Constantine Stephanidis Margherita Antona Stavroula Ntoa Gavriel Salvendy (Eds.)

**Communications in Computer and Information Science** 

1655

## HCI International 2022 – Late Breaking Posters

24th International Conference on Human-Computer Interaction HCII 2022, Virtual Event, June 26 – July 1, 2022 Proceedings, Part II



Part 2



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Constantine Stephanidis · Margherita Antona · Stavroula Ntoa · Gavriel Salvendy (Eds.)

# HCI International 2022 – Late Breaking Posters

24th International Conference on Human-Computer Interaction HCII 2022, Virtual Event, June 26 – July 1, 2022 Proceedings, Part II



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#### **Foreword**

Human-computer interaction (HCI) is acquiring an ever-increasing scientific and industrial importance, as well as having more impact on people's everyday life, as an ever-growing number of human activities are progressively moving from the physical to the digital world. This process, which has been ongoing for some time now, has been dramatically accelerated by the COVID-19 pandemic. The HCI International (HCII) conference series, held yearly, aims to respond to the compelling need to advance the exchange of knowledge and research and development efforts on the human aspects of design and use of computing systems.

The 24th International Conference on Human-Computer Interaction, HCI International 2022 (HCII 2022), was planned to be held at the Gothia Towers Hotel and Swedish Exhibition & Congress Centre, Göteborg, Sweden, during June 26 to July 1, 2022. Due to the COVID-19 pandemic and with everyone's health and safety in mind, HCII 2022 was organized and run as a virtual conference. It incorporated the 21 thematic areas and affiliated conferences listed on the following page.

A total of 5583 individuals from academia, research institutes, industry, and governmental agencies from 88 countries submitted contributions, and 1276 papers and 275 posters were included in the proceedings that were published just before the start of the conference. Additionally, 296 papers and 181 posters are included in the volumes of the proceedings published after the conference, as "Late Breaking Work". The contributions thoroughly cover the entire field of human-computer interaction, addressing major advances in knowledge and effective use of computers in a variety of application areas. These papers provide academics, researchers, engineers, scientists, practitioners, and students with state-of-the-art information on the most recent advances in HCI. The volumes constituting the full set of the HCII 2022 conference proceedings are listed in the following pages.

I would like to thank the Program Board Chairs and the members of the Program Boards of all thematic areas and affiliated conferences for their contribution and support towards the highest scientific quality and overall success of the HCI International 2022 conference; they have helped in so many ways, including session organization, paper reviewing (single-blind review process, with a minimum of two reviews per submission) and, more generally, acting as good-will ambassadors for the HCII conference.

This conference would not have been possible without the continuous and unwavering support and advice of Gavriel Salvendy, Founder, General Chair Emeritus, and Scientific Advisor. For his outstanding efforts, I would like to express my appreciation to Abbas Moallem, Communications Chair and Editor of HCI International News.

### HCI International 2022 Thematic Areas and Affiliated Conferences

#### **Thematic Areas**

- HCI: Human-Computer Interaction
- HIMI: Human Interface and the Management of Information

#### **Affiliated Conferences**

- EPCE: 19th International Conference on Engineering Psychology and Cognitive Ergonomics
- AC: 16th International Conference on Augmented Cognition
- UAHCI: 16th International Conference on Universal Access in Human-Computer Interaction
- CCD: 14th International Conference on Cross-Cultural Design
- SCSM: 14th International Conference on Social Computing and Social Media
- VAMR: 14th International Conference on Virtual, Augmented and Mixed Reality
- DHM: 13th International Conference on Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management
- DUXU: 11th International Conference on Design, User Experience and Usability
- C&C: 10th International Conference on Culture and Computing
- DAPI: 10th International Conference on Distributed, Ambient and Pervasive Interactions
- HCIBGO: 9th International Conference on HCI in Business, Government and Organizations
- LCT: 9th International Conference on Learning and Collaboration Technologies
- ITAP: 8th International Conference on Human Aspects of IT for the Aged Population
- AIS: 4th International Conference on Adaptive Instructional Systems
- HCI-CPT: 4th International Conference on HCI for Cybersecurity, Privacy and Trust
- HCI-Games: 4th International Conference on HCI in Games
- MobiTAS: 4th International Conference on HCI in Mobility, Transport and Automotive Systems
- AI-HCI: 3rd International Conference on Artificial Intelligence in HCI
- MOBILE: 3rd International Conference on Design, Operation and Evaluation of Mobile Communications

