

## Introduction

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# Special issue: Various forms of intelligence

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Technologies such as cloud, MapReduce and high-speed mobile connectivity have enabled data-driven decision making to deliver new insights. For example, ‘big data’ are providing insights into effective medical treatments, health care cost management, and marketing products. As data become constantly available and ubiquitous, in our opinion the next wave of innovations ought to be related to finding solutions to the problem – known and yet-to-be-discovered ones – created by these technologies and their dependent services. The future of computing related to decision making should be about helping all stakeholders *make sense* out of complex situations and data, and to utilize the capabilities on offer. In short, we need *intelligent systems*. All data have to be legible and the resulting information *intelligible*. One needs something more than the ordinary, something going beyond mere technology and availability – something that is smart, often simple, hopefully genuine and always a bit ahead of the customary.

One of the main characteristics of intelligence is the ability to manage *context*. The essence of intelligent behaviour is the awareness of context, the ability to *re-align changes in context* and the readiness to accommodate that. That is the reason why the 2012 International Federation for Information Processing (IFIP) 8.3 conference (DSS 2012) focused on the topic “*Fusing DSS into the Fabric of the Context*”. The bi-annual conferences of the IFIP 8.3 DSS (decision support systems) working group are focused on decision support and its system, and this area has grown in reach over the close to three decades since the first conference was initiated

and has had a huge influence on the traditional understanding of DSS.

Consider, for example, the spread of social networking and the meaning of its “crowd” power: is virtual crowd behaviour going to help individuals make wiser decisions or will it lead us as a society to decision making determined by the lowest common denominator? Or look at the challenges of Big Data: is it going to end in smarter data or will just result in an ever-increasing demand for larger storage spaces? Is business intelligence – often fuelled by cloud solutions – going to help organizational decision makers or is it going to lead us to poor decisions on risk-taking? BI, dashboards, Big Data, 2.0 and other ideas have penetrated the realm of Decision Support, essentially challenging the definition of DSS. Indeed, DSS is getting new momentum from these solutions and technologies as was demonstrated by the range of papers presented at DSS 2012.

This change in the ICT and the DSS landscape is the reason that this Special Issue of the *Intelligent Decision Technologies* journal is devoted to *various forms of intelligence*. The need for more intelligent solutions has inspired this collection. The ideas presented in the papers selected for this special issue address the question of intelligence in decision making in several ways: each is taking its own approach; each adds something extra to go beyond the ordinary; each seeks something more than expected in their usual context; each displays a spark of genuine intelligence. So, to re-appropriate the title of the conference, this special issue attempts to demonstrate how to fuse context into DSS solutions in order to take a step (or two) towards more

intelligent decision support. What are the dimensions of intelligence then? Each of these papers provide an answer, each partial, but together they may contribute to a better picture overall.

The paper by Shaofeng Liu, Zhihong Wang, and Li Liu (“*An integrated sustainability analysis approach to support strategic decision making in green supply chain management*”) concerns the area of green supply chain management in the context of sustainability. The problem addressed is the isolated nature of the various solutions that have been developed over the years each tackling specific issues. Considering the whole life-cycle of assets and products – from raw material to assembly to use and safe disposal or even reuse – makes the work of decision makers all the more complex. The research offers an integrated approach based on Multi-Criteria Decision Making helping decision makers in supply chain management to have a better chance of more intelligent decision making through an overall view.

Collaborative decision making has been at the core of DSS since the beginning. With the dawn of the Internet the issue of distributed collaboration had been attacked almost immediately. Yet questions and challenges still persist and the report by Abdelkader Adla and Bakhta Nachet (“*An Agent-based Distributed Collaborative Decision Support System*”) proposes a special approach to this special problem. They advance a method relying on agent-based technology to enable the flow of information and interoperation among participants: Intelligent agents are used to enhance the performance of members of distributed work group.

Susan Farley, Alexander Brodsky, and Lance Sherry add new insights and propose a different approach to the age-old problem of how to reduce delays associated with rescheduled flights. Instead of looking at local solutions, their contribution (“*Flight Rescheduling Decisions for Minimizing Passenger Trip Delays*”) investigates avenues of a more holistic optimization. They look at the overall costs of several options that may be deployed when dealing with the impact of a delayed or cancelled flight: instead of just looking at managing affected passengers individually, the proposal looks at all flights and passengers in a wider scope assuming the ability of some bold decisions that would be unexpected otherwise.

The concept of ontology has grown in popularity to improve the intelligence of information systems. Indeed, consistency in the use of terminology and the ability of applications and services to interpret them is crucial for the future of the IT field. The contribution by Nora Taleb, Bornia Tighiouart, and Sara Laiche (“*A Method Based on Owl Schema for Detecting Changes between Ontology’s Versions*”) reports on research related to the often mundane task of managing ontologies of a given field. As the understanding of a particular problem area grows, so does the need to detect and reflect on those changes during the development of related systems. The mathematical model proposed offers a solution to that challenge.

Managing the aftermath of disasters is not a task that may be taken lightly and the area, fortunately, has received increasing attention over the first decade of the 21<sup>st</sup> century. Stanislaw Stanek and Stanislaw Drosio add a new dimension to how to address related questions by a method described in their paper (“*Intelligent Computer Support for Crisis Management*”). Providing real life examples of its use they advance an intelligent platform based on a hybrid architecture of data warehousing and both back-end (emergency operations) and front-end (citizens) user service management. The resulting system is capable of taking a holistic view of a wide range of emergency response operations and information management. Although it has been recognised that it is necessary to go beyond mere response coordination and there are solutions for prevention and pre-crisis situations, offering such an overarching system was made possible by the abilities of cloud computing.

As the readers may see from this collection, decision support is always about at least two areas: indeed, it is at the meeting point of problems of a specific field or domain and the techniques and tools available – or to be designed and developed. And if those new techniques each add a little bit of more intelligent behaviour to the systems we use daily, we move toward making information more intelligible and putting problems into context. So, what else could we offer to our readers? May be an advice that might sound unusual in the context of an intelligent scientific outlet: Enjoy!

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