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Human-Computer Interaction – INTERACT 2017

16th IFIP TC 13 International Conference
Mumbai, India, September 25–29, 2017
Proceedings, Part II

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Foreword

The 16th IFIP TC13 International Conference on Human–Computer Interaction, INTERACT 2017, took place during September 25–29, 2017, in Mumbai, India. This conference was held on the beautiful campus of the Indian Institute of Technology, Bombay (IIT Bombay) and the Industrial Design Centre (IDC) was the principal host. The conference was co-sponsored by the HCI Professionals Association of India and the Computer Society of India, in cooperation with ACM and ACM SIGCHI. The financial responsibility of INTERACT 2017 was taken up by the HCI Professionals Association of India.

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 36 countries, apart from 16 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 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.

In 2017, the venue was Mumbai. Located in western India, the city of Mumbai is the capital of the state of Maharashtra. It is the financial, entertainment, and commercial capital of the country and is the most populous city in India. *Mumbaikars* might add that it is also the most hardworking.

The theme of INTERACT 2017 was “Global Thoughts, Local Designs.” The theme was designed to let HCI researchers respond to challenges emerging in the new age of global connectivity where they often design products for users who are beyond their borders belonging to distinctly different cultures. As organizers of the conference, we focused our attention on four areas: *India, developing countries, students, and research.*

As the first INTERACT in the subcontinent, the conference offered a distinctly Indian experience to its participants. The span of known history of India covers more than 5,000 years. Today, India is the world’s largest democracy and a land of diversity. Modern technology co-exists with ancient traditions within the same city, often within the same family. Indians speak 22 official languages and hundreds of dialects. India is also a hub of the information technology industry and a living laboratory of experiments with technology for developing countries.

INTERACT 2017 made a conscious effort to lower barriers that prevent people from developing countries from participating 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 2017 provided a platform to explore these challenges and opportunities but also made it easier for people from developing countries to participate. We also introduced a new track called Field Trips, which allowed participants to directly engage with stakeholders within the context of a developing country.

Students represent the future of our community. They bring in new energy, enthusiasm, and fresh ideas. But it is often hard for students to participate in international conferences. INTERACT 2017 made special efforts to bring students to the conference. The conference had low registration costs and several volunteering opportunities. Thanks to our sponsors, we could provide several travel grants. Most importantly, INTERACT 2017 had special tracks such as Installations, a Student Design Consortium, and a Student Research Consortium that gave students the opportunity to showcase their work.

Finally, great research is the heart of a good conference. Like its predecessors, INTERACT 2017 aimed to bring together high-quality research. As a multidisciplinary field, HCI requires interaction and discussion among diverse people with different interest and background. The beginners and the experienced, theoreticians and practitioners, and people from diverse disciplines and different countries gathered together in Mumbai to learn from each other and to contribute to each other's growth. We thank all the authors who chose INTERACT 2017 as the venue to publish their research.

We received a total of 571 submissions distributed in two peer-reviewed tracks, five curated tracks, and seven juried tracks. Of these, the following contributions were accepted:

- 68 Full Papers (peer reviewed)
- 51 Short Papers (peer reviewed)
- 13 Case Studies (curated)
- 20 Industry Presentations (curated)
- 7 Courses (curated)
- 5 Demonstrations (curated)
- 3 Panels (curated)
- 9 Workshops (juried)
- 7 Field Trips (juried)
- 11 Interactive Posters (juried)
- 9 Installations (juried)
- 6 Doctoral Consortium (juried)
- 15 Student Research Consortium (juried)
- 6 Student Design Consortium (juried)

The acceptance rate for contributions received in the peer-reviewed tracks was 30.7% for full papers and 29.1% for short papers. In addition to full papers and short papers, the present proceedings feature contributions accepted in the form of case studies, courses, demonstrations, interactive posters, field trips, and workshops.

The final decision on acceptance or rejection of full papers was taken in a Program Committee meeting held in Paris, France, in March 2017. The full-paper chairs, the associate chairs, and the TC13 members 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 additional electronic meetings and discussions.

INTERACT 2017 was made possible by the persistent efforts over several months by 49 chairs, 39 associate chairs, 55 student volunteers, and 499 reviewers. We thank them all. Finally, we wish to express a special thank you to the proceedings publication co-chairs, Marco Winckler and Devanuj Balkrishan, who did extraordinary work to put together four volumes of the main proceedings and one volume of adjunct proceedings.

September 2017

Anirudha Joshi
Girish Dalvi
Marco Winckler

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 37 member national societies and 10 Working Groups, representing specialists of the various disciplines contributing to the field of human–computer interaction (HCI). 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 in 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 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, 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 focus 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, 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, guidelines, the problems of integrating multimedia systems to match system needs, and organizational practices, etc.).

In 2015, TC 13 approved the creation of a Steering Committee (SC) for the INTERACT conference. The SC is now in place, chaired by Jan Gulliksen 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 aforementioned topics)
- 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 also 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.

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 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 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 (Resilience, Reliability, Safety and Human Error in System Development) seeks a frame-work 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 promotes 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 at: <http://ifip-tc13.org/>

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