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Science and Technologies for Smart Cities

5th EAI International Summit, SmartCity360
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Preface Smart City 360°

Our civilization is changing rapidly. Forecasts point to a rise in megacities, pushing population density, and putting some pressure on governments, municipalities, private and public organizations, and citizens to maintain the quality of life (but, of course, to improve it, if possible). However, the challenges to accomplish such a simple goal are enormous. Technology evolution plays a vital role but, as usual, also introduces some risks. Human behavior needs to adapt, as well as social habits, and, more than ever, professional activities, following the tendencies of the so-called fourth industrial revolution, mostly based on digital transformation, demanding for a more enlightened society. Environmental aspects are also critical, but social indicators are not less important, as demonstrated in the recent pandemic crisis. The only way to embrace such a challenge is by working together (all society agents), sharing ideas and experiments, discussing alternatives openly, making science, in its fundamental aspects, the leading guide to our path towards a healthy and pleasant society, living in really Smart and Sustainable Cities.

The Smart City 360° Convention is an annual event providing a proper forum to pursue such a vision. This year (in its 5th edition), the event included four co-located conferences from which we selected 33 papers. Furthermore, we added five papers from excellent keynote presentations, ending up with the present volume as a valuable contribution to the area.

The selected co-located conferences were as follows:

- The 4th International Conference on IoT in Urban Space (Urb-IoT 2019), focused on the impact of new technologies on the recreation of the urban spaces and the environment (nine papers)
- The First International Conference on Smart Governance for Sustainable Smart Cities (SmartGov 2019), focused on all aspects of urban smart governance issues, from planning, managing, transforming, and monitoring cities' governance, to improving decision-making processes (eight papers)
- The 10th Sensor Systems and Software (S-cube 2019), focused on all aspects of state-of-the-art engineering for artifacts based on wireless sensors networks and fostering system and software techniques to fulfill the evolving requirements of Smart Cities (six papers)
- The 11th International Conference on Intelligent Technologies for Interactive Entertainment (INTETAIN 2019), focused on intelligent technologies for interactive entertainment, in the emerging and demanding context of Smart Cities (ten papers)

Lastly, we thank all participants, authors, keynote speakers, the Municipality of Braga (kindly supported the venue), the chairs of all conferences, and the incredible teams they manage to put together, the local collaborators, and the EAI staff (we would

like to name all involved, but space do not allow it). It was an honor and a pleasure to organize and host the 5th Smart City 360° International Summit in Braga, Portugal.

May 2020 Henrique Santos

Preface Urb-IoT 2019

We are delighted to introduce the proceedings of the 4th edition of the European Alliance for Innovation (EAI) International Conference on IoT in Urban Space (Urb-IoT 2019), co-located with the Smart City 360° Summit 2019, which took place in Braga, Portugal. This conference brought researchers, developers, and practitioners around the world together who are exploring the urban space and its dynamics within the scope of the Internet of Things (IoT) and the new science of cities.

The technical program of Urb-IoT 2019 consisted of eight full papers, which were distributed by two sessions: Session 1 – Sensing Methods; and Session 2 – Environmental Sensing.

Coordination with the steering chairs, Prof. Imrich Chlamtac and Prof. Fahim Kawsar, as well as with the general chair of Smart City 360º Summit, Prof. Henrique Santos, was essential for the success of the conference. We sincerely appreciate their constant support and guidance. It was also a great pleasure to work with such an excellent Organizing Committee and we thank them for their hard work in organizing and supporting the conference. In particular, the Technical Program Committee (TPC), led by our TPC co-chairs, Dr. Philipp M. Scholl and Dr. Matthias Budde, and all the additional reviewers, who completed the peer-review process of technical papers for the Urb-IoT 2019 technical program. We are also grateful to conference managers: Kristina Lappyova, Andrea Piekova, and Karolina Marcinova for their support.

Finally, a special mention to all the authors who submitted their work to the Urb-IoT 2019 conference. We strongly believe that the Urb-IoT conference provides a good forum for all researcher, developers, and practitioners to discuss all science and technology aspects that are relevant to Smart Cities. We are now even more confident that future Urb-IoT conferences will be as successful and stimulating as suggested by the contributions presented in this volume.

May 2020

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Preface SmartGov 2019

It is a pleasure to introduce the proceedings of the first edition of the 2019 European Alliance for Innovation (EAI) International Conference on Smart Governance for Sustainable Smart Cities (SmartGov 2019). This conference focused on all aspects of urban smart governance, broadly understood as the intelligent use of digitization and their technologies (e.g. data-driven, cognitive, cyber-physical, etc.) in planning, managing, transforming, and monitoring cities' governance instances and improving decision-making through enhanced collaboration among different stakeholders.

The technical program of SmartGov 2019 consisted of eight full papers, which were presented in two sessions at the main conference track. The conference tracks were: Track 1 – Framing and measuring Smart Cities chaired by Lorenzo Madrid; and Track 2 – Smart Governance applications chaired by Luís Soares Barbosa. Aside from the high-quality technical paper presentations, which is empathized by the acceptance rate of 37%, the technical program also featured one keynote speech by Soumaya Ben Dhaou, Research Coordinator at UNU-EGOV, Portugal. The keynote speech discussed how the emerging/frontier and disruptive technologies leveraged in smart city initiatives could be oriented towards sustainable public value generation.

