
Preface

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Biographical notes: Shu-Ching Chen received his PhD from the School of Electrical and Computer Engineering at Purdue University, West Lafayette, IN, in December 1998. He also received Masters degrees in computer science, electrical engineering, and civil engineering from Purdue University, West Lafayette, IN. He has been an Associate Professor in the School of Computer Science (SCS), Florida International University (FIU) since August 2004. Prior to that, he was an Assistant Professor in SCS at FIU dating from August 1999. Currently, he is the Director of Distributed Multimedia Information System Laboratory and Associate Director of The Center for Advanced Distributed System Engineering. His main research interests include distributed multimedia database systems, data mining and multimedia networking. Dr. Chen authored and co-authored more than 100 research papers in journals, refereed conference/symposium/ workshop proceedings and book chapters. He was the general co-chair of the 2003 IEEE International Conference on Information Reuse and Integration and the program co-chairs of the 10th ACM International Symposium on Advances in Geographic Information Systems and the First ACM International Workshop on Multimedia Databases.

Jianhua Ma is a Professor at Faculty of Computer and Information Science in Hosei University since 2000. Previously, he had worked for 7 years at NUDT, 3 years at Xidian University and 5 years at the University of Aizu, respectively. His research interests include multimedia technologies, networks, intelligent agents and distributed collaborative systems as well as their applications in distance learning community and other e-business over the wired and wireless Internet. He is an editor of the *International Journal of Computer Processing of Oriental Languages*, an associated editor of the *International Journal of Distance Education Technologies* and in the editorial board of the *International Journal of Wireless and Mobile Computing*. He has served the international journals of *CPOL*, *SEKE*, *JASS*, *JOIN* and *HPCN* as guest editors. He has organised international conferences of *AINA04* and *MNSA04* as a general co-chair, and organized *DMS99*, *DMS01*, *VUME2000*, *CW02* and *AINA03* as a PC cochair. He initialised and coordinated five international workshops of *ICaM02*, *MDEST02*, *XMLinDM02*, *CANS02* and *MSEAT02* at San Francisco in 2002. He is/was in PC committees of many international conferences. Dr. Ma has published about 100 academic papers in journals, books and conference proceedings.

Shi-Kuo Chang received his B.S.E.E. degree from National Taiwan University in 1965. He received the M.S. and PhD degrees from the University of California, Berkeley, in 1967 and 1969, respectively. He was a research scientist at IBM Watson Research Center from 1969 to 1975. From 1975 to 1982 he was Associate Professor and then Professor at the Department of Information Engineering, University of Illinois at Chicago. From 1982 to 1986 he was Professor and Chairman of the Department of Electrical and Computer Engineering, Illinois Institute of Technology. From 1986 to 1991 he was Professor and Chairman of the Department of Computer Science, University of Pittsburgh. He is currently Professor and Director of the Center for Parallel, Distributed and Intelligent Systems, University of Pittsburgh. Dr. Chang is a Fellow of IEEE. He has published over 230 papers and 16 scientific books. He is the founder and co-editor-in-chief of the international journal, *Visual Languages and Computing*, published by Academic Press the editor-in-chief of the international journal, *Software Engineering & Knowledge Engineering*, published by World Scientific Press, and the co-editor-in-chief of the international journal on *Distance Education Technologies*.

Yi Deng is the Director and Professor of School of Computer Science (SCS) at Florida International University (FIU), the State University of Florida at Miami. He is responsible for overall strategic planning, management and operation of the school, as well as for coordinating university-wide computing and information technology related initiatives. He had been the Managing Director of Embedded Software Center (ESC), a joint R&D centre with Texas Instruments, Inc. and Alcatel USA, and a tenured Associate Professor of Computer Science at University of Texas at Dallas (UTD). Prior to joining UTD, he was the founding director of Center for Advanced Distributed System Engineering (CADSE) at FIU a university research centre designated by the Florida Board of Regents. His research interests include software specification and design, software architecture, formal methods for complex systems, distributed object technology, component-based software engineering and middleware. He received a PhD in Computer Science from the University of Pittsburgh in 1992. He has been the PI/Co-PI of 15 research grants/contracts from various Federal agencies, as well as from industry. He has published over 70 papers in various journals and conferences. Dr. Deng has been an editor for the *International Journal of Software Engineering and Knowledge Engineering* and conference or program chair for several conferences.

