

JOURNAL OF TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY

Preface

In this volume of the 1/2013 *Journal of Telecommunications and Information Technology* we have collected a set of thirteen papers presenting a broad range of topics related to telecommunication networks. The topics cover subjects ranging from various applications of telecommunications networks and recommendations as to the implementation of new services and protocols, to analytical and simulation methods for modelling telecommunications networks and systems.

This issue is opened by the article *Wireless at the “Connected Games”: How the London 2012 Olympic and Paralympic Games will utilize the latest Wi-Fi Technology*, the best paper of the 51st FITCE Congress held in Poznań in 2012. Peter Leonhardt, the author of the article, describes Wi-Fi deployment across the London 2012 Olympic Games venue – one of the largest and most dense Wi-Fi deployment in the world. The article presents the adopted strategy in the implementation of the Wi-Fi network, effective analysis of different technologies in Wi-Fi networks and the Wi-Fi traffic patterns observed during the most popular Olympic events.

The second article *Connecting for Surgery: The Belgian Use Case on the Legal Aspects of the Digital Operating Room*, the authors, Niels Vandezande, Griet Verhenneman, and Jos Dumortier, address the problem of protecting patients’ privacy and securing their health information following the threats resulting directly from the implementation of telecommunication technology in medicine. The introduction of the concept of the Internet of Things has led to solutions termed as “digital operating room”, according to which different devices will become interconnected and will create store and exchange patients’ data. The authors of the article attempt to provide some answers to whether the currently used automation of the flow and the storage environment of patient’s data violate the European framework on data protection.

Practical dimensions of the implementation of the IP network in the datacentre infrastructure of the company Capgemini are presented in Marco van der Pal’s article *IPv6 Preparation and Deployment in Datacenter Infrastructure – A Practical Approach*. The author gives a detailed description of particular stages in the implementation of the IPv6 protocol, pointing out that the IPv6 is not solely a networking technology. The presented conclusions on the cooperation between the Pv6 and the IPv4 networks, the ongoing evolution of standards for IPv6 and the influence of the implementation of IPv6 on existing operating systems and software, may help facilitate the process of migration towards IPv6 in many companies and organizations.

The present issue of the journal (*JTIT*) also includes articles that focus on advances in analytical and simulation methods for modelling telecommunications systems. The first article in this section of articles, entitled *The Goals and Benefits of Network Modelling in a Commercial Environment*, attempts to define and classify the areas of implementation for modelling and simulation tools. Edward Smith, the author of the article, describes a number of academic solutions as well as commercial applications, juxtaposing their performance levels and providing a comparative evaluation. The evaluation of modelling tools is accompanied with an important remark of the author that 85% of the results presented in literature cannot actually be independently confirmed by other researchers due to the lack of precise description of parameters for a given model application.

One of the modelling tools described by E. Smith, OPNET discrete event simulation tools, is then used in the following article *Reliable and High QoS Wireless Communications over Harsh Environments* to evaluate the efficiency of the proposed algorithm for improvement of multicast transmission in wireless networks. The authors of the article, Josu Bilbao, Aitor Calvo, Igor Armendariz, and Pedro Crespo, have managed to achieve a significant improvement in the QoS parameters for multicast transmission through the use of inter-node collaborative schema and Network Coding.

Simulation tool, i.e., ns2, has been also used by Veronica Palma and Anna Maria Vegni to evaluate vehicular network performances in the dissemination of safety and emergency messages. The studies carried out by the authors have made it possible to assess throughput and delays values for different traffic scenarios and for both Vehicle-to-Vehicle (V2V) communications and for Vehicle-to-Infrastructure (V2I) communications. The authors of the article *On the Optimal Design of a Broadcast Data Dissemination System over VANET Providing V2V and V2I Communications "The Vision of Rome as a Smart City"* proceed to consider the results of their research study within the framework of recommendations for optimum deployment of relay nodes in order to maximize network performance while keeping low the economic requirements.

