

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, Lancaster, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Friedemann Mattern

ETH Zurich, Zurich, Switzerland

John C. Mitchell

Stanford University, Stanford, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

TU Dortmund University, Dortmund, Germany

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max Planck Institute for Informatics, Saarbrücken, Germany

More information about this series at <http://www.springer.com/series/7409>

Margherita Antona · Constantine Stephanidis (Eds.)

Universal Access in Human–Computer Interaction

Design and Development Approaches
and Methods

11th International Conference, UAHCI 2017
Held as Part of HCI International 2017
Vancouver, BC, Canada, July 9–14, 2017
Proceedings, Part I

Editors

Margherita Antona
Foundation for Research
and Technology – Hellas (FORTH)
Heraklion, Crete
Greece

Constantine Stephanidis
University of Crete and Foundation
for Research & Technology – Hellas
(FORTH)
Heraklion, Crete
Greece

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-319-58705-9 ISBN 978-3-319-58706-6 (eBook)
DOI 10.1007/978-3-319-58706-6

Library of Congress Control Number: 2017940383

LNCS Sublibrary: SL3 – Information Systems and Applications, incl. Internet/Web, and HCI

© Springer International Publishing AG 2017

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Foreword

The 19th International Conference on Human–Computer Interaction, HCI International 2017, was held in Vancouver, Canada, during July 9–14, 2017. The event incorporated the 15 conferences/thematic areas listed on the following page.

A total of 4,340 individuals from academia, research institutes, industry, and governmental agencies from 70 countries submitted contributions, and 1,228 papers have been included in the proceedings. These papers address the latest research and development efforts and highlight the human aspects of design and use of computing systems. The papers 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. The volumes constituting the full set of the conference proceedings are listed on 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 to the highest scientific quality and the overall success of the HCI International 2017 conference.

This conference would not have been possible without the continuous and unwavering support and advice of the founder, Conference General Chair Emeritus and Conference Scientific Advisor Prof. Gavriel Salvendy. For his outstanding efforts, I would like to express my appreciation to the communications chair and editor of *HCI International News*, Dr. Abbas Moallem.

April 2017

Constantine Stephanidis

HCI International 2017 Thematic Areas and Affiliated Conferences

Thematic areas:

- Human–Computer Interaction (HCI 2017)
- Human Interface and the Management of Information (HIMI 2017)

Affiliated conferences:

- 17th International Conference on Engineering Psychology and Cognitive Ergonomics (EPCE 2017)
- 11th International Conference on Universal Access in Human–Computer Interaction (UAHCI 2017)
- 9th International Conference on Virtual, Augmented and Mixed Reality (VAMR 2017)
- 9th International Conference on Cross-Cultural Design (CCD 2017)
- 9th International Conference on Social Computing and Social Media (SCSM 2017)
- 11th International Conference on Augmented Cognition (AC 2017)
- 8th International Conference on Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management (DHM 2017)
- 6th International Conference on Design, User Experience and Usability (DUXU 2017)
- 5th International Conference on Distributed, Ambient and Pervasive Interactions (DAPI 2017)
- 5th International Conference on Human Aspects of Information Security, Privacy and Trust (HAS 2017)
- 4th International Conference on HCI in Business, Government and Organizations (HCIBGO 2017)
- 4th International Conference on Learning and Collaboration Technologies (LCT 2017)
- Third International Conference on Human Aspects of IT for the Aged Population (ITAP 2017)

