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Editorial

CIT. Journal of Computing and Information Technology brings five papers in its third issue of Vol. 26 (September 2018). The first two of them are from the area of vehicular computer networks, followed by one paper on optimization algorithms, and concluding with two on time series.

The first paper in this issue, *Doppler Shift Estimation and Compensation in High Speed MIMO-OFDM VANETs* by Ferdinand C. Nyongesa and Thomas O. Olwal, focuses on the applicability of the Basis Exponential Modeling (BEM) approach in Doppler Frequency Shifts (DFS) estimation for vehicular communication. Namely, motion in Vehicular Ad hoc NETworks (VANETs) causes DFSs, which are described by frequency dispersions in received signals. Although there are other sources of perturbations in VANET channels, DFSs due to high speed vehicular mobility cause the highest Bit-Error Rates (BER) in these channels. Since present schemes addressing DFS estimation and compensation in MIMO-OFDM based VANETs exhibit significant computational complexity, the authors have devised a novel one showing reduced computational complexity, which is based on general complex exponential Basis Expansion Matrix (BEM) modeling. The proposed approach has been evaluated through extensive simulations indicating a better BER performance than the conventional ones.

In the second paper of the issue, Ouafa Mahma, Ahmed Korichi and Abdelhabib Bourouis, titled *EBP*: *An Efficient Broadcast Protocol for Warning Message Dissemination in VANETs*, address the issue of broadcasting warning messages in VANETs. As it is already known, VANETs have attracted great interest basied on their application in improving road safety, where sharing of warning messages is of paramount importance in helping drivers minimize accidents and plan alternative routes in case of congestions. After presenting a thorough review of message dissemination protocols for VANETS, the authors hence introduce their newly developed protocol called Efficient Broadcast Protocol (EBP), which avoids drawbacks previously identified in the analysis of existing ones. In order to validate EBP, they conducted a number of simulations under various scenarios, eventually demonstrating its effectiveness.

The next paper of this issue, *Improved Resource Allocation for TV White Space Network Based on Modified Firefly Algorithm* by Kennedy K. Ronoh, George Kamucha, Thomas O. Olwal and Tonny K. Omwansa, deals with optimizing power and spectrum allocation in a TV White Space (TVWS) network in order to reduce the interference among its users. Due to growing needs for wireless broadband communication, white spaces i.e. frequencies allocated to broadcasting services which are not used (e.g. because they were freed after the switchover to digital TV) are becoming increasingly interesting as a communication medium. In this respect, optimization algorithms should be applied as they will both protect TVWS primary users (i.e. licensed operators) from harmful interference and reduce the level of interference among TVWS secondary users. The authors propose a novel algorithm which is developed on a nature based metaheuristics inspired by the flashing behavior of fireflies, and rectifies sub-optimal resource allocation of existing greedy algorithms. Matlab simulations of this algorithm show improvements of sum throughput and signal to interference noise ratio with respect to a number of other algorithms.

The widespread use of computer technology in various application domains (e.g. finance, meteorology, biology, astronomy and the like) has led to increased attention for time series, which basically consist of a sequence of data points indexed in time order. As the importance of time series raise, their effective and efficient management and use becomes of key importance. Time

series whose value at each time point is indeterminate is denoted as uncertain. As methods used in similarity matching for classical time series, like Dynamic Time Warping (DTW) and Euclidian distance, do not work for uncertain time series, Liangli Zuo and Li Yan propose a new approach in the paper *A Weighted DTW Approach for Similarity Matching over Uncertain Time Series*. Their approach combines a modified logistic weight function and the expected distance of two uncertain time series, based on the expectation and variance of their elements. The authors reproduce the testing procedure of earlier related work, and find that the proposed approach yields improved results compared to other procedures.

The second paper on time series focuses on pattern search in uncertain time series. *Spatial Index for Uncertain Time Series*, by Diwei Zheng, Li Yan and Yu Wang, introduces a specialized spatial index structure designed for efficient probabilistic similarity search in uncertain time series. The authors improve search efficiency both by examining uncertain data variance and by refraining to visit the deeper nodes of the index tree when the minimum distance between the two time series is larger than the maximum threshold. They also propose a heuristic method based on variance in which the time series candidates are disregarded when the time slot has different random variance from the searched series. The improvement achieved by this method is assessed with respect to two recently introduced similarity measures – PROUD and DUST. Experiments performed on synthetic data, and on data originated from real data, respectively, are used to demonstrate the efficiency of the approach.

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