In the article *Innovative Method of the Evaluation of Multicriterial Multicast Routing Algorithms*, simulation studies are also used for the evaluation of the effectiveness of multicriteria multicast routing algorithms. The article proposes a new routing algorithm: Aggregated MLARAC (Multi-dimensional LAgragian Relaxation based Aggregated Cost algorithm). To evaluate its effectiveness, a comparative study of the effectiveness in constructing trees in the function of the number of receivers for networks with different topologies and size has been carried out. The authors of the article, Krzysztof Stachowiak and Piotr Zwierzykowski, propose a new original method for the evaluation of multicriteria multicast routing algorithms and demonstrate that the proposed Aggregated MLRAC algorithm is the most effective when chosen for a small number of criteria.

An analytical approach to modelling of telecommunications systems is presented in the article *Recurrent Method for Blocking Probability Calculation in Switching Networks with Overflow Links*. The article proposes an analytical method for modelling multi-service switching networks with overflow links. The method worked out by the authors makes it possible to quickly determine values of the internal and the external blocking probabilities. The results obtained in the study clearly indicate a possibility of a significant reduction of the value of internal blocking for all classes of streams of offered traffic following an application of overflow links.

In the article *Blind Estimation of Linear and Nonlinear Sparse Channels*, Kristina Georgoulakis presents a Clustering Based Blind Channel Estimator for the so-called zero pad channels. The proposed algorithm uses an unsupervised clustering technique for the estimation of data clusters. Clusters labeling is performed by a Hidden Markov Model of the observation sequence appropriately modified to exploit channel sparsity. The algorithm achieves a substantial complexity reduction compared to the fully evaluated technique. In conjunction with a Parallel Trellis Viterbi Algorithm for data detection, the proposed algorithm can lead to the reduced complexity without performance reduction.

Juliusz L. Kulikowski in his article *Hidden Context Influence on Pattern Recognition* considers the influence of hidden additional information concerning the circumstances of input data acquisition on the quality of decisions based on the data. An analogue to the intuition influencing natural decision making is indicated in the article. The problem of contextual information in decision making based on Bayes rule, on reference data sets in various applications as well as of scene analysis by numerous examples is also illustrated.

The last three articles discuss the results obtained from processing of measurement data for telecommunications systems. Jakub Sobczak in his article *Traffic Analysis in the Network of a Local Voice over Internet Protocol Operator* presents the results of measurements obtained in a network of one of the operators of the Voice over IP service. The study was aimed at gathering information on distributions describing the intensity of calls and holding times of connections that represent residential and business subscribers to the VoIP service. Thus obtained statistical data, along with information on voice codecs used (determining demanded throughput and bit rates) allowed the author to present his own conclusions regarding the choice of method for dimensioning of VoIP networks.

The paper *Diversity of Temporal and Territorial Social Penetration Rates of Information Technology in Europe* by Beata Ziewiec presents the diversity of social penetration rates of information and communication technologies (ICT) among selected European countries according to European statistics on diverse ICT indicators. The data considered cover the 2006–2010 time range and was obtained from the Eurostat portal. The following ICT indicators were analyzed: percentage of households or corporation with broadband access to the Internet (HHBAI), percentage of individuals who are regularly using the Internet (IRUI), percentage of individuals who ordered goods or services over the Internet (IOGSI). These indicators were analyzed, inter alia, in terms of delays or advances (in years) as compared to the averages in EU.

In the last article entitled *Performance and Limitations of VDSL2-based Next Generation Access Networks*, George Heliotis, Lowell-Panayotis Dimos, Ioannis Kordoulis and George Agapiou present the results of feasible bit rates in VDSL2-based access networks. The measurements involved 3 VDSL2 operational profiles for different scenarios that differed in crosstalk values and impulse noise as the two principal sources of degradation in high-rate transmission systems. The obtained results will be then used by the authors to improve the quality of transmission in access networks.

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Guest Editor

