

# Editorial

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In this issue of *CIT. Journal of Computing and Information Technology* we bring five papers from diverse fields of computing. Three of them deal with various aspects of networks, while the other two address issues in optimization and semantic text processing.

In the first paper of this issue, Hai Liu, Yong Feng, Qian Qian and Bin Zhang consider the question of constructing virtual backbones in Wireless Sensor Networks (WSN). Namely, in real WSN implementations, nodes are connected to others with a certain probability, contrary to the existing deterministic network model (DNM). Hence it makes sense to consider probabilistic network models for planning algorithms in WSNs. In this respect, the paper *Constructing Reliable Virtual Backbones in Probabilistic Wireless Sensor Networks* brings the design of RVBP-CDS, a new algorithm for constructing a reliable virtual backbone in a probabilistic WSN, using Effective Degree of Delivery Probability (EDDP) as the key parameter to determine network connectivity by selecting, for each node, those neighboring nodes with the highest EDDP. Simulation results provided prove that RVBP-CDS shows higher performance in terms of network lifetime and network delay when compared to other existing algorithms (RMCDS-GA and LBVBP-MOGA).

The second paper, *Design, Implementation and Performance Estimation of mtd64-ng, a New Tiny DNS64 Proxy* by Gábor Lencse and Dániel Bakai, tackles an issue regarding intercommunication of IPv6 and IPv4 networks, specifically the communication of IPv6-only clients with IPv4-only servers. Within such a context, the authors focus on high performance and computation efficient multi-threaded DNS64 server implementations able to utilize novel multi-core CPU designs. In this respect, the paper describes the redesign of their previous DNS64 server implementation named MTD64, which explicitly addresses this latter's identified shortcomings regarding memory leaking and potential vulnerability to DoS attacks. This new server, named mtd64-ng, was designed and implemented using modern programming concepts of object oriented decomposition and RAI (Resource Acquisition Is Initialization) in order to ensure readable code and avoid critical security vulnerabilities and memory leakage issues. Measurements provided show that mtd64-ng outperforms both the standard BIND server as well as MTD64 in the number of served "AAAA" record requests per second.

The next paper, *Evaluation of Correlation Measures for Computationally-Light vs. Computationally-Heavy Centrality Metrics on Real-World Graphs*, addresses a problem within the emerging discipline of network science, an academic field which studies complex networks in a number of application areas from a graph theoretic perspective. Specifically, the author Natarajan Meghanaathan investigates data clustering and ranking in real-world networks. He identifies three levels of correlation to be assessed between centrality metrics for real-world networks, and uses Kendall's concordance-based correlation measure to quantitatively assess the relative ordering of two vertices within "computationally-light" and "computationally-heavy" centrality metrics. Among other things, the paper provides a comprehensive review of several centrality metrics, which are used as tools for ranking of nodes in a network. Performance of "computationally-light" vs. "computationally-heavy" centrality metrics is evaluated on a set of 50 real-world networks.

In their paper titled *Hybrid Feature Selection Approach Based on GRASP for Cancer Microarray Data*, the authors Arpita Nagpal and Deepti Gaur present a computational study of complex microarray data containing a large number of genes with the objective to extract some useful medical information by adopting known heuristic methods. In particular, in order to improve the computational efficiency of the learning model they developed two improved algorithms by modifying with

specific local search procedures the Greedy Randomized Adaptive Search Procedure (GRASP) for high dimensional microarray data sets. The first algorithm (Tabu based Greedy Randomized Adaptive Search Procedure, TGRASP) results from the application of the tabu search algorithm, while the other (Firefly Greedy Randomized Adaptive Search Procedure, FFGRASP) results from the firefly optimization algorithm. Experimental results show that both introduced algorithms outperform the existing ones with respect to three performance parameters viz. accuracy, run time and number of selected subsets of features.

The last paper in this issue, *Mix Multiple Features to Evaluate the Content and the Linguistic Quality of Text Summaries* by Samira Ellouze, Mahar Jaoua and Lamia Hadrach Belguith, addresses evaluation of document summaries produced by automatic summarization systems. The authors propose a supervised machine learning-based approach to predict the overall content and linguistic quality scores of a summary, as assigned by human judges, which is in contrast to the existing work on summary evaluation, which mostly relies on metrics that capture specific content- or linguistic-oriented aspects of a summary. Thus, they consider a number of machine learning models that combine scores produced by individual metrics, alongside a number of linguistic features, including coherence and redundancy features. The experimental evaluation provided in the paper demonstrates that models combining content and linguistic features considerably outperform individual metrics in terms of correlation against human-assigned scores for both content and linguistic quality, with linguistic- and content-based features jointly contributing to these improvements.

Vlado Glavinić  
Editor-in-Chief