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Emerging Directions in Embedded and Ubiquitous Computing

**EUC 2006 Workshops:
NCUS, SecUbiq, USN, TRUST, ESO, and MSA
Seoul, Korea, August 2006, Proceedings**



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Proceedings



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Preface

This volume contains the proceedings of the workshops held in conjunction with the IFIP International Conference on Embedded and Ubiquitous Computing, EUC 2006, in Seoul, Korea, August 1-4, 2006.

The objective of these workshops is to complement the spectrum of the main conference, which is a premier international forum for researchers and practitioners from both industry and academia, by discussing hot topics and emerging areas, by sharing recent progress and emerging results, and by promoting cutting-edge research and future cooperation in embedded and ubiquitous computing. With this objective in mind, we selected six workshops out of ten proposals submitted to us for consideration:

- NCUS 2006: The Second International Symposium on Network-Centric Ubiquitous Systems
- SecUbiq 2006: The Second International Workshop on Security in Ubiquitous Computing Systems
- USN 2006: The Second International Workshop on RFID and Ubiquitous Sensor Networks
- TRUST 2006: The First International Workshop on Trustworthiness, Reliability and services in Ubiquitous and Sensor neTworks
- ESO 2006: The First International Workshop on Embedded Software Optimization
- MSA 2006: The First International Workshop on Multimedia Solution and the Assurance in the Ubiquitous Information Systems

Response to the call for papers was overwhelming. Six workshops received 375 submissions in total and accepted 102, representing an overall acceptance rate of 27%. All papers published in the workshops proceedings were selected by the Program Committee on the basis of referee reports. Each paper was reviewed by independent referees who judged the papers for originality, quality, presentation, and consistency with the themes of the workshops.

We would like to thank the EUC 2006 General Co-chair Cheng-Zhong Xu and the Program Chair Edwin Sha for their guidance and vision, the Steering Committee Co-chairs, Minyi Guo and Laurence T. Yang, for their support and encouragement, chairs of individual workshops for their tireless efforts, and our Korean colleagues for local arrangements. Special thanks are due to Haibo Yu and Bin Xiao for their help with some publication issues.

We gratefully acknowledge sponsorship from the International Federation for Information Processing (IFIP) and the cooperation of the IEEE Computer Society and *Lecture Notes in Computer Science* of Springer.

Finally, we hope you will enjoy the proceedings.

August 2006

Xiaobo Zhou and Oleg Sokolsky
EUC 2006 Workshops Chairs

The Second International Symposium on Network-Centric Ubiquitous Systems (NCUS 2006)

Historically, ubiquitous systems have been highly engineered for a particular task, with no spontaneous interactions among devices. Recent advances in wireless communication and sensor and actuator technologies have given rise to a new genre of ubiquitous systems. This new genre is characterized as self-organizing, critically resource constrained, and network centric. The fundamental change is communication: numerous small devices operating collectively, rather than as standalone devices, form a dynamic ambient network that connects each device to more powerful networks and processing resources.

NCUS 2006 was the successor of NCUS 2005 held in Nagasaki, Japan and offered a premier international forum for researchers and practitioners from both industry and academia to discuss hot topics and emerging areas, to share recent progress and latest results, and to promote cutting-edge research and future cooperation in ubiquitous systems and ubiquitous networking.

The exciting program was the result of the hard and excellent work of many others. We would like to express our sincere appreciation to all authors for their valuable contributions and to all TPC members and external reviewers for their cooperation in completing the program under a very tight schedule.

Lu Yan et al.
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The Second International Workshop on Security in Ubiquitous Computing Systems (SecUbiq 2006)

Ubiquitous computing technology provides an environment where users expect to access resources and services anytime and anywhere. The serious security risks and problems arise because resources can now be accessed by almost anyone with a mobile device in such an open model. The security threats exploited the weakness of protocols as well as operating systems, and also extended to attack ubiquitous applications. The security issues, such as authentication, access control, trust management, privacy and anonymity, etc., should be fully addressed.

This workshop provides a forum for academic and industry professionals to discuss recent progress in the area of ubiquitous computing system security, and includes studies on analysis, models and systems, new directions, and novel applications of established mechanisms approaching the risks and concerns associated with the utilization and acceptance of ubiquitous computing devices and systems.

This year we were very proud to receive 48 high-quality submissions. We conducted a rigorous blind peer review process for each submission, with the great support of all Program Committee members as well as a group of external reviewers. Based on the reviews, we selected 13 papers to be included in this program, representing an acceptance rate of 27%. We congratulate the authors of accepted papers, and regret many quality submissions could not be included, due to the time limit of this program.

Taking this opportunity, we would like to thank all the authors for their contributions to the program. We would also like to thank the PC members and external reviewers for their efforts in reviewing the submissions.