Conference Proceedings Volumes Full List

1. LNCS 10271, Human–Computer Interaction: User Interface Design, Development and Multimodality (Part I), edited by Masaaki Kurosu
2. LNCS 10272 Human–Computer Interaction: Interaction Contexts (Part II), edited by Masaaki Kurosu
3. LNCS 10273, Human Interface and the Management of Information: Information, Knowledge and Interaction Design (Part I), edited by Sakae Yamamoto
4. LNCS 10274, Human Interface and the Management of Information: Supporting Learning, Decision-Making and Collaboration (Part II), edited by Sakae Yamamoto
5. LNAI 10275, Engineering Psychology and Cognitive Ergonomics: Performance, Emotion and Situation Awareness (Part I), edited by Don Harris
6. LNAI 10276, Engineering Psychology and Cognitive Ergonomics: Cognition and Design (Part II), edited by Don Harris
7. LNCS 10277, Universal Access in Human–Computer Interaction: Design and Development Approaches and Methods (Part I), edited by Margherita Antona and Constantine Stephanidis
8. LNCS 10278, Universal Access in Human–Computer Interaction: Designing Novel Interactions (Part II), edited by Margherita Antona and Constantine Stephanidis
9. LNCS 10279, Universal Access in Human–Computer Interaction: Human and Technological Environments (Part III), edited by Margherita Antona and Constantine Stephanidis
10. LNCS 10280, Virtual, Augmented and Mixed Reality, edited by Stephanie Lackey and Jessie Y.C. Chen
11. LNCS 10281, Cross-Cultural Design, edited by Pei-Luen Patrick Rau
12. LNCS 10282, Social Computing and Social Media: Human Behavior (Part I), edited by Gabriele Meiselwitz
13. LNCS 10283, Social Computing and Social Media: Applications and Analytics (Part II), edited by Gabriele Meiselwitz
14. LNAI 10284, Augmented Cognition: Neurocognition and Machine Learning (Part I), edited by Dylan D. Schmorrow and Cali M. Fidopiastis
15. LNAI 10285, Augmented Cognition: Enhancing Cognition and Behavior in Complex Human Environments (Part II), edited by Dylan D. Schmorrow and Cali M. Fidopiastis
16. LNCS 10286, Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management: Ergonomics and Design (Part I), edited by Vincent G. Duffy
17. LNCS 10287, Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management: Health and Safety (Part II), edited by Vincent G. Duffy
18. LNCS 10288, Design, User Experience, and Usability: Theory, Methodology and Management (Part I), edited by Aaron Marcus and Wentao Wang

19. LNCS 10289, Design, User Experience, and Usability: Designing Pleasurable Experiences (Part II), edited by Aaron Marcus and Wentao Wang
20. LNCS 10290, Design, User Experience, and Usability: Understanding Users and Contexts (Part III), edited by Aaron Marcus and Wentao Wang
21. LNCS 10291, Distributed, Ambient and Pervasive Interactions, edited by Norbert Streitz and Panos Markopoulos
22. LNCS 10292, Human Aspects of Information Security, Privacy and Trust, edited by Theo Tryfonas
23. LNCS 10293, HCI in Business, Government and Organizations: Interacting with Information Systems (Part I), edited by Fiona Fui-Hoon Nah and Chuan-Hoo Tan
24. LNCS 10294, HCI in Business, Government and Organizations: Supporting Business (Part II), edited by Fiona Fui-Hoon Nah and Chuan-Hoo Tan
25. LNCS 10295, Learning and Collaboration Technologies: Novel Learning Ecosystems (Part I), edited by Panayiotis Zaphiris and Andri Ioannou
26. LNCS 10296, Learning and Collaboration Technologies: Technology in Education (Part II), edited by Panayiotis Zaphiris and Andri Ioannou
27. LNCS 10297, Human Aspects of IT for the Aged Population: Aging, Design and User Experience (Part I), edited by Jia Zhou and Gavriel Salvendy
28. LNCS 10298, Human Aspects of IT for the Aged Population: Applications, Services and Contexts (Part II), edited by Jia Zhou and Gavriel Salvendy
29. CCIS 713, HCI International 2017 Posters Proceedings (Part I), edited by Constantine Stephanidis
30. CCIS 714, HCI International 2017 Posters Proceedings (Part II), edited by Constantine Stephanidis

Universal Access in Human–Computer Interaction

**Program Board Chair(s): Margherita Antona
and Constantine Stephanidis, Greece**

- Gisela Susanne Bahr, USA
- João Barroso, Portugal
- Rodrigo Bonacin, Brazil
- Ingo K. Bosse, Germany
- Anthony Lewis Brooks, Denmark
- Christian Bühler, Germany
- Stefan Carmien, Spain
- Carlos Duarte, Portugal
- Pier Luigi Emiliani, Italy
- Qin Gao, P.R. China
- Andrina Granić, Croatia
- Simeon Keates, UK
- Georgios Kouroupetroglou, Greece
- Patrick M. Langdon, UK
- Barbara Leporini, Italy
- Tania Lima, Brazil
- Alessandro Marcengo, Italy
- Troy McDaniel, USA
- Ana Isabel Paraguay, Brazil
- Enrico Pontelli, USA
- Jon A. Sanford, USA
- Vagner Santana, Brazil
- Jaime Sánchez, Chile
- Anthony Savidis, Greece
- Kevin Tseng, Taiwan
- Gerhard Weber, Germany
- Fong-Gong Wu, Taiwan

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-2017.php>



HCI International 2018

The 20th International Conference on Human–Computer Interaction, HCI International 2018, will be held jointly with the affiliated conferences in Las Vegas, NV, USA, at Caesars Palace, July 15–20, 2018. 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 is available on the conference website: <http://2018.hci.international/>.