Timothy K. Shih is a Professor of the Department of Computer Science and Information Engineering at Tamkang University, Taiwan, ROC. He is a senior member of IEEE and a member of ACM. His current research interests include multimedia computing and networking, distance learning and content-based multimedia information retrieval. He was a faculty of the Computer Engineering Department at Tamkang University in 1986. In 1993 and 1994, he was a part time faculty of the Computer Engineering Department at Santa Clara University. He was also a Visiting Professor at the University of Aizu, Japan in summer 1999, a visiting researcher at the Academia Sinica, Taiwan in summer 2001 and an adjunct faculty member of Xidian University, China. Dr. Shih received his BS and MS degrees in computer engineering from Tamkang University and California State University, Chico, in 1983 and 1985, respectively. He also received his PhD in computer engineering from Santa Clara University in 1993. Dr. Shih has edited many books and published over 300 papers and book chapters, as well as participated in many international academic activities, including the organisation of many international conferences and special issues of international journals. He is the founder and co-editor-in-chief of the *International Journal of Distance Education Technologies*, published by Idea Group Publishing, USA. Dr. Shih has received many research awards, including Tamkang University research awards, NSC research awards (National Science Council of Taiwan), and IAS research award of Germany. He also received many funded research grants from both domestic and international agencies. Dr. Shih has been invited frequently to give keynote speeches, tutorials, panels and talks at international conferences and overseas research organisations. His e-mail ID is tshih@cs.tku.edu.tw and website is <http://www.mine.tku.edu.tw/chinese/teacher/tshih.htm>

1 Introduction

The technology of multimedia networking and wireless communication systems has made great progress in recent years. These systems are expected to provide a wide range of multimedia services to the network and mobile users with guaranteed quality-of-service (QoS). Multimedia services required in these networks include data, voice, video, graphics and Internet access, each with its own traffic characteristics and distinct QoS requirements. This special

issue selected the best papers presented at *The Ninth International Conference on Distributed Multimedia Systems (DMS'03)* and two of its workshops: *The 2003 International Workshop on Cryptology and Network Security (CANS03)* and *The 2003 International Workshop on Mobile Systems, E-commerce and Agent Technology (MSEAT2003)* held at Florida International University, Miami, FL, from 24 to 26 September, 2003. *DMS'03* is the ninth in an international conference series that covers a wide spectrum of technique discussions, demonstrations and

student programme/paper contests in the field of distributed multimedia computing. Started in 1994, the series of conference has been held at Hawaii, Hong Kong, Vancouver, Taipei, Aizu-Wakamatsu, Japan and San Francisco. The main theme of this special issue focuses on techniques, systems, applications and theories in the fields of computer networks and wireless communications.

The first paper in this special issue, 'Conferencing³: 3D audio conferencing and archiving services for handheld wireless devices' is by Stuart Goose, Jochen Riedlinger and Sreedhar Kodlhalli. The focus of this work describes a framework called Conferencing³, which leverages 3D audio spatialisation offering greater clarity, improves distinguishability between the individual participants, has a personalisable audio listening space; and the ability to add indexes with text descriptors into the conference. To the knowledge of the authors, this is the first reported mobile solution offering interactive 3D, both audio and graphical, support for conferencing on commercially available wireless devices. Providing 3D audio support to the handheld device has demonstrated improvements over the current situation with respect to the issues of speech intelligibility, identifying speakers and distance cues. In addition, a unique approach is offered to the 3D visualisation and browsing of archived sessions in this paper.

In 'A cross-layer optimisation approach for multimedia over CDMA mobile wireless networks' by Yee Sin Chan and James W. Modestino, the authors studied a cross-layer optimisation approach for the transport of packetised digital video over future generation CDMA mobile wireless networks. Their proposed approach takes into account both the interferencelimited and bandwidth-limited characteristics associated with spread-spectrum CDMA systems. A joint source coding-power control (JSCPC) strategy combined with adaptive channel coding employing the class of rate-compatible punctured turbo (RCPT) codes to forward error correction (FEC) with unequal error protection (UEP) was also proposed. The efficacy of their proposed approach using the ITU-T H.263+ video source coder was demonstrated. Furthermore, the authors mentioned that their proposed approach is generally applicable to other source coding schemes.

In the third paper entitled 'A real-time interactive distance education system for a broadband internet environment', Billy Pham, Kazuo Yana and Hisato Kobayashi introduced a system for the real, synchronous distance-class delivery of the Hosei University and California State University, Hayward joint pre-MBA program. The system consists of a smalldelay, interactive video/audio streaming server, a presentation synchronisation/sharing server and an integration Web server, and provides a real-time interactive learning environment. The authors indicated that a conventional H.323-based synchronous e-learning system could be replaced by their proposed system as broadband personal network environments become even more popular.

The fourth paper, 'Transparent eye contact and gesture videoconference' by Thitiporn Lertrudachakul, Akinori

Taguchi, Terumasa Aoki and Hiroshi Yasuda, describes an innovative videoconferencing system called 'IshinDenshin System', in which the participant's image and shared workspace are naturally merged. The IshinDenshin System was proposed for increasing the efficiency of two-way videoconference by supporting eye contact and presence of finger pointing with freely seamless control between human image and shared workspace. The experimental results presented in this paper show that the efficiency of conference can be improved by eye contact, gesture interface and seamless integration, which demonstrates that their proposed system gives a new meaning to communication and information exchange and contributes the evolution of collaborative work in the future.

