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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 ·
Geert Heijenk · Srinivas Katkoori ·
Leon Strous (Eds.)

Internet of Things

Technology and Applications

4th IFIP International Cross-Domain Conference, IFIPIoT 2021
Virtual Event, November 4–5, 2021
Revised Selected Papers

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Preface

The fourth IFIP International Internet of Things (IoT) Conference, that took place in a virtual mode during November 4–5, 2021, addressed both technology and applications. The topics presented reflected the variety of aspects with respect to IoT, aspects covered by IFIP’s Domain Committee on IoT which organizes this annual event.

The IoT Technical Program Committee for this edition consisted of 53 members from 18 countries who considered 36 submitted abstracts with 33 full papers. The selection was based on the full papers. Each paper was on average refereed by four reviewers, using the single-blind review principle. In total, 15 papers were selected for presentation resulting in an acceptance rate of 45%.

This book contains the revised versions of the refereed papers presented at the conference. The papers were selected on the basis of originality, quality, and relevance to the topic. As expected, the peer-reviewed papers covered a wide array of topics that were clustered in five thematic sessions:

- Modernizing agricultural practice using IoT
- Cyber-physical IoT systems in wildfire context
- IoT for smart health
- Security
- Methods

The conference featured two keynote speakers. The first keynote was given by Schahram Dustdar from TU Wien, Austria. In his talk “Edge Intelligence - Engineering the Fabric of IoT, Systems, and People” he analyzed the role of IoT, edge, cloud, and human-based computing as well as AI in the co-evolution of distributed systems for the new decade. He identified challenges and discussed a roadmap that these new distributed systems have to address, and he took a closer look at how a cyber-physical fabric will be complemented by AI operationalization to enable seamless end-to-end distributed systems.

The second keynote on “Secure IoT by Design” was given by Saraju P. Mohanty from the University of North Texas, USA. A broad perspective of the vast multifaceted forms of cybersecurity attacks secure/security by design (SbD) solutions in IoT was presented. SbD advocates making security as a requirement right in the design phase so that retrofitting would not be needed. He presented SbD driven cybersecurity solutions for IoT using the hardware security primitive Physical Unclonable Function (PUF). This included the first-ever hardware-integrated blockchain (called PUFchain) whose architecture he has overhauled using SbD principles to be secure, energy efficient, and scalable, while running 1000X faster than original blockchain with Proof-of-Work (PoW).

In two panel sessions, one on IoT applications and one on IoT research, panel members presented their views and discussed questions about the main engineering challenges in IoT development and current IoT research challenges, about promising

approaches to face such challenges, and a forecast on futuristic application scenarios and on emerging technologies that are likely to have an impact in the next 5–10 years. A summary of the panel sessions is included in this book as the first chapter.

We thank the authors and presenters, the panel members, the session chairs, the organizers of special sessions, the Program Committee, and the external reviewers for their hard work and contributions, and we look forward to their continued involvement.

We feel that all the contributions make the book a rich volume in the IFIP AICT series and we trust that the reader will be inspired by it.

December 2021

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