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IFIP is the global non-profit federation of societies of ICT professionals that aims at achieving a worldwide professional and socially responsible development and application of information and communication technologies.

IFIP is a non-profit-making organization, run almost solely by 2500 volunteers. It operates through a number of technical committees and working groups, which organize events and publications. IFIP's events range from large international open conferences to working conferences and local seminars.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is generally smaller and occasionally by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is also rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

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Luis M. Camarinha-Matos · Nastaran Farhadi ·
Fábio Lopes · Helena Pereira (Eds.)

Technological Innovation for Life Improvement

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Preface

This proceeding, which collects selected results produced in engineering doctoral programs, focuses on research and development in technological innovation for life improvement. Nowadays, life improvement has become a trending topic across different areas due to technological advancements that focus on human wellbeing. Different scientific areas, such as electronics, telecommunications, computing, and energy, are innovating and changing their paradigms to promote a digital-oriented world. Concepts and tools coming from the areas of artificial intelligence, collaborative networks, virtual and augmented reality, machine learning, big data, cyber-physical systems, and the internet of things (IoT), can be adopted to provide a better and sustainable future with high quality of life. The impacts of these technological developments can result in enhancement of health care, environment, manufacturing, transportation, and communication systems across the globe, namely through new products and services. This ongoing digital transformation has a huge potential to face existing societal challenges, while increasing knowledge, wellbeing, quality of life, and collaboration among companies, organizations, people, and systems.

The 11th Advanced Doctoral Conference on Computing, Electrical and Industrial Systems (DoCEIS 2020) aims at providing a venue for sharing and discussing ideas and results from doctoral research in various interrelated areas of engineering, while promoting a strong multidisciplinary dialog. Furthermore, the conference aims at creating collaborative opportunities for young researchers as well as an effective way of collecting valuable feedback from colleagues in a welcoming environment. As such, participants were challenged to look beyond the specific technical aspects of their research question and relate their work to the selected theme of the conference, namely, to identify in which ways their research topics can contribute to life improvement. Furthermore, current trends in strategic research programs point to the fundamental role of multidisciplinary and interdisciplinary approaches in innovation. More and more funding agencies are including this element as a key requirement in their research agendas. In this context, the challenge proposed by DoCEIS is a contribution to the process of acquiring such skills, which are mandatory in the profession of a PhD.

DoCEIS 2020, which was sponsored by SOCOLNET, IFIP, and IEEE IES, attracted a good number of paper submissions from a large number of PhD students and their supervisors from 18 countries. This book comprises the works selected by the International Program Committee for inclusion in the main program and covers a wide spectrum of application domains. As such, research results and ongoing work are presented, illustrated, and discussed in areas such as:

- Collaborative systems
- Decision and optimization systems
- Communications systems

- Digital twins and smart manufacturing
- Energy systems
- Biomedical systems
- Instrumentation and health

We hope that this collection of papers will provide readers with an inspiring set of new ideas and challenges, presented in a multidisciplinary context, and that by their diversity these results can trigger and motivate richer research and development directions.

We would like to thank all the authors for their contributions. We also appreciate the efforts and dedication of the DoCEIS International Program Committee members, who both helped with the selection of articles and contributed valuable comments to improve the quality of papers.

July 2020

Luis M. Camarinha-Matos
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