

Lecture Notes in Networks and Systems

Volume 277

Series Editor

Janusz Kacprzyk, Systems Research Institute, Polish Academy of Sciences,
Warsaw, Poland

Advisory Editors

Fernando Gomide, Department of Computer Engineering and Automation—DCA,
School of Electrical and Computer Engineering—FEEC, University of Campinas—
UNICAMP, São Paulo, Brazil

Okyay Kaynak, Department of Electrical and Electronic Engineering,
Bogazici University, Istanbul, Turkey

Derong Liu, Department of Electrical and Computer Engineering, University
of Illinois at Chicago, Chicago, USA; Institute of Automation, Chinese Academy
of Sciences, Beijing, China

Witold Pedrycz, Department of Electrical and Computer Engineering,
University of Alberta, Alberta, Canada; Systems Research Institute,
Polish Academy of Sciences, Warsaw, Poland

Marios M. Polycarpou, Department of Electrical and Computer Engineering,
KIOS Research Center for Intelligent Systems and Networks, University of Cyprus,
Nicosia, Cyprus

Imre J. Rudas, Óbuda University, Budapest, Hungary

Jun Wang, Department of Computer Science, City University of Hong Kong,
Kowloon, Hong Kong

The series “Lecture Notes in Networks and Systems” publishes the latest developments in Networks and Systems—quickly, informally and with high quality. Original research reported in proceedings and post-proceedings represents the core of LNNS.

Volumes published in LNNS embrace all aspects and subfields of, as well as new challenges in, Networks and Systems.

The series contains proceedings and edited volumes in systems and networks, spanning the areas of Cyber-Physical Systems, Autonomous Systems, Sensor Networks, Control Systems, Energy Systems, Automotive Systems, Biological Systems, Vehicular Networking and Connected Vehicles, Aerospace Systems, Automation, Manufacturing, Smart Grids, Nonlinear Systems, Power Systems, Robotics, Social Systems, Economic Systems and other. Of particular value to both the contributors and the readership are the short publication timeframe and the world-wide distribution and exposure which enable both a wide and rapid dissemination of research output.

The series covers the theory, applications, and perspectives on the state of the art and future developments relevant to systems and networks, decision making, control, complex processes and related areas, as embedded in the fields of interdisciplinary and applied sciences, engineering, computer science, physics, economics, social, and life sciences, as well as the paradigms and methodologies behind them.

Indexed by SCOPUS, INSPEC, WTI Frankfurt eG, zbMATH, SCImago.

All books published in the series are submitted for consideration in Web of Science.

More information about this series at <http://www.springer.com/series/15179>

Daniel Raposo · Nuno Martins ·
Daniel Brandão
Editors

Advances in Human Dynamics for the Development of Contemporary Societies

Proceedings of the AHFE 2021 Virtual
Conference on Human Dynamics
for the Development of Contemporary
Societies, July 25–29, 2021, USA

Editors

Daniel Raposo
CIAUD & School of Applied Arts
Polytechnic Institute of Castelo Branco
Castelo Branco, Portugal

Nuno Martins
ID+ & Design School
Polytechnic Institute of Cávado and Ave
Barcelos, Portugal

Daniel Brandão
CECS/Institute of Social Sciences
University of Minho
Braga, Portugal

ISSN 2367-3370

ISSN 2367-3389 (electronic)

Lecture Notes in Networks and Systems

ISBN 978-3-030-80414-5

ISBN 978-3-030-80415-2 (eBook)

<https://doi.org/10.1007/978-3-030-80415-2>

© The Editor(s) (if applicable) and The Author(s), under exclusive license
to Springer Nature Switzerland AG 2021

This work is subject to copyright. All rights are solely and exclusively licensed 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

Advances in Human Factors and Ergonomics 2021

AHFE 2021 Series Editors

Tareq Z. Ahram, Florida, USA

Waldemar Karwowski, Florida, USA



12th International Conference on Applied Human Factors and Ergonomics and the
Affiliated Conferences (AHFE 2021)

Proceedings of the AHFE 2021 Virtual Conference on Human Dynamics for the
Development of Contemporary Societies, July 25–29, 2021, USA.

