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Modern Technologies for Web-based Adaptive Systems

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The 1th Workshop on Modern Technologies for Web-based Adaptive took place in Krakow, Poland, in June 2004. This workshop was organized as a part of International Conference on Computational Science. The Co-Chairs, and organizers of this workshop, were Ngoc Thanh Nguyen and Janusz Sobecki. Adaptive systems are nowadays used for continuous adjustment to changes in the environment. The web-based systems environment contains users, system platforms, and other elements to be controlled by the system. These elements are not stable. Their characteristics change over time and new elements appear in the scope of systems of this kind. As a consequence, ordinary systems tend to be ineffective in such circumstances. So there is a great need for systems that can adapt to changes in the environment, especially users. Depending on the characteristics of the system, different technologies for adaptability can be used.

The aim of this workshop was to present and discuss the new technologies being applied in web-based adaptive systems. The topics were mainly related to adaptive techniques and theories applied in the following areas: web browsing, information retrieval, user interfaces, information management and e-Learning.

The scope of the workshop and this special issue also concerns some theoretical methods that are applied in many adaptive web-based such as systems of consensus methods in inconsistency of knowledge processing and Petri nets approach for modeling and control of dynamic systems.

The contributions were presented at the workshop by authors from Europe, Asia and New Zealand. Authors of six selected papers have been proposed to extend their papers and submit for this special issue. Besides two other papers related to the subject also have been considered. Each of submitted papers has been reviewed by at least two reviewers and revised according two the reviewers' comments. Their characteristics can be presented as follows:

Collaborative Web Browsing Based on Semantic Extraction of User Interests with Bookmarks by Jason J. Jung (Intelligent E-Commerce Systems Laboratory, School of Computer and Information Engineering, Inha University, Korea). It presents a user-support mechanism based on the sharing of knowledge with other users through the collaborative Web browsing, focusing specifically on the user's

interests extracted from his or her own bookmarks. This system is composed of a facilitator agent and multiple personal agents.

RankFeed – Recommendation as Searching without Queries: New Hybrid Method of Recommendation by Maciej Kiewra (Fujitsu Services, Spain). The paper describes RankFeed an adaptive method of recommendation that benefits from similarities between searching and recommendation. The principal factors determining the method's behavior are: the quality document ranking, navigation patterns, textual similarity and the list of recommended pages that have been ignored during the navigation. In the paper the method RankFeed was compared with PageRank and other classical approaches.

Consensus-Based Hybrid Adaptation of Web Systems User Interfaces by Janusz Sobecki (Institute of Applied Informatics, Wroclaw University of Technology, Poland). It this paper a hybrid adaptation of web-based system user interfaces that uses consensus methods is presented. The hybrid recommendation is a combination of the following methods: demographic, content-based, and collaborative. Each of this method has its specific advantages and disadvantages. The hybrid adaptation enables overcoming disadvantages of each separate solution.

Creation of Information Profiles in Distributed Databases as a Game Problem by Juliusz L. Kulikowski (Institute of Biocybernetics and Biomedical Engineering Polish Academy of Sciences) In the paper a problem of information profiles and information resources collection formed in distributed data- and/or knowledge bases as a result of an attempt to satisfy the information requirements of the customers represented by their information profiles is considered. It is shown that the interests of managers of data- and knowledge bases are not fully convergent and that they participate in composite, partially co-operative, partially non-co-operative *n*-persons games.

Processing Inconsistency of Knowledge on Semantic Level by Ngoc Thanh Nguyen (Institute of Technical Computer Science, Wroclaw University of Technology, Poland). In the paper problems of resolution of knowledge inconsistency in many practical applications of computer systems are addressed. The reason of this kind of inconsistency is included in the possibilities of using varied resources of knowledge in realizing practical tasks. Consensus methodology has been proved to be useful in solving conflicts and should be also effective for knowledge inconsistency resolution.

An Application of the DEDS Control Synthesis Method by Frantisek Capkovic