EDITORIAL PREFACE

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The papers in this second issue of The International Journal of Information Technology and Web Engineering address three important dimensions of design in the deployment of modern Web-engineered knowledge intensive systems: users, user Web communities, and associated risk and security measures. For users, knowledge in the form of large sets of data and documents must be both accurately and logically organized so as to represent valid knowledge in terms of security, integrity, and consistency. Improvements in classification and clustering of such data and document sets are needed. For user communities, on the other hand, virtual groups of users need to be supported by special collective and harmonized knowledge. Rectifying these research efforts, however, requires the development of improved Web system architectures that support the higher quality of both individual’s and user community’s Web virtual knowledge intensive needs. Communities with their own vested interests are becoming much more knowledge intensive, and requiring greater degrees of information security assurance. Operating in a global competitive world, today’s organizations treat data/information/knowledge as the most critical asset. These organizations would require the deployment of a far better risk management and security measures against compromising such asset. Therefore, the last dimension of concern to both individual users and user communities is security (see, for example, Piromsopa et al., 2005). The papers in this issue point to both growing improvements and growing concerns in these three dimensions. But these concerns will be dwarfed by future increases in complexity, as such knowledge intensive systems become more ubiquitous, creating a new frontier in Web engineering research with additional challenges and opportunities.

Ubiquitous computing is articulated as a world of non-intrusive and omnipresent information technology. Ubiquitous computing envisages a world where IT artifacts are seamlessly integrated into the physical environment, making themselves an integral, invisible part of people’s lives (see for example, Weiser, 1993, and http://sandbox.xerox.com/hypertext/weiser/UbiHome.html). The vision of ubiquitous computing is to push computational services out of conventional desktop interfaces into environments characterized by transparent
forms of interactivity. The research community has embraced this vision by producing tangible results in such areas as:

- **Engineering**, providing innovative solutions in terms of middleware, representation and management of context, and intelligent fusion of data sensors.
- **Interaction design**, extending traditional human-computer interaction (HCI) methods and developing new user-interface technologies.
- **New applications design**, implementing advanced services in several application domains, such as office environments, the home, public areas, etc.

Still, significant research effort is required to completely fulfill the ubiquitous computing vision. For example, recent technology developments, such as wireless networks, storage and memory capabilities, microelectromechanical systems, and interaction design technologies are not capable of supporting truly ubiquitous systems.

Even though ubiquitous computing may not have arrived yet, ubiquitous Web computers certainly have. The growing complexity of purpose-built Web-based systems using large data and document sets is making it difficult to conceal the Web computers within. Current virtual learning group communities using Grid configurations will also become more complex, and the data and document sets used will require much more accurate classification and organization so that appropriate security measures can be set. This all means that the four key topics in this issue are in fact interrelated.

Virtual learning group communities, such as those using a grid configuration, require large numbers of Web pages to be organized by better classifiers. The Web software applications using these large Web data and document sets require better Web-based security. But holes penetrable due to incorrectly classified data and document sets need better document classification and distillation of misclassified documents. And as Web-based virtual learning group communities become even more ubiquitous, complexity will increase and both proper classification and security measures will become a new set of Web-based quality concerns, demanding much better Web-based computer architectures than are currently available.

The first article by Tappenden et al. discusses the security of Web-based applications. A four-point strategy that is part of an agile development framework permits first exploring the vulnerabilities that Web-based applications face, and second, suggesting the appropriate protective measures. In this strategy, the first step represents the security requirements as test-cases. The second step consists of deploying a highly testable architecture so different types of security tests are conducted. The third step executes the testable architecture using an automatable, open source testing framework. Finally the fourth step culminates the practice by re-factoring the insecure code and developing secure code in an iterative and evolutionary fashion.

