



# A Special Issue of Intelligent Automation and Soft Computing

## FORTHCOMING MULTIMEDIA & INTELLIGENT SERVICES IN UBIQUITOUS AND PERVASIVE COMPUTING

BY

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The proliferation of wireless technologies and electronic devices has led to a rapid growth in interest in the field of Ubiquitous and Pervasive Computing (UPC). UPC makes it possible to create a human-oriented computing environment where computer chips embedded in everyday objects interact with the physical world. Users can connect to the Internet even while moving around, giving them almost permanent access to their preferred services. With its great potential to revolutionize our lives, UPC also poses new research challenges. This special issue of *Intelligent Automation and Soft Computing* focuses on the challenges and solutions offered by the new UPC technology with a particular emphasis on forthcoming multimedia and embedded applications. Academic and industry professionals discuss the latest issues and progress in the area of UPC in a series of high quality papers that examine both the theoretical aspects and practical applications of UPC. We expect that this special issue will stimulate debate and inspire our readers paving the way for further technological advance in this important and exciting field.

This special issue is composed of total nine papers as follows: (most of them are the extended versions of the outstanding papers presented at the 2nd International Workshop on Intelligent, Mobile and Internet Services in Ubiquitous Computing):

- 1- The first paper in this special issue describes an optimal-read only-write buffer architecture that was developed based on the properties of flash memory. In order to take into account temporal and spatial localities, an adaptive grey decision policy capable of dynamically adjusting the replacement policy is proposed. A performance evaluation confirms that the proposed architecture and policy is a practical way to utilize flash memory in mobile devices as it considerably reduces the device's energy consumption.
- 2- This paper proposes a practical system architecture for Wireless Sensor Networks (WSN). In particular, the proposed architecture incorporates a new way of treating service brokers and gateways that is expected to improve support for dynamic changes in WSN systems. In order to evaluate its usability, a real-world application, the Kindergarten Safety System, is suggested.

- 3- Here the authors introduce an adaptive authentication and registration key management scheme that addresses the critical handoff latency experienced by the current Authentication, Authorization, and Accounting (AAA) architecture. In this scheme, during the inter-domain handoff the AAA server located in the previous domain, rather than the AAA home server, authenticates the mobile host then provides it with the key material. In the intra-domain handoff case, the mobile host is authenticated by the AAA server located in the current domain. The performance evaluation included in this paper shows the effectiveness of the proposed scheme.
- 4- In this paper, a new DSP platform developed as a sensor node with high performance in a ZigBee-based WSN is described, and an arrhythmia-aware and bandwidth-efficient telemedicine system is proposed. According to simulations and several real-world tests, this new approach shows promise for applications such as a more bandwidth-conservable, stable, and reliable WSN-based telemedicine system.
- 5- This paper examines ways to take advantage of synergies at the HTTP layer between device capability expression, content negotiation, channel optimization and content adaptation. In addition, a system is proposed that optimizes the transmission of HTTP requests through HTTP header reduction over the cellular channel, a significantly improving the response time.
- 6- Here a new geographic routing protocol with energy efficiency and reliability that takes into account the wireless link condition is described. The simulation performed for the study indicates that the proposed scheme will be very efficient in performance.
- 7- In this paper, the authors report the development of a new solution selection method for dynamic sensor networks. In order to conserve energy, a fuzzy rule-based system that incorporates a consideration of network status is used to choose between two filtering solutions and thus optimize detection power. Simulation results confirm the effectiveness of the proposed method.
- 8- This paper presents two distributive key management schemes using maximum distance separable codes (MDS) for wireless ad hoc networks. In the first, a practical  $(n, t + 1)$ -threshold key management system is constructed, while the second scheme proposes a key pre-distribution scheme using MDS codes. As a result of their cover-free family properties, both schemes are expected to be relatively secure against fraud and tapping by malicious nodes.
- 9- This paper models a context for intelligent navigation applications and proposes a context-aware workflow management algorithm capable of dynamically adjusting workflow execution behaviours in terms of current context information. The proposed algorithm is modeled and its correctness is verified through Petri nets. The paper concludes with a description of iCampus, an implemented pervasive campus system. Experimental testing shows that the proposed algorithm can indeed guide campus users intelligently and transparently.

We wish to thank Editor-in-Chief Mo Jamshidi for giving us the opportunity of serving IASC as Guest Editors of this Special Issue. It has been a real pleasure and a privilege to work with the exceptional researchers who have contributed papers. We would also like to express our gratitude to all the members of the editorial office, and to the independent reviewers whose hard work and enthusiasm have made this idea a reality. Finally, we hope that our readers find the techniques described in the papers in this Special Issue useful and a source of valuable new insights that will benefit their future research.



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