JOURNAL OF TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY

Preface

We are immensely pleased to introduce you to the latest issue of the *Journal of Telecommunications and Information Technology* quarterly.

The articles presented in this edition cover some important problems experienced in the field of broadly understood telecommunications (from network protocols and services to telecommunications systems and security issues). The current issue of the Journal comprises fourteen papers.

The first group of articles brings up issues related to various problems occurring in wireless communication.

The first paper, titled *ACO-Inspired Energy-Aware Routing Algorithm for Wireless Sensor Networks*, was written by R. Yamamoto, S. Nishibu, T. Yamazaki, Y. Okamura and Y. Tanaka. It proposes a routing algorithm, known as AERO, that was inspired by the concept of ant colony optimization for Wireless Sensor Networks. This algorithm enables to balance traffic loads by utilizing transient optimization behaviors. AREO requires a shorter transmission to send the same amount of data and improves energy efficiency compared with other solutions of this type.

The second paper, titled *Adaptive Load Balancing Ad Hoc Routing Scheme Inspired by True Slime Mold*, by H. Katada, T. Yamazaki and T. Miyoshi, proposes an adaptive ad hoc routing method that is capable of constructing multiple paths based on the bandwidth available for each link, transmission data size and residual battery level of the node. It relies on the physarum solver that is applied to dynamic networks. The authors confirmed that the proposed method may adaptively construct single or multiple paths based on available bandwidth, transmission data size and residual battery level of nodes within a dynamic network topology.

The next paper, titled *Robot Local Network using TQS Protocol for Land-to-Underwater Communications*, by A. Irawan, M. F. Abas and N. Hasan, presents the modeling and analysis of the proposed Tag QoS switching (TQS) protocol for a heterogeneous robot operating

in different environments. The proposed TQS protocol was inspired by multiprotocol label switching (MPLS) with good quality of services (QoS) achieved.

The paper titled *Fuzzy Clustering with Multi-Constraint QoS Service Routing in Wireless Sensor Networks*, by J. Agarkhed, V. Kadrolli and S. R. Patil, proposes a fuzzy logic-based, service-differentiated, QoS-aware routing protocol with multipath routing for wireless sensor networks. The proposed solution relies on a modified QoS k-nearest neighborhood technique.

Similarities between human brain and dense wireless networks have become an inspiration for the authors of the article titled *Neuroplasticity and Microglia Functions Applied in Dense Wireless Networks* (Ł. Kułacz and A. Kliks). The proposed concept is based on the idea of wireless neurons. The neurons are stand-alone devices which do not require a central management unit – a feature that enables scalability and easy reconfiguration for dense wireless networks.

The paper titled *Empirical Approach in Topology Control of Sensor Networks for Urban Environment*, by B. Musznicki, presents solutions for controlling topology of wireless sensor networks.

The next paper by T. Miyoshi, Y. Shimomura and O. Fourmaux is titled *A P2P-based Communication Framework for Geo-Location Oriented Networks*. It proposes a novel peer-to-peer communication framework to realize geographical location-oriented networks called GLocON. G-LocON provides geolocation-oriented device-to-device communication, relying solely on current wireless technologies, such as LTE and Wi-Fi, and cooperating with the global positioning system and peer-to-peer overlay networking.

The paper titled *LoCO: Local Cooperative Data Offloading System Based on Location Information*, drawn up by T. Yamazaki, K. Asano, S. Arai, Y. Shimomura and T. Miyoshi, proposes a local cooperative data offloading system (LoCO) that reduces the overall traffic by sharing data via direct communication between neighbors, based on their location information.

Two subsequent papers deal with problems encountered in telecommunication systems. The paper titled *Rectangular Dielectric Resonator Antenna with Single Band Rejection Characteristics*, by M. Debab and Z. Mahdjoub, presents a rectangular dielectric resonator antenna suitable for wideband applications and a band notch of WLAN. The presented results have confirmed the usefulness of the proposed solutions.

In *Product of Three Random Variables and its Application in Relay Telecommunication Systems in the Presence of Multipath Fading*, D. Krstic, P. Nikolic, D. Aleksic, S. Minic, D. Vuckovic and M. Stefanovic consider the product of three random variables. The distribution of the product of independent random variables is very important in many applied problems, as well as in wireless relay telecommunication systems (for example for multiple relay channels).

The next paper, tilted *Enhancement of Ground-to-Aircraft Communication Using Audio Watermarking*, by P. Dymarski, presents the results of research into improving the intelligibility of spoken messages transmitted to aircraft from ground stations. This solution is based on a selective calling system and the audio watermarking technique. It may help improve the comprehension of voice commands transmitted from ground to aircraft using an analog communication link.

In the paper titled *Method for Determining Broadcaster Advised Emergency Wake-up Signal for ISDB-T Digital Television Receivers*, S. Takahashi presents a method for determining a wake-up signal which is used to reduce the rate of false alarms in ISDB-T digital television receivers during their idle phase of operation. The proposed method decreases the number of false alarms, especially for low-mobility users.

The next paper, titled *WannaCry Ransomware: Analysis of Infection, Persistence, Recovery Prevention and Propagation Mechanisms*, by M. Akbanov, V. G. Vassilakis and M. D. Logothetis, presents the results of research concerned with WannaCry Ransomware attacks. Results obtained by the authors may be used for developing relevant detection and defense solutions – both for WannaCry and for other ransomware families that exhibit similar behaviors.

The last paper is titled *Theoretical and Experimental Analysis of Cryptographic Hash Functions*. Its authors – J. Tchórzewski and A. Jakóbik – present a theoretical introduction to the cryptographic hash function theory and a statistical experimental analysis of selected hash functions. Such an analysis facilitates the understanding of the behavior of cryptographic hash functions and may be very helpful in comparing the level of security offered the hashing method selected.

We would like to thank all the authors and reviewers for the effort they have put into preparing this issue of the *Journal of Telecommunications and Information Technology*.

Sławomir Hanczewski
Maciej Piechowiak
Joanna Weissenberg
Guest Editors

https://doi.org/10.26636/jtit.2019.preface1