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Deepak Puthal
Saraju Mohanty
Baek-Young Choi (Eds.)

Internet of Things

Advances in Information and Communication Technology

6th IFIP International Cross-Domain Conference, IFIPIoT 2023
Denton, TX, USA, November 2–3, 2023
Proceedings, Part I

1 Part I

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Deepak Puthal · Saraju Mohanty ·
Baek-Young Choi
Editors

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Editors
Deepak Puthal
Khalifa University
Abu Dhabi, United Arab Emirates

Saraju Mohanty
University of North Texas
Denton, TX, USA

Baek-Young Choi
University of Missouri at Kansas City
Kansas City, MO, USA

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Preface

6th IFIP International Conference on Internet of Things (IFIP IoT 2023)

The rapid evolution of technology has led to the development of the Internet of Things (IoT), a network of physical objects that are embedded with sensors, software, and network connectivity, enabling them to collect and exchange data. The IoT is transforming our digital landscape, and the IFIP Internet of Things (IFIP-IoT) 2023 conference is a crucial platform for scholars, researchers, and practitioners to come together, share ideas, and advance this transformative field.

This edited book is a compilation of cutting-edge research and developments presented at the IFIP-IoT conference. The conference serves as a dynamic hub where experts from diverse backgrounds come together to explore the multifaceted aspects of IoT, from its technological foundations to its far-reaching implications for society, industry, and beyond.

The chapters in this book are a testament to the collaborative spirit of the IFIP-IoT community. They offer insights into the latest innovations, challenges, and opportunities in IoT, covering a wide array of topics, including IoT architectures, security and privacy, data analytics, edge computing, and applications in various domains. These contributions not only reflect the state of the art in IoT research but also provide valuable perspectives that pave the way for future breakthroughs.

The IFIP-IoT Conference is an annual IFIP event dedicated to IoT research, innovation, and applications, emphasizing the multidisciplinary nature of IoT. IoT encompasses topics from network protocols and embedded systems to analytics, machine learning, and social, legal, ethical, and economic considerations, enabling services in e-health, mobility, energy, manufacturing, smart cities, agriculture, and more. Security, privacy, and societal aspects are essential in IoT deployment. IFIP-IoT covers these diverse areas, seeking papers showcasing technical advancements, research, innovation, pilot results, and policy discussions. Contributors include researchers, users, organizations, ICT industry experts, authorities, and regulators.

IFIP-IoT welcomed full and short paper submissions, with full papers being original and unpublished elsewhere. Poster presentations were limited to student papers. The conference program featured keynotes, plenary talks, tutorials, technical sessions, special sessions, expert panels, a research demo session (RDS), and a student research forum (SRF). New tracks like “SRF” and “RDS” aimed to enhance event participation.

The paper submission guidelines include an 18-page limit for full papers, which applied to both regular and special sessions, as well as an 8-page limit for short papers, applicable to any session, including SRF and RDS. To ensure a thorough review process, we implemented a four-tier review mechanism within EDAS, consisting of TPC-Chairs, Track Chairs, TPC members, and dedicated reviewers. We took measures to address conflicts of interest by appointing multiple TPC chairs and multiple track

chairs for each track. Additionally, we imposed a limit of 2 papers maximum for PC members. SRF encouraged student first-author papers with an 8-page limit, while RDS papers also had an 8-page limit and may or may not feature student first authors. It's important to note that TPC members were permitted to co-author papers with their students in both SRF and RDS. Furthermore, our conference included Regular tracks/sessions that accept submissions from any authors, as well as Special Sessions/Tracks proposed by established researchers, with submissions received by invitation.

The IFIP-IoT conference had six regular tracks, each focusing on a different aspect of IoT:

- **Hardware/Software Solutions for IoT and CPS (HSS):** This track covered the design, development, and implementation of hardware and software solutions for IoT and cyber-physical systems (CPS).
- **Electronics and Signal Processing for IoT (ESP):** This track focused on the use of electronics and signal processing techniques for IoT applications.
- **Artificial Intelligence and Machine Learning Technologies for IoT (AMT):** This track explored the use of artificial intelligence (AI) and machine learning (ML) technologies for IoT applications.
- **Cyber Security/Privacy/Trust for IoT and CPS (SPT):** This track addressed the security, privacy, and trust challenges of IoT and CPS systems.
- **IoT or CPS Applications and Use Cases (APP):** This track presented case studies and applications of IoT and CPS technologies.
- **Networking and Communications Technology for IoT (NCT):** This track focused on the networking and communication technologies used in IoT systems.

Leading IoT experts from around the globe proposed special sessions on cutting-edge IoT topics. These session organizers then invited other established researchers to submit papers to their sessions. We are pleased to announce that the following special sessions took place and contributed excellent research papers to the IFIP-IoT 2023 conference:

- **AI and Big Data for Next-G Internet of Medical Things (IoMT):** This special session explored the use of AI and big data for the next generation of IoMT systems.
- **Blockchain for IoT-Driven Systems (BIoT):** This special session examined the use of blockchain for IoT-driven systems.
- **Edge AI for Smart Wearables (EAW):** This special session focused on the use of edge AI for smart wearables.
- **Energy-Aware Security for IoT (EAS):** This special session addressed the security challenges of IoT systems, with a focus on energy efficiency.
- **IoT for Smart Healthcare (SHC):** This special session explored the use of IoT for smart healthcare applications.
- **IoT for Wearables and Smart Devices (IWS):** This special session focused on the use of IoT for wearables and smart devices.
- **Metaverse for IoT (MIoT):** This special session examined the use of the metaverse for IoT applications.

- **Security by Design for IoT (SbD):** This special session discussed the importance of security by design for IoT systems.
- **Technologies for Smart Agriculture (TSA):** This special session explored the use of IoT technologies for smart agriculture.

In addition to the regular tracks and special sessions mentioned earlier, we introduced two sessions to support graduate students, early career researchers, and ongoing projects through short papers:

- **Student Research Forum (SRF):** This session was designed to provide valuable opportunities for research scholars and graduate students. Presentations in this session were in a concise oral or poster format.
- **Research Demo Session (RDS):** Authors in this session had the chance to showcase live demonstrations and hardware prototypes of their research.

We are grateful to the authors who contributed their expertise to this volume, and we commend their dedication to advancing the field of IoT. We would also like to acknowledge the reviewers whose insightful feedback ensured the quality and rigor of the included chapters.

We hope that this edited book will serve as a valuable resource for researchers, educators, policymakers, and industry professionals alike, fostering a deeper understanding of IoT and inspiring further innovation in this transformative domain. As the IFIP-IoT conference continues to evolve and grow, we look forward to witnessing the continued impact of this vibrant community on the ever-expanding Internet of Things.

Deepak Puthal
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Regular Track - Electronics and Signal Processing for IoT (ESP)

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Regular Track - Hardware/Software Solutions for IoT and CPS (HSS)

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Regular Track - Networking and Communications Technology for IoT (NCT)

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Regular Track - Research Demo Session (RDS)

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Regular Track - Research Demo Session (RDS); Special Track - Metaverse for IoT (MIoT)

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Special Track - AI and Big Data for Next-G Internet of Medical Things (IoMT)

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Special Track - Blockchain for IoT-Driven Systems (BIoT)

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Special Track - Edge AI for Smart Wearables (EAW)

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Special Track - Energy-Aware Security for IoT (EAS)

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Special Track - IoT for Smart Healthcare (SHC)

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