

Preface

This volume is a compilation of cutting-edge research regarding how simulation and modeling supports human factors. The compilation of chapters is the result of efforts by the 8th International Conference on Applied Human Factors and Ergonomics (AHFE), which provides the organization for several affiliated conferences. Specifically, the chapters herein represent the 2nd International Conference on Human Factors and Simulation and the 6th International Conference on Digital Human Modeling and Applied Optimization.

Simulation can be thought of as technology that supports an approximation of real-world scenes and scenarios for a user. For example, a cockpit simulator represents how the inside of a cockpit is set up and will present a sensory experience to mimic flight. Simulations advance research by providing similar experiences to those scenarios that would otherwise be impractical to carry out in the real world for such reasons as monetary cost or safety concerns. Simulations can support numerous goals including training or practice on established skills.

Modeling is a somewhat different tool than simulation, though the two are often used interchangeably as they both imply estimation of real-world scenes or scenarios to bypass practical concerns. The difference in the context of this book is that modeling is not intended to provide a user with an experience, but rather to represent everything pertinent about the real world in computational algorithms, possibly including people and their psychological processing. Modeling may answer questions about large-scale scenarios that would be difficult to address otherwise, such as the effects of economic interventions or smaller scale scenarios such as the cognitive processing required to perform a task when it is otherwise undetectable by measurement devices.

The goal of the research herein is to bring awareness and attention to advances that human factors specialists can make in their field to address the design of programs of research, systems, policy, and devices. This book provides a plethora of avenues for human factors research that may be helped by simulation and modeling.

This book is divided into the following sections: (1) Human Factors and Automated Agents addresses how humans teaming with each other and with

technology; (2) Occupational Safety Simulators inspects workplace safety design and the important considerations necessary to the research; (3) Medical Simulation: Filling the Training Gap examines medical concerns that could help practitioners improve their craft; (4) Modeling and Simulation for the Extreme Environment considers how modeling and simulation can illuminate the effects of extreme environments on humans when it is impractical and unsafe to test these conditions in the real world; (5) Transportation Modeling and Simulation reviews research into transportation issues that arise in the real world through the use of modeling and simulation; (6) Advances in Computational Social Sciences regards large-scale relationships between people with a particular emphasis on how modeling can influence social policy; (7) User Experience Modeling discusses modeling research that considers the individual and how mental processing regarding different tasks unfolds; (8) Applied Digital Human Modeling and Simulation examines different aspects of humans including bodily and motion parameters that govern human behavior; and (9) Optimization, Analysis, and Scheduling addresses how modeling techniques may be used to examine data with the end goal to enlighten human factors researchers on device or system design.

Special thanks to Vincent Duffy for the significant contributions to the conference on Digital Human Modeling and Applied Optimization. All papers in this book were either reviewed or contributed by the members of editorial board. For this, I would like to appreciate the board members listed below:

Human Factors and Simulation

Karim Abdel-Malek, USA

Hanon Alnizami, USA

Jasbir Arora, USA

Rajan Bhatt, USA

Jennica Bellanca, USA

Norbou Buchler, USA

Margaret Duff, USA

Brian Gore, USA

Javier Irizarry, USA

Tiffany Jastrzembski, USA

Debbie Patton, USA

Teresita Sotomayor, USA

Ming Sun, USA

J.W.C. (Hans) van Lint, The Netherlands

Vladislav (Daniel) Veksler, USA

Julia Wright, USA

Zining Yang, USA

Digital Human Modeling and Applied Optimization

Thomas Alexander, Germany
Jasbir Arora, USA
Sue Bogner, USA
Julie Charland, Canada
Zhiqing Cheng, USA
Thomas Convard, France
Brian Corner, USA
Miguel Corticeiro Neves, Portugal
Nicolas Dechy, France
Jasmin Dell’Anna, Germany
Michael Fray, UK
Lars Fritzsche, Germany
Ravi Goonetilleke, Hong Kong
Richard Goossens, Netherlands
Brian Gore, USA
Rush Green, USA
Lars Hanson, Sweden
Daniel Högberg, Sweden
Masaomi Kimura, Japan
Bruce Byung Cheol Lee, USA
Zhizhong Li, China
Ameersing Luximon, Hong Kong
Tim Marler, USA
Russell Marshall, UK
Marco Mazzola, Italy
Myriam Merad, France
Claus Möbus, Germany
Masaaki Mochimaru, Japan
Anabela Pereira, Portugal
Stefan Pickl, Germany
George Psarros, Norway
Klaus Radermacher, Germany
Hanna Barbara Rasmussen, Denmark
Sudhakar Rajulu, USA
James Yang, USA
Zaili Yang, UK

This book is the first step in covering diverse topics in simulation and modeling. I hope this book is informative and helpful for the researchers and practitioners in developing better products, services, and systems.

July 2017

Daniel N. Cassenti

Advances in Human Factors in Simulation and Modeling
Proceedings of the AHFE 2017 International
Conference on Human Factors in Simulation and
Modeling, July 17–21, 2017, The Westin Bonaventure
Hotel, Los Angeles, California, USA
Cassenti, D.N. (Ed.)
2018, XVI, 597 p. 242 illus., Softcover
ISBN: 978-3-319-60590-6