# **Communications** in Computer and Information Science

1226

Commenced Publication in 2007
Founding and Former Series Editors:
Simone Diniz Junqueira Barbosa, Phoebe Chen, Alfredo Cuzzocrea,
Xiaoyong Du, Orhun Kara, Ting Liu, Krishna M. Sivalingam,
Dominik Ślęzak, Takashi Washio, Xiaokang Yang, and Junsong Yuan

### **Editorial Board Members**

Joaquim Filipe 10

Polytechnic Institute of Setúbal, Setúbal, Portugal

Ashish Ghosh

Indian Statistical Institute, Kolkata, India

Igor Kotenko

St. Petersburg Institute for Informatics and Automation of the Russian Academy of Sciences, St. Petersburg, Russia

Raquel Oliveira Prates (1)

Federal University of Minas Gerais (UFMG), Belo Horizonte, Brazil Lizhu Zhou

Tsinghua University, Beijing, China

More information about this series at http://www.springer.com/series/7899

Constantine Stephanidis · Margherita Antona (Eds.)

# HCI International 2020 - Posters

22nd International Conference, HCII 2020 Copenhagen, Denmark, July 19–24, 2020 Proceedings, Part III



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

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

ISSN 1865-0929 ISSN 1865-0937 (electronic) Communications in Computer and Information Science ISBN 978-3-030-50731-2 ISBN 978-3-030-50732-9 (eBook) https://doi.org/10.1007/978-3-030-50732-9

#### © Springer Nature Switzerland AG 2020

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 22nd International Conference on Human-Computer Interaction, HCI International 2020 (HCII 2020), was planned to be held at the AC Bella Sky Hotel and Bella Center, Copenhagen, Denmark, during July 19–24, 2020. Due to the COVID-19 coronavirus pandemic and the resolution of the Danish government not to allow events larger than 500 people to be hosted until September 1, 2020, HCII 2020 had to be held virtually. It incorporated the 21 thematic areas and affiliated conferences listed on the following page.

A total of 6,326 individuals from academia, research institutes, industry, and governmental agencies from 97 countries submitted contributions, and 1,439 papers and 238 posters were included in the 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 conference proceedings are listed in the following pages.

The HCI International (HCII) conference also offers the option of "late-breaking work" which 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 2020 - Late Breaking Papers" 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 2020 - Late Breaking Posters" 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 2020 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 2020

Constantine Stephanidis

# HCI International 2020 Thematic Areas and Affiliated Conferences

#### Thematic areas:

- HCI 2020: Human-Computer Interaction
- HIMI 2020: Human Interface and the Management of Information

#### Affiliated conferences:

- EPCE: 17th International Conference on Engineering Psychology and Cognitive Ergonomics
- UAHCI: 14th International Conference on Universal Access in Human-Computer Interaction
- VAMR: 12th International Conference on Virtual, Augmented and Mixed Reality
- CCD: 12th International Conference on Cross-Cultural Design
- SCSM: 12th International Conference on Social Computing and Social Media
- AC: 14th International Conference on Augmented Cognition
- DHM: 11th International Conference on Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management
- DUXU: 9th International Conference on Design, User Experience and Usability
- DAPI: 8th International Conference on Distributed, Ambient and Pervasive Interactions
- HCIBGO: 7th International Conference on HCI in Business, Government and Organizations
- LCT: 7th International Conference on Learning and Collaboration Technologies
- ITAP: 6th International Conference on Human Aspects of IT for the Aged Population
- HCI-CPT: Second International Conference on HCI for Cybersecurity, Privacy and Trust
- HCI-Games: Second International Conference on HCI in Games
- MobiTAS: Second International Conference on HCI in Mobility, Transport and Automotive Systems
- AIS: Second International Conference on Adaptive Instructional Systems
- C&C: 8th International Conference on Culture and Computing
- MOBILE: First International Conference on Design, Operation and Evaluation of Mobile Communications
- AI-HCI: First International Conference on Artificial Intelligence in HCI

