Preface

This year we had a great pleasure to organize 19th edition of the International Conference on Systems Science (ICSS) held in Wrocław (Poland). ICSS is the series of international conferences, jointly organized on a rotational basis among three universities, namely Wrocław University of Science and Technology (Poland), University of Nevada Las Vegas (the USA), and Coventry University (UK). The conference covered major topics in systems science and was divided into four workshops: Workshop on Applications of Machine Learning, Workshop on Uncertain Systems, Workshop on Cloud Computing, and Workshop on Transportation and Multi-Robot Systems.

Workshop on Applications of Machine Learning. Machine Learning (ML) is currently one of the fastest growing disciplines in computer science. The ML algorithms are widely applicable in many different areas including (but not limited to) automatic drug design, business intelligence, computer vision, image processing, information retrieval, natural language processing, online advertising, recommendation systems, social networks, speech recognition, systems biology, text mining, bioinformatics, biomedicine, credit scoring, economy, and spam detection.

The Workshop on Applications of Machine learning organized as a part of the 19th edition of the International Conference on Systems Science gathered outstanding researchers that presented valuable applications of various machine learning methods including medical image processing and diagnosis, power load prediction, voice recognition or character recognition. All the accepted and presented papers are included in this book.

Workshop on Cloud Computing. Cloud computing has emerged as one of the most widespread used paradigms for on-demand resource provisioning and application development. Due to its popular characteristics such as resource pooling, rapid elasticity, broad network access, or pay-as-you-go pricing models, it has been widely adopted for a variety of application scenarios and use cases. Those unique attributes have led to a number of new research topics. Possibilities offered by modern cloud infrastructures gave researchers and developers an opportunity to

design new application architectures, develop algorithms and methods for Big Data processing in the cloud, introduce new methods for web service management and resource management, propose new service composition methods, apply new business models for cloud services' delivery, and develop methods for management of methods supporting Internet of Things data aggregation and processing in the cloud.

All these research topics are closely related and can be implemented in scenarios utilizing cloud computing in the Internet of Things (IoT). Applications in the scope of the IoT, such as telemedicine, smart homes, smart cities, or applications with industrial background such as factory automation, logistics, or automotive are often based on a variety of heterogeneous sensor nodes and sensor networks collecting data about the environment. Both, amount and diversity of sensor nodes and resulting data streams are rapidly increasing. Thus, IoT applications can benefit from the ability to elastically provide computing, network, and storage resources offered by the cloud. However, the cloud computing and Internet of Things domains show divergent characteristics in terms of their underlying resources. While IoT developers often have to be aware of resource constraints, location and semantics of sensor nodes, non-functional and infrastructure management requirements, cloud computing is perceived as a rather homogenous and endless resource being accessible within seconds and without limits. Therefore, it is necessary to investigate and develop appropriate concepts that allow leveraging the advantages of the cloud computing for the challenging application scenarios of the Internet of Things domain.

Workshop on Transportation and Multi-Robot Systems. Development and usage of autonomous devices capable of solving spatially distributed problems in a timely fashion is an ever-growing field of interest. This workshop set the study of movement in complex systems as its main field of interest. Fundamentally, problems arising from such considerations are on the perimeter of logistic, transportation, and robotics. It is therefore worthwhile to consider them in a jointly fashion.

The workshop covers a wide range of topics, from problems of multicriteria decision-making in logistics to task allocation in multi-robot environments. More specifically, tackled are problems of traffic modeling and transportation sharing, of service design for transportation grids and of sensing and control mechanisms in robotic systems. Finally, the workshop gives consideration towards social and environmental aspect of extensive automation.

Workshop on Uncertain Systems. Uncertain systems constantly attract much attention since they enable the better describing and understanding the reality. They are useful from the practical point of view, since the models of the actual processes and phenomenons are almost never exact and the precise values of their parameters are often not known in advance.

The aim of this workshop was to present the latest results concerning application of probabilistic and non-probabilistic descriptions of uncertainty to the systems science. The workshop presentations concerned the use of different uncertainty

descriptions (i.e., fuzzy logics, grey systems, and uncertain variables) to many areas including economic, control systems, and even computer networking.

Jerzy Świątek
Jakub M. Tomczak
Editors
Adam Gonczarek
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