

Preface

Web-based Support Systems (WSS) are an emerging multidisciplinary research area in which one studies the support of human activities with the Web as the common platform, medium and interface. The Internet affects every aspect of our modern life. Moving support systems to online is an increasing trend in many research domains. One of the goals of WSS research is to extend the human physical limitation of information processing in the information age.

Research on WSS is motivated by the challenges and opportunities arising from the Internet. The availability, accessibility and flexibility of information as well as the tools to access this information lead to a vast amount of opportunities. However, there are also many challenges we face. For instance, we have to deal with more complex tasks, as there are increasing demands for quality and productivity. WSS research is a natural evolution of the studies on various computerized support systems such as Decision Support Systems (DSS), Computer Aided Design (CAD), and Computer Aided Software Engineering (CASE). The recent advancement of computer and Web technologies make the implementation of more feasible WSS. Nowadays, it is rare to see a system without some type of Web interaction.

The research of WSS is classified into four groups.

- WSS for specific domains.
 - WSS for specific domains:
 - Web-based DSS
 - Enterprise-wide DSS
 - Web-based group DSS
 - Web-based executive support systems
 - Web-based business support systems
 - Web-based negotiation support systems
 - Web-based medical support systems
 - Web-based research support systems
 - Web-based information retrieval support systems
 - Web-based education support systems
 - Web-based learning support systems
 - Web-based teaching support systems

- Web-based applications and WSS Techniques
 - Web-based knowledge management systems
 - Web-based groupware systems
 - Web-based financial and economic systems
 - Web-based multimedia systems
 - Web information fusion
 - Internet banking systems
 - XML and data management on the Web
 - Web information management
 - Web information retrieval
 - Web data mining and farming
 - Web search engines
 - Information fusion
 - Web services
 - Grid computing
- Design and development of WSS
 - Design and development of WSS
 - Web-based systems development
 - CASE tools and software for developing Web-based applications
 - Systems analysis and design methods for Web-based applications
 - User-interface design issues for Web-based applications
 - Visualizations of Web-based systems
 - Security issues related to Web-based applications
 - Web engineering

This book can be viewed as an extended culmination to three international workshops on WSS. The First International Workshop On WSS was held on October 13, 2003 in Halifax, Canada. The Second International WSS was held on September 20, 2004 in Beijing, China. The proceedings were published by Saint Mary's University in Canada. There are 26 and 24 papers in each set of the proceedings respectively. The Third International Workshop On WSS was held on December 18, 2006 in Hong Kong, China. There are 14 papers presented in a volume of IEEE published proceedings.

In order to keep track of the research on WSS, a Web site devoted to the research of WSS has been set up at <http://www.cs.uregina.ca/~wss/>. There are articles on the Bibliography page of the Web site. If you want your publications to be listed on the page or identify yourself as a researcher in the area of WSS, please send information to wss@cs.uregina.ca. Proceedings for the first two workshops are also online at <http://www.cs.uregina.ca/~wss/wss03/wss03.pdf> and <http://www.cs.uregina.ca/~wss/wss04/wss04.pdf>.

This book is intended to present research related to fundamental issues of WSS, frameworks for WSS, and current research on WSS. A key issue of WSS research is to identify both domain independent and dependent activities before selecting

suitable computer and Web technologies to support them. We will also examine how applications and adaptations of existing methodologies on the Web platform benefit our decision-making and other various activities.

The selection of this book was started with call-for-chapter proposals. We received 33 chapter proposals. Authors of 26 proposals were chosen to submit full chapters. After receiving the full chapters, each chapter was reviewed by three reviewers. Including the authors, some domain experts were asked to review chapters. After a couple of rounds of revisions, we present 19 chapters in this book.

There are three parts of this book: WSS for specific domains, Web-based applications and WSS techniques, and Design and development of WSS.

