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## Preface

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**Biographical notes:** Richard Chbeir received his PhD in Computer Science from the University of INSA – France. Currently he is an Associate Professor in the Computer Science Department of the Bourgogne University, Dijon-France. His research interests are in the areas of distributed multimedia database management, XML similarity, spatio-temporal applications, multimedia access control models. He has published in international journals (*IEEE Transactions on SMC, JoDS, JSA* etc.), conferences (*ER, WISE, SOFSEM, EDBT, ACM SAC, FLAIRS*, etc.), and has served on the programme committees of several conferences (*ICDIM, SITIS, ACM SAC, ISSPIT, EuroPar, SBBD*, etc.). Also he is the Chair of the French Chapter ACM SIGAPP.

Youakim Badr received his Doctorate in Information Systems from the French National Institute for Applied Sciences in Lyon (INSA of Lyon). In 2004, he joined the Faculty of the INSA of Lyon as an Assistant Professor of Computer Science. He has worked extensively in the field of coupling XML documents and Object-Relational Database. His current academic research interests include systems in both the service sector and ICT. In particular, he studies the ecosystem of services and the multidisciplinary modelling approach to design services through the integration of ICT, strategy and processes. He is involved in several international conferences as General Co-Chair of ICDIM'07, CSTST'08 and the Web Technology Track of SAC 2008, and International Programme Member of IAS'08, NOTERE'08, SITIS'07, JFO'07, WCNC'07 and ECWS'06.

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The management of digital data proves the cornerstone of a corporation's information technology. The evolution of data acquisition technologies continues to enhance the entire life-cycle of products and services from their conception, through design and manufacturing, to delivery. This undeniable shift has resulted in a truly explosive growth in the number, size and diversity of potentially useful digital information sources of various types and leads towards the advent of a digital society. However, products or

services in the broader sense of the word present significant hurdles in acquiring useful knowledge from available data through their life-cycles. Naturally, issues on how to capture, retrieve, classify, interpret, monitor and manage the massive available data and systems have become crucial in manufacturing, commerce, management and collaboration and indeed require various improvements and major modifications of the current tools to be provided to designers, salesmen and customers. Currently, there is notable number of research work on digital information management approaches to design and deploy advance techniques for products and services. The ability for current scholarship to follow, anticipate and dialogue with these important questions in the Information and Communication Technologies (ICT) community will prove an important foundation for the next generation of technological advances.

This special issue seeks to contribute new insights on these issues and challenges in order to better address the evolution of data acquisition technologies and computing advances. The articles included here stem from the second annual *IEEE International Conference on Digital Information Management (ICDIM)* held in Lyon-France in 2007. This edition of *ICDIM* successfully achieved its goal of bringing scholars from academia, research laboratories and industry to the proverbial table to discuss their work and share their experience both theoretically and practically. The forum served as a collaborative platform to address the emerging issues of the digital society and solutions in information science and technology. We believe that their insight contributes to a greater understanding of these important questions that are in the forefront of scholarship and intellectual inquiry in the ICT community.

Not only did the following articles receive accolade from conference participants, but also they were chosen at the end of a special procedure to be shared in this published format after a very tight review process in which eight extended articles out of 44 articles presented were selected for inclusion in this special issue after two rounds of reviews. The acceptance rate was thus 18.18% and the selected works reflect the high standards for excellence used by the many esteemed members of the editorial board who contributed to this special issue. Their contributions are greatly appreciated. This special issue is organised as follows.

The first article is entitled ‘An intelligent system for estimating full product lifecycle cost at the early design stage’, in which Haifeng Liu, Vivekanand Gopalkrishnan, Wee-Keong Ng, Bin Song and Xiang Li study how product Life-Cycle Cost (LCC) for manufacturing companies becomes as crucial as product quality and functionality in deciding the success of a product in the market. While LCC estimation has been seen as an aid to design decision making, the current cost estimating techniques suffer from drawbacks of low accuracy, restriction to specific life-cycle phases, and so on. The authors propose to build up an efficient and intelligent LCC estimation system that aims to overcome the drawbacks of existing systems. As a generic system, it allows users to alternatively apply the Activity-Based Costing (ABC) technique and state-of-the-art machine learning techniques to define and estimate various LCC elements depending upon the information available in a product life-cycle database. The system consists of five major components: Product Life-cycle Database (PLD), LCC template manager, ABC module, Machine Learning (ML) module and synthesiser. Through the proposed hybrid approach, the system considers all aspects of the product life-cycle, and can be used at the very early stages of design and provide information to the designers in a timely manner and in a form that can be understood and used.

The second article is entitled ‘An e-commerce fair exchange protocol that enforces the customer to be honest’ by Abdullah Alaraj and Malcolm Munro. Here, a new optimistic fair exchange protocol between a customer (C) and a merchant (M) is presented, that makes minimum use of a Trusted Third Party. The protocol is for exchanging a payment with a digital product in the B2C domain. A novel feature of the protocol is that once the parties have agreed to the exchange then they are forced to be honest. The protocol has the following features:

- 1 it comprises of only three messages sent between C and M in the exchange phase
- 2 it guarantees strong fairness for both C and M
- 3 it allows both the parties to be sure of the item that they will receive
- 4 it automatically resolves disputes online.

