

*Commenced Publication in 1973*

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

## Editorial Board Members

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, Chennai, 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*

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

Vincent G. Duffy (Ed.)

# Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management

## Human Body and Motion

10th International Conference, DHM 2019

Held as Part of the 21st HCI International Conference, HCII 2019

Orlando, FL, USA, July 26–31, 2019

Proceedings, Part I

*Editor*  
Vincent G. Duffy  
Purdue University  
West Lafayette, IN, USA

ISSN 0302-9743 ISSN 1611-3349 (electronic)  
Lecture Notes in Computer Science  
ISBN 978-3-030-22215-4 ISBN 978-3-030-22216-1 (eBook)  
<https://doi.org/10.1007/978-3-030-22216-1>

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

© Springer Nature Switzerland AG 2019

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, expressed 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.

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

# Foreword

The 21st International Conference on Human-Computer Interaction, HCI International 2019, was held in Orlando, FL, USA, during July 26–31, 2019. The event incorporated the 18 thematic areas and affiliated conferences listed on the following page.

A total of 5,029 individuals from academia, research institutes, industry, and governmental agencies from 73 countries submitted contributions, and 1,274 papers and 209 posters were included in the pre-conference proceedings. These contributions address the latest research and development efforts and highlight the human aspects of design and use of computing systems. 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. The volumes constituting the full set of the pre-conference proceedings are listed in the following pages.

This year the HCI International (HCII) conference introduced the new option of “late-breaking work.” This applies both for papers and posters and the corresponding volume(s) of the proceedings will be published just after the conference. Full papers will be included in the *HCII 2019 Late-Breaking Work Papers Proceedings* volume of the proceedings to be published in the Springer LNCS series, while poster extended abstracts will be included as short papers in the *HCII 2019 Late-Breaking Work Poster Extended Abstracts* volume to be published in the Springer CCIS series.

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 2019 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.

July 2019

Constantine Stephanidis

# **HCI International 2019 Thematic Areas and Affiliated Conferences**

Thematic areas:

- HCI 2019: Human-Computer Interaction
- HIMI 2019: Human Interface and the Management of Information

Affiliated conferences:

- EPCE 2019: 16th International Conference on Engineering Psychology and Cognitive Ergonomics
- UAHCI 2019: 13th International Conference on Universal Access in Human-Computer Interaction
- VAMR 2019: 11th International Conference on Virtual, Augmented and Mixed Reality
- CCD 2019: 11th International Conference on Cross-Cultural Design
- SCSM 2019: 11th International Conference on Social Computing and Social Media
- AC 2019: 13th International Conference on Augmented Cognition
- DHM 2019: 10th International Conference on Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management
- DUXU 2019: 8th International Conference on Design, User Experience, and Usability
- DAPI 2019: 7th International Conference on Distributed, Ambient and Pervasive Interactions
- HCIBGO 2019: 6th International Conference on HCI in Business, Government and Organizations
- LCT 2019: 6th International Conference on Learning and Collaboration Technologies
- ITAP 2019: 5th International Conference on Human Aspects of IT for the Aged Population
- HCI-CPT 2019: First International Conference on HCI for Cybersecurity, Privacy and Trust
- HCI-Games 2019: First International Conference on HCI in Games
- MobiTAS 2019: First International Conference on HCI in Mobility, Transport, and Automotive Systems
- AIS 2019: First International Conference on Adaptive Instructional Systems