General Chair

Prof. Constantine Stephanidis

University of Crete and ICS-FORTH

Heraklion, Crete, Greece

E-mail: general_chair@hcii2018.org

<http://2018.hci.international/>



Contents – Part I

Design for All Methods and Practice

Universal Design Approaches Among Norwegian Experts	3
<i>Miriam Eileen Nes Begnum</i>	
Exploring Summative Depictions of Older User Experiences Learning and Adopting New Technologies	21
<i>Mike Bradley, Ian Michael Hosking, Patrick M. Langdon, and P. John Clarkson</i>	
Universal Design in Ambient Intelligent Environments	31
<i>Laura Burzagli and Pier Luigi Emiliani</i>	
A Systematic Approach to Support Conceptual Design of Inclusive Products	43
<i>Silvia Ceccacci, Luca Giraldi, and Maura Mengoni</i>	
Visual Capabilities: What Do Graphic Designers Want to See?	56
<i>Katie Cornish, Joy Goodman-Deane, and P. John Clarkson</i>	
Inclusion Through Digital Social Innovations: Modelling an Ecosystem of Drivers and Barriers	67
<i>Jennifer Eckhardt, Christoph Kaletka, and Bastian Pelka</i>	
Older People's Use of Tablets and Smartphones: A Review of Research	85
<i>Helen Petrie and Jenny S. Darzentas</i>	
Achieving Universal Design: One if by Product, Two if by Process, Three if by Panacea.	105
<i>Jon A. Sanford</i>	
Universal Design of Mobile Apps: Making Weather Information Accessible	113
<i>Bruce N. Walker, Brianna J. Tomlinson, and Jonathan H. Schuett</i>	
A Conceptual Framework for Integrating Inclusive Design into Design Education	123
<i>Ting Zhang, Guoying Lu, and Yiyun Wu</i>	
A Review of Interactive Technologies Supporting Universal Design Practice.	132
<i>Emilene Zitkus</i>	

Accessibility and Usability Guidelines and Evaluation

A Case for Adaptation to Enhance Usability and Accessibility of Library Resource Discovery Tools	145
<i>Wondwossen M. Beyene and Mexhid Ferati</i>	
The Usability and Acceptability of Tablet Computers for Older People in Thailand and the United Kingdom.	156
<i>Maneerut Chatrangsan and Helen Petrie</i>	
Developing Heuristics for Evaluating the Accessibility of Digital Library Interfaces	171
<i>Mexhid Ferati and Wondwossen M. Beyene</i>	
Game Accessibility Evaluation Methods: A Literature Survey.	182
<i>Renata Pontin M. Fortes, André de Lima Salgado, Flávia de Souza Santos, Leandro Agostini do Amaral, and Elias Adriano Nogueira da Silva</i>	
Accessibility Challenges of Hybrid Mobile Applications	193
<i>Mark McKay</i>	
Young Computer Scientists' Perceptions of Older Users of Smartphones and Related Technologies.	209
<i>Helen Petrie</i>	
Obtaining Experiential Data on Assistive Technology Device Abandonment	217
<i>Helen Petrie, Stefan Carmien, and Andrew Lewis</i>	
Supporting Accessibility in Higher Education Information Systems: A 2016 Update.	227
<i>Arsénio Reis, Paulo Martins, Jorge Borges, André Sousa, Tânia Rocha, and João Barroso</i>	
Bringing Accessibility into the Multilingual Web Production Chain: Perceptions from the Localization Industry.	238
<i>Silvia Rodríguez Vázquez and Sharon O'Brien</i>	
Usability of Mobile Consumer Applications for Individuals Aging with Multiple Sclerosis	258
<i>Ljilja Ruzic and Jon A. Sanford</i>	
Usability of University Websites: A Systematic Review.	277
<i>Zehra Yerlikaya and Pınar Onay Durdu</i>	