Advances in Neuroergonomics and Cognitive Engineering	Hasan Ayaz, Umer Asgher and Lucas Paletta
Advances in Industrial Design	Cliff Sungsoo Shin, Giuseppe Di Bucchianico, Shuichi Fukuda, Yong-Gyun Ghim, Gianni Montagna and Cristina Carvalho
Advances in Ergonomics in Design	Francisco Rebelo
Advances in Safety Management and Human Performance	Pedro M. Arezes and Ronald L. Boring
Advances in Human Factors and Ergonomics in Healthcare and Medical Devices	Jay Kalra, Nancy J. Lightner and Redha Taiar
Advances in Simulation and Digital Human Modeling	Julia L. Wright, Daniel Barber, Sofia Scataglin and Sudhakar L. Rajulu
Advances in Human Factors and System Interactions	Isabel L. Nunes
Advances in the Human Side of Service Engineering	Christine Leitner, Walter Ganz, Debra Satterfield and Clara Bassano
Advances in Human Factors, Business Management and Leadership	Jussi Ilari Kantola, Salman Nazir and Vesa Salminen
Advances in Human Factors in Robots, Unmanned Systems and Cybersecurity	Matteo Zallio, Carlos Raymundo Ibañez and Jesus Hechavarria Hernandez
Advances in Human Factors in Training, Education, and Learning Sciences	Salman Nazir, Tareq Z. Ahram and Waldemar Karwowski

(continued)

(continued)

Advances in Human Aspects of Transportation	Neville Stanton
Advances in Artificial Intelligence, Software and Systems Engineering	Tareq Z. Ahram, Waldemar Karwowski and Jay Kalra
Advances in Human Factors in Architecture, Sustainable Urban Planning and Infrastructure	Jerzy Chartyonowicz, Alicja Maciejko and Christianne S. Falcão
Advances in Physical, Social & Occupational Ergonomics	Ravindra S. Goonetilleke, Shuping Xiong, Henrijs Kalkis, Zenija Roja, Waldemar Karwowski and Atsuo Murata
Advances in Manufacturing, Production Management and Process Control	Stefan Trzcielinski, Beata Mrugalska, Waldemar Karwowski, Emilio Rossi and Massimo Di Nicolantonio
Advances in Usability, User Experience, Wearable and Assistive Technology	Tareq Z. Ahram and Christianne S. Falcão
Advances in Creativity, Innovation, Entrepreneurship and Communication of Design	Evangelos Markopoulos, Ravindra S. Goonetilleke, Amic G. Ho and Yan Luximon
Advances in Human Dynamics for the Development of Contemporary Societies	Daniel Raposo, Nuno Martins and Daniel Brandão

Preface

The AHFE 2021 International Conference on Human Dynamics for the Development of Contemporary Societies focuses on how human factors and ergonomic principles impact on quality of life and society lifestyles through interactions between academia, industry and government. We understand that research and design should be centered on people without considering them as the center of the universe, but rather as people who participate in a society and world.

The objective of this conference is to promote research on human factors and ergonomic principles in the context of the design of artifacts and systems (human, social, symbolic, technological, economic and cultural) that impact on health, wellbeing, safety, sustainability, food, enjoyment, accessibility, interaction, education, intelligibility, integrity, democracy and place development.

The conference welcomes submissions of original papers, case studies or research papers reporting on new models, practices and processes with an impact on the development of society considering people, companies, government bodies and the world. This book covers five unique yet overlapping design areas such as:

- Human dynamics for social cohesion
- Arts and creativity in education
- Co-creation perspectives
- Creativity and complexity
- Design and human–computer interaction
- Design for equality and human rights
- Design for health
- Design for sustainability
- Design for welfare
- Human dynamics and urban planning
- Identity, citizenship and mobility
- Media arts and socio-cultural factors
- Food design
- Transdisciplinary design wayfinding

A total of three sections are presented in this book:

