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Preface

Intelligent computing is usually defined as advanced computing methods and techniques based on classical computational intelligence, artificial intelligence, and intelligent agents. On the other hand, large-scale distributed systems such as grids, peer-to-peer and ad hoc networks, and clouds enable the aggregation and sharing of geographically-distributed resources from different organization with distinct owners, administrators, and policies. With the advent of large-scale distributed systems, where efficient inter-domain operation is one of the most important features, it is arguably required to investigate novel methods and techniques to enable secure access to data and resources, personalization of the distributed and gathered information, efficient scheduling, self-adaptation, decentralization, and self-organization. The concepts of computing, data and information processing and multichannel visualization in intelligent large-scale distributed systems bring together the results from various research and application areas, making a positive impact on the development of new system architectures, routing and communication protocols and system management technologies.

This issue encompass eleven research papers reporting the recent findings, applications and developments of intelligent models and management, optimization and visualization techniques in modern large-scale scalable distributed environments.

Advances in network communication technology certainly open the way to a wide range of applications in engineering, industry, business and science, such environmental monitoring, traffic control, building management, etc. The effectiveness of the system and the reliability of the network nodes depend mainly on the network bandwidth and latency, network scalability and the communication protocols. V. Stanciu *et al.* have developed a network protocol for reliable communication from one point to multiple points, on possible multiple machines connected through Internet. Their approach is based on the transmission model of UDP in order to extend the conventional TCP-like services to one-to-many communication system and overcome the limitations of the methodologies with two logical endpoints transmission.

Recently, computational cloud has been recognized as one of the most popular type of intelligent distributed system. The term "Cloud computing" is used for the modern consumption and delivery model for IT services based on the Internet. It typically involves over-the-Internet provision of dynamically scalable and virtualized resources. R. Dębski *et al.* present an interesting integration of augmented cloud environment with the multi-agent system as the new, cost effective highly scalable execution environment dedicated for the large-scale

computing systems. The authors span the cloud system beyond the data center borders by utilizing web browsers for the access to the evolutionary multi-agent system (EMAS), which plays the role of a service model (Agent Platform as a Service). They constructed an effective agent-based support mechanism for solving the system load management problem in cloud systems, where non-deterministic load changes are often monitored.

The low cost data transmission is a key issue of large-scale but also small-area networks. In Wireless Body Area Networks (WBANs) technologies the communication module and types of sensors are the core technologies and protocols in the whole system. E. M. E. Hassan and K. Mohammed have developed an embedded system for cardiac monitoring in WBANs. This system is mainly dedicated to the acquisition, storage, and transfer the warning messages on detected heart arrhythmia of humans by using the GSM technologies. This system is promoted as a low-cost support tool in the medical diagnostic processes.

An effective data management remains still challenging and crucial problem in large-scale distributed systems, especially in the cases of different access policies of the users, who work in different administrative domains and different operation systems, which is typical for computational grids and wide area networks. G. Gębczyński et al. present a framework for simulating the security-aware scheduling the dynamic grid environment. The grid simulator is an event-based application that allows to activate and deactivate various resolution methods and scheduling criteria in a flexible way.

In the next two papers the authors present the recent technologies in the multi-stream video transmission. Y. Ebara uses the tiled display wall technology for the transmission of a high-resolution video streaming in the large-scale display environment. He constructed a remote communication environment for the display wall design and has performed several experiments for tuning and the evaluation of the system. Another methodology of improving the quality of the video streaming is presented by F. de Asís López-Fuentes and C. Cabrera-Medina. They implemented a network coding model at the intermediate nodes of the network for a low-cost processing of the video packets. The proposed methodology differs from the conventional store-and-forward techniques in the encoding protocols. The video packets are encoded by the source nodes and the intermediate nodes implement these encoding protocols before the processing the data to the end-user nodes.

An interesting practical approach of multichannel communication and visualization system is presented by A. Gentile et al. The authors have developed the "QRouteMe" system for supporting the management and for tracking the visitors of the museums and any kinds of exhibitions. This system allows to configure a virtual guide for each user. The user can use various kinds of devices, from touch screen to mobile- and smartphones, for the communication and synchronization of the required information and processes. One of the most important features of the system is an auto-localization module, which is personalized for each active user in the system. The current location of the visitor is approximated by using the fiduciary mark reference points distributed in the building (museum or exhibition building). A silent feature of the presented model is an excellent solution for the personalization of the information systems, which is one of the hottest research topics in the management of the sheer-size scalable systems. Another practical example of the multicomponent system, in which the personalization is one of the most important issue is a system for supporting the criminal analysis presented by J. Dajda et al. The authors have designed a distributed heterogeneous platform for the low-cost processing of huge amounts of data. The high accuracy of the system and privacy together with the fast decentralized management of complex criminal databases are the main attitudes of the proposed technology.

The last three papers of the issue are focused on the generic models which can be the promising and potential solutions for realistic future generation scalable systems. E. Gajda-Zagórska presents an effective clustering model for the improvement of the meta-heuristic multiobjective optimizers in the distributed environments. C. V. Suciu et al. propose an intelligent model for optimizing the suspensions in modern green cars. Finally, A. Plichta has implemented the neural network model for improving the management of online information and knowledge processing.

We are grateful to all the contributors of this issue. We thank the authors for their interesting papers, their time and efforts in the presentation of their recent research results. We also would like to express our sincere thanks to the reviewers, who have helped us to ensure the quality of this publication.

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Joanna Kołodziej
Guest Editor
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