Editorial

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Biographical notes: Reda Alhajj is a Professor in the Department of Computer Science at the University of Calgary, Alberta, Canada. He has published over 300 papers in prestigious venues. He served on the programme committee of several international conferences. He is the founding Editor-in-Chief of the *Springer Journal of Social Networks Analysis and Mining*, founding Editor of *Springer Series LNSN* and Associate Editor of *IEEE SMC-C*. His primary work and research interests are in the areas of computational biology and bioinformatics, data mining, multi-agent systems and social networks. He currently leads a research group of 12 PhD and eight MSc candidates.

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Information reuse and integration (IRI) seeks to maximise the reuse of information by creating simple, rich, and reusable knowledge representations and consequently explores strategies for integrating this knowledge into legacy systems. IRI plays a pivotal role in the capture, representation, maintenance, integration, validation, and extrapolation of

information; and applies both information and knowledge for enhancing decision-making in various application domains. Information reuse considers optimising representation methodologies; information integration studies strategies for creatively applying models in novel domains; and reusable systems focus on ontological opportunities for deploying models and corresponding processes.

This special issue of *International Journal of Information and Decision Sciences (IJIDS)* on *information and knowledge reuse* aims at addressing the above issues, by selecting eight best papers presented at the *2009 IEEE International Conference on Information Reuse and Integration (IRI'09)*. All the papers have been substantially extended with at least 30% additional contents. They cover an excellent range of information and knowledge reuse topics, from feature selection, clustering, and information extraction from web and video, to their applications in biology and natural disaster prediction.

The first paper by Liang and Rubin applies randomisation theory to the problem of selecting software test cases for software systems and applications in order to overcome the high costs incurred in testing componentised systems of systems (SoS). The authors used a corner point semantics, which can approximate a proof of correctness – termed a pseudo-proof of correctness. Test cases for each component are designed to be mutually orthogonal, or randomised. They also show a metaheuristic algorithm based on the framework to be used with test design methodologies that are randomisation-friendly.

Matsuo proposes a unified modelling set of components used in all sorts of graph-based simulations. The set of components consists of qualitative conditions and values of nodes, transmission of effects, relationships of static rule, and several others. When a simulation model is developed and given the condition/assumption of nodes and arcs in actual use of simulator, the model is completed by referring from our defined set of components. Further, the author proposes a method and support to make a graph model based on tree-structured chart and a reuse method of sub-graph in the simulation graph model.

Realising that information integration is a key for further growth of efficiency in management decisions for the railway domain, Fischer, Roshchin, Langer and Pirker proposed techniques facilitate integration, analysis and interpretation of distributed observation data in the railway domain. In addition, the implementation of the presented approach is presented by a demonstration scenario, which integrates existing real-world data for symptom identification and incipient fault detection.

Bhattacharjee and Jamil propose a new method, OntoMatch, for schema matching that can avoid wasteful computation by a prudent and objective selection of the ordering of a subset of useful matchers and consequently improves the matching efficiency and accuracy.

The paper by Khojastehpour, Makki and Sun introduces delineated R-tree (DR-tree) indexing structure which has performance advantages over recent R-tree based indexing structures for a number of essential operations such as read, write, node-split, and tree adjustment. DR-tree is a balanced tree, and the nodes common property is based on the principle of recursive decomposition of space without any overlap.

A video semantic concept detection framework that uses ARM together with a novel correlation-based interestingness measure is proposed by Lin, Shyu and Chen. The interestingness measure is obtained from applying multiple correspondence analysis (MCA) to capture the correlation between the features and concept classes and to bridge the semantic gap between low-level features and high-level concepts.

The quality of software products can be estimated and improved by building software quality classification models. Motivated by this, Gao, Khoshgoftaar and Wang investigated four filter-based feature selection techniques, automatic hybrid search (AHS), rough sets (RS), Kolmogorov-Smirnov (KS) and probabilistic search (PS) and tested them by experimenting them on a very large telecommunications software system.

The last paper by Tan, Xu, Meyer and Erwin proposes an open and extensible framework for analysing supply chains with heterogeneous elements and network structures. To improve extensibility, the framework has incorporated the following features:

1   it adopts an agent-based approach to handle interactions among elements of a supply chain

2   to improve the design reusability and ease the difficulty in defining a new type of element, the authors propose an object-oriented type system that supports behaviour inheritance

3   the framework includes a meta-model for elements of a supply chain

4   the framework includes a discrete event simulation algorithm.

Finally, we would like to thank all the authors for their efforts in enhancing and extending their papers for this special issue. The Editor-in-Chief, Professor John Wang's guidance and support are particularly appreciated.