Advances in

Ergonomics In Design, Usability & Special Populations

Part II

Advances in Human Factors and Ergonomics 2014

5th International Conference on Applied Human Factors and Ergonomics

20 Volume Set: Proceedings of the 5th AHFE Conference 19-23 July 2014

Advances in The Human Side of Service Engineering	*Louis Freund and Wojciech Cellary*
Advances in Human Factors and Sustainable Infrastructure	*Jerzy Charytonowicz*
Advances in Human Aspects of Healthcare	*Vincent Duffy and Nancy Lightner*
Advances in Applied Digital Human Modeling	*Vincent Duffy*
Advances in Cross-Cultural Decision Making	*Sae Schatz, Joseph Cohn and Denise Nicholson*
Advances in Human Factors, Software, and Systems Engineering	*Ben Amaba and Brian Dalgetty*
Advances in Human Aspects of Transportation (Part I, II, III)	*Neville Stanton, Steve Landry Giuseppe Di Bucchianico and Andrea Vallicelli*
Advances in Safety Management and Human Factors	*Pedro Arezes and Paulo Carvalho*
Advances in Cognitive Engineering and Neuroergonomics	*Kay Stanney and Kelly Hale*
Advances in Social and Organizational Factors	*Peter Vink*
Advances in The Ergonomics in Manufacturing: Managing the Enterprise of the Future	*Stefan Trzcielinski and Waldemar Karwowski*
Advances in Physical Ergonomics and Human Factors (Part I, II)	*Tareq Ahram and Renliu Jang*
Advances in Ergonomics In Design, Usability & Special Populations (Part I, II, III)	*Marcelo Soares and Francisco Rebelo*
Advances in Affective and Pleasurable Design	*Yong Gu Ji and Sooshin Choi*
Advances in Science, Technology, Higher Education and Society in the Conceptual Age: STHESCA	*Tadeusz Marek*

Advances in

Ergonomics In Design, Usability & Special Populations

Part II

Edited By

Francisco Rebelo
and
Marcelo Soares

Published by AHFE Conference © 2014

Published by AHFE Conference © 2014

Printed in the United States of America on acid-free paper

Version Date: 20140710

International Standard Book Number: 978-1-4951-2107-4 (Hardback)

Visit the AHFE Web site at
http://www.ahfe.org

Table of Contents

Section 19: Virtual Reality and Digital Environment II

Section 20: Ergonomics, Product and Work Design I

Section 21: Interaction Design and Usability Evaluation

Section 22: Design Methods and Techniques

Section 23: Ergonomics and Product Design

Section 24: Ergonomics and Cognition in Aviation

Section 25: Seating Ergonomics and Body Posture

Section 26: Sustainable Design III

Preface

Successful interaction with products, tools and technologies depends on usable designs and accommodating the needs of potential users without requiring costly training. In this context, this book is concerned with emerging ergonomics in design concepts, theories and applications of human factors knowledge focusing on the discovery, design and understanding of human interaction and usability issues with products and systems for their improvement.

This book will be of special value to a large variety of professionals, researchers and students in the broad field of human modeling and performance who are interested in feedback of devices' interfaces (visual and haptic), user-centered design, and design for special populations, particularly the elderly. We hope this book is informative, but even more - that it is thought provoking. We hope it inspires, leading the reader to contemplate other questions, applications, and potential solutions in creating good designs for all.

The book is organized into three volumes with a total of thirty-eight sections that focus on the following subject matters: Devices and user interfaces, Virtual Reality and Digital Environment , User Studies, Product Design and Evaluation, and Sustainable Design. In the sections that cover "Devices and user interfaces" the focus is on optimization of user devices, with emphasis on visual and haptic feedback. In the sections that cover "User studies," the focus goes to the limits and capabilities of special populations, particularly the elderly, which can influence the design. Generally, the effect of changes in force and kinematics, physiology, cognitive performance, in the design of consumer products, tools and workplaces is discussed. The sections that cover "Virtual Reality and Digital Environment", "Product and design evaluation" and "Sustainable design" employs a variety of research methods and user-centered evaluation approaches, for developing products that can improve safety and human performance and at same time, the efficiency of the system. Usability evaluations are reported for different kinds of products and technologies.