The next article by Gouardères and Conté presents an e-portfolio for promoting virtual learning group communities over a Grid configuration. This e-portfolio project is part of the ELGi FP6 project. Currently several challenges face the widespread adoption and expansion of current learning services. For instance, those accepting the challenge need to embrace the strategy of offering e-learning systems anywhere and everywhere, so different types of users can be accommodated. In addition, those accepting the challenge need to integrate modern pedagogical approaches of learning. To cope with all these challenges, the collabora-
tion of different distributed, autonomous, goal-oriented entities is deemed appropriate. This article shows how some technologies contribute toward the development of the next generation of e-learning systems.

The main objective of the third paper by Ali and Farrag is to enhance the performance of the scheduling mechanism of the mobile computing environment by distributing some of the responsibilities of the access point among the available attached mobile devices. To accomplish this objective, the paper investigates a scheduling mechanism framework that comprises an algorithm providing the mobile device with the authority to evaluate itself as a resource. The proposed mechanism is based on the “self ranking algorithm” (SRA), which provides a lifetime opportunity to reach a proper solution. This mechanism depends on an event-based programming approach to start its execution in a pervasive computing environment. Using such mechanism will simplify the scheduling process by grouping the mobile devices according to their self-ranking value, and assign tasks to these groups. Moreover, it will maximize the benefit of the mobile devices incorporated with the already existing Grid systems by using their computational power as a subordinate value to the overall power of the system. The authors evaluated the performance of the investigated algorithm extensively, demonstrating how it overcomes the connection stability problem of the mobile devices. Finally, experimental results emphasized that the proposed SRA has a great impact in reducing the total error and link utilization compared with the traditional mechanism.

Finally, the last article by Chen et al. constructs a Prediction-Learning-Distillation (PLD) framework for interactive document classification and distillation of misclassified documents. Whenever a user points out misclassified documents, the PLD learns from the misclassification mistakes and identifies the same mistakes from all other classified documents. The PLD approach then enforces this learning for future classifications. If the classifier fails to accept relevant documents or reject irrelevant documents on certain categories, then the PLD approach will assign those documents as new positive/negative training instances. The classifier can then strengthen its weakness by learning from these new training instances. Experimental results demonstrate that the PLD approach can learn from and distill user-identified misclassified documents.

In conclusion, we hope that articles in this issue will significantly contribute to the current research drive in the area of Web intelligence and Web security that integrates artificial intelligence and Web engineering systems, such as ubiquitous computing, software intelligent agents, data mining, Grid computing, and Semantic Web (see, for example, www.comp.hkbu.edu.hk/awi06/wi). Specifically, extended research may develop adaptive intelligent interfaces, be it on the desktop or on mobile devices, that allow users to access and share relevant Web pages based on personal preferences — whether for individuals, virtual Web communities, or virtual organizations.

References
Dr. David Rine is a professor and founding chair of computer science with the School of Information Technology and Engineering, George Mason University. He is also part of the group of co-founders of information technology. He received a PhD from The University of Iowa in 1970. He has developed and directed the teaching of several Web-based distance education courses and has directed a variety of MS and PhD students in Web engineering. During his 40-year career in computing, he has published nearly 300 papers in the areas of computer science, engineering, information technology and information systems, computer applications, computational science, science and engineering education, systems engineering and software engineering. Dr. Rine is internationally known for his work in science and engineering education, having accumulated many years of experience in directing curriculum, large scale software, computational science and systems projects. He has received numerous awards from computer science societies and associations, including the IEEE Centennial Award, the IEEE Computer Society Pioneer Award, the IEEE Computer Society Meritorious Service Award, the IEEE Computer Society Special Award, and the IEEE Computer Society 50th Anniversary Golden Core Award. He has also been a multiple-time recipient of the IEEE Computer Society Honor Roll (and Distinguished Service) Award and the IEEE Computer Society Certificate of Appreciation Award. The Army, Air Force, Navy, NATO, National Science Foundation, IEEE, NASA, IBM, USDA and many other industrial organizations have funded Dr. Rine’s scientific research and development work.

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