# **Conference Proceedings Volumes Full List**

- 1. LNCS 12181, Human-Computer Interaction: Design and User Experience (Part I), edited by Masaaki Kurosu
- 2. LNCS 12182, Human-Computer Interaction: Multimodal and Natural Interaction (Part II), edited by Masaaki Kurosu
- 3. LNCS 12183, Human-Computer Interaction: Human Values and Quality of Life (Part III), edited by Masaaki Kurosu
- 4. LNCS 12184, Human Interface and the Management of Information: Designing Information (Part I), edited by Sakae Yamamoto and Hirohiko Mori
- 5. LNCS 12185, Human Interface and the Management of Information: Interacting with Information (Part II), edited by Sakae Yamamoto and Hirohiko Mori
- LNAI 12186, Engineering Psychology and Cognitive Ergonomics: Mental Workload, Human Physiology, and Human Energy (Part I), edited by Don Harris and Wen-Chin Li
- 7. LNAI 12187, Engineering Psychology and Cognitive Ergonomics: Cognition and Design (Part II), edited by Don Harris and Wen-Chin Li
- 8. LNCS 12188, Universal Access in Human-Computer Interaction: Design Approaches and Supporting Technologies (Part I), edited by Margherita Antona and Constantine Stephanidis
- 9. LNCS 12189, Universal Access in Human-Computer Interaction: Applications and Practice (Part II), edited by Margherita Antona and Constantine Stephanidis
- 10. LNCS 12190, Virtual, Augmented and Mixed Reality: Design and Interaction (Part I), edited by Jessie Y. C. Chen and Gino Fragomeni
- 11. LNCS 12191, Virtual, Augmented and Mixed Reality: Industrial and Everyday Life Applications (Part II), edited by Jessie Y. C. Chen and Gino Fragomeni
- 12. LNCS 12192, Cross-Cultural Design: User Experience of Products, Services, and Intelligent Environments (Part I), edited by P. L. Patrick Rau
- 13. LNCS 12193, Cross-Cultural Design: Applications in Health, Learning, Communication, and Creativity (Part II), edited by P. L. Patrick Rau
- 14. LNCS 12194, Social Computing and Social Media: Design, Ethics, User Behavior, and Social Network Analysis (Part I), edited by Gabriele Meiselwitz
- 15. LNCS 12195, Social Computing and Social Media: Participation, User Experience, Consumer Experience, and Applications of Social Computing (Part II), edited by Gabriele Meiselwitz
- 16. LNAI 12196, Augmented Cognition: Theoretical and Technological Approaches (Part I), edited by Dylan D. Schmorrow and Cali M. Fidopiastis
- 17. LNAI 12197, Augmented Cognition: Human Cognition and Behaviour (Part II), edited by Dylan D. Schmorrow and Cali M. Fidopiastis