Part I:

Section 1: Human Factors and Ergonomics in Design of Safety-Critical Systems
Section 2: Sustainable Design I
Section 3: Interface Design I
Section 4: Human Factors Applications
Section 5: Design and Human Behavior I
Section 6: The Role and Functions of Professional Certification Organizations
Section 7: Design and Applied Anthropometry I
Section 8: Ergonomics in Design of Workstations I
Section 9: Virtual Reality and Digital Environment I
Section 10: Sustainable Design II
Section 11: Design and Human Behavior II
Section 12: Design and Applied Anthropometry II
Section 13: Interface Design II

Part II:

Section 14: User-Centered Design I
Section 15: Ergonomics in the Analysis and Design of Production Systems
Section 16: Ergonomics in the Automotive Industry
Section 17: Transportation Design

Section 18: Ergonomics in Design of Workstations II
Section 19: Virtual Reality and Digital Environment II
Section 20: Ergonomics, Product and Work Design I
Section 21: Interaction Design and Usability Evaluation
Section 22: Design Methods and Techniques
Section 23: Ergonomics and Product Design
Section 24: Ergonomics and Cognition in Aviation
Section 25: Seating Ergonomics and Body Posture
Section 26: Sustainable Design III
Section 27: Ergonomics, Product and Work Design II

Part III:

Section 28: Human Factors and Ergonomics in Information Design
Section 29: Product Design
Section 30: Ergonomics in the Design of Products and Services
Section 31: Ergonomics and Usability Evaluation
Section 32: Sustainable Design IV
Section 33: Ergonomics, Accessibility and Built Environment
Section 34: Sustainable Innovation
Section 35: Ergonomics and Design for Elderly People
Section 36: Assistive Technology
Section 37: Ergonomic Design in Healthcare and Childcare
Section 38: Design of Protective Clothing and Safety

This book will be of special value to a large variety of professionals, researchers and students in the broad field of human performance who are interested in feedback of devices' interfaces (visual and haptic), user-centered design, and design for special populations, particularly the elderly. We hope this book is informative, but even more - that it is thought provoking. We hope it inspires, leading the reader to contemplate other questions, applications, and potential solutions in creating good designs for all.

We would like to thank the Editorial Board members for their contributions.

P. Arezes, Portugal
E. Attaianese, Italy
R. Bruder, Germany
F. M. da Silva, Portugal
J. C. P. da Silva, Brazil
M. E. Duarte, Portugal
E. Filgueiras, Portugal
M. Goebel, South Africa
L. B. Macedo, Brazil
P. Noriega, Portugal
M. L. Okimoto, Brazil
L. Paschoarelli, Brazil
L. Prado, Mexico
S. Summerskill, UK
B. Thomas, The Netherlands
S. J. Ward, Australia
T. Yamaoka, Japan
B. Amaba, USA
D. Feathers, USA
W. Friesdorf, Germany
S. Fukuzumi, Japan
S. Hignett, UK
W. Hwang, Korea
Y. Ji, Korea
B. Jiang, Taiwan
S.Landry, USA
Z. Li, PR China
A. Moallem, USA
F. Rebelo, Portugal
V.Rice USA
C. Stephanidis, Greece
A. Yeo, Malaysia
W. Zhang, PR China

July 2014

Francisco Rebelo

Centre for Architecture, Urban Planning and Design (CIAUD)

Ergonomics Laboratory, Faculdade de Motricidade Human

University of Lisbon

Lisbon, Portugal

Marcelo Soares

Federal University of Pernambuco

Recife, Brazil

Editors