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Volume 268

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Editors

Advances in Human Factors in Robots, Unmanned Systems and Cybersecurity

Proceedings of the AHFE 2021 Virtual Conferences on Human Factors in Robots, Drones and Unmanned Systems, and Human Factors in Cybersecurity, July 25–29, 2021, USA

Springer

Editors
Matteo Zallio
Department of Engineering
University of Cambridge
Cambridge, UK

Carlos Raymundo Ibañez
Department of Engineering
Peruvian University of Applied Sciences
Lima, Peru

Jesus Hechavarria Hernandez
Universidad de Guayaquil
Quayaquil, Ecuador

ISSN 2367-3370 ISSN 2367-3389 (electronic)
Lecture Notes in Networks and Systems
ISBN 978-3-030-79996-0 ISBN 978-3-030-79997-7 (eBook)
https://doi.org/10.1007/978-3-030-79997-7

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

Proceedings of the AHFE 2021 Virtual Conferences on Human Factors in Robots, Drones and Unmanned Systems, and Human Factors in Cybersecurity, July 25–29, 2021, USA.

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Preface

This book deals with two areas of critical importance both in the digital society and in the field of human factors: “Robots, Drones and Unmanned Systems” and “Human Factors in Cybersecurity”. Researchers are conducting cutting-edge investigations in the area of unmanned systems to inform and improve how humans interact with robotic platforms. Many of the efforts focused on refining the underlying algorithms that define system operation and on revolutionizing the design of human–system interfaces. The multi-faceted goals of this research are to improve ease of use, learnability, suitability, interaction, and human–system performance, which in turn will reduce the number of personnel hours and dedicated resources necessary to train, operate, and maintain the systems. As our dependence on unmanned systems grows along with the desire to reduce the manpower needed to operate them across both the military and the commercial sectors, it becomes increasingly critical that system designs are safe, efficient, and effective and provide humans with reliable solutions to daily challenges. Optimizing human–robot interaction and reducing cognitive workload at the user interface require research emphasis to understand what information the operator requires, when they require it, and in what form it should be presented, so they can intervene and take control of unmanned platforms when it is necessary. With a reduction in manpower, each individual’s role in system operation becomes even more important to the overall success of the mission or task at hand. Researchers are developing theories as well as prototype user interfaces to understand how best to support human–system interaction in complex operational environments. Because humans tend to be the most flexible and integral part of unmanned systems, the human factors and unmanned systems’ focus considers the role of the human early in the design and development process in order to facilitate the design of effective human–system interaction and teaming. This book addresses a variety of professionals, researchers, and students in the broad field of robotics, drones, and unmanned systems who are interested in the design of multi-sensory user interfaces (auditory, visual, and haptic), user-centered design, and task–function allocation when using artificial intelligence/automation to offset cognitive workload for the human operator.

This book additionally deals with the role of the human factors in cybersecurity. It is in fact the human element what makes the cyberspace complex and adaptive. According to international cybersecurity reports, people are both an essential part of the cybersecurity challenge and part of its solution. Cyber-intrusions and attacks have increased dramatically over the last decade, exposing sensitive personal and business information, disrupting critical operations, and imposing high costs on the economy. Therefore, understanding how people behave in the digital environment and investigate the role of human error in security attacks is therefore fundamental for developing an effective approach to cybersecurity in a variety of contexts. This book gathers studies on the social, economic, and behavioral aspects of the cyberspace and reports on technical and analytical tools for increasing cybersecurity. It describes new educational and training methods for management and employees aimed at raising cybersecurity awareness. It discusses key psychological and organizational factors influencing cybersecurity. Additionally, it offers a comprehensive perspective on ways to manage cybersecurity risks for a range of different organizations and individuals, presenting inclusive, multidisciplinary, and integrated user-centered design approaches combining technical and behavioral elements. As editors, we hope its informative content will provide inspiration, leading the reader to formulate new, innovative research questions, applications, and potential solutions for creating effective human-centered solutions by teaming with robots and unmanned systems.

Contributions have been organized into five sections:

Human Factors in Robots, Drones and Unmanned Systems

1. Human Factors and Unmanned Aerial Vehicles
2. Robots in Transportation Systems
3. Drones, Robots and Humanized Behaviors
4. Robotic Systems for Social Interactions

Cybersecurity

5. Human Factors in Cybersecurity

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July 2021

Matteo Zallio
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