

This article was downloaded by: [University of Newcastle (Australia)]

On: 06 March 2013, At: 15:57

Publisher: Taylor & Francis

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## Cybernetics and Systems: An International Journal

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/ucbs20>

### CURRENT RESEARCH ADVANCES AND IMPLEMENTATIONS IN SMART KNOWLEDGE-BASED SYSTEMS: PART II

Edward Szczerbicki <sup>a</sup>, Manuel Graña <sup>b</sup>, Jorge Posada <sup>c</sup> & Carlos Toro <sup>c</sup>

<sup>a</sup> The University of Newcastle, Newcastle, Australia

<sup>b</sup> The University of The Basque Country UPV/EHU, San Sebastian, Spain

<sup>c</sup> Vicomtech-IK4 Research Centre, San Sebastian, Spain

Version of record first published: 05 Mar 2013.

To cite this article: Edward Szczerbicki, Manuel Graña, Jorge Posada & Carlos Toro (2013): CURRENT RESEARCH ADVANCES AND IMPLEMENTATIONS IN SMART KNOWLEDGE-BASED SYSTEMS: PART II, Cybernetics and Systems: An International Journal, 44:2-3, 184-186

To link to this article: <http://dx.doi.org/10.1080/01969722.2013.762254>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.tandfonline.com/page/terms-and-conditions>

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

## **Current Research Advances and Implementations in Smart Knowledge-Based Systems: Part II**

This Special Edition follows Volume I (*Current Research Advances and Implementations in Smart Knowledge-Based Systems: Part I*) and contains carefully selected and reviewed papers that expand significantly on topics covered by some very recent conferences on knowledge engineering and smart knowledge-based systems design and development. The selection enhances efforts toward intelligent systemic approaches researched in this exciting area of new, innovative, and very promising developments that can be of great interest to cybernetics and systems science communities.

### SELECTED RESEARCH CONTRIBUTIONS

The issue of ontology processing is addressed in the paper that starts the selection for this volume. The authors of the paper titled “Impact of Reflexive Ontologies in Semantic Clinical Decision Support Systems” introduce reflexive ontologies (ROs) as a novel approach intended to reduce time consumption problems while providing as a result a fast reaction from ontology-based applications. The presented real-life application is a case study for a knowledge-based clinical decision support system for the diagnosis of Alzheimer’s disease. In order to measure the impact of RO in the overall performance of the implemented system, the authors presented a benchmark that compares two systems, one of them using RO and the other using a conventional ontology. The comparative evaluation shows that in the proposed diagnosis system the use of RO significantly improves efficiency, reducing the execution time by up to 70%.

Data-driven approaches have been found to be particularly useful in designing adaptive decision support systems. The next paper in the issue, titled “Adaptive Decision Support System for Automatic Physical Effort Plan

---

The Guest Editors gratefully acknowledge the assistance and support provided by Professor Robert Trappl, Editor-in-Chief of *Cybernetics and Systems: An International Journal*; Karin Vorsther from the CBS Editorial Office; and a number of anonymous referees who reviewed the manuscripts of the papers included in this Guest Issue.

Generation—Data-Driven Approach,” demonstrates the usefulness of data-driven models in custom application designed to enhance sport training management. The authors developed and presented a system that applies expert knowledge together with measurement data (heart rate, acceleration, etc.) in order to generate an optimal training plan. The proposed smart decision support system may be utilized in any domain where large volumes of data are generated, processed, and stored.

The following paper, titled “A Method for Temporal Knowledge Integration Using Indeterminate Model of Time,” addresses the problem of knowledge inconsistency related to processing data from highly distributed global sources in real time. The authors investigate a new approach to processing inconsistency of knowledge and its integration process using the temporal model of indeterminate valid time and probability. This model is used to describe events that take place in the future with some degree of certainty. The model also considers conflict as a situation in which for the same event different agents give different time intervals and probabilities about the occurrence of that event. The authors finished their paper with directions for future expansion of the proposed model.

The following paper, titled “Ontology-Driven Rule-Based Model for an Extension of Information Technology Infrastructure Library Processes,” introduces a new approach to assure the consistency of models used to assess organizational stages of technological progress with standards provided by an information technology infrastructure library (ITIL). This new approach is ontology driven and uses rules to support inference processes. The authors provide illustrative implementation of their ideas through a comprehensive case study in the banking sector.

Modern mortgage Internet-based markets are dynamic, difficult to predict, and fuzzy. They need modeling approaches and models to enhance the process of understanding their functioning and possible prediction and thus control of directions they follow. Development of such a model is discussed in the next paper, titled “Toward a Fuzzy Model of Polish Internet Mortgage Market.” The paper introduces the proposed structure of the model and its submodels, discusses real-life implementation issues, and provides a verification process and its analysis. The authors finish their paper with suggestions for further research on the proposed approach and the introduced model.

This Special Issue is concluded with the paper titled “Implementing Fuzzy Logic to Generate User Profile in Decisional DNA Television: The Concept and Initial Case Study.” The paper is a brief communication of a novel approach that generates a TV user’s profile utilizing principles of fuzzy logic. A user profile refers to the user’s basic information, such as gender, age, and profession. The generated profile has the potential of significantly improving Digital TV (DTV) service, making it smarter and more user friendly and

enabling TV broadcasters to suggest program choices based upon the user's past viewing habits and experiences.

Edward Szczerbicki

The University of Newcastle, Newcastle, Australia

Manuel Graña

The University of The Basque Country UPV/EHU, San Sebastian, Spain

Jorge Posada

Vicomtech-IK4 Research Centre, San Sebastian, Spain

Carlos Toro

Vicomtech-IK4 Research Centre, San Sebastian, Spain