#### **Conference Proceedings – Full List of Volumes**

- 1. LNCS 13302, Human-Computer Interaction: Theoretical Approaches and Design Methods (Part I), edited by Masaaki Kurosu
- 2. LNCS 13303, Human-Computer Interaction: Technological Innovation (Part II), edited by Masaaki Kurosu
- 3. LNCS 13304, Human-Computer Interaction: User Experience and Behavior (Part III), edited by Masaaki Kurosu
- 4. LNCS 13305, Human Interface and the Management of Information: Visual and Information Design (Part I), edited by Sakae Yamamoto and Hirohiko Mori
- LNCS 13306, Human Interface and the Management of Information: Applications in Complex Technological Environments (Part II), edited by Sakae Yamamoto and Hirohiko Mori
- 6. LNAI 13307, Engineering Psychology and Cognitive Ergonomics, edited by Don Harris and Wen-Chin Li
- 7. LNCS 13308, Universal Access in Human-Computer Interaction: Novel Design Approaches and Technologies (Part I), edited by Margherita Antona and Constantine Stephanidis
- 8. LNCS 13309, Universal Access in Human-Computer Interaction: User and Context Diversity (Part II), edited by Margherita Antona and Constantine Stephanidis
- LNAI 13310, Augmented Cognition, edited by Dylan D. Schmorrow and Cali M. Fidopiastis
- 10. LNCS 13311, Cross-Cultural Design: Interaction Design Across Cultures (Part I), edited by Pei-Luen Patrick Rau
- 11. LNCS 13312, Cross-Cultural Design: Applications in Learning, Arts, Cultural Heritage, Creative Industries, and Virtual Reality (Part II), edited by Pei-Luen Patrick Rau
- 12. LNCS 13313, Cross-Cultural Design: Applications in Business, Communication, Health, Well-being, and Inclusiveness (Part III), edited by Pei-Luen Patrick Rau
- 13. LNCS 13314, Cross-Cultural Design: Product and Service Design, Mobility and Automotive Design, Cities, Urban Areas, and Intelligent Environments Design (Part IV), edited by Pei-Luen Patrick Rau
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- 16. LNCS13317, Virtual, Augmented and Mixed Reality: Design and Development (Part I), edited by Jessie Y. C. Chen and Gino Fragomeni
- 17. LNCS 13318, Virtual, Augmented and Mixed Reality: Applications in Education, Aviation and Industry (Part II), edited by Jessie Y. C. Chen and Gino Fragomeni