User and Context Modelling and Monitoring and Interaction Adaptation

Interaction Behind the Scenes: Exploring Knowledge and User Intent in Interactive Decision-Making Processes	291
<i>Rafael R.M. Brandão, Marcio F. Moreno, and Renato F.G. Cerqueira</i>	
An Object Visit Recommender Supported in Multiple Visitors and Museums	301
<i>Pedro J.S. Cardoso, João M.F. Rodrigues, João A.R. Pereira, and João D.P. Sardo</i>	
Video Summarization for Expression Analysis of Motor Vehicle Operators . . .	313
<i>Albert C. Cruz and Alex Rinaldi</i>	
HAIL Gmail: Email with Hierarchical Adaptive Interface Layout	324
<i>Prithu Dasgupta and John Magee</i>	
Colors Similarity Computation for User Interface Adaptation	333
<i>Ricardo José de Araújo, Julio Cesar dos Reis, and Rodrigo Bonacin</i>	
On Capturing Older Adults' Smartphone Keyboard Interaction as a Means for Behavioral Change Under Emotional Stimuli Within i-PROGNOSIS Framework	346
<i>Stelios Hadjidimitriou, Dimitrios Iakovakis, Vasileios Charisis, Sofia B. Dias, José A. Diniz, Julien Mercier, and Leontios J. Hadjileontiadis</i>	
Employing Personalized Shortcut Options and Group Recommending Options for Improving the Usability of User Interface of Hospital Self-service Registration Kiosks	357
<i>T.K. Philip Hwang, Ssu-Min Wu, Guan-Jun Ding, Ting-Huan Ko, and Ying-Chia Huang</i>	
Abstraction Levels as Support for UX Design of User's Interaction Logs. . . .	369
<i>Juliana Jansen Ferreira, Vinícius Segura, Ana Fucs, Rogerio de Paula, and Renato F.G. Cerqueira</i>	
Personalizing HMI Elements in ADAS Using Ontology Meta-Models and Rule Based Reasoning	383
<i>Yannis Lilis, Emmanouil Zidianakis, Nikolaos Partarakis, Margherita Antona, and Constantine Stephanidis</i>	
Marketing Intelligence and Automation – An Approach Associated with Tourism in Order to Obtain Economic Benefits for a Region.	402
<i>Célia M.Q. Ramos, Nelson Matos, Carlos M.R. Sousa, Marisol B. Correia, and Pedro Cascada</i>	

A Scheme for Multimodal Component Recommendation	412
<i>Natacsha Ordones Raposo, Thais Castro, and Alberto Castro</i>	
MyAutoIconPlat: An Automatic Platform for Icons Creation	423
<i>Tânia Rocha, Paulo Pinheiro, Jorge Santos, António Marques, Hugo Paredes, and João Barroso</i>	
Adaptive Card Design UI Implementation for an Augmented Reality Museum Application	433
<i>João M.F. Rodrigues, João A.R. Pereira, João D.P. Sardo, Marco A.G. de Freitas, Pedro J.S. Cardoso, Miguel Gomes, and Paulo Bica</i>	
Tracing Personal Data Using Comics.	444
<i>Andreas Schreiber and Regina Struminski</i>	
Interpretable Feature Maps for Robot Attention.	456
<i>Kasim Terzić and J.M.H. du Buf</i>	
Design for Children	
Design of a Multisensory Stimulus Delivery System for Investigating Response Trajectories in Infancy.	471
<i>Dayi Bian, Zhaobo Zheng, Amy Swanson, Amy Weitlauf, Zachary Warren, and Nilanjan Sarkar</i>	
Designing for Children Using the RtD and HCD Approaches	481
<i>Thais Castro and David Lima</i>	
The Relationship Between the Parents’ Feeding Practices and Children’s Eating Behavior	491
<i>Jo-Han Chang and Ssu-Min Chang</i>	
Inclusive Toys for Rehabilitation of Children with Disability: A Systematic Review	503
<i>Eunice P. dos Santos Nunes, Vicente Antônio da Conceição Júnior, Lucas Vinicius Giraldeleli Santos, Mauricio Fernando L. Pereira, and Luciana C.L. de Faria Borges</i>	
“DIY” Prototyping of Teaching Materials for Visually Impaired Children: Usage and Satisfaction of Professionals	515
<i>Stéphanie Giraud, Philippe Truillet, Véronique Gaildrat, and Christophe Jouffrais</i>	
“Tell Your Day”: Developing Multimodal Interaction Applications for Children with ASD	525
<i>Diogo Vieira, Ana Leal, Nuno Almeida, Samuel Silva, and António Teixeira</i>	

A Highly Customizable Parent-Child Word-Learning Mobile Game
for Chinese Children with Autism 545
Pinata Winoto, Vince Lineng Cao, and Esther Mingyue Tang