## **Pre-conference Proceedings Volumes Full List**

1. LNCS 11566, Human-Computer Interaction: Perspectives on Design (Part I), edited by Masaaki Kurosu
2. LNCS 11567, Human-Computer Interaction: Recognition and Interaction Technologies (Part II), edited by Masaaki Kurosu
3. LNCS 11568, Human-Computer Interaction: Design Practice in Contemporary Societies (Part III), edited by Masaaki Kurosu
4. LNCS 11569, Human Interface and the Management of Information: Visual Information and Knowledge Management (Part I), edited by Sakae Yamamoto and Hirohiko Mori
5. LNCS 11570, Human Interface and the Management of Information: Information in Intelligent Systems (Part II), edited by Sakae Yamamoto and Hirohiko Mori
6. LNAI 11571, Engineering Psychology and Cognitive Ergonomics, edited by Don Harris
7. LNCS 11572, Universal Access in Human-Computer Interaction: Theory, Methods and Tools (Part I), edited by Margherita Antona and Constantine Stephanidis
8. LNCS 11573, Universal Access in Human-Computer Interaction: Multimodality and Assistive Environments (Part II), edited by Margherita Antona and Constantine Stephanidis
9. LNCS 11574, Virtual, Augmented and Mixed Reality: Multimodal Interaction (Part I), edited by Jessie Y. C. Chen and Gino Fragomeni
10. LNCS 11575, Virtual, Augmented and Mixed Reality: Applications and Case Studies (Part II), edited by Jessie Y. C. Chen and Gino Fragomeni
11. LNCS 11576, Cross-Cultural Design: Methods, Tools and User Experience (Part I), edited by P. L. Patrick Rau
12. LNCS 11577, Cross-Cultural Design: Culture and Society (Part II), edited by P. L. Patrick Rau
13. LNCS 11578, Social Computing and Social Media: Design, Human Behavior and Analytics (Part I), edited by Gabriele Meiselwitz
14. LNCS 11579, Social Computing and Social Media: Communication and Social Communities (Part II), edited by Gabriele Meiselwitz
15. LNAI 11580, Augmented Cognition, edited by Dylan D. Schmorrow and Cali M. Fidopiastis
16. LNCS 11581, Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management: Human Body and Motion (Part I), edited by Vincent G. Duffy

17. LNCS 11582, Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management: Healthcare Applications (Part II), edited by Vincent G. Duffy
18. LNCS 11583, Design, User Experience, and Usability: Design Philosophy and Theory (Part I), edited by Aaron Marcus and Wentao Wang
19. LNCS 11584, Design, User Experience, and Usability: User Experience in Advanced Technological Environments (Part II), edited by Aaron Marcus and Wentao Wang
20. LNCS 11585, Design, User Experience, and Usability: Application Domains (Part III), edited by Aaron Marcus and Wentao Wang
21. LNCS 11586, Design, User Experience, and Usability: Practice and Case Studies (Part IV), edited by Aaron Marcus and Wentao Wang
22. LNCS 11587, Distributed, Ambient and Pervasive Interactions, edited by Norbert Streitz and Shin'ichi Konomi
23. LNCS 11588, HCI in Business, Government and Organizations: eCommerce and Consumer Behavior (Part I), edited by Fiona Fui-Hoon Nah and Keng Siau
24. LNCS 11589, HCI in Business, Government and Organizations: Information Systems and Analytics (Part II), edited by Fiona Fui-Hoon Nah and Keng Siau
25. LNCS 11590, Learning and Collaboration Technologies: Designing Learning Experiences (Part I), edited by Panayiotis Zaphiris and Andri Ioannou
26. LNCS 11591, Learning and Collaboration Technologies: Ubiquitous and Virtual Environments for Learning and Collaboration (Part II), edited by Panayiotis Zaphiris and Andri Ioannou
27. LNCS 11592, Human Aspects of IT for the Aged Population: Design for the Elderly and Technology Acceptance (Part I), edited by Jia Zhou and Gavriel Salvendy
28. LNCS 11593, Human Aspects of IT for the Aged Population: Social Media, Games and Assistive Environments (Part II), edited by Jia Zhou and Gavriel Salvendy
29. LNCS 11594, HCI for Cybersecurity, Privacy and Trust, edited by Abbas Moallem
30. LNCS 11595, HCI in Games, edited by Xiaowen Fang
31. LNCS 11596, HCI in Mobility, Transport, and Automotive Systems, edited by Heidi Krömker
32. LNCS 11597, Adaptive Instructional Systems, edited by Robert Sottilare and Jessica Schwarz
33. CCIS 1032, HCI International 2019 - Posters (Part I), edited by Constantine Stephanidis



34. CCIS 1033, HCI International 2019 - Posters (Part II), edited by Constantine Stephanidis
35. CCIS 1034, HCI International 2019 - Posters (Part III), edited by Constantine Stephanidis

