



# A Special Issue of Intelligent Automation and Soft Computing

## GUEST EDITORIAL

### WIRELESS NETWORK AND COMMUNICATION SIGNAL PROCESSING

BY

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The topics of this special issue are mainly devoted to the most recent research, development and applications in the field of wireless ad-hoc networks, multimedia networks, communication signal processing. Among all the submitted manuscripts, 15 papers were selected and included in this special. Creative thoughts and interesting inspirations will be presented, discussed and disseminated in this issue.

There are five papers concerned with wireless ad-hoc networks. Y. Mao et al. proposed an effective data gathering scheme for heterogeneous energy wireless sensor networks; J. J. Gui et al. gave a mathematic approach to model the vulnerabilities from the Sybil attack for ad-hoc routing protocol. X. Yan et al. designed a new STAR MAC protocol to reduce the energy consumption in the traditional sensor network. H. Chen et al. proposed a novel trust routing scheme based on node behavior evaluation to enhance the security of the ad-hoc network. S. Shuo et al. in their paper proposed a weighted trilateral position algorithm to improve the position accuracy, and meanwhile, indoor field tests were also designed and carried out to verify their newly proposed algorithm.

As to multimedia networks, three papers were selected in this issue. F. Wang et al. studied the problem of reliable multi-path routing with bandwidth and delay constraints. The authors first proposed a heuristic algorithm as the benchmark, and then presented a polynomial time approximation to obtain a  $(1+\varepsilon)$ -approximation solution. P. Zeng et al. proposed two different

network coding schemes combined with scalable video coding technology to solve the problems of huge bandwidth consumption, less effective in heterogeneous environment, etc. W. Shen et al. proposed a three-layer streaming media network architecture based on the fusion of P2P and CDN. It used P2P network as the backbone, and selected the nodes with high performance, high bandwidth and stable online time as the CDN edge servers, and provided mobile devices with streaming media services under the schedule of the load-balancing servers.

Three papers are about communication signal processing. In order to overcome the channel capacity decrement flaw of uniform linear array, Y. Li et al. proposed a novel 4-element square antenna array with space symmetric structure to improve the channel capacity stability of compact MIMO systems. Three-dimensional capacity matrix eigenvalue distribution and generalized condition number (GCN) were also developed in the paper to analyze the capacity stability of 4-element compact MIMO systems. H. Wang et al. investigated a back-off algorithm to deal with the unfairness problem by changing the contention window size based on analyzing the connectivity of local topology and the polymerization degrees of the nodes. The algorithm can improve the throughput and real-time efficiency. E. Ding et al. proposed a novel ray-tracing based radio wave propagation (RTRWP) law to evaluate the wireless signal propagation characteristics in underground tunnel. Field test results show that the transmission loss caused by the hydraulic supports in tunnel could be effectively avoided by RTRWP.

The last four papers are about remote-sensed image processing, embedded systems, processor optimization algorithms, and particle swarm optimization (PSO) and neural network based soft sensor models. A. Shi et al. in their paper proposed an SRR method using the combined hyperacuity mechanism with half quadratic Markov random field (MRF) in the frame of maximum a posteriori (MAP). Steepest-descent optimization algorithm is also used to find the high resolution image. G. Hu et al. designed an embedded real-time Java processor for real-time applications. Based on the proposed automatic memory management (AMM) mechanism, the run-time efficiency of the embedded real-time processor was enhanced and the predictability of the worst-case execution time was also promoted. X. Yuan *et al.* studies the affine partition algorithm for automatic parallelization of serial programs. The authors proposed a method to select a unique optimal solution among the feasible solutions of the affine partition algorithm. Y. Lv et al. built a soft sensor model based on a PSO-BP neural network for titanium bullet beating furnace temperature. An improved particle swarm optimization is proposed, which optimizes the initial neural network weights.



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