- 18. LNCS 12198, Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management: Posture, Motion and Health (Part I), edited by Vincent G. Duffy
- 19. LNCS 12199, Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management: Human Communication, Organization and Work (Part II), edited by Vincent G. Duffy
- 20. LNCS 12200, Design, User Experience, and Usability: Interaction Design (Part I), edited by Aaron Marcus and Elizabeth Rosenzweig
- 21. LNCS 12201, Design, User Experience, and Usability: Design for Contemporary Interactive Environments (Part II), edited by Aaron Marcus and Elizabeth Rosenzweig
- LNCS 12202, Design, User Experience, and Usability: Case Studies in Public and Personal Interactive Systems (Part III), edited by Aaron Marcus and Elizabeth Rosenzweig
- LNCS 12203, Distributed, Ambient and Pervasive Interactions, edited by Norbert Streitz and Shin'ichi Konomi
- 24. LNCS 12204, HCI in Business, Government and Organizations, edited by Fiona Fui-Hoon Nah and Keng Siau
- 25. LNCS 12205, Learning and Collaboration Technologies: Designing, Developing and Deploying Learning Experiences (Part I), edited by Panayiotis Zaphiris and Andri Ioannou
- LNCS 12206, Learning and Collaboration Technologies: Human and Technology Ecosystems (Part II), edited by Panayiotis Zaphiris and Andri Ioannou
- 27. LNCS 12207, Human Aspects of IT for the Aged Population: Technologies, Design and User Experience (Part I), edited by Qin Gao and Jia Zhou
- 28. LNCS 12208, Human Aspects of IT for the Aged Population: Healthy and Active Aging (Part II), edited by Qin Gao and Jia Zhou
- 29. LNCS 12209, Human Aspects of IT for the Aged Population: Technology and Society (Part III), edited by Qin Gao and Jia Zhou
- 30. LNCS 12210, HCI for Cybersecurity, Privacy and Trust, edited by Abbas Moallem
- 31. LNCS 12211, HCI in Games, edited by Xiaowen Fang
- 32. LNCS 12212, HCI in Mobility, Transport and Automotive Systems: Automated Driving and In-Vehicle Experience Design (Part I), edited by Heidi Krömker
- 33. LNCS 12213, HCI in Mobility, Transport and Automotive Systems: Driving Behavior, Urban and Smart Mobility (Part II), edited by Heidi Krömker
- 34. LNCS 12214, Adaptive Instructional Systems, edited by Robert A. Sottilare and Jessica Schwarz
- 35. LNCS 12215, Culture and Computing, edited by Matthias Rauterberg
- 36. LNCS 12216, Design, Operation and Evaluation of Mobile Communications, edited by Gavriel Salvendy and June Wei
- 37. LNCS 12217, Artificial Intelligence in HCI, edited by Helmut Degen and Lauren Reinerman-Jones

- 38. CCIS 1224, HCI International 2020 Posters Part I, edited by Constantine Stephanidis and Margherita Antona
- 39. CCIS 1225, HCI International 2020 Posters Part II, edited by Constantine Stephanidis and Margherita Antona
- 40. CCIS 1226, HCI International 2020 Posters Part III, edited by Constantine Stephanidis and Margherita Antona

### http://2020.hci.international/proceedings



# HCI International 2020 (HCII 2020)

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-2020.php



# **HCI International 2021**

The 23rd International Conference on Human-Computer Interaction, HCI International 2021 (HCII 2021), will be held jointly with the affiliated conferences in Washington DC, USA, at the Washington Hilton Hotel, July 24–29, 2021. It will cover a broad spectrum of themes related to Human-Computer Interaction (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://2021.hci.international/.

General Chair Prof. Constantine Stephanidis University of Crete and ICS-FORTH Heraklion, Crete, Greece Email: general\_chair@hcii2021.org

http://2021.hci.international/



# **Contents – Part III**

Universal Access, Accessibility and Design for the Elderly	
Brain-Computer Interaction and Silent Speech Recognition on Decentralized Messaging Applications	3
TACTILE – A Novel Mixed Reality System for Training and Social Interaction	12
Affordance Requirements in Product Interface Design for Elderly User Hui-Qing Cai and Li-Hao Chen	21
A Resort or A Remote Village? - Using Jobs-To-Be-Done Theory to Understand Elderly's Thinking Toward Senior Residences in Taiwan Miao-Hsien Chuang, Ming-Shien Wen, and You-Shan Lin	29
Design Method of Online Health Education with Service Interaction System for the Elderly	35
Shaping Social Relationships Digitally: WhatsApp's Influence on Social Relationships of Older Adults	42
Process Automation in the Translation of Standard Language Texts into Easy-to-Read Texts – A Software Requirements Analysis	50
Development of Behavior-Based Game for Early Screening of Mild Cognitive Impairment: With the Plan for a Feasibility Study	58
Robot Use for Older Adults – Attitudes, Wishes and Concerns. First Results from Switzerland	64