**<http://2019.hci.international/proceedings>**



# **10th International Conference on Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management (DHM 2019)**

**Program Board Chair(s): Vincent G. Duffy, USA**

- Stephen Baek, USA
- André Calero Valdez, Germany
- H. Onan Demirel, USA
- Stephen J. Elliott, USA
- Afzal A. Godil, USA
- Ravi Goonetilleke, Hong Kong, SAR China
- Akihiko Goto, Japan
- Hossam Haick, Israel
- Hiroyuki Hamada, Japan
- Dan Högberg, Sweden
- Thorsten Kuebler, USA
- Noriaki Kuwahara, Japan
- Byung Cheol Lee, USA
- Kang Li, USA
- Claudio Loconsole, Italy
- Masahide Nakamura, Japan
- Sergio Nesteriuk, Brazil
- T. Patel, India
- Caterina Rizzi, Italy
- Beatriz Santos, Portugal
- Juan A. Sánchez-Margallo, Spain
- Meng-Dar Shieh, Taiwan
- Leonor Teixeira, Portugal
- Renran Tian, USA
- Anita Woll, Norway
- Kuan Yew Wong, Malaysia
- S. Xiong, Korea
- James Yang, USA
- Rachel Zuanon, Brazil

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-2019.php>**



## **HCI International 2020**

The 22nd International Conference on Human-Computer Interaction, HCI International 2020, will be held jointly with the affiliated conferences in Copenhagen, Denmark, at the Bella Center Copenhagen, July 19–24, 2020. It will cover a broad spectrum of themes related to HCI, 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://2020.hci.international/>.

General Chair

Prof. Constantine Stephanidis

University of Crete and ICS-FORTH

Heraklion, Crete, Greece

E-mail: [general\\_chair@hcii2020.org](mailto:general_chair@hcii2020.org)

<http://2020.hci.international/>



# Contents – Part I

## Anthropometry and Computer Aided Ergonomics

A Comparison Between Virtual Reality and Digital Human Modeling for Proactive Ergonomic Design. . . . .	3
<i>Salman Ahmed, Lukman Irshad, H. Onan Demirel, and Irem Y. Tumer</i>	
Comparison of Digital Human Model-Based Ergonomic Software Using Eye-Tracking Methodology – Presenting Pilot Usability Tests. . . . .	22
<i>Mária Babicsné Horváth, Károly Hercegfı, and Tamás Fergencs</i>	
A Full-Chain OpenSim Model and Its Application on Posture Analysis of an Overhead Drilling Task. . . . .	33
<i>Jing Chang, Damien Chablat, Fouad Bennis, and Liang Ma</i>	
Design and Evaluation of the System Device for Mitigation of the Low Back Pain Among Veterinarians . . . . .	45
<i>Tzu-Lien Chou, Hsi-Jen Chen, and Fong-Gong Wu</i>	
Research on Body Pressure Distribution of Office Chair with Different BMI . . . . .	59
<i>Pu Hong, Yinxia Li, Huimin Hu, and Mengjing Cai</i>	
Design Method of 3D-Printable Ergonomically Personalized Stabilizer. . . . .	71
<i>Ryota Kawamura, Kazuki Takazawa, Kenta Yamamoto, and Yoichi Ochiai</i>	
Size North America – The New North American Anthropometric Survey. . . . .	88
<i>Thorsten Kuebler, Andre Luebke, Jamie Campbell, and Tim Guenzel</i>	
Research on the Characteristic and Gender Differences in Adult Foot Shape in China . . . . .	99
<i>Jing Zhao, Jingjing Wang, Haitao Wang, Fan Zhang, Chao Zhao, and Gang Wu</i>	

## Motion Prediction and Motion Capture

Exploring the Feasibility of Classifying Fundamental Locomotor Skills Using an Instrumented Insole and Machine Learning Techniques . . . . .	113
<i>Toyin Ajisafe and Dugan Um</i>	