Design of a Tablet Game to Assess the Hand Movement in Children
with Autism 555
*Huan Zhao, Amy Swanson, Amy Weitlauf, Zachary Warren,
and Nilanjan Sarkar*

Author Index 565

Contents – Part II

Sign Language Processing

Evaluation of Animated Swiss German Sign Language Fingerspelling Sequences and Signs	3
<i>Sarah Ebling, Sarah Johnson, Rosalee Wolfe, Robyn Moncrief, John McDonald, Souad Baowidan, Tobias Haug, Sandra Sidler-Miserez, and Katja Tissi</i>	
Sign Search and Sign Synthesis Made Easy to End User: The Paradigm of Building a SL Oriented Interface for Accessing and Managing Educational Content	14
<i>Eleni Efthimiou, Stavroula-Evita Fotinea, Panos Kakoulidis, Theodore Goulas, Athansia-Lida Dimou, and Anna Vacalopoulou</i>	
Synthesizing Sign Language by Connecting Linguistically Structured Descriptions to a Multi-track Animation System	27
<i>Michael Filhol, John McDonald, and Rosalee Wolfe</i>	
An Improved Framework for Layering Linguistic Processes in Sign Language Generation: Why There Should Never Be a “Brows” Tier	41
<i>John McDonald, Rosalee Wolfe, Sarah Johnson, Souad Baowidan, Robyn Moncrief, and Ningshan Guo</i>	
Coarticulation Analysis for Sign Language Synthesis.	55
<i>Lucie Naert, Caroline Larboulette, and Sylvie Gibet</i>	
Investigation of Feature Elements and Performance Improvement for Sign Language Recognition by Hidden Markov Model	76
<i>Tatsunori Ozawa, Hirotoshi Shibata, Hiromitsu Nishimura, and Hiroshi Tanaka</i>	
Towards Automatic Recognition of Sign Language Gestures Using Kinect 2.0.	89
<i>Dmitry Ryumin and Alexey A. Karpov</i>	

Universal Access to Virtual and Augmented Reality

On Capitalizing on Augmented Reality to Impart Solid Geometry Concepts: An Experimental Study	105
<i>Bruno Alves, Diego R. Colombo Dias, Simone de S. Borges, Vinicius H.S. Durelli, Paulo Alexandre Bressan, Valéria Farinazzo Martins, and Marcelo de Paiva Guimarães</i>	

WebAR: A Web-Augmented Reality-Based Authoring Tool with Experience API Support for Educational Applications	118
<i>André Barone Rodrigues, Diego R. Colombo Dias, Valéria Farinazzo Martins, Paulo Alexandre Bressan, and Marcelo de Paiva Guimarães</i>	
How Augmented Reality Technology Consolidates the SMB Ecosystem of the Tourism Industry in Taiwan	129
<i>Ya-Hui Chan, Jung-Yu Lin, Yu-Hsiu Wang, I-Ying Lu, and Yueh-Hsin Hsu</i>	
AR Based User Interface for Driving Electric Wheelchairs	144
<i>Shigeyuki Ishida, Munehiro Takimoto, and Yasushi Kambayashi</i>	
Geomorphology Classroom Practices Using Augmented Reality	155
<i>André Luiz Satoshi Kawamoto and Maristela Denise Moresco Mezzomo</i>	
Head-Mounted Augmented Reality Displays on the Cheap: A DIY Approach to Sketching and Prototyping Low-Vision Assistive Technologies	167
<i>Frode Eika Sandnes and Evelyn Eika</i>	
Effect of Difference in Information Between Vision and Vestibular Labyrinth on a Human Body	187
<i>Akihiro Sugiura, Kunihiko Tanaka, Hiroki Takada, and Masaru Miyao</i>	
Exploring Location-Based Augmented Reality Experience in Museums	199
<i>Tsai-Hsuan Tsai, Ching-Yen Shen, Zhi-Sheng Lin, Huei-Ru Liu, and Wen-Ko Chiou</i>	
Non Visual and Tactile Interaction	
BrailleTap: Developing a Calculator Based on Braille Using Tap Gestures . . .	213
<i>Mrim Alnfai and Srinivas Sampalli</i>	
Technology-Enhanced Accessible Interactions for Visually Impaired Thai People	224
<i>Kewalin Angkananon and Mike Wald</i>	
Mobile Audio Games Accessibility Evaluation for Users Who Are Blind	242
<i>Maria C.C. Araújo, Agebson R. Façanha, Ticianne G.R. Darin, Jaime Sánchez, Rossana M.C. Andrade, and Windson Viana</i>	
Read It Aloud to Me	260
<i>Sergio Celaschi, Mauricio Sol Castro, and Sidney Pinto da Cunha</i>	
Providing Dynamic Access to Electronic Tactile Diagrams	269
<i>Tyler Ferro and Dianne Pawluk</i>	

