Mathware & Soft Computing 16 (2009), 103-105

Editorial: Special issue devoted to FLINS 2008 conference

Tomasa Calvo[1], Javier Montero[2], Adela Salvador[3]
[1] Department of Computer Science and Artificial Intelligence
University of Alcalá, 28071 Spain
[2] Faculty of Mathematics
Complutense University of Madrid, 28040 Spain
[3] Department of Mathematics and Informatics in Civil Engineering
Technical University of Madrid, 28040 Spain
tomasa.calvo@uah.es ; monty@mat.ucm.es; ma09@caminos.upm.es

The 8th International **FLINS** Conference on Computational Intelligence in Decision and Control hold in Madrid (Spain), September 21-24, 2008, with the participation of scientists coming from 35 different countries and the presentation of 184 papers, selected in a strict peer review process from the 292 submitted papers. A short version of all accepted papers have been published in the **FLINS** 2008 proceedings (D. Ruan, J. Montero, J. Lu, L. Martínez, P. D'hondt. and E.E. Kerre, *"Computational Intelligence in Decision and Control"*, World Scientific Proceedings Series on Computer Engineering and Information Science, Vol. 1, 2008 (http://www.mat.ucm.es/congresos/flins2008). **FLINS** acronym stands for **F**uzzy **L**ogic and **I**ntelligent Technologies in **N**uclear **S**cience (1994), a project launched by 1994 in line with the Belgian Nuclear Research Centre (SCK•CEN) objectives to give PhD and Postdoc researchers the opportunity to carry out future orientated research. But since then, particular initial objectives have evolved into a much wider interest, covering now any research within computational intelligence in decision and control, with the declared objective of producing a real advance in the theory and applications of decision making and control for complex systems. **FLINS** 2008 is the eighth in a series of conferences on computational intelligence systems, and follows the successful **FLINS** 1994 in Mol, **FLINS** 1996 in Mol, **FLINS** 1998 in Antwerp, **FLINS** 2000 in Bruges, **FLINS** 2002 in Gent, **FLINS** 2004 in Blankenberge, Belgium, and **FLINS** 2006 in Genova, Italy. Next **FLINS** conference will be held in Chengdu (China), August 2-4, 2010.

Since **FLINS** 2008 authors were asked to extend their papers for a Mathware & Soft Computing special issue, a second and independent review was run for those extended papers being submitted for consideration. The five selected papers describe some approaches and algorithms inside the soft computing area, some of then addressing optimization methods in different fields, but always developing appropriate algorithms in order to guarantee that their theoretical approaches can be implemented into practice.

The first contribution of this volume, entitled *"OWA weights determination by means of linear functions"* (by E. Cables Pérez and M. Teresa Lamata), is related to ordered weighted averaging (OWA) operators, which have received an increasing

attention since these operators were introduced by Yager in 1988. Namely, the authors of this paper develop a novel practical method for obtaining the OWA weights, that is based in linear functions, and which is different from the existing ones. Some of their desirable properties have also been investigated. Also, an algorithm and a practical example have been proposed in Sections 4 and 5, respectively. Finally, the authors collect their conclusions: there are infinite linear functions for each value of *n*, such that it verifies the OWA's properties; when selecting the value of the slope of the linear function for each value of *n*, you can increase or decrease the differences between a weight w_i and the subsequent one w_{i+1}, always staying the linear behaviour; moreover, the dispersion of the linear function set, that permits obtain *the weights* and which constitutes OWA, trends infinity.