<b>Classifying Non-elementary Movements in Vietnamese Mõ Dances. . . . .</b>	<b>128</b>
<i>Mustapha Bourahla, Abdelmoutia Telli, Salem Benferhat, and Ma Thi Chau</i>	
<b>Periodicity Detection of Quasi-Periodic Slow-Speed Gait Signal Using IMU Sensor . . . . .</b>	<b>140</b>
<i>Jayeeta Chakraborty and Anup Nandy</i>	
<b>Using Foot and Knee Movement and Posture Information to Mitigate the Probability of Injuries in Functional Training . . . . .</b>	<b>153</b>
<i>Rafael de Pinho André, Alberto Raposo, and Hugo Fuks</i>	
<b>Extraction of the Graceful Feature from Classical Dance Motion Focused on Dancer’s Perspective. . . . .</b>	<b>170</b>
<i>Yuki Inazu, Yuya Tsukigata, Etsuko Ueda, Kenichi Iida, Kentaro Takemura, Takayuki Nakamura, and Masanao Koeda</i>	
<b>Homologous Mesh Extraction via Monocular Systems. . . . .</b>	<b>182</b>
<i>Mohamed Fateh Karoui and Thorsten Kuebler</i>	
<b>Machine Learning to Estimate the Amount of Training to Learn a Motor Skill . . . . .</b>	<b>198</b>
<i>Moisés R. Santos, Eduardo D. F. Souza, Mateus B. F. Carvalho, Alexandre C. M. Oliveira, Areolino de Almeida Neto, Marco R. Curado, and Paulo R. A. Ribeiro</i>	
<b>Capture of Stability and Coordination Indicators in Virtual Training Scenarios for the Prevention of Slip, Trip, and Fall (STF) Accidents . . . . .</b>	<b>210</b>
<i>Anika Weber, Peter Nickel, Ulrich Hartmann, Daniel Friemert, and Kiros Karamanidis</i>	
<b>Effect of Selective Training Device in the Mono-Articular Muscle of Lower Limbs . . . . .</b>	<b>220</b>
<i>Takashi Yoshikawa, Ryuga Sadaoka, Tadashi Akehi, Tomonori Inoue, Yuichi Suzuki, and Takamasa Omori</i>	
 <b>Work Modelling and Industrial Applications</b>	
<b>The Neuroeducational Principles of the SEE BEYOND Method Applied on the Materialization of a Fashion Collection Designed by Visually Impaired Fashion Designers. . . . .</b>	<b>233</b>
<i>Geraldo Coelho Lima Júnior and Rachel Zuanon</i>	
<b>First Impressions and Acceptance of Order Pickers Towards Using Data Glasses at a Simulated Workstation. . . . .</b>	<b>251</b>
<i>Daniel Friemert, Mirko Kaufmann, Ulrich Hartmann, and Rolf Ellegast</i>	

Continuous Measurement of Muscle Fatigue Using Wearable Sensors During Light Manual Operations. . . . .	266
<i>Jiawei Fu, Liang Ma, Liuxing Tsao, and Zhanwu Zhang</i>	
Level of Robot Autonomy and Information Aids in Human-Robot Interaction Affect Human Mental Workload – An Investigation in Virtual Reality . . . . .	278
<i>Mara Kaufeld and Peter Nickel</i>	
OSH and the Future of Work: Benefits and Risks of Artificial Intelligence Tools in Workplaces . . . . .	292
<i>Phoebe V. Moore</i>	
Cooperation Between Design and Neuroscience: Contributions to Current Project Methodologies Applied to Automotive Design . . . . .	316
<i>Carolina Vieira Liberatti Rosa and Rachel Zuanon</i>	
An Integrated Ergonomics Evaluation Method of HWDs . . . . .	335
<i>Hongjun Xue, Hua Zhao, and Xiaoyan Zhang</i>	
Evaluation of the Advising Doctor for Operating of Medical Student by Laparoscopic Surgery Simulator . . . . .	345
<i>Kazuaki Yamashiro, Koichiro Murakami, Hisanori Shiomi, and Akihiko Goto</i>	
Research on Path Planning Algorithm for Two-Dimensional Code Guidance Model of Automated Guided Vehicle . . . . .	355
<i>Wei-Dong Zheng, Ben Yan, Zhi-Xian Li, Hua-Ping Yao, Li-Li Wei, and Masahide Nakamura</i>	
<b>Risk Assessment and Safety</b>	
A Framework to Quantitatively Assess Safety Performance for Civil Aviation Organization . . . . .	369
<i>Mingliang Chen, Min Luo, Yuan Zhang, and Yanqiu Chen</i>	
Modeling Vehicle-Pedestrian Encountering Risks in the Natural Driving Environment Using Machine Learning Algorithms . . . . .	382
<i>Priyanka Gandhi, Xiao Luo, and Renran Tian</i>	
Innovative and Comprehensive Support System for Training People Working in Dangerous Conditions. . . . .	394
<i>Andrzej Grabowski</i>	
Development and Evaluation of a Tablet-Control for a Surgical Workstation in the Open Integrated Operating Room. . . . .	406
<i>Johanna Hemmeke, Philipp Krumholz, Armin Janß, and Klaus Radermacher</i>	