Towards Tangible and Distributed UI for Cognitively Impaired People	283
<i>Ruzalin Galiev, Dominik Rupperecht, and Birgit Bomsdorf</i>	
Tactile Acoustic Devices: The Effect on Drowsiness During Prolonged Attentional Tasks	301
<i>Patrick M. Langdon and Maria Karam</i>	
Evaluating Vibrotactile Recognition Ability of Geometric Shapes by Using a Smartphone	313
<i>Ray F. Lin</i>	
Non-visual Web Browsing: Beyond Web Accessibility	322
<i>I.V. Ramakrishnan, Vikas Ashok, and Syed Masum Billah</i>	
The 3D Printing of Tactile Maps for Persons with Visual Impairment	335
<i>Roman Renner</i>	
“I’m Blind, Can I Play?” Recommendations for the Development of Audiogames	351
<i>Olimar Teixeira Borges and Marcia de Borba Campos</i>	
Designing Interfaces to Make Information More Tangible for Visually Impaired People	366
<i>Ikuko Eguchi Yairi</i>	
A Generic Framework for Creating Customized Tactile User Interfaces	379
<i>Francis Zinke, Elnaz Mazandarani, Marlene Karlapp, and Ulrike Lucke</i>	
Gesture and Gaze-Based Interaction	
Identifying the Usability Factors of Mid-Air Hand Gestures for 3D Virtual Model Manipulation	393
<i>Li-Chieh Chen, Yun-Maw Cheng, Po-Ying Chu, and Frode Eika Sandnes</i>	
FittsFace: Exploring Navigation and Selection Methods for Facial Tracking . . .	403
<i>Justin Cuaresma and I. Scott MacKenzie</i>	
Comparing Pointing Performance of Mouse and Eye-Gaze Input System	417
<i>Wenbin Guo and Jung Hyup Kim</i>	
A Visuospatial Memory Game for the Elderly Using Gestural Interface	430
<i>André Luiz Satoshi Kawamoto and Valéria Farinazzo Martins</i>	
The Application of Dynamic Analysis to Hand Gestures	444
<i>Toshiya Naka</i>	

Camera Mouse: Dwell vs. Computer Vision-Based Intentional Click
Activation 455
 Rafael Zuniga and John Magee

Author Index 465

Contents – Part III

Universal Access to Health and Rehabilitation

Universally Accessible mHealth Apps for Older Adults: Towards Increasing Adoption and Sustained Engagement	3
<i>Christina N. Harrington, Ljilja Ruzic, and Jon A. Sanford</i>	
Achieving End User Acceptance: Building Blocks for an Evidence-Based User-Centered Framework for Health Technology Development and Assessment	13
<i>Matthias R. Hastall, Christoph Dockweiler, and Juliane Mühlhaus</i>	
Ergonomic Evaluation of the Portal of the Repository in the Health Area of UNIFESP: Proposal of Specifications and Ergonomic Recommendations for Its Interface	26
<i>Wilma Honorio dos Santos, Luciano Gamez, and Felipe Mancini</i>	
Hearables in Hearing Care: Discovering Usage Patterns Through IoT Devices	39
<i>Benjamin Johansen, Yannis Paul Raymond Flet-Berliac, Maciej Jan Korzepa, Per Sandholm, Niels Henrik Pontoppidan, Michael Kai Petersen, and Jakob Eg Larsen</i>	
The Privacy, Security and Discoverability of Data on Wearable Health Devices: Fitness or Folly?	50
<i>Vishakha Kumari and Sara Anne Hook</i>	
Design and Usability Evaluation of Speech Rehabilitation APP Interface for Patients with Parkinson’s Disease.	65
<i>Hsin-Chang Lo, Shih-Tsang Tang, Wan-Li Wei, and Ching-Chang Chuang</i>	
Game-Based Speech Rehabilitation for People with Parkinson’s Disease	76
<i>Juliane Mühlhaus, Hendrike Frieg, Kerstin Bilda, and Ute Ritterfeld</i>	
User Evaluation of an App for Liquid Monitoring by Older Adults	86
<i>Zaidatol Haslinda Abdullah Sani and Helen Petrie</i>	
SmartGym: An Anticipatory System to Detect Body Compliance During Rehabilitative Exercise.	98
<i>Arash Tadayon, Ramesh Tadayon, Troy McDaniel, and Sethuraman Panchanathan</i>	

