
Preface

Leonard Barolli

Department of Information and Communication Engineering,
Fukuoka Institute of Technology (FIT),
3-30-1 Wajiro-Higashi, Higashi-ku, Fukuoka 811-0295, Japan
E-mail: barolli@fit.ac.jp

Yoshitaka Shibata

Faculty of Software and Information Science,
Iwate Prefectural University, 152-52 Sugo,
Takizawa, Takizawa-Mura 020-0193, Iwate, Japan
E-mail: shibata@iwate-pu.ac.jp

Hui-Huang Hsu

Department of Computer Science and Information Engineering,
Tamkang University, 151 Ying-Chuan Road,
Tamsui, Taipei, 25137, Taiwan, ROC
E-mail: hhsu@cs.tku.edu.tw

Biographical notes: Leonard Barolli is a Professor at Department of Information and Communication Engineering, Fukuoka Institute of Technology (FIT), Japan. He received BE and PhD Degrees from Tirana University and Yamagata University in 1989 and 1997, respectively. He has published more than 200 papers in journals, book chapters and international conferences. He has served as a Guest Editor for many journals. He was PC Chair of IEEE AINA-2004 and ICPADS-2005. He served as General Co-Chair of IEEE AINA-2006. His research interests include high-speed networks, network protocols, ad-hoc and sensor networks. He is member of IEEE, IPSJ and SOFT.

Yoshitaka Shibata received his PhD in Computer Science from the University of California, Los Angeles (UCLA), USA in 1985. From 1985 to 1989, he was a Research Member in Bell Communication Research (former AT&T Bell Laboratory), USA. From 1989 to 1998, he was a Professor at Information and Computer Science Department, Toyo University, Japan. Since 1998, he is working as a Professor at Iwate Prefectural University, Japan. His research interests include intelligent multimedia networks, next generation Internet, VR and agent technologies. He is a member of IEEE, ACM, IPSJ and IEICE.

Hui-Huang Hsu received the PhD Degree in Electrical Engineering from the University of Florida, Florida, USA in 1994. From August 1995 to July 2003, he had been with Chung Kuo Institute of Technology, Takming College, and Chinese Culture University, all located in Taipei, Taiwan. He joined the Department of Computer Science and Information Engineering, Tamkang University in August 2003, where he is now an Associate Professor. His current research interests are in the areas of mobile multimedia, multimedia processing, machine learning, data mining, bioinformatics, and e-learning. He is a senior member of the IEEE.

The success of all-IP networking and wireless technology has changed the ways of living for people around the world. The progress of electronic integration and wireless communications is going to pave the way to offer people access to the wireless networks on the fly, based on which all electronic devices will be able to exchange information with each other whenever necessary. Also, the network speed is increasing very fast and by using optical networks a speed in range of terabits per second (Tb/s) can be achieved. Furthermore, in the last few years we have observed an

explosive growth of multimedia computing, communication and applications. Thus, the networks of today are going through a rapid evolution and many new networks such as very high speed networks, ad-hoc networks, P2P networks, and sensor networks are becoming new research topics. The architectures and algorithms in these networks become very complex and it seems imperative to focus on new protocols and models that can enable the network to perform adaptive behaviour in order to manage the increasing usage demands, provide support for a significant

number of services, guarantee their QoS, and optimise the use of network resources. However, the most important factor for the success of the future networks are killer-applications. For this reason, the research on new applications and protocols is a very important issue.

This special issue, with emphasis on network protocols and applications, is organised from the papers of the IEEE International Conference on Advanced Information Networking (AINA-2005), which was held in Tamkang University, Taiwan, from 28 to 30 March 2005. Only the authors of AINA-2005 conference and workshop papers who presented papers at AINA-2005 were invited to submit their revised papers to this special issue. The conference received 451 submissions and every paper was reviewed carefully by three reviewers. Based on their quality and significance 150 papers were accepted in AINA-2005. We received 32 papers for this special issue of which we accepted nine based on their quality and suitability for the special issue as well as the journal.