1. Sustainability and Ecodesign
2. Human Interaction and Communication in Industry
3. Human Dynamics for Social Cohesion

Each section contains research papers that have been reviewed by members of the International Editorial Board. Our sincere thanks and appreciation to the Board members as listed below:

Design for Inclusion

M. Adelfio, Sweden
F. Carneiro Moreira Silva, Portugal
J. Eckert, Sweden
H. Evans, Japan
L. Farinha, Portugal
J. Frascara, Canada
M. Juan Ramón, Spain
M. Martins, Portugal
J. Matos Neves, Portugal
V. Mendes da Costa Carvalho, Portugal
H. Pinto da Cunha e Alvelos, Portugal
K. van der Waarde, UK/Switzerland

We hope that this book, which presents the international state of the art in the field of industrial design, will serve as a valuable source of theoretical and applied knowledge enabling human-centered design of a variety of products, services and systems for global markets.

July 2021

Daniel Raposo
Nuno Martins
Daniel Brandão

Contents

Sustainability and Ecodesign

Dryas as a Model for Lighting Products Design 3

Liliana Soares, Ermanno Aparo, Rita Almendra,
Fernando Moreira da Silva, João Teixeira, and Jorge Passos

Design, Plastics and Sustainability – Methodological Reflections 9

Dília Nunes and Joana Lessa

Fostering Sustainability on Campus: Design of an IoT-Enabled Smartbottle for Plastic Reduction in the Academic Environment 18

João Mendes, Ana Curralo, António Curado, and Sérgio I. Lopes

Fashion Design Education Towards Transition: Circularity and Biobased Materials 26

Gabriela Forman

Design and Science for the Valorisation of Residues and By-products of the Wine Industry 35

Elena Cioffi, Sonia Capece, Severina Pacífico, and Mario Buono

Human Interaction and Communication in Industry

Design and Development of a F-16 Fighter Pilot Training System Using Virtual Reality: First Insights 47

Nuno Martins, Rui Oliveira, Sílvia Faria, Vítor Carvalho, and Jorge Silva

Creativity for Good: How Advertising Can Impact Lives - Case Study on Binge Drinking 54

Sara Balonas

Design and Its Multiple Roles in Place Branding: The Case of Mississauga, Canada 62

Paula Malamud, Marco Neves, and Gabriel Patrocínio

Additive Manufacturing Re-designs the Industry	70
Ciro Scognamiglio, Rosario Borrelli, Assunta Capece, Francesco Caputo, Stefania Franchitti, and Mario Buono	
Human-Centered-Design for Definition of New Collaborative Scenarios	78
Fabrizio Formati, Elena Laudante, and Mario Buono	
Information Design and the Hermeneutic Process of Knowledge	86
Maria Luísa Costa and Sílvia Rala	
Human Dynamics for Social Cohesion	
bYou: A Research Proposal About and with Children and Youngsters as Creative Agents of Change Through the Use of the Media	95
Sara Pereira, Daniel Brandão, and Manuel Pinto	
Brand Models: A Comparative Study on Brand Creation and Management	104
Emílio Santos and Daniel Raposo	
Co-creating Places: Human Participatory Dynamics Through Territorial Communication	111
Ana Duarte Melo	
Collaborative Pedagogy for Co-creation and Community Outreach: An Experience from Architectural Education in Social Inclusion Using the Miro Tool	118
Emilio Brandao, Marco Adelfio, Shea Hagy, and Liane Thuvander	
Design Infrastructures: Proposing Alternative Strategies for Countries with a Lower Maturation of Design Culture	127
Nina Costa, Vasco Branco, Rui Costa, Afonso Borges, Raul Cunha, António Modesto, and Ana Vieira Silva	
Psychosocial Toxicology: Emotional Work and Mental Health in Security Guards	135
Olga Piñeros and Carlos Marín	
<i>Traje à Vianesa – A Study on Historical Costume to Inform Contemporary Design Projects</i>	143
Lídia Araújo and Gabriela Forman	
Kalokagathia, Made in Italy and Cultural Heritage in Campania Region	150
Rosa Maria Giusto and Mario Buono	
Author Index	159