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Preface

This volume, entitled *Intelligent Human Systems Integration 2019*, aims to provide a global forum for introducing and discussing novel approaches, design tools, methodologies, techniques, and solutions for integrating people with intelligent technologies, automation, and artificial cognitive systems in all areas of human endeavor in industry, economy, government, and education. Some of the notable areas of application include, but are not limited to, energy, transportation, urbanization and infrastructure development, digital manufacturing, social development, human health, sustainability, a new generation of service systems, as well as developments in safety, risk assurance, and cybersecurity in both civilian and military contexts. Indeed, rapid progress in developments in the ambient intelligence, including cognitive computing, modeling, and simulation, as well as smart sensor technology, weaves together the human and artificial intelligence and will have a profound effect on the nature of their collaboration at both the individual and societal levels in the near future.

As applications of artificial intelligence and cognitive computing become more prevalent in our daily lives, they also bring new social and economic challenges and opportunities that must be addressed at all levels of contemporary society. Many of the traditional human jobs that require high levels of physical or cognitive abilities, including human motor skills, reasoning, and decision-making abilities, as well as training capacity, are now being automated. While such trends might boost economic efficiency, they can also negatively impact the user experience and bring about many unintended social consequences and ethical concerns.

The intelligent human systems integration is to a large extent affected by the forces shaping the nature of future computing and artificial system development. This book discusses the needs and requirements for the symbiotic collaboration between humans and artificially intelligent systems, with due consideration of the software and hardware characteristics allowing for such cooperation from the societal and human-centered design perspectives, with the focus on the design of intelligent products, systems, and services that will revolutionize future human–technology interactions. This book also presents many innovative studies of ambient artificial technology and its applications, including the consideration of

human–machine interfaces with a particular emphasis on infusing intelligence into development of technology throughout the lifecycle development process, with due consideration of user experience and the design of interfaces for virtual, augmented, and mixed reality applications of artificial intelligence.

Reflecting on the above-outlined perspective, the papers contained in this volume are organized into seven main sections, including:

I. Humans and Artificial Cognitive Systems
II. Intelligence, Technology and Analytics
III. Computational Modeling and Simulation
IV. Humans and Artificial Systems Complexity
V. Smart Materials and Inclusive Human Systems
VI. Human-Autonomy Teaming
VII. Applications and Future Trends

We would like to extend our sincere thanks to Axel Schulte, Stefania Campione, and Marinella Ferrara, for leading a part of the technical program that focuses on Human-Autonomy Teaming and Smart Materials and Inclusive Human Systems. Our appreciation also goes to the members of Scientific Program Advisory Board who have reviewed the accepted papers that are presented in this volume, including the following individuals:

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We hope that this book, which presents the current state of the art in Intelligent Human Systems Integration, will be a valuable source of both theoretical and applied knowledge enabling the design and applications of a variety of intelligent products, services, and systems for their safe, effective, and pleasurable collaboration with people.

Orlando, FL, USA
February 2019

Waldemar Karwowski
Tareq Ahram

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