“The <i>Sum</i> of All Our Feelings!”: Sentimental Analysis on Chinese Autism Sites.	108
<i>Tiffany Y. Tang, Relic Yongfu Wang, and Carl Guangxing Chen</i>	
Design of an Innovative Assisting Device for Knee Osteoarthritis	117
<i>Fong-Gong Wu and Hsien-Chi Kuo</i>	
Universal Access to Education and Learning	
Applying Movie and Multimedia to the Inclusive Learning and Teaching in Germany: Problems and Solutions.	129
<i>Ingo K. Bosse and Annette Pola</i>	
Considerations for Designing Educational Software for Different Technological Devices and Pedagogical Approaches	143
<i>Paulo Alexandre Bressan, Thiago Henrique dos Reis, Artur Justiniano Roberto Jr., and Marcelo de Paiva Guimarães</i>	
Teaching Robot Programming Activities for Visually Impaired Students: A Systematic Review	155
<i>Juliana Damasio Oliveira, Márcia de Borba Campos, Alexandre de Morais Amory, and Isabel Harb Manssour</i>	
Participatory Design of Technology for Inclusive Education: A Case Study	168
<i>Leonara de Medeiros Braz, Eliane de Souza Ramos, Maria Luisa Pozzebom Benedetti, and Heiko Hornung</i>	
QUIMIVOX MOBILE: Assistive Tool to Teach Mendeleeev Table	188
<i>Alex Santos de Oliveira, Bruno Merlin, Heleno Fülber, João Elias Vidueira Ferreira, and Tatiana Nazaré de Carvalho Artur Barros</i>	
The Use of Computational Artifacts to Support Deaf Learning: An Approach Based on the Direct Way Methodology	198
<i>Marta Angélica Montiel Ferreira, Juliana Bueno, Rodrigo Bonacin, and Laura Sánchez García</i>	
Evaluation of an Automatic Essay Correction System Used as an Assessment Tool.	210
<i>Sergio A.A. Freitas, Edna D. Canedo, Cristóvão L. Frinhani, Maurício F. Vidotti, and Marcia C. Silva</i>	
A Bridge to Cognition Through Intelligent Games.	223
<i>Carla V.M. Marques, Carlo E.T. Oliveira, and Claudia L.R. Motta</i>	
Chatbot and Dialogue Demonstration with a Humanoid Robot in the Lecture Class.	233
<i>Shu Matsuura and Riki Ishimura</i>	

Universal Design to a Learning Environment-Object Adding Network as Condition and Data Visualization as Framework to Provide Universal Access.	247
<i>Izabel P. Meister, Felipe Vieira Pacheco, Eduardo Eiji Ono, Suelen Carolyne Polese de Magalhães, Tiago Paes de Lira, Margeci Leal de Freitas Alves, Vanessa Itacaramby Pardim, João Luis Gaspar, Marco Antonio Pinheiro Diógenes Júnior, Daniel Gongora, Valéria Gomes Bastos, and Marcelo da Silva Franco</i>	
Wearable Life: A Wrist-Worn Application to Assist Students in Special Education	259
<i>Hui Zheng and Vivian Genaro Motti</i>	
Universal Access to Mobility	
Identifying Sound Cues of the Outdoor Environment by Blind People to Represent Landmarks on Audio-Tactile Maps	279
<i>Nazatul Naquiah Abd Hamid, Wan Adilah Wan Adnan, and Fariza Hanis Abdul Razak</i>	
Design of Geographic Information Systems to Promote Accessibility and Universal Access	291
<i>Hugo Fernandes, Ricardo Teixeira, Bruno Daniel, Cristina Alves, Arsénio Reis, Hugo Paredes, Vitor Filipe, and João Barroso</i>	
Assess User Needs for Time-Related Information to Design an Airport Guide System.	300
<i>Yilin Elaine Liu and Jon A. Sanford</i>	
Lived Experiences and Technology in the Design of Urban Nature Parks for Accessibility	308
<i>Tiiu Poldma, Hélène Carbonneau, Sylvie Miaux, Barbara Mazer, Guylaine Le Dorze, Alexandra Gilbert, Zakia Hammouni, and Abdulkader El-Khatib</i>	
Outdoor Wayfinding and Navigation for People Who Are Blind: Accessing the Built Environment	320
<i>Robert Wall Emerson</i>	
Inclusive Design Thinking for Accessible Signage in Urban Parks in Taiwan.	335
<i>Ko-Chiu Wu and Hsuan Wang</i>	
Accessible Tourism for Deaf People in Poland: The SITur and SITex Programs as Proposals for Accessible Urban Information	348
<i>Alina Zajadacz and Przemysław Szmal</i>	

