

JOURNAL OF TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY

Preface

This issue of the *Journal of Telecommunications and Information Technology* contains fifteen papers that deal with diverse problems of energy-efficient networks and computing servers, network security, wire and wireless communication, or various issues related to application of high performance computing to neural systems simulation, large finite element problems and social networks analysis. The inspiration for the research presented in most papers published in this issue is the result of collaboration of the authors in the IC1406 COST Action cHiPSet *High-Performance Modeling and Simulation for Big Data Applications*, working group WG1: *Enabling infrastructures and middleware for Big-Data modeling and simulation*.

The first three papers are devoted to energy-efficient networks and data centers. Michał P. Karpowicz and Piotr Arabas in the paper *Server Workload Model Identification: Monitoring and Control Tools for Linux* present a brief overview of performance and power consumption monitoring tools available in the Linux systems. The authors argue that the measurements collected at high sampling rate can be used to develop maximally informative power consumption metrics and accurate dynamical processing models for the purpose of energy-aware design of server controllers. Selected approaches to save power in wired IP networks are discussed in the paper *Energy-saving Algorithms for the Control of Backbone Networks: A Survey*. Mariusz Kamola *et al.*, describe proactive solutions employing advanced optimization techniques to squeeze as much energy saving as possible, and reactive ones supplementing the well rooted technologies (OSFP) with an energy-saving extra mechanisms. A model of dynamic power management in energy-aware networks is presented in the paper *New Developments in a Two-criteria Approach to Dynamic Power Management in Energy-Aware Computer Networks*. Andrzej Karbowski and Przemysław Jaskóła propose two-criteria approach to routing table calculation, i.e., energy consumption and the quality of service.

The following two papers deal with the application of GPU accelerators to large scale scientific and engineering computing problems. S. Y. Fialko and F. Zeglen describe in the paper *Preconditioned Conjugate Gradient Method for Solution of Large Finite Element Problems on CPU and GPU* the efficient parallel implementation of the preconditioned conjugate gradient method, and present the efficiency of its application to the large finite element problems. An OpenCL-based software platform for spiking neural networks simulation is described

in the paper *A Novel GPU-Enabled Simulator for Large Scale Spiking Neural Networks*. Paweł Szykiewicz focuses on computationally efficient implementation of three widely used models of spiking neural networks. The presented results of numerical experiments conducted on AMD and NVIDIA graphical processors confirm the efficiency of the simulator.

The application of wavelet neural networks for the prediction of the stock price is described in the paper *Forecasting Stock Price using Wavelet Neural Network Optimized by Directed Artificial Bee Colony Algorithm*. Thanh Tung Khuat, Quang Chanh Le, Bich Loan Nguyen, My Hanh Le propose to use an artificial bee colony to optimize neural network parameters. The authors describe the results of calculations conducted on real data collected from Yahoo Finance. They claim that their solution can support traders and investors in their decision process.

Next two papers focus on network security. Agnieszka Jakóbiak in the paper *A Cloud-aided Group RSA Scheme in Java 8 Environment and OpenStack Software* describes the RSA-enabled cryptosystem that allows a group of users to upload a single masked message to the computing cloud. The implementation employing open source cloud computing software for public and private clouds (OpenStack) is presented. Multiple numerical results are discussed in the final part of the paper. The application of honeypots to threat detection is discussed in the paper *Graph-based Forensic Analysis of Web Honeypot* by Hudan Studiawan, Supeno Djanali and Baskoro Adi Pratomo. The authors propose to employ a graph-based forensic analysis to examine an access log from a Web. Using graphical interface various forensic investigators can collaborate to detect given attacks. Thus, the presented solution can support intrusion detection systems.

Youness Jouihri, Zouhair Guennoun, Youssef Chagh and Driss Zahi in the paper *Network Function Virtualization: Mitigating the Impact of VoLTE on the Policy and the Charging System* consider a problem of the optimization of network resources utilization while providing for adequate transmission quality. The paper addresses issues related to the impact of Diameter signaling generated after massive Voice over LTE (VoLTE) deployment on the operation of a core network. The authors describe the application of network function virtualization technology to create a model that can anticipate the impact induced by massively introducing VoLTE, and support network operators in signaling related to policy management without impacting existing services.

The attention of next two papers is focused on social networks technologies and their application in telecommunication domain. Witold Gruszczyński and Piotr Arabas in the paper *Application of Social Network Inferred Data to Churn Modeling in Telecoms* consider the idea of the usage of social network analysis to divide customers into specific segments, and finally predict churn of telephony network subscribers. The authors describe and evaluate through extensive simulation a hybrid predictor that employs a set of regression models and data describing social links between subscribers. The article *Similarity Index based Link Prediction Algorithms in Social Networks: A Survey* by Pulipati Srilatha and Ramakrishnan Manjula is devoted to the issue of the detection of possible potential links among people. The paper overviews algorithms of links prediction and development lines that can be observed in the literature on the social networks technologies.

The following two papers deal with modern radio systems. *Antenna Arrays Focused on Broadband Signals* by Denis A. Vedenkin, Yuri E. Sedelnikov and Aydar R. Nasybullin addresses issues related to the design and development of broadband antennas. The authors provide models for ultra-wideband signals transmission and antenna arrays, respectively. They draw attention that at wide band signal the difference between function characterizing the spatial selectivity in receiving mode and functions determining the spatial distribution of energy in the transmit mode can be considerable. Oleg G. Morozov, Aydar R. Nasybullin, Denis A. Vedenkin and Timur A. Agliullin in the paper *Radio Photonic Systems for Measurement of Instantaneous Radio Frequency with Amplitude-Phase Modulation of Optical Carrier* focus on application of radio photonics to measure radio signals instantaneous frequency (MSRSIF). The authors claim that a further development of measurement systems considered may be based on the use of amplitude phase modulation transformation (AFMT) of optical carrier, for measuring the instantaneous frequency, and to provide a stable operating mode of conversion devices.

The application of multi-class support vector machine to efficient data decoding of Bose Chaudhuri Hocquenghem code is discussed by V. Sudharsan and B. Yamuna in the paper

Support Vector Machine based Decoding Algorithm for BCH Codes. The presented simulation results confirm that the described algorithm gives better results when compared with the conventional Chase-2 algorithm. The authors highlight the advantages of the SVM based decoding method such as: a more generalized decision model, fast convergence to globally optimal solution and prevention of outliers.

The last paper *An Efficient Early Iteration Termination for Turbo Decoder* is concerned with the development of efficient iteration control techniques for decoding turbo code. P. Salija and B. Yamuna describe a simple method based on absolute value of the mean of extrinsic information at the component decoders of turbo code. The authors present the simulation results that confirm good performance of their method. It allows to reduce the average number of iterations while maintaining performance closed to that of fixed iteration termination.

We wish our Readers an interesting reading time.

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Guest Editors

