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Guest editorial

The *Sixth Scientific Days of Young Researchers in Electrical Engineering and Informatics* was held in Hammamet - Tunisia on March 26-28, 2006. It was organized by the Multimedia InfoRmation systems and Advanced Computing Laboratory at the Institute of Informatics and Multimedia of Sfax, the Automatic Commands Research Unity, the Commands of Industrial Techniques Research Unity, the Informatics Systems and Embedded Electronic Research Unity, and the Research Unity on Development and Control of Distributed Applications at the National School of Engineer's Sfax. It was supported by the Tunisian Ministry for the Higher Education, the Tunisia Ministry of Scientific Research, Technology and Development of Competences, and the University of Sfax. The home page of these scientific days can be found at URL: http://gei.tunisieweb.com.

These scientific days included five sessions for long papers and six sessions for short papers. In addition, there was five invited sessions for long papers which are:

- Networks and communication protocols.
- Processing and analysis of multimedia documents.
- Robust commands and systems with delay
- Methodologies, models and tools for the distributed applications.
- Micro-electronics and telecommunication systems.

After the scientific days the program committee suggested to publish a selection of best presented paper in a special issue of the *International Journal of Computing and Information Sciences*. Out of the 43 long papers that were presented during the scientific days, we have encouraged authors of 12 papers to prepare extended versions of their papers for submission to the special issue, from which we have selected seven, after a thorough evaluation process. These seven papers are included in this special issue, volume 4, number 1, April 2007.

The first paper, titled *Practical Efficiencies of Slotted Stream Tapping in IP Networks*, is co-authored by A. Gazdar and A. Belghith. This paper deals with video-on-demand (VoD) protocols. The authors argue that most proposed protocols are merely analytically evaluated and do not take into account the feasibility of the implementation in a real work environment. Consequently, they propose a VoD protocol, called Slotted Stream Strapping, that is designed and implemented over IP networks using IETF. The authors presented both client side and server side implementation. The comparisons of this protocol results with theoretical results of most known protocols show that the proposed one presents an adequate compromise between simplicity of implementation and server/network performance. The experimentation results confirm the analytical results about performance obtained in a previous author's work.

The second paper, titled *Enhancing PSM Efficiencies in Infrastructure 802.11 Networks*, is co-authored by A. Belghith, A. Belghith and M. Molnar. The paper presents a study of the power consumption in ad-hoc networks. The authors claim through simulations that PSM does not level up to its design objectives. In particular, PSM blocks the network traffic flow and it does not adequately save energy as supposed to be. Moreover, at high traffic loads, PSM exhibits a very poor throughput and excessive power consumption per delivered data frame. The authors investigated the inherent properties that made PSM inefficient and proposed two different enhancements: State Aware PSM (SA-PSM) and Once Poll PSM (OP-PSM). They claim through simulation that tangible improvements are attained. These enhancements save power as much as PSM for light traffic loads and deliver as much a throughput as when no power saving mechanism is deployed. This paper is relevant to recent topics in power consumption in ad-hoc networks and presents original ideas about power saving mechanisms.

The third paper, titled *A Distributed Clustering Algorithm without an Explicit Neighbourhood Knowledge*, is co-authored by A. Belghith, I. Jemili and M. Mosbah. This paper describes a new clustering algorithm for wireless ad hoc networks. The proposed algorithm minimizes the number of control messages exchanged during the clustering process by reducing the exchange of neighbourhood

information. *This allows* alleviating the network from the additional messages exchanged during the neighborhood discovery phase in clustering algorithms. The authors evaluate their algorithm using the Visidia simulation tool and show that it outperforms one of the most known clustering algorithms in minimizing both the number of control messages and the number of elected clusterheads. This paper contributes to research area of wireless ad hoc networks by providing an efficient solution to the clustering problems.

The fourth paper, titled *From Formal Specification to Model Checking of MAS Using CSP-Z and SPIN,* is co-authored by A. Hadj Kacem and N. Hadj Kacem. This paper deals with formal specification and verification of multi-agent systems. It extends the development process of a formal approach for designing agent-based applications, called ForMAAD. The effort expended in the added phase is concentrated on two tasks: formally specifying MAS to provide a more concrete specification, and verifying that the specified system fulfils correctness properties. The authors use an extension of Z with temporal properties as a specification language and CSP-Z as a design language. They make use of the SPIN in order to exploit (*i*) the simulation facilities for early fault detection, and (*ii*) the technique of model checking to prove correctness properties. This paper contributes to reduce the gap between the formal design and the corresponding implementation by providing translation rules from abstract specifications to more concrete design.

The fifth paper, titled *Considering Topological Constraints for the Description of Dynamic Service-Oriented Orchestrated Architectures*, is co-authored by K. Guennoun, K. Drira and M. Diaz. This paper deals with the formal specification of dynamic software architectures. It develops the concept of architectural styles which describes the set of all correct configurations. The authors elaborate and specify the basic architectural styles for the design of service-oriented applications. They make use of an appropriate formal framework using graph grammars. The approach enables both generating architectures in conformance with a given style and checking conformance of ad-hoc architectures.

The sixth paper, titled *Workflow Soundness Verification based on Structure Theory of Petri Nets*, is co-authored by K. Barkaoui, R. Ben Ayed and Z. Sbaï. This paper suggests an analysis method for verifying the correctness of workflow specifications. It exploits recent advances in structure theory of Petri nets to define efficient structural characterization of the basic soundness property. The obtained results allow the identification and analysis of workflow net classes allowing the modeling of complex synchronization and routing workflow constructs of practical need particularly in the context of collaborative management systems.

The seventh paper, titled *Lip Localization and Viseme Classification for Visual Speech Recognition*, co-authored by S. Werda, W. Mahdi and A. Ben Hamadou. This paper presents a new approach for lip-reading system. This approach enables localizing lip feature points in a speaker's face and carrying out a spatial-temporal tracking of these points. The extracted visual information is then classified in order to recognize the uttered viseme (visual phoneme). The authors present a prototype that implements their approach, called AliFE : Automatic Lip Feature Extraction. The AliFE system includes three principle parts: lip localization and tracking, lip feature extraction, and classification and recognition of the viseme. The authors show, through experimentations, good results for the tracking of characteristic points on lip contours and for the recognition of the viseme.

The Guest editor wishes to thank all the research days' authors who submitted their papers to the special issue. He also thanks the program committee and the reviewers of this special issue (listed above), whose dedications made it possible. Last but not least, he wishes to thank the Editor in Chief of the International Journal of Computing and Information Sciences, Prof. Jehad Moh. AlJa'am, for the opportunity he offers GEI'2006 to showcase part of its proceedings.

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