EDITORIAL

"Wireless Systems"

Guest Editors: Uwe Grossmann, Juergen Sieck, Axel Sikora

This special issue of the International Scientific Journal of Computing includes a selection of invited papers presented partly within the Special Stream Wireless Systems at the Sixth IEEE International Confererence on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications (IDAACS'2011), which was held in Prague, Czech Republic, September 15th-17th, 2011. The Conference was organized by the Research Institute of Intelligent Computer Systems, Ternopil National Economic University, Ternopil, Ukraine and co-organized by the Faculty of Electrical Engineering, Czech Technical University in Prague, Czech Republic.

The IDAACS Conference series is established as a forum for high quality reports on state-of-the-art theory, technology and applications of intelligent data acquisition and advanced computer systems. These techniques and applications have experienced a rapid expansion in recent years that have resulted in more intelligent, sensitive, and accurate methods of data acquisition and data processing. Subsequently, these advances have been applied to: manufacturing process control and inspection; environmental and medical monitoring and diagnostics; and intelligent information gathering and analyses for the purpose security and safety.

The IDAACS'11 workshop sessions were organized under the following topic areas: Advanced Instrumentation and Data Acquisition Systems; Intelligent Distributed Systems and Remote Control; Virtual Instrumentation Systems; Advanced and High Performance Computing Systems; Cluster and Grid Technologies, Parallel Software Tools and Environments; Embedded Systems; Artificial Intelligence and Neural Networks for Advanced Data Acquisition and Computing Systems; Advanced Mathematical Methods for Data Acquisition and High Performance Computing; Industrial Signal and Image Processing; Data Analysis and Dynamic Modelling; Intelligent Information and Retrieval Systems; Robotics and Autonomous Systems; Information Computing Systems for Education and Commercial Applications; Bio-Informatics and Homeland Security; Safety, Security and Reliability of Software; Wireless Systems – Special Stream.

The Special Stream – Wireless Systems was convened for the third time since 2007. The papers selected for this special issue reflect the variety of research in the area of wireless systems.

The paper *"Virtual WLAN: Extension of Wireless Networking into Virtualized Environments"* of **G. Aljabari** and **E. Eren** considers the task of sharing a wireless network interface. Virtualization can solve this problem. A software platform for hosting multiple virtual wireless networks over a shared physical infrastructure by means of open source virtualization techniques is presented. The hosting platform can extend wireless networking into virtualized environments without compromising the performance, isolation, or wireless LAN security mechanisms.

The paper *"Hybrid Indoor Tracking of Humans in Hazardous Environments"* of **A. Fink** and **H. Beikirch** presents a centroid location estimation technique based on received signal strength (RSS) readings. Sensor fusion of the RSS-based localization with an inertial navigation system (INS) leads to a more precise tracking. The long-term stability of the RSS-based localization and the good short-term accuracy of the INS are combined using a Kalman filter. The experimental results on a motion test track show that a tracking of humans in multipath environments is possible with low infrastructural costs.

Within the paper *"Automated Network Protocol Evaluation – The Potsdam Wireless Testbed"* by **S. Fudickar** and **B. Schnor** the Potsdam Wireless Testbed is presented and discussed. It supports validation and evaluation of Wi-Fi radio stacks and wireless applications in environments with heterogeneous hardware. Scheduled test-runs are executed automatically for a defined duration including compilation and deployment of the protocols and measurement scripts as well as collection of measurement results and log files.

The paper *"Providing household customers with smart meter data on mobile devices"* by **S. Hakobyan, J. Kohlbrecher, J. Pickert** and **U. Grossmann** deals with the suitable visualization of energy data, corresponding costs and tariff information on mobile devices. The household customer is enabled to manage his energy usage

consumption in order to hold the optimal load and meet the optimal price. Energy data are acquired by a smart meter and transferred over a Smart energy controller (SEC) to a mobile device to provide the customer with relevant information about his current energy usage. Suitable visualization methods, specific for different tariffs, are identified and presented together with according technologies and methods for communication and data access.

In the paper *"RFID based applications in culture, media and creative industries"* from **S. Bergemann, E. Kuehn, J. Reinhardt** and **J. Sieck** two different approaches to visualise information from culture, media and creative industries by using RFID based tracking and identification are presented. Besides the required RFID backend, the paper also introduces the information system built on top of the backend. The first approach is based on passive RFID whereas the second uses active RFID. In particular, the differences in the processing of system events, delivery of needed information and the implemented infrastructure are discussed and evaluated.

In their paper "*Reducing radio bandwidth load in Nanoloc-based Wireless Networks through selecting appropriate subset of base stations for ranging*" **A. Galov, A. Moschevikin** and **A. Soloviev** discuss the overall performance of radio segment and location accuracy in wireless sensor networks based on nanoLOC standard and using server-centric control depending amongst others on the efficiency of the location engine. The efficiency may be increased by selecting an appropriate subset of base stations for ranging.

The paper *"Gateway architectures for home care applications using wireless sensor networks"* of **A. Sikora, N. Braun, S. Jaeckel** and **D. Jaeckle** deals with Telecare Applications and Ambient Assisted Living. A significant number of challenges within this field exist for real-life applications. Those include the lack of sufficiently standardized and interoperable solutions and thus, the necessity of gateways for integrated solutions, restrictions of the energy budgets, and scalability of solutions with regard to cost and network size. The experience from the inCASA project (Integrated Network for Completely Assisted Senior Citizen's Autonomy) is presented, where architectures for heterogeneous physical and logical communication flow are examined.

Throughout the paper *"Indoor monitoring applications using fixed and mobile wireless sensors"* of **M. Strutu** and **D. Popescu** the idea of a wireless sensor network with applicability in monitoring systems is proposed. The goal of the project is to build a monitoring system capable of data gathering which can benefit from both characteristics of fixed and mobile nodes. In order to implement data acquisition and communication functions, the solution agreed has been to use the MTS400 sensor board. Mobile nodes communicate to a central node individual data and statistical indicators over a period. The proposed energy-aware architecture was tested and validated in an indoor experiment.

The paper *"Nonlinear data coding in wireless sensor networks"* of **V. Yatskiv, S. Jun, N. Yatskiv** and **A. Sachenko** presents a proposed nonlinear method of sensor data coding. The method allows the increase of the useful capacity of the data transmission protocols for Wireless Sensor Networks by 3-5 times using integration of sensor data with different digits capacity and reducing the transmissions number.

This selection of papers represents topics of IDAACS'2011 and results of the area Wireless Systems the editors found worth presenting. We hope the readers find them interesting, useful and even enjoyable, as well.

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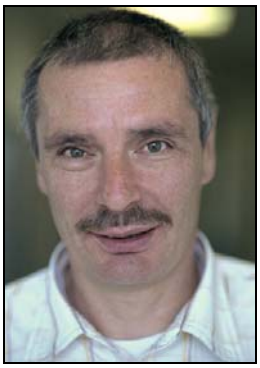

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