Special Issue on Multimedia Contents Security in Social Networks Applications

Guest Editorial

Recent years have witnessed rapid developments of the information and communication technologies, and the Next-Generation Internet, 3G and 4G wireless mobile networks have been striding to a large-scale deployment and application. The emerging versatile network admissions, especially for social network services, tools and applications, enable a much more convenient access to multimedia contents in anytime, at anywhere, for anyone. Unfortunately, in such environment, copyright infringement behaviors, such as illicit copying, malicious distribution, unauthorized usage, free sharing of copyright-protected digital contents, will also become a much more common phenomenon. Some research frontiers on multimedia contents security in social networks applications have been in progress, including enhanced security mechanisms, methods and algorithms, trust assessment and risk management in social network applications, as well as social factors and soft computing in social media distributions.

The special issue attempts to bring together researchers, contents industry engineers and administrators resorting to the state-of-the-art technologies and ideas to protect valuable multimedia contents and services against attacks and IP piracy in the emerging social networks. It includes 5 selected papers as follows:

The first paper focuses on an interesting recommendation trust issue in the large-scale distributed computing, including social networks. Dr. Gang Wang proposed a dynamic recommendation trust evaluated model based on bidding in E-Commerce environment. By greatly increasing the "criminal cost" of malicious recommendation nodes, with recommendation optimization algorithm based on Markov chain, the model ensures that the recommendation service is true and more objective, which will stimulate the enthusiasm of nodes objective recommendation and reach the goal that nodes give up malicious recommendation and cooperative cheating on its own initiative by objective method so as to restrain malicious recommendation and cooperative cheating effectively. The model also shows good restraint on malicious recommendation by a serious of simulation experiments.

Then, the continuous emergence of multimedia video coding standards is cared in the second paper. Especially, the existing challenges are two folds: one fold is to find efficient coding algorithms which require high performance, and the other is to speed up the coding process. With recent advancement of VLSI (the Very Large Scale Integration) semiconductor technology contributing to the emerging digital multimedia word, this paper intends to investigate efficient parallel architecture for the emerging high efficiency video coding (HEVC) standard to speed up the intra coding process, without any prediction modes ignored. Dr. Jie Jiang's experimental implementations of the proposed algorithm are demonstrated by using a set of video test sequences that are widely used and freely available. The results show that the proposed algorithm can achieve a satisfying intra parallelism without any significant performance loss.

In the third paper, LSB matching steganography technologies were explored and discussed in detail. The authors proposed a novel optimized LSB matching steganography scheme based on Fisher Information. The embedding algorithm is designed to solve the optimization problem, in which Fisher information is the objective function and embedding transferring probabilities are variables to be optimized. By modeling the groups of elements in a cover image as Gaussian mixture model, the joint probability distribution of cover elements for each cover image is obtained by estimating the parameters of Gaussian mixture distribution. Finally, in order to embed message bits, pixels chose to add or subtract one according to the optimized transferring probabilities of the category. The experiments show that the security performance of this new algorithm is better than the existing LSB matching.

As one of key technologies for digital rights management, the research on watermarking algorithms is followed. In this paper, authors denoted the unsolved issues on traditional watermarking algorithms. For instance, the insertion of watermark into the original signal inevitably introduces some perceptible quality degradation. Another problem is the inherent conflict between imperceptibility and robustness. Some existing zero-watermarking algorithm available for audio and image cannot resist against some signal processing manipulations or malicious attacks. In the paper, a novel audio zero-watermarking scheme based on discrete wavelet transform (DWT) is proposed, which is more efficient and robust. The experiments show that the algorithm is robust against the common audio signal processing operations such as MP3 compression, re-sampling, low-pass filtering, cutting-replacement, additive white Gaussian noise and so on. These results demonstrate that the proposed watermarking method can be a suitable candidate for audio copyright protection.

In the last paper of the special issue, a burning issue on the hiding harmful information in multimedia conveniently in the emerging multimedia social networks. Dr. Jing Liu considered the problem of estimating the stego key used for hiding using least significant bit (LSB) paradigm, which has been proved much difficult than detecting the hidden message. Previous framework for stego key search was provided by the theory of hypothesis testing. However, the test threshold is hard to determine. In this paper, we propose a new method, in which the correct key can be identified by inspecting the difference between stego sequence and its shifted sequence on the embedding path. It's shown that the new technique is much simpler and quicker than that previously known.

The above five paper were selected by strict two rounds of peer reviewing based on their originality, relevance, technical clarity and presentation, by at least two anonymous reviewers. Here, I show gratitude to Prof. Maheswaran for

his collaboration on the successful special issue on the very interesting and challenging topic of multimedia contents security in social networks. Besides, all invited reviewers are appreciated for their reviewing, comments and suggestions for authors. Finally, I give special thanks to Prof. Jiebo Luo and Dr. George Sun for their great helps and efforts so as to the special issue publication on time and successfully.

Guest Editors

Zhiyong Zhang (Email: z.zhang@ieee.org)
Department of Computer Science, Henan University of Science & Technology, Luoyang, P. R. of China

Muthucumaru Maheswaran (Email: maheswar@cs.mcgill.ca)
School of Computer Science, McGill University, Montreal, Canada

Zhiyong Zhang, received his Master, Ph.D. degrees in Computer Science from Dalian University of Technology and Xidian University, China, respectively, and post-doctoral fellowship at Xi'an Jiaotong University, China.

He is currently associate professor with College of Electronics Information Engineering, Henan University of Science & Technology, and research interests include digital rights management and soft computing, trusted computing and access control, as well as security risk management. Recent years, he has published over 50 scientific papers and 2 monographs on the above research fields, and held 3 authorized patents.

Dr. Zhang is IEEE Senior Member, IEEE Systems, Man, Cybermetics Society Technical Committee on Soft Computing, World Federation on Soft Computing Young Researchers Committee, Membership for Digital Rights Management Technical Specialist Workgroup Attached to China National Audio, Video, Multimedia System and Device Standardization Technologies Committee, Topic Editor-in-Chief of International Journal of Digital Content Technology and Its Applications, and Guest Editor of Journal of Multimedia. Besides, he is Chair/Co-Chair and TPC Member for numerous international workshops/sessions on Digital Rights Management and contents security.

Muthucumaru Maheswaran, received BSc degree in Electrical and Electronic Engineering from University of Peradeniya, Sri Lanka in 1990. In 1994, he received a MSEE degree in Electrical Engineering from School of Electrical and Computer Engineering at Purdue University, West Lafayette, Indiana, USA. From the same school he also received a PhD in Computer Engineering in December 1998.

Prof. Maheswaran is nowadays an associate professor at the School of Computer Science and Department of Electrical and Computer Engineering of McGill University, Canada. He is directing the research activities at the Advanced Networking Research Lab, and His research interests are in the general areas of Computer Networking, Information Security, and Distributed Systems. He has published hundreds of scientific on the related research realms in numerous international journals and conferences.