Evaluation of Musical Playing Ability of Children with Intellectual Disabilities by Using Keyboard-Playing-Software with the Figurenotes System	71
Constructing a Highly Accurate Japanese Sign Language Motion Database Including Dialogue	70
A User-Centered Approach to Digital Household Risk Management	82
Making the Home Accessible - Experiments with an Infrared Handheld Gesture-Based Remote Control	89
A Proposal of Rehabilitation Application System Using Sliding Block Puzzles for Prevention of Mild Cognitive Impairment (MCI)	98
Effectiveness of Color and Shape Matching Learning in Figurenotes System Using Musical Instrument Software	107
Simultaneous Speech Subtitling Systems for Multiple Speakers	114
Voice and Speech Training System for the Hearing-Impaired Children Using Tablet Terminal	121
Research on Interface Design for the Elderly	128
Smartphones, Social Media and Human Behaviour	
Effect of Online Weight Loss Advertising in Young Women with Body Dissatisfaction: An Experimental Protocol Using Eye-Tracking and Facial Electromyography	139
Examining Independent Podcasts in Portuguese iTunes	149

The Framing Effect of Questions in Community Question-Answering Sites Qian Wu, Dion Hoe-Lian Goh, and Chei Sian Lee	246
Latent Profile Analysis of Generation Z and Millennials by Their Smartphone Usage Pattern	253
Interacting with Cultural Heritage	
Magical Pond: Exploring How Ambient and Tangible Art Can Promote Social Interaction at Work  Araceli Patricia Alcarraz Gomez, Ann-Charlott Beatrice Karlsen, Bjørn Arild Lunde, and Susanne Koch Stigberg	263
Quantifying Museum Visitor Attention Using Bluetooth	270
Proximity Beacons  Jonathan D. L. Casano, Jenilyn L. Agapito, Abigail Moreno, and Ma. Mercedes T. Rodrigo	270
The Museum Guidance System in Gamification Design	278
Explore the Usability of the Cultural Museum Website – An Example of Pazeh Cultural Museum	286
Embodied Interaction for the Exploration of Image Collections in Mixed Reality (MR) for Museums and Other Exhibition Spaces	291
Participatory Management for Cultural Heritage: Social Media and Chinese Urban Landscape	300
Discussion on Aesthetic Design in Chinese Painting Based on Cross-Cultural Design	308
Towards the User Interface of Augmented Reality-Based Public Art	317
Displaying Art in Virtual Environments	324
Experience Communication Design of Intangible Cultural Heritage Shanghai Style Lacquerware Brand Based on H5 Game	329

## **Human-Vehicle Interaction**

Prevalence of Driving Schedule Habits and Fatigue Among Occupational Heavy Truck Drivers	339
Facing Driver Frustration: Towards Real-Time In-Vehicle Frustration Estimation Based on Video Streams of the Face	349
One of by Map - Two if by See: Implications of Dissonant Affordance Structures in Human-Computer Interaction with especial Reference to the Case of Driver-Automated Vehicle Relationships	357
Investigating User Needs for Trip Planning with Limited Availability of Automated Driving Functions	359
Calculation and Validation of Driver's Readiness for Regaining Control from Autonomous Driving	367
Requirements for an Autonomous Taxi and a Resulting Interior Concept Manuel Kipp, Ingrid Bubb, Johannes Schwiebacher, Ferdinand Schockenhoff, Adrian Koenig, and Klaus Bengler	374
Impact of Visual Embodiment on Trust for a Self-driving Car Virtual Agent: A Survey Study and Design Recommendations	382
Improving the Detection of User Uncertainty in Automated Overtaking Maneuvers by Combining Contextual, Physiological and Individualized User Data	390
Theorization Human-Computer Interaction in the All-Digital Car:  Mediatized Driver Experiences	398
"Light On": A Voice Controlled Vehicle-Light System Based on Translating Drives' Voice into Computer Commands to Reduce Operation Workload of Drivers	408
Design and Evaluation of an In-Vehicle Communication System	417