Takuya Tojo, Tomoya Enokido and Makoto Takizawa proposed a notification-based data transmission procedure with two-phase slow start (TPSS) to efficiently exchange multimedia messages in a group so as to satisfy QoS requirement in their paper entitled 'High-speed group communication protocol for exchanging real-time multimedia data'. Two control parameters, namely transmission rate (TR) and holding time (HT), are used to control data transmission so as to satisfy QoS requirements, bandwidth, packet loss ratio and delay time. The protocol NQCP was implemented and evaluated. The authors showed that more number of prioritised packets can be delivered in the QoS notification-based approach than in the traditional feedback-based approach in the evaluation.

In 'The editing generator and its cryptanalysis' by Guang Gong and Shaoquan Jiang, the authors presented a new pseudo-random sequence generator, called an editing generator, constructed by using two ternary linear feedback shift registers (LFSR). Their proposed generator is a combined model of the clock-control generator (viewed as insertion) and the shrinking generator (viewed as deletion), which is shown to have good properties of randomness, such as large periods, high linear spans, large ratio of linear span per symbol and small bias of occurrences of symbols. It is known that clock-control generators and shrinking generators are both insecure. On the other hand, their proposed combined model is secure against these attacks which make use of the individual weakness. The security of the editing generator was also analysed under the parity-check attack, the unconstraint embedding attack. Thus, it cannot affect the security of their proposed generator.

The seventh paper, 'Provably secure fail-stop signature schemes based on RSA' by Willy Susilo and Yi Mu, the authors addressed the issue that the security of ordinary digital signature schemes relies on a computational assumption. The fail-stop signature (FSS) schemes provide security for a forger with unlimited computational power by enabling the sender to provide a proof of forgery if it occurs, and the RSA-based FSS schemes allow the signer to provide a non-trivial factor of the modulus in the case of forgery. However, the scheme is not provably secure. Hence, the authors fixed this problem by replacing the definition of the mapping used in the original scheme. The authors

developed an insecure variant of FSS scheme based on factorisation and the mapping, and showed a complete security proof of their proposed scheme.

Hyeok Chan Kwon, Sang Choon Kim, Jae Hoon Nah and Sung Won Sohn designed and implemented an automatic security test engine for IPv6 network in their paper ‘An automatic security test engine for IPv6 network’. Their proposed approach can evaluate security by sniffing, modifying, sending and analysing packets by real time. In addition, their proposed evaluation engine is rule-based test system, and hence it is able to automate the security test of the network and cope with the new vulnerability easily without modifying the system. If its users get information about new vulnerability, then the users can add Security Test Rules that can handle the new vulnerability. Their proposed approach is very scalable because it manages the functions that are needed for security test system with the modules. Also, additional security test modules that have new functions can be added to the security test system easily without modifying the whole system.

In the paper ‘A smart IDS and response system for the internet malicious worm’, Jason C. Hung, Chun-Chia Wang, Lun-Ping Hung, Anthony Y. Chang and Yi-Chun Liao proposed a behaviour-based intrusion detection and response system for the Internet worm. Their proposed Lambent anti-worm system (LAWS) can detect the intruded services and influenced range automatically. Moreover, it can also analyse the key information of the intrusion. The contributions of their proposed LAWS include:

- LAWS can detect the newly attacking or unknown worms according to analyses of the attacking packets
- LAWS can check all possible kinds of intrusion by monitoring indicated network services
- cooperated defence system (CDS) decreases the damage range and shortens the response time.

The mobile agent technique was involved to form the defence system. If an unknown malicious worm was found in a local area network, the responsible mobile agent will inform others to construct the defence system for getting the newly attacking pattern. The influenced damaged range can be reduced in the smallest period.

Finally, the paper by San-Yuan Wang on ‘Scheduled share-tree multicasting for bluetooth networks’ addressed the issues on multicast routing for bluetooth scatternets by developing a proactive, source-routing multicast protocol for bluetooth scatternet based on a scheduled shared core tree. The shared core tree was designed to have a core to manage the structure of the tree. Before applying their proposed algorithm, one should construct a shared core based tree with simple scatternet-wide time-slot scheduling so that packet transmission cannot be affected by masters’ polling delay and bridges’ switching delay to reduce the multicast latency. In order to reduce the transmission delay and switch delay, scatternet-wide synchronisation and slot-group scheduling were enforced. These processes make the multicasting latency predictable. Thus, their proposed algorithm is suitable for considering the QoS requirements.

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