviewing process with the help of expert reviewers. Hereafter we list the ten subcommittees of INTERACT 2019:

- Accessibility and Assistive Technologies
- Design for Business and Safety/Critical Interactive Systems
- Design of Interactive Entertainment Systems
- HCI Education and Curriculum
- Information Visualization
- Interaction Design for Culture and Development
- Interactive Systems Technologies and Engineering
- Methodologies for User-Centred Design
- Social Interaction and Mobile HCI
- Understanding Human Aspects of HCI

The final decision on acceptance or rejection of full papers was taken in a Program Committee meeting held in London, United Kingdom in March 2019. The full papers chairs, the subcommittee chairs, and the associate chairs participated in this meeting. The meeting discussed a consistent set of criteria to deal with inevitable differences among the large number of reviewers. The final decisions on other tracks were made by the corresponding track chairs and reviewers, often after electronic meetings and discussions.

INTERACT 2019 was made possible by the persistent efforts across several months by 10 subcommittees chairs, 62 associated chairs, 28 track chairs, and 510 reviewers. We thank them all.

September 2019

Panayiotis Zaphiris
David Lamas

IFIP TC13 (http://ifip-tc13.org/)

Established in 1989, the International Federation for Information Processing Technical Committee on Human–Computer Interaction (IFIP TC 13) is an international committee of 32 member national societies and 10 Working Groups, representing specialists of the various disciplines contributing to the field of human-computer interaction. This includes (among others) human factors, ergonomics, cognitive science, computer science, and design. INTERACT is its flagship conference of IFIP TC 13, staged biennially in different countries around the world. The first INTERACT conference was held in 1984 running triennially and became a biennial event in 1993.

IFIP TC 13 aims to develop the science, technology, and societal aspects of HCI by encouraging empirical research; promoting the use of knowledge and methods from the human sciences in design and evaluation of computer systems; promoting a 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 systems design. Thus, TC 13 seeks to improve interactions between people and computers, to encourage the growth of HCI research and its practice in industry and to disseminate these benefits worldwide.

The main orientation is to place the users at the center of the development process. Areas of study include: the problems people face when interacting with computers; the impact of technology deployment on people in individual and organizational contexts; the determinants of utility, usability, acceptability, learnability, and user experience; the appropriate allocation of tasks between computers and users especially in the case of automation; modeling the user, their tasks, and the interactive system 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 resilience, documentation, training material, appropriateness of alternative interaction technologies, design guidelines, the problems of integrating interactive systems to match system needs, and organizational practices, etc.).

In 2015, TC13 approved the creation of a Steering Committee (SC) for the INTERACT conference. The SC is now in place, chaired by Anirudha Joshi and is responsible for:

- Promoting and maintaining the INTERACT conference as the premiere venue for researchers and practitioners interested in the topics of the conference (this requires a refinement of the topics above)
- Ensuring the highest quality for the contents of the event

- Setting up the bidding process to handle the future INTERACT conferences (decision is made up at TC 13 level)
- Providing advice to the current and future chairs and organizers of the INTERACT conference
- Providing data, tools, and documents about previous conferences to the future conference organizers
- Selecting the reviewing system to be used throughout the conference (as this impacts the entire set of reviewers)
- Resolving general issues involved with the INTERACT conference
- Capitalizing history (good and bad practices)

In 1999, TC 13 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. In 2007, IFIP TC 13 launched an Accessibility Award to recognize an outstanding contribution in HCI with international impact dedicated to the field of accessibility for disabled users. In 2013, IFIP TC 13 launched the Interaction Design for International Development (IDID) Award that 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 sent to the publisher for publication, the awards are not identified in the proceedings.

This year a special agreement has been made with the *International Journal of Behaviour and Information Technology* (published by Taylor and Francis) with Panos Markopoulos as editor in chief. In this agreement, authors of BIT whose papers are within the field of HCI are offered the opportunity to present their work at the INTERACT conference. Reciprocally, a selection of papers submitted and accepted for presentation at INTERACT are offered the opportunity to extend their contribution to be published in BIT.

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 TC 13 stimulates working events and activities through its Working Groups (WGs). Working Groups consist of HCI experts from many countries, who seek to expand knowledge and find solutions to HCI issues and concerns within their domains. The list of Working Groups and their area of interest is given below.

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 the 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 (Human Error, Resilience, Reliability, Safety and 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 integrates 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) is currently working to reformulate its 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.

WG13.10 (Human-Centered Technology for Sustainability) aims to promote research, design, development, evaluation, and deployment of human-centered technology to encourage sustainable use of resources in various domains.

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

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