# Transport, Safety and Crisis Management

Blockchain Technology: A Bibliometric Analysis	513
Security, Privacy and Trust	
Construction of Airlines Safety Subculture Based on Human Factor Analysis	504
Efficient Exploration of Long Data Series: A Data Event-driven  HMI Concept	495
System Safety, Risk Management, and Human Performance Improvement Hiroshi Ujita and Naoko Matsuo	486
Implementation of a Learning Assistance Framework for Prolonged Evacuation Life in an Era of Massive Natural Disasters	480
Development of Simple and Inexpensive Pedestrian Simulator in General Traffic Conditions	472
Using Block-Based Programming and Sunburst Branching to Plan and Generate Crisis Training Simulations	463
Research on Safety Risk Management Programme, Procedures and Standards in Aircraft Design and Manufacture Organizations Based on Multi-management Systems Integration	454
Flow-Based ROS2 Programming Environment for Control Drone	449
Aid Demand Aggregation Using Technology During Disaster Relief	439
Model Study Case: Public and Government Regulatory Responses on Urban Mobile Ride Hailing	429

	Contents – Part III	xxiii
Effects of Recipient Information and Urgence Xinyue Cui, Yan Ge, Weina Qu, and Kan	•	520
Evaluating Multiple Approaches to Impact Labeling, Design, and Support Features Benjamin Ewerz and Peter Moertl		526
LINE Based Learning System for IT Securi Intrinsic Motivation		534
Co-occurrence Based Security Event Analyst Physical Systems		540
The Right to Privacy in Socio-Technical Sn Privacy Risks in Multi-Stakeholder Environ Marina Konrad, Sabine Koch-Sonneborn	ments	549
Imitation-Resistant Passive Authentication I Touch Screen Devices		558
Emergence of Human-Centric Information S an Integrated Research Framework Bin Mai		566
Neither Do I Want to Accept, nor Decline; Nurul Momen and Sven Bock	Is There an Alternative?	573
Improving the Training Materials of Inform on Cybersecurity Framework		581
Cyber Trust in the Norwegian Online Flea Mon Fraud		589
Attention! Designing a Target Group-Orient Communication Strategy		597
Understanding the Impact of Service Trials Yayoi Suganuma, Jun Narita, Masakatsu	· · · · · · · · · · · · · · · · · · ·	605
PISA: A Privacy Impact Self-assessment App Behavior to Risks to Smartphone User  Ludwig Toresson, Maher Shaker, Sebasti	S	613

and Multitasking in Action Slips	62
Dylan M. Jones, Qiyuan Zhang, and Phillip L. Morgan	
A Study on Biometric Authentication and Liveness Detection Using Finger Elastic Deformation	63
Yu Yoshitani and Nobuyuki Nishiuchi	
Product and Service Design	
A Study on Oral Health Care System Designing for the Middle-Aged Based on SAPAD-PCA	63
Shanshan Chen and Yajun Li	
Consumers' Digital Capability and Demand for Intelligent Products and Services	6.
Seonglim Lee, Jaehye Suk, Hee Ra Ha, Yue Huang, and YuanZhou Deng	0.
Product Innovation Redesign Method Based on Kansei Engineering	
and Customer Personality Type	6
An Evaluation Model of Commercial Ring Designs from Cognitive and Emotional Aspects Based on the Quantification Theory I	6
Ting Liu and Jian Shi	Ŭ
Designing a New Interactive Outdoor Light Installation for a Recreational	
Urban Trail	6
and Susanne Koch Stigberg	
Study on the External Ear Size of Chinese Minors for Product Design Linghua Ran, He Zhao, and Zhongting Wang	6
Impression Estimation Model for Clothing Patterns Using Neural	_
Style Features	6
Design Aid of 3D Wire Art Using 3D Models	6
Research on Design of Shared Bicycle Service System Based	7
on Kansei Engineering	70

Contents – Part III	XXV
A Comparative Study on the Preference Model of Users and Designers for Scissors Modeling	714
Extracting Kansei Evaluation Index Using Time Series Text Data:  Examining Universality and Temporality	722
Behavioral Research and Service Innovation of Cinema Viewers in China Xiaofang Yuan and Qiujie Jiang	730
Interactively Solving the Takeout Delivery Problem Based on Customer Satisfaction and Operation Cost	738
Author Index	747