

## Synasc 2005 - Invited talks

Invited talks Natural Computation for Business Intelligence from Web Usage Mining

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WWW: <http://ajith.softcomputing.net> Abstract: The rapid e-commerce growth has made both business community and customers face a new situation. Due to intense competition on the one hand and the customer's option to choose from several alternatives, the business community has realized the necessity of intelligent marketing strategies and relationship management. Web usage mining attempts to discover useful knowledge from the secondary data obtained from the interactions of the users with the Web. Web usage mining has become very critical for effective Web site management, creating adaptive Web sites, business and support services, personalization, network traffic flow analysis and so on. This talk presents the important concepts of Web usage mining and its various practical applications. Further a web usage mining framework based on novel natural computation techniques is presented. Proposed framework is compared with several clustering and function approximation techniques like neural networks, fuzzy clustering, genetic programming and Takagi - Sugeno fuzzy inference system etc. The results are graphically illustrated and the practical significance is discussed in detail. Empirical results clearly show that the proposed Web usage-mining framework is efficient.

References:

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Semantics of Membrane Computing

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[gabriel@iit.tuiasi.ro](mailto:gabriel@iit.tuiasi.ro) Symbolic Computing Grid for Computational Origami

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Abstract: Although grid technologies are coming closer to scientists and engineers in many domains of sciences and technologies, they have not reached the level of maturity that the Internet provides to us in our daily life. In this talk I will introduce Computation Origami System (to be abbreviated to COS hereafter) as a case for the necessity of a grid for symbolic computation. COS, which is under development by us, is a 'paper' folding system, where origami papers and folding operations are simulated by a computer. Algorithmically, paper folds by COS are formulated as symbolic constraint solving. Namely, a paper fold problem is modeled symbolically as a set of polynomial equalities that represent the constraints. Although for visualizing origami we need to resort to traditional numeric computing to find the solutions of the set of polynomial equalities, we have a new aspect of computing: the formulation as symbolic constraint solving leads to the possibility of directly proving the correctness of origami constructions. This is achieved by interaction of COS and theorem prover Theorema. We will show that the interaction of COS with Theorema will indeed solve a very sophisticated problem of constructing and proving Morley's triangle by origami. We will further point out that the proof requires heavy use of computer resources, which can best be provided by a symbolic computing grid. To obtain a correct proof, we need to have a connection with Theorema server for Gröbner bases computation for quite a long time and many times for finding out the optimal specification of parameters to the proof computation by Theorema. By illustration I will show that these requirements are fulfilled by a service oriented symbolic computing grid.

Membrane computing. Basic ideas, results, applications

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www: <http://www.imar.ro/~gpaun>Abstract: Membrane computing is a branch of natural computing whose goal is to abstract computing models from the cell structure and functioning. In the basic model, one processes multisets, mainly by rewriting-like rules, in a compartmental structure defined by hierarchically arranged membranes. There also are tissue-like and neural-models. All these models (called P systems) are distributed parallel computing devices. There were introduced many types of P systems. Most of them were proven to be computationally complete, while several classes of P systems with additional possibilities of producing an exponential working space can solve computationally hard problems in a feasible time (by a time-space trade-off). In the last years, membrane computing was also proven to be a promising framework for applications in various areas, especially in biology (but also in computer science, linguistics, economics, etc). The talk will present the basic ideas of membrane computing, the types of results (universality and efficiency), some research directions, and will briefly discuss some recent applications. Role of Knowledge/Annotations in Complex KDD Processes.

Illustration in Web Usage Mining

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www: <http://www-sop.inria.fr/aid/personnel/Brigitte.Trousse/bri-eng.html>Abstract: the aim of this talk will be to address issues related to the role of knowledge and/or annotations in complex KDD processes. We first introduce the notion of complexity in Knowledge Discovery from Databases and in Data Mining. Two domains will be considered in this talk: the analyst domain and the analysed domain of expertise. We will present a synthesis of research works issued from Semantic Web and Knowledge Engineering in order to improve KDD processes or to support the reuse of such processes. Then we will focus mainly on the importance of capturing some knowledge in KDD and annotating such KDD processes in order to keep the sense of the main decision-makings and to support the reuse of such processes. We will illustrate it in the context of Web Usage Mining.