Yi Mu, Willy Susilo, and Bin Xiao
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The Second International Workshop on RFID and Ubiquitous Sensor Networks (USN 2006)

Welcome to the proceedings of the second annual International Workshop on RFID and Ubiquitous Sensor Networks (USN 2006). In the emerging era of a ubiquitous society, RFID and ubiquitous sensor networks will be essential technologies still with many challenging issues to be solved. Small enough to guarantee pervasiveness in the ubiquitous world, ubiquitous sensor networks provide valuable information to be exploited for a great variety of sensor applications. While there has been intensive research during the last few years, the consideration of anywhere and anytime presence still presents new challenges, keeping the topic of sensor networks in the center of ubiquitous systems investigation. At the same time, radio frequency identification (RFID) shows a great potential in market penetration to address today's object identification systems, and its technologies already entail a success for the industry with some field applications across the globe. However, numerous questions about its implementation, capability, performance, reliability, economy and integration with other technologies still remain to be answered.

The purpose of USN 2006 was to establish a discussion forum on all the challenges raised from the evolution of the ubiquitous sensor networks and RFID technologies. As a unique opportunity to obtain insight into the leading technologies of the next pervasive era, USN 2006 tried to provide the place for discussing and exchanging ideas from both academia and industry worldwide. This year we received 46 submissions for the technical program, not only from Asia, but also from Europe and North America and finally accepted 12 papers of very high quality.

We owe a great deal of thanks to the members of the Program Committee and the reviewers. The success of this year's USN would not be possible without their hard work. We are also grateful to all the members of the Steering Committee, Jongsuk Chae, Sang-gug Lee, Hao Min, and Hyun Yoe for their advice and support. Finally, our many thanks to Tomás Sánchez López of the Information and Communications University for his great help in preparing the workshop.

USN 2006 was sponsored by the u-agriculture research center (ITRC program of the Ministry of Information and Communication, Korea) and Auto-ID Labs, Korea.

Daeyoung Kim
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The First International Workshop on Trustworthiness, Reliability and Services in Ubiquitous and Sensor neTworks (TRUST 2006)

Welcome to the proceedings of the First International Workshop on Trustworthiness, Reliability and services in Ubiquitous and Sensor networks (TRUST). It was our pleasure to work with the Program Committee and all the other volunteers who helped create this workshop. This workshop was organized with the goal of providing a forum for the exciting research in the increasingly important area of ubiquitous and sensor networks.

We wish to thank the authors of the 83 papers that were submitted for publication and presentation at the workshop. The workshop program contains 22 regular papers and 2 invited papers, which represents an acceptance rate of 27%. The overall quality of submissions was high. We conducted a thorough review of all the submissions, with each paper receiving three reviews on average. Due to the large number of submissions, many good papers could not be included in the workshop program. Our special thanks go to the Program Committee and external reviewers listed below, who had the difficult task of reviewing the large number of papers in a relatively short time.

We hope that you will enjoy the workshop program.

David Chadwick and Eun-Sun Jung
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The First International Workshop on Embedded Software Optimization (ESO 2006)

Embedded systems are driving an information revolution with their pervasion in our everyday lives. The increasingly ubiquitous embedded systems pose a host of technical challenges different from those faced by general-purpose computers because they are more constrained in terms of timing, power, area, memory and other resources. Embedded software optimization becomes a major concern for embedded system design.

ESO 2006 aimed to provide a forum for scientists, engineers, and researchers to discuss and exchange their new ideas, novel results, work in progress and experience on all aspects of embedded software optimization. It covered a wide range of theoretical and experimental topics in the area of embedded system optimization including software optimization techniques for power, timing, memory minimization, code size optimization techniques, software design and optimization for multi-core, parallel and heterogeneous embedded systems, software management for memory systems, real-time software design and optimization, trustworthy computing in embedded software, secure embedded software design, application-specific embedded software design and optimization, code generation and optimization for embedded processors, compilation for reconfigurable architectures, design space exploration and minimization, embedded Java optimization, profiling and analysis techniques for embedded software, verification and testing techniques for embedded software, power/energy estimation tools for embedded software, system-level power/energy management, and case studies.

This year we were very proud to receive a huge amount of high-quality submissions. We conducted a rigorous peer review process for each submission, with the great support of all Program Committee members as well as a group of external reviewers. Based on the reviews, we selected 17 papers to be included in this program. We congratulate the authors of accepted papers, and regret many quality submissions could not be included, due to the time and space limit.

We would like to thank all the authors for their contributions to the program. We would also like to thank the PC members and external reviewers for their efforts in reviewing the submissions. Finally, we would like to thank Xiaobo Zhou, the EUC Workshops Co-chair, for the guidance in the organization of this workshop.

Zili Shao, Edwin H.-M. Sha, Yu Hen Hu, and Shuvra S. Bhattacharyya
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