Universal Access to Information and Media

Impact of Cognitive Learning Disorders on Accessing Online Resources	363
<i>Alexander Cadzow</i>	
Young Female Consumers' Perceptions and Purchase Intentions Towards Character Economy	382
<i>Cheih-Ying Chen</i>	
A Software to Capture Mental Models	393
<i>Hashim Iqbal Chunpir and Thomas Ludwig</i>	
Rethinking Audio Visualizations: Towards Better Visual Search in Audio Editing Interfaces	410
<i>Evelyn Eika and Frode E. Sandnes</i>	
Media Use of Persons with Disabilities	419
<i>Anne Haage and Ingo K. Bosse</i>	
Now You See It, Now You Don't: Understanding User Interface Visibility . . .	436
<i>Ian Michael Hosking and P. John Clarkson</i>	
Impressive Picture Selection from Wearable Camera Toward Pleasurable Recall of Group Activities	446
<i>Eriko Kinoshita and Kaori Fujinami</i>	
Analytics Solution for Omni-Channel Merchandising	457
<i>Chieh-Yu Liao, Chia-Chi Wu, Yu-Ling Hsu, and Yi-Chun Chen</i>	
Temporal Evolution in Potential Functions While Peripheral Viewing Video Clips with/without Backgrounds	471
<i>Masaru Miyao, Hiroki Takada, Akihiro Sugiura, Fumiya Kinoshita, Masumi Takada, and Hiromu Ishio</i>	
Camera Canvas: Photo Editing and Sharing App for People with Disabilities	483
<i>Trung Ngo, Christopher Kwan, and John Magee</i>	
Evaluation of Cerebral Blood Flow While Viewing 3D Video Clips	492
<i>Masumi Takada, Keisuke Tateyama, Fumiya Kinoshita, and Hiroki Takada</i>	

Design for Quality of Life Technologies

Low Cost Smart Homes for Elders	507
<i>Gabriel Ferreira, Paulo Penicheiro, Ruben Bernardo, Luís Mendes, João Barroso, and António Pereira</i>	

Fire Warning System by Using GPS Monitoring and Quadcopters.	518
<i>Jei-Chen Hsieh</i>	
Robotic Assistants for Universal Access.	527
<i>Simeon Keates and Peter Kyberd</i>	
Study on the Application of Computer Simulation to Foldable Wheelchairs.	539
<i>Yu-Ting Lin, Fong-Gong Wu, and I-Jen Sung</i>	
Mindfulness and Asynchronous Neurofeedback: Coping with Mind Wandering	549
<i>Alessandro Marcengo, Emanuela Sabena, and Angelo Crea</i>	
Data Design for Wellness and Sustainability.	562
<i>Flavio Montagner, Barbara Stabellini, Andrea Di Salvo, Paolo Marco Tamborrini, Alessandro Marcengo, and Marina Geymonat</i>	
Introducing Wearables in the Kitchen: An Assessment of User Acceptance in Younger and Older Adults	579
<i>Valeria Orso, Giovanni Nascimben, Francesca Gullà, Roberto Menghi, Silvia Ceccacci, Lorenzo Cavalieri, Michele Germani, Anna Spagnolli, and Luciano Gamberini</i>	
Using Intelligent Personal Assistants to Strengthen the Elderlies' Social Bonds: A Preliminary Evaluation of Amazon Alexa, Google Assistant, Microsoft Cortana, and Apple Siri.	593
<i>Arsénio Reis, Dennis Paulino, Hugo Paredes, and João Barroso</i>	
Designing Autonomous Systems Interactions with Elderly People	603
<i>Arsénio Reis, Isabel Barroso, Maria João Monteiro, Salik Khanal, Vitor Rodrigues, Vitor Filipe, Hugo Paredes, and João Barroso</i>	
A Systematic Review of the Potential Application of Virtual Reality Within a User Pre-occupancy Evaluation	612
<i>Kevin C. Tseng, Do Thi Ngoc Giau, and Po-Hsin Huang</i>	
Reconciling Cognitive Reappraisal and Body Awareness in a Digital Mindfulness Experience.	621
<i>Ralph Vacca</i>	
Author Index	641