Developing Real-Time Face Identification Device Composable with Distributed Applications . . . . .	420
<i>Kosuke Hirayama, Sachio Saiki, and Masahide Nakamura</i>	
An Integrated Approach of Multiple Correspondences Analysis (MCA) and Fuzzy AHP Method for Occupational Health and Safety Performance Evaluation in the Land Cargo Transportation . . . . .	433
<i>Genett Jimenez-Delgado, Nidia Balmaceda-Castro, Hugo Hernández-Palma, Emiro de la Hoz-Franco, Jesus García-Guilianny, and Jairo Martinez-Ventura</i>	
The Relevance of Cybersecurity for Functional Safety and HCI . . . . .	458
<i>Sebastian Korfmacher</i>	
Highway End-of-Queue Alerting System Based on Probe Vehicle Data . . . . .	467
<i>Keyu Ruan, Zahra Yarmand, Renran Tian, Lingxi Li, Yaobin Chen, Feng Li, and Jim Sturdevant</i>	
Creating and Testing Objective Performance Metrics for the Manual Teleoperation of Robotic Arms . . . . .	479
<i>Shuqi Xue, Guohua Jiang, Ting Jiang, Chunhui Wang, and Zhiqiang Tian</i>	
A Method of Designing Outdoor Safety Way Guidance Sign Layout Information Based on Human Factors Engineering . . . . .	491
<i>Jiliang Zhang, Yongquan Chen, and Jingquan Liu</i>	
Memories and Brain Maps: Representations of Fear, Risk and Insecurity in Downtown Areas . . . . .	509
<i>Rachel Zuanon, Melissa Ramos da Silva Oliveira, Cláudio Lima Ferreira, Evandro Ziggiatti Monteiro, and Haroldo Gallo</i>	
<b>Author Index . . . . .</b>	<b>525</b>

## Contents – Part II

### Models in Healthcare

Digital Transformation of Prostate Cancer Pathway and Optimizing Patient Experience, Patient Safety and Clinical Professionalism. . . . .	3
<i>Joan Cahill, Ben Turney, Sean Wetherall, Haseeb Khan, Maurice McGrath, and Igor Widlicki</i>	
Usability Testing of a Mobile Application for Alleviating Postpartum Emotional Disorders: A Case of We'll . . . . .	23
<i>Wen-Ko Chiou, Shih-Chen Lai, and Ding-Hau Huang</i>	
A Lightweight and Affordable Sleep Quality Monitoring and Visualization System with a GSR Sensor for Users in Rural Areas to Facilitate Tele-Health . . . . .	41
<i>Yang Du, Qiming Sun, Kou Wang, and Tiffany Y. Tang</i>	
ECG Identification Based on PCA and Adaboost Algorithm. . . . .	50
<i>Qi Liu, Yujuan Si, Liangliang Li, and Di Wang</i>	
Increasing Availability Control of Human Biological Samples Using a Mobile Management System. . . . .	63
<i>Leonardo Lima Marinho, Isabel Cristina P. da Nóbrega, Nayat Sanchez Pi, Rosa Maria E. Moreira da Costa, and Vera Maria B. Werneck</i>	
Using Computer Simulation for Reducing the Appointment Lead-Time in a Public Pediatric Outpatient Department . . . . .	75
<i>Miguel Ortiz-Barrios, Genett Jiménez-Delgado, Sally McClean, and Giselle Polifroni-Avedaño</i>	
Applying Multi-phase DES Approach for Modelling the Patient Journey Through Accident and Emergency Departments . . . . .	87
<i>Miguel Ortiz-Barrios, Pablo Pancardo, Genett Jiménez-Delgado, and Jeferson De Ávila-Villalobos</i>	
Discrete-Event Simulation for Performance Evaluation and Improvement of Gynecology Outpatient Departments: A Case Study in the Public Sector. . . . .	101
<i>Miguel Ortiz-Barrios, Pedro Lopez-Meza, Sally McClean, and Giselle Polifroni-Avedaño</i>	



