

JOURNAL OF TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY

Preface

In this issue of the *Journal of Telecommunications and Information Technology* we have collected a set of fourteen papers documenting a broad range of topics related to modern wire and wireless telecommunications networks. Rapid advances in wire and wireless technologies have significantly accelerated the introduction of new technologies and services, defining and building the rules to ensure the transfer of huge volumes of data.

Quality of Service is becoming one of the most important criteria for the selection of old and new services and technologies. Two papers in this issue are related to this topic. In the first one, *QoS Requirements as Factor of Trust to 5G Network*, the authors V. Tikhvinskiy, G. Bochechka, and A. Gryazev discuss the role of QoS in the formation of trust in both consumers and regulators in the case of the 5G network. The second article, entitled *Digital Audio Broadcasting or Webcasting: A Network Quality Perspective*, describes the advantages and disadvantages of digital audio broadcasting and webcasting transmission techniques from a network quality perspective. The authors P. Gilski and J. Stefański present a case study of user expectations with respect to the perceived quality of real digital broadcasted and webcasted radio stations.

The next three articles concern the topic of network monitoring. The paper *Monitoring of a Cloud-Based Environment for Resilient Telecommunication Services* by G. Wilczewski presents a tool designed for Data Center resources monitoring. The results presented in the paper allow a high-level resiliency analysis of telecommunication services. The problem of ensuring the quality of service of video is discussed in the paper entitled *Study of No-Reference Video Quality Metrics for HEVC Compression*. The authors K. Rouis, M. Leszczuk, L. Janowski, Z. Papir, and J. B. H. Tahar propose the application of a No-Reference (NR) quality assessment measurement for High Efficiency Video Coding (HEVC). In the last paper concerning this topic, entitled *Quantifying the Suitability of Reference Signals for the Video Streaming Analysis for IPTV*, the authors C. Hoppe, R. Manzke, M. Rompf, and T. Uhl, present the assessment of the quality of video streaming in IPTV based on PEVQ and VQuad-HD algorithms. The conducted measurements provide information that may be valuable for determining the QoS of IPTV services in practice.

The need to introduce new services directly affects the development of ICT operator networks. However, network expansion entails substantial investments. Therefore, the optimization process is very important for telecommunication networks. This problem is addressed

in the next six papers. The first three present analytical methods that may be used for modeling and dimensioning of elements of modern multi-service ICT networks. The next two discuss algorithms enhancing the efficiency of wireless networks. The last paper introduces a new algorithm for the optimization of the expected costs of project implementation. The first paper, *Properties of the Multiservice Erlang's Ideal Gradings* by S. Hanczewski and D. Kmiecik, discusses the conditions for the application of the Erlang's Ideal Grading (EIG) for modeling of the multiservice systems. In the second paper, entitled *Call Blocking Probabilities of Multirate Elastic and Adaptive Traffic under the Threshold and Bandwidth Reservation Policies*, authors I. D. Moscholios, M. D. Logothetis, A. C. Boucouvalas, and Vassilios G. Vassilakis propose an analytical model of a multi-service system in which threshold and reservation traffic management mechanisms have been applied. The next paper, *Estimation of Network Disorder Effects by In-depth Analysis of the Resequencing Buffer Contents in Steady-state* by A. Pechinkin and R. Razumchik, presents a calculation method that allows the analysis of the resequencing problem in the buffers of packet networks. In the fourth article, entitled *Multicast Connections in Wireless Sensor Networks with Topology Control*, the authors M. Piechowiak, K. Stachowiak, and T. Bartczak discuss the performance analysis of multicast trees constructed by heuristic routing algorithms in relation to protocols of topology control for wireless sensor networks. The fifth paper in this group, *LDAOR – Location and Direction Aware Opportunistic Routing in Vehicular Ad hoc Networks* by M. Barootkar, A. Ghaffarpour Rahbar, and M. Sabaei, proposes an opportunistic routing mechanism called Location and Direction Aware Opportunistic Routing (LDAOR) for Vehicular Ad hoc Networks. The algorithm finds the best neighbor node based on, i.e., vehicle positions and directions, and prioritization of messages from buffers. The investigations conducted by the authors show that LDAOR not only increases the delivery rate, but also reduces network overhead, traffic loss, and number of aborted messages. The last article in this group concerning optimization of telecommunication networks is entitled *A Novel Technique of Optimization for the COCOMO II Model Parameters using Teaching-learning based Optimization Algorithm*. The authors, T. T. Khuat and M. Hanh Le, propose a novel technique to optimize the estimation of project cost. In the paper, the teaching-learning-based optimization (TLBO) algorithm for the COCOMO II model is presented. The results indicate that the proposed TLBO algorithm allows for obtaining better estimation capabilities compared to the original COCOMO II model.

One of the best-developed research areas of wire and wireless networks are broadband wireless networks. This is the subject of the next paper, *100 Gb/s Data Link Layer – from a Simulation to FPGA Implementation* by Ł. Łopaciński, M. Brzozowski, R. Kraemer, S. Buechner, and J. Nolte. The paper presents a simulation and hardware implementation of a data link layer for 100 Gb/s terahertz wireless communications. The investigations show that uncoded transmissions are most influenced by the change of the segment size and that the FPGA memory footprint can be reduced when the hybrid automatic repeat request type II is replaced by type I with link adaptation.

The introduction of new services and technologies leads to increased energy consumption. Therefore, it is important to develop technologies and algorithms enabling the reduction of this consumption. In the paper *DS-UWB and TH-UWB Energy Consumption Comparison*, the authors A. Elabboubi, F. Elbahhar, M. Heddebaut, and Y. Elhillali study the energy efficiency of multi-user techniques for UWB systems. The elaborated energetic model can be used as a green communication tool in order to determine the best multiuser techniques. Threats to modern ICT systems also arise from giving access to data connected with users' customs and activities. One of the easiest methods of obtaining information about users' customs is monitoring the consumption of electricity. It is made possible by automatic systems monitoring electricity consumption. Ensuring security in such systems is the topic of the next paper, *Monetary Fair Battery-based Load Hiding Scheme for Multiple Households in Automatic Meter Reading System* by R. Negishi, S. Haruta, C. Inamura, K. Toyoda, and I. Sasase. In the paper, the authors proposed Battery-based Load Hiding (BLH) algorithms to obfuscate the actual user's energy consumption profile by charging and discharging. The proposed BLH algorithms are discussed in the case of multiple households where one battery is shared among them due to its high cost.