Congestion control is a very important problem for the QoS of the internet. Considering this problem, A. Durresi, M. Sridharan and R. Jain proposed an Adaptive Multi-level Explicit Congestion Notification (AMECN) scheme that solves the parameter-tuning problems of the present MECN scheme. Based on the simulation results, they show that the AMECN scheme performs better than Adaptive RED.

Another paper, by Ashraf Udin Ahmed et al., also deals with congestion control of the internet. The authors propose a macro-level congestion detection mechanism and a congestion control method. The proposed approach uses the concept of zone, which is a collection of hundreds/thousands of networks situated in a geographical region. The authors show that the proposed method can minimise internet traffic congestion.

In the third paper, Hedley et al. present CCReSD (Concept-based Categorisation over Refined Sampled Documents), in order to address issues associated with the information extraction, summarisation and categorisation of Hidden Web document databases. The authors conduct experiments to evaluate the effectiveness of the proposed approach in database categorisation. Their results show that the proposed approach assigns databases with more relevant subject categories.

In the fourth paper, Sawamoto et al. deal with cooperative problem-solving using multi-agents. They present usage of templates of the agent model and the task model as a development support technique, and discuss the evaluation of the proposed multi-agent system considering delivery-scheduling support and network community support problems. They show that the proposed multi-agent framework is a good approach for problem-solving.

In the fifth paper, the authors (Liu et al.) propose an enhanced multiple access protocol called the UPMA++ protocol, which integrates the advantages of random multiple access and fixed allocation multiple access protocols. The proposed protocol adjusts the length of the contention access period and polling period effectively to

resolve the conflicts between active stations and transmission stations. By analysis, the optimal contention access period length for the given maximum polling period length is found, and the performance evaluations show that the UPMA++ protocol has a high throughput, low average message delay and small average message dropping probability.

The most important issue in transportation systems is to reduce the higher number of accidents. For this reason, effective broadcast protocols are needed. In the sixth paper, M. Durresi et al. present an emergency broadcast inter vehicle protocol. To make the proposed protocol secure, a security protocol that would allow secure non-refutable broadcasts is also presented. Key distribution for this protocol is performed by using both roadside base stations and threshold cryptography.

In the seventh paper, Itaya et al. present a Heterogeneous Asynchronous Multi-source Streaming (HAMS) model where multiple contents peers transmit multimedia packets to a requesting leaf peer to realise high reliability and scalability. The authors evaluate the proposed model by simulation, and show that the HAMS model has high performance and highly reliable communication compared with asynchronous multi-source streaming and a traditional single-source streaming model.

In the eighth paper, Enokido discusses concurrency control algorithms based on the significance of roles assigned to transactions. He defines a significantly dominant relation on roles and proposes a Role Ordering (RO) scheduler so that multiple conflicting transactions are serialisable in a significant dominant relation of roles. The author evaluates the RO scheduler compared with the Two-Phase Locking (2PL) protocol, and shows that the proposed scheduler has better performance.

Considering the ownership rights of digital images, content providers want to devise an effective way to protect their intellectual property rights. Digital watermarking, which protects legal copy and distribution of digital products, has been used by Fan and Tsao to construct a dual pyramid watermarking method for JPEG-2000. Dual pyramid watermarking includes a robust pyramid watermark and a fragile pyramid watermark. Experimental results show that the proposed technique successfully survives JPEG-2000 compression, image cropping, pepper noise, scaling and rotation, and can detect modification of the host image.

We hope that this special issue will lead to a better understanding on network protocols and applications. As we conclude this overview, we would like to thank all the authors for submitting their papers, and all the reviewers for their good work to make it possible to publish this special issue.

In particular, we would like to address our special thanks to Editor-in-Chief of the *International Journal of High Performance Computing and Networking*, Professor Laurence T. Yang, for his strong encouragement and support.