In ‘Use of a manufacturing ontology and function–behaviour–structure approach for the design of a reconfigurable machine tool’, Aamer Baqai, Ali Siadat, Jean-Yves Dantan and Patrick Martin focus on the problem of rapid changes and uncertainty in market which requires manufacturing system to become highly responsive. Reconfigurable manufacturing systems are the recent addition to the domain of manufacturing. This article focuses on the use of a manufacturing upper ontology called MAnufacturing’s Semantics ONtology (MASON) for the design of reconfigurable machine tool using function–behavior–structure approach. A concrete proposal MASON with its main classes and object properties is discussed. The design approach is introduced and its application for machine tool design is discussed. The design problem is modeled as a constraint satisfaction problem. An example to illustrate the integration of MASON along with the design process for a particular machining feature is presented.

The fourth article, ‘A product retrieval system robust to subjective queries’, authored by Kenji Sugiki and Shigeki Matsubara, proposes a method for retrieving products that match users’ search queries written in natural language. It uses a large amount of product reviews written by consumers, in order to match those queries with products. Since reviews include a lot of valuable information in which commerce service providers do not supply, by using these reviews the system can respond to a wide variety of users’ requests, especially to subjective requests. If a review includes a description that coincides with the condition described in a user’s query, the product to which the review refers is considered matching the query and is shown to the user. Using the proposed method, an accommodation retrieval system named ‘Yado-Tan’ has been implemented. The result of experiments using natural language queries confirmed the retrieval capability of using this method.

Authored by Renaud Vanlande and Christophe Nicolle, the fifth article addresses ‘CDMF: semantic facilities management’. In essence, facility management is the practice of coordinating the physical workplace with the people and work of the organisation. It integrates the principles of business administration, architecture and the behavioural and engineering sciences. Software dedicated to facility management is usually limited to spreadsheet software. With the development of the IFC (a new object-oriented standard to model buildings) and web-based networks, a new generation of methods and tools dedicated to facility management are required. To deal with these requirements, the authors present a framework based on Semantic Web technologies: RDF, OWL, SWRL

and Named Graph. This framework, called CDMF, allows facilities manager to organise all knowledge generating during building life-cycle in end-user contextual graphs.

The sixth article is dedicated to ‘Accessibility and scalability in collaborative e-commerce environments’. Michel Khoury, Xiaojun Shen and Shervin Shirmohammadi deal here with advancement that has recently occurred in e-commerce systems’ interfaces. Product specifications listings combined with pictures are no longer considered the benchmark for e-commerce interfaces. Albeit commercial websites have not ventured in these developments, academic research has tried, through this progression, to mimic the real-life shopping experience. Shopping in real-life is a social experience with other components attached to it: customers consult with experts and shop in groups benefiting from others’ opinions. These aspects, when lacking, can lead to reduction in sales. In this article, the authors build on a collaborative e-commerce system. The system adopts concepts from virtual environments, allowing customers to interact with three-dimensional models of the items of interest in the virtual shop, as well as share those items with other customers or ask for expert opinions, in real-time. Their system addresses accessibility, by using Macromedia Shockwave, a widely deployed player, and therefore avoids the need of unusual plug-ins, such as VRML viewers. The system also addresses scalability, by using a peer-to-peer communications architecture to support a number of geographically dispersed customers on the Internet simultaneously.

Authored by Christoph Schroth, the seventh article is entitled ‘Global industrialization of information-intensive services: a reference architecture for electronic business media’. In essence, the relentless march of improvements in the cost-performance ratio of information technology today facilitates the provision and consumption of electronic information intensive services across company boundaries. However, existing products and services exhibit both managerial and technological weaknesses. New concepts are therefore required to facilitate a comprehensive industrialisation of cross-organisational, electronic information intensive services. In this work, the author presents and discusses a modular, service-oriented reference architecture for electronic business media which allows for realising ‘Lean’ management and implementation of cross-organisational collaboration. Based on the *IEEE Recommended Practice for Architectural Description*, in combination with the St Gallen Media Reference Model, this reference architecture provides four main views: community (structural organisation), process (process-oriented organisation), services and infrastructure. By applying this reference architecture to the case of public administration in Switzerland, the author shows the potential to realise a ‘Lean’ organisation and implementation of cross-organisational electronic collaboration.

The last article in this special issue is authored Davy Monticolo, Samuel Gomes, Vincent Hilaire and Abder Koukam. It focuses on ‘An approach to support the knowledge management process inside professional activities’ and proposes an approach to model, identify, synthesise and reuse knowledge all along engineering design projects. As a matter of fact, these projects require that engineers, with different specialties, collaborate to carry out the same goal. Inside professional processes, they use their know-how and knowledge in order to achieve the laid down goals. The approach consists in using an organisational approach to identify the competences and knowledge of professional actors which allows the design and the description of agents’ know-how. Furthermore, the article describes the design of an agent model based on an organisational approach and the role of a domain ontology called OntoDesign to manage heterogeneous and distributed knowledge.

We hope this special issue motivates researchers to take the next step beyond building models to implementing, evaluating, comparing and extend proposed approaches. Many people worked long and hard to help this issue become a reality. We would first like to gratefully acknowledge and sincerely thank all the reviewers for their timely and insightful valuable comments and criticism of the manuscripts that greatly improved the quality of the final versions. Of course, thanks are due to the authors, who provided excellent articles and timely extended revisions. Finally, we are grateful to the editors of the *Journal of Product Lifecycle Management* for their trust in us, their efforts, patience and painstaking editorial work during the production of this special issue.

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