Ambient Intelligence Model for Monitoring, Alerting and Adaptively Recommending Patient’s Health-Care Agenda Based on User Profile. . . . .	113
<i>Manuel F. J. Patiño and Demetrio A. Ovalle</i>	
A Human-in-The-Loop Context-Aware System Allowing the Application of Case-Based Reasoning for Asthma Management . . . . .	125
<i>Mario Quinde, Nawaz Khan, Juan Carlos Augusto, and Aléchia van Wyk</i>	
Experimental Web Service and Eye-Tracking Setup for Unilateral Spatial Neglect Assessment . . . . .	141
<i>Timothé Rossa, Pierre Pompidor, Nancy Rodriguez, Arnaud Sallaberry, Pascal Poncelet, Marika Urbanski, Clémence Bourlon, Antoine Seilles, and Guillaume Tallon</i>	
Human-Robot Interaction in Health Care Automation . . . . .	156
<i>Sumona Sen, Lisanne Kremer, and Hans Buxbaum</i>	
Uncovering User Affect Towards AI in Cancer Diagnostics . . . . .	169
<i>Stephanie Tom Tong and Pradeep Sopory</i>	
<b>Quality of Life Technologies</b>	
Architecture-Neuroscience Cooperation: Project Recommendations to Therapeutic Gardens Design for the Non-pharmacological Treatment of Individuals with Alzheimer’s Disease . . . . .	181
<i>Barbara Alves Cardoso de Faria and Rachel Zuanon</i>	
Design and Usability Evaluation of Interface of Mobile Application for Nutrition Tracking for People with Parkinson’s Disease . . . . .	200
<i>Bojan Blažica, Peter Novak, Franc Novak, and Barbara Koroušić Seljak</i>	
Thermoregulating and Hydrating Microcapsules: Contributions of Textile Technology in the Design of Wearable Products for Wheelchair Dependents. . . . .	209
<i>Veridianna Cristina Teodoro Ferreira and Agda Carvalho</i>	
Estimating Age-Dependent Degradation Using Nonverbal Feature Analysis of Daily Conversation. . . . .	222
<i>Natsumi Kana, Yumi Wakita, and Yoshihisa Nakatoh</i>	
The Decision-Making System for Alzheimer’s Patients by Understanding Ability Test from Physiological Signals . . . . .	232
<i>Peijia Liao, Fangmeng Zeng, Iwamoto Miyuki, and Noriaki Kuwahara</i>	
Development of IoT Robotic Devices for Elderly Care to Measure Daily Activities . . . . .	248
<i>Yoshio Matsumoto, Kunihiro Ogata, Isamu Kajitani, Keiko Homma, and Yujin Wakita</i>	