The conference organization was supported by UNU-EGOV, the Operational Unit on Policy-driven Electronic Governance of the United Nations University. Coordination with the steering chairs, Imrich Chlamtac and Henrique Santos, was essential for the success of the conference. We sincerely appreciate their constant support and guidance. It was also a great pleasure to work with such an excellent Organizing Committee and we thank them for their hard work in organizing and supporting the conference. In particular, the Technical Program Committee (TPC), led by the TPC co-chair, Prof. Luís Soares Barbosa, who, together with myself, have completed the peer-review process of technical papers and made a high-quality technical program. We are also grateful to the conference manager, Karolina Marcinova, for her support, to the local chair, Dr. Teresa Pereira, and all the authors who submitted their papers to the SmartGov 2019 conference.

I strongly believe that the SmartGov conference provides a good forum for all researchers, policy makers, and practitioners to discuss all science and technology aspects that are relevant to smart governance. I also expect that future SmartGov conferences will be as successful and stimulating, as indicated by the contributions presented in this volume.

May 2020 Gabriela Viale Pereira

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Preface S-cube 2019

We are delighted to introduce the proceedings of the 10th edition of the European Alliance for Innovation (EAI) International Conference on Sensor Systems and Software (S-cube 2019). This conference has brought researchers, developers, and practitioners from around the world together who are leveraging and developing state-of-the-art work in the areas of system development and software support for wireless sensors networks.

Integrated in Smart City 360° Summit, the technical program of S-cube 2019 consisted of six full papers, in an oral presentation session at the main summit track, which represents an acceptance rate of 50%. Aside from the high-quality technical paper presentations, the papers approached a wide range of topics, with some prevalence in the monitoring and predictive maintenance issues, which are becoming more relevant with the technological advancements and the application of sensor networks to critical infrastructures, like water quality management, urban air quality, and electric motors-based equipment. Notwithstanding, there are also important contributions centred on the human side of the IoT revolution, both concerning tracking in dense industrial environments (using video images), and the quality of the working environment as perceived through building management systems. Data analysis is also a fundamental function linked to sensor networks and in particular with the spread of sensor technologies. No surprise, the smart aspects of sensors are also addressed, this time connected to an irrigation system, contributing to optimise agriculture-related activities.

Coordination with the Smart City 360° Summit was essential for the success of the conference. It was a great pleasure to work with such an excellent Organizing Committee and we thank them for their hard work in organizing and supporting the conference. In particular, the Technical Program Committee, who carried out a high-quality peer-review process of the technical papers. We are also grateful to conference managers, Karolina Marcinova and Barbora Cintava, for their support from the beginning to end of the conference, and EAI publications coordinator, Martin Karbovanec, for his help in validating the camera-ready versions of the papers and preparing the publication. We also thank all authors who submitted their papers to the S-cube 2019 conference and especially those who presented them and contributed to make S-cube 2019 an interesting and fruitful exchange of ideas.

May 2020

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Preface INTETAIN 2019

We are delighted to introduce the proceedings of the 11th edition of the 2019 European Alliance for Innovation (EAI) International Conference on Intelligent Technologies for Interactive Entertainment (INTETAIN 2019). This conference has brought researchers, developers, and practitioners from around the world together who are leveraging and using intelligent technologies for interactive entertainment. The theme of INTETAIN 2019 was "New Frontiers for Intelligence Technologies in Society of Future."

The technical program of INTETAIN 2019 consisted of 10 full papers, including oral presentation sessions at the main conference tracks. The conference tracks were: Track 1 – Technology as Tool for New Sensory Experiences; Track 2 – Opportunities for Artificial Intelligence in Society of Future. Aside from the high-quality technical paper presentations, the technical program also featured two keynote speeches. The two keynote speeches were presented by Prof. Mohd Shahrizal Sunar from the Institute of Human of Centered Engineering (iHumEn) Universiti Teknologi Malaysia, Malaysia, and Prof. Dagmar Caganova from Institute of Industrial Engineering and Management, Faculty of Materials Science and Technology, Slovak University of Technology, Slovakia.

Coordination with the steering chair, Imrich Chlamtac, was essential for the success of the conference. We sincerely appreciate his constant support and guidance. It was also a great pleasure to work with such an excellent Organizing Committee and we thank them for their hard work in organizing and supporting the conference. In particular, the Technical Program Committee (TPC) and publication chair, Prof. Mohd Shahrizal Sunar, workshop chair, Prof. Andy Pusca, poster and PhD chair, Ruhiyati Idayu Abu Talib, and TPC co-chairs, Prof. Dagmar Caganova and Prof. Alessandro Simeone, who completed the peer-review process of technical papers and made a high-quality technical program. We are also grateful to conference managers, Barbora Cintava and Kristina Lappova, for their support, and to all the authors who submitted their papers to the INTETAIN 2019 conference and workshops.

We strongly believe that the INTETAIN conference provides a good forum for all researcher, developers, and practitioners to discuss all science and technology aspects that are relevant to usage of intelligent technologies for interactive entertainment. We also expect that future INTETAIN conferences will be as successful and stimulating, as indicated by the contributions presented in this volume.

May 2020 Predrag K. Nikolic

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