The second paper, *"Gaussian Naive Bayes for Online Training Assessment in Virtual Reality-Based Simulators"* (by Ronei Marcos de Moraes and Liliane dos Santos Machado) is devoted on a new approach to online training assessment based on Gaussian Naive Bayes (GNB) for modelling and classification of simulation in M pre-defined classes. Gaussian Naive Bayes (GNB) classifier is a generalization of Naive Bayes Networks, which are a special case of probabilistic networks that allows treating continuous variables. The introduced approach solves the main problems in assessment procedures: low complexity and high accuracy. The authors compare the different performance obtained between an Assessment Tool based on Gaussian Naive Bayes and an Assessment Tool based on Naive Bayes. From the computed data, the authors conclude that the Assessment Tool based on Gaussian Naive Bayes presents significant better results when compared with an Assessment Tool based on Naive Bayes for the same case. Besides, the Assessment Tool based on Naive Bayes presented better computational performance in terms of CPU time. However, the statistical separability among performance categories is difficult to be obtained due to subjectivity aspects of the experts to classify performance (own and of trainees). It can explain a possible low performance of assessments, but also estimates its adaptability to the presented problem. Training systems based on virtual reality are used in several areas, as in the medical sciences. In these systems the user is immersed into a virtual world to have realistic training through realistic interactions. In such training is important to know the quality of user's training and by didactic reasons the user must receive his/her assessment immediately after of end of training. For this reason, an online assessment system allows the user to improve his/her learning because it can identify, where he committed mistakes or presented low efficiency. Several approaches to perform assessment in training simulators based on virtual reality have been proposed. However, the presented assessment method can also be used for other complex scenario, as driving and flight training and several skills training based on virtual reality. Equally, longer training sessions could be simulated since the hardware used could provide enough performance to sustain the real time required for a virtual reality simulation.

In the third work of this volume, *"Solving Single And Multiobjective Models For An Assembly Line Design Problem Through Ant Colony Algorithms"* (by H. Chedade, L. Amodeo and F. Yalaoui), the authors present a special type of the assembly lines design problem and also new hybrid methods based on ant colony optimization. The aim of this problem consists to assign machines to workstations and to size the intermediate buffers. They try to solve the two optimization aspects of the problem, namely the mono and the multiobjective sides of the problem. Moreover, the performances evaluations are

realized using an algorithm based on the decomposition method. Also, the developed algorithms are tested on theoretical and industrial applications. Computational experiments show that the proposed algorithms perform efficiently.

The fourth paper, *"An Automatic Generator of Presentations to Tour-Guide Robots"* (by J. Javier Rainer, Jaime Gómez and Ramón Galán) describes an approach to the automatic generation of presentations using means of learning based on a genetic algorithm to estimate and thereby design presentations for a robot guide. The means of learning a new knowledge is based on access to the Internet. This paper presents a novel method to the use of a computer ontology to represent the corpus that the robot works with, and the quality criteria for a presentation. The authors propose the use of a fuzzy system to select the most appropriate group of paragraphs for a presentation, and they use a genetic algorithm for the evolution of the rules. The most relevant aspect of the described proposal is that the design uses learning to optimize the quality of the presentations.

The fifth paper "A*n algorithm to compute the transitive closure, a transitive approximation and a transitive opening of a fuzzy proximity*" (by Luis Garmendia, Ramón González del Campo, Victoria López and Jordi Recasens) proposes a new method to compute the transitive closure, a transitive opening and a transitive approximation of a proximity (a reflexive and symmetric finite fuzzy relation) at the same time, within the same steps. The three approximations of the proximity are then transitive (Min-transitive), so the computed fuzzy approximated relations are similarities in the sense of Zadeh. There are many papers in literature proposing methods to compute the (unique) transitive closure of fuzzy relations (containing the initial proximity), one of the existing openings (that is contained in the initial proximity) or one 'closest' approximations (not contains nor is contained in the initial proximity) but this is the first proposed algorithm that compute three different similarities that approximate a proximity at the same time, so the applications needing transitivity (mostly clustering or multicriteria decision methods) can choose to use the best fitting transitive approximations without extra computational cost.

The above short selection of papers do not show the whole variety of topics covered in **FLINS** 2008 conference, but we hope that readers will still find in this special issue the spirit of the leading missions of **FLINS** activities: on one hand, to conduct research on computational intelligence systems for solving intricate problems pertaining to complex systems research, and on the other hand, to bridge the gap between machine intelligence and complex systems via joint research with European, and international research institutes and universities, specially encouraging interdisciplinary research and bringing multi-discipline researchers together.

Tomasa Calvo, Javier Montero and Adela Salvador
Madrid, August 15, 2009