“Memes” UX-Design Methodology Based on Cognitive Science Regarding Instrumental Activities of Daily Living . . . . .	264
<i>Hiroyuki Nishimoto, Tomoyoshi Koyanagi, Makoto Sarata, Ayae Kinoshita, and Mitsukazu Okuda</i>	
Design and Validation of a Tremor Stabilizing Handle for Patients with Parkinson Disease and Essential Tremor . . . . .	274
<i>Nandan Sarkar and Zhaobo K. Zheng</i>	
Preliminary Design of Soft Exo-Suit for Arm Rehabilitation . . . . .	284
<i>Deep Seth, V. K. Harsha Vardhan Varma, Padamati Anirudh, and Pavan Kalyan</i>	
Aiding Episodic Memory in Lifelog System Focusing on User Status . . . . .	295
<i>Xin Ye and Jiro Tanaka</i>	
Architecture in Mind: Elderly’s Affective Memories and Spatial Perceptions of a Downtown Area . . . . .	306
<i>Evandro Ziggianti Monteiro, Cláudio Lima Ferreira, Rachel Zuanon, Melissa Ramos da Silva Oliveira, and Sidney Piocchi Bernardini</i>	
<b>Health Dialogues</b>	
Edgard, the Chatbot: Questioning Ethics in the Usage of Artificial Intelligence Through Interaction Design and Electronic Literature . . . . .	325
<i>Fernando Fogliano, Fernando Fabbrini, André Souza, Guilherme Fidélío, Juliana Machado, and Rachel Sarra</i>	
Mobile Phone-Based Chatbot for Family Planning and Contraceptive Information . . . . .	342
<i>Syed Ali Hussain, Folu Ogundimu, and Shirish Bhattarai</i>	
Memory Aid Service Using Mind Sensing and Daily Retrospective by Virtual Agent . . . . .	353
<i>Haruhisa Maeda, Sachio Saiki, Masahide Nakamura, and Kiyoshi Yasuda</i>	
Exploring Rhetoric Theory in Persuasive Design: A Mobile Web Application for Obesity Prevention . . . . .	365
<i>G. Mauricio Mejia and Sauman Chu</i>	
Identifying Users in the Bridging Service Between Two Different Chat Services Using User Icons . . . . .	380
<i>Ko Miyazaki and Haruaki Tamada</i>	

Implementation and Evaluation of Personal Ontology Building System with Virtual Agent . . . . .	391
<i>Shota Nakatani, Sachio Saiki, Masahide Nakamura, and Kiyoshi Yasuda</i>	
Design of Coimagination Support Dialogue System with Pluggable Dialogue System - Towards Long-Term Experiment . . . . .	404
<i>Seiki Tokunaga and Mihoko Otake-Matsuura</i>	
A Method of Generating a Dialogue Pattern to Induce Awareness Based on a Reflection Support Agent . . . . .	421
<i>Kazuaki Yokota, Sho Ooi, and Mutsuo Sano</i>	
<b>Health Games and Social Communities</b>	
Bubble Trouble: Strategies Against Filter Bubbles in Online Social Networks . . . . .	441
<i>Laura Burbach, Patrick Halbach, Martina Ziefle, and André Calero Valdez</i>	
Health Games in Brazil . . . . .	457
<i>Marcelo Vasconcellos, Cynthia Dias, Flávia Carvalho, Rafael Braga, and Guilherme Xavier</i>	
Gamification and Learning: A Comparative Study of Design Frameworks . . .	473
<i>Priscilla Garone and Sérgio Nesteriuk</i>	
Follow Me: The Impact of Opinion Majorities in Social Networks and the Role of Digital Maturity . . . . .	488
<i>Patrick Halbach, Laura Burbach, Martina Ziefle, and André Calero-Valdez</i>	
A Training System for Swallowing Ability by Visualizing the Throat Position . . . . .	501
<i>Nagisa Matsumoto, Chihiro Suzuki, Koji Fujita, and Yuta Sugiura</i>	
Literature Review: The Use of Games as a Treatment for Obsessive Compulsive Disorder . . . . .	512
<i>Juliana Miranda, Vania Teofilo, Anthony Lins, Bruno S. Oliveira, Fábio Campos, and Sergio Nesteriuk</i>	
Exergames: Game Prototype Using Maker Movement Assets . . . . .	532
<i>Bruno S. Oliveira, Vania Teofilo, Juliana Miranda, and Sergio Nesteriuk</i>	
An Empirical Study on the Influential Factors of User Loyalty in Digital Fitness Community . . . . .	550
<i>Yao Shen</i>	
<b>Author Index . . . . .</b>	<b>561</b>