- 18. LNCS 13319, Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management: Anthropometry, Human Behavior, and Communication (Part I), edited by Vincent G. Duffy
- 19. LNCS 13320, Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management: Health, Operations Management, and Design (Part II), edited by Vincent G. Duffy
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- 24. LNCS 13325, Distributed, Ambient and Pervasive Interactions: Smart Environments, Ecosystems, and Cities (Part I), edited by Norbert A. Streitz and Shin'ichi Konomi
- 25. LNCS 13326, Distributed, Ambient and Pervasive Interactions: Smart Living, Learning, Well-being and Health, Art and Creativity (Part II), edited by Norbert A. Streitz and Shin'ichi Konomi
- 26. LNCS 13327, HCI in Business, Government and Organizations, edited by Fiona Fui-Hoon Nah and Keng Siau
- 27. LNCS 13328, Learning and Collaboration Technologies: Designing the Learner and Teacher Experience (Part I), edited by Panayiotis Zaphiris and Andri Ioannou
- 28. LNCS 13329, Learning and Collaboration Technologies: Novel Technological Environments (Part II), edited by Panayiotis Zaphiris and Andri Ioannou
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- 30. LNCS 13331, Human Aspects of IT for the Aged Population: Technology in Everyday Living (Part II), edited by Qin Gao and Jia Zhou
- 31. LNCS 13332, Adaptive Instructional Systems, edited by Robert A. Sottilare and Jessica Schwarz
- 32. LNCS 13333, HCI for Cybersecurity, Privacy and Trust, edited by Abbas Moallem
- 33. LNCS 13334, HCI in Games, edited by Xiaowen Fang
- 34. LNCS 13335, HCI in Mobility, Transport and Automotive Systems, edited by Heidi Krömker
- 35. LNAI 13336, Artificial Intelligence in HCI, edited by Helmut Degen and Stavroula Ntoa
- 36. LNCS 13337, Design, Operation and Evaluation of Mobile Communications, edited by Gavriel Salvendy and June Wei
- 37. CCIS 1580, HCI International 2022 Posters Part I, edited by Constantine Stephanidis, Margherita Antona and Stavroula Ntoa
- 38. CCIS 1581, HCI International 2022 Posters Part II, edited by Constantine Stephanidis, Margherita Antona and Stavroula Ntoa

- 39. CCIS 1582, HCI International 2022 Posters Part III, edited by Constantine Stephanidis, Margherita Antona and Stavroula Ntoa
- 40. CCIS 1583, HCI International 2022 Posters Part IV, edited by Constantine Stephanidis, Margherita Antona and Stavroula Ntoa
- 41. LNCS 13516, HCI International 2022 Late Breaking Papers: Design, User Experience and Interaction, edited by Masaaki Kurosu, Sakae Yamamoto, Hirohiko Mori, Marcelo M. Soares, Elizabeth Rosenzweig, Aaron Marcus, Pei-Luen Patrick Rau, Don Harris and Wen-Chin Li
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- 43. LNCS 13518, HCI International 2022 Late Breaking Papers: Interacting with eXtended Reality and Artificial Intelligence, edited by Jessie Y. C. Chen, Gino Fragomeni, Helmut Degen and Stavroula Ntoa
- 44. LNCS 13519, HCI International 2022 Late Breaking Papers: Multimodality in Advanced Interaction Environments, edited by Masaaki Kurosu, Sakae Yamamoto, Hirohiko Mori, Dylan D. Schmorrow, Cali M. Fidopiastis, Norbert A. Streitz and Shin'ichi Konomi
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- 48. CCIS 1654, HCI International 2022 Late Breaking Posters (Part I), edited by Constantine Stephanidis, Margherita Antona, Stavroula Ntoa and Gavriel Salvendy
- 49. CCIS 1655, HCI International 2022 Late Breaking Posters (Part II), edited by Constantine Stephanidis, Margherita Antona, Stavroula Ntoa and Gavriel Salvendy



#### http://2022.hci.international/proceedings

## 24th International Conference on Human-Computer Interaction (HCII 2022)

The full list with the Program Board Chairs and the members of the Program Boards of all thematic areas and affiliated conferences is available online at:

http://www.hci.international/board-members-2022.php



#### **HCI International 2023**

The 25th International Conference on Human-Computer Interaction, HCI International 2023, will be held jointly with the affiliated conferences at the AC Bella Sky Hotel and Bella Center, Copenhagen, Denmark, 23–28 July 2023. It will cover a broad spectrum of themes related to human-computer interaction, including theoretical issues, methods, tools, processes, and case studies in HCI design, as well as novel interaction techniques, interfaces, and applications. The proceedings will be published by Springer. More information will be available on the conference website: http://2023.hci.international/.

General Chair Constantine Stephanidis University of Crete and ICS-FORTH Heraklion, Crete, Greece Email: general chair@hcii2023.org

http://2023.hci.international/



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