The first part consists of seven chapters. Chapter 1 entitled “Context-Aware Adaptation in Web-based Groupware Systems” presents research on applying context-based filtering technology for a Web-based group decision support system and its mobile users. Chapter 2 entitled “Framework for Supporting Web-based Collaborative Applications” proposes a framework to support automated service management, in particular for a Web-based medical support system. Chapter 3 entitled “Helplets: A Common Sense Based Collaborative Help Collection and Retrieval Architecture for Web-Enabled Systems” presents an online intelligent query support system for replacing a traditional help desk. Chapter 4 entitled “Web-based Virtual Research Environments” presents a Web-based research support system for research collaborations. Chapter 5 entitled “Web-based Learning Support System” proposes an adaptive learning support environment that effectively accommodates a wide variety of students with different skills, background, and cognitive learning styles. Chapter 6 entitled “A Cybernetic Design Methodology for ‘Intelligent’ On-line Learning Support” describes a Web-based learning support system that aims to evolve Web-based teaching environments into intelligent learning systems modelled on cybernetic, systems theory principles. Chapter 7 entitled “A Web-based Learning Support System for Inquiry-based Learning” employs a treasure hunt model for teaching and learning support.

Part two includes six chapters. Chapter 8 entitled “Combinatorial fusion analysis for meta search information retrieval” describes a combinatorial fusion methodology including a theoretical framework and illustrations of various applications of the framework using examples from the information retrieval domain. Chapter 9 entitled “Automating Information Discovery within the Invisible Web” discusses issues related to the deep Web information retrieval. Chapter 10 entitled “Supporting Web Search with Visualization” introduces information visualization as a means for supporting users for their search and retrieval tasks on the Web. Chapter 11 entitled “XML Based Markup Languages for Specific Domains” describes the need for domain-specific Markup Languages within the context of XML, provides a detailed outline of the steps involved in markup language development, and gives the desired properties of Markup Languages for WSS in incorporating human factors from a domain based angle. Chapter 12 entitled “Evaluation, Analysis and Adaptation of Web Prefetching Techniques in Current Web” presents a study on Web prefetching to reduce the user-perceived latency in three steps: evaluating Web prefetching

techniques from the user's point of view, analyzing how prefetching algorithms can be improved, and exploring the performance limits of Web prefetching to know the potential benefits of this technique depending on the architecture in which it is implemented. Chapter 13 entitled "Knowledge Management System Based on Web 2.0 Technologies" demonstrates that Web 2.0 technologies could be used to design user interaction in a knowledge management system to improve online interaction with WSS in other application domains.

Part three consists six chapters. Chapter 14 entitled "A Web-based System for Managing Software Architectural Knowledge" presents and discusses the design, implementation, and deployment details of a Web-based architectural knowledge management system, called PAKME, to support the software architecture process. Chapter 15 entitled "CoP Sensing Framework on Web-based Environment" presents a Web-based social learning support system based on the concept of Community of Practice and theories of social constructivism. Chapter 16 entitled "Designing a Successful Bidding Strategy using Fuzzy Sets and Agent Attitudes" presents the implementation of an online bidding system armed with intelligent agents using fuzzy strategy. Chapter 17 entitled "Design Scenarios for Web-Based Management of On-line Information" discusses a scenario-based design process, and results thereof, used to examine how online communication management might be supported by a Web-based system. Chapter 18 entitled "Data Mining for Web-based Support Systems: A Case Study in e-Custom Systems" provides an example of a Web-based support system used to stream-line trade procedures, prevent potential security threats and reduce tax-related fraud in cross-border trade. Chapter 19 entitled "Service Oriented Architecture (SOA) as a technical framework for Web-based Support Systems (WSS)" discusses issues on applying service oriented technique to WSS.

Last but not least, I would like to thank all authors who contributed a chapter in this book as well as the reviewers who helped to improve the quality of chapters. I would like to thank Series Editors Drs. Lakhmi Jain and Xindong Wu and Springer editors Catherine Brett and Rebecca Mowat, for their assistance and help editing this book. Dong Won Kim, a graduate student of the University of Regina under my supervision, helped final compiling with L^AT_EX. He also spent a lot of his time on converting some chapters prepared in Microsoft Word. I thank him for his time and patience. Without everyone's effort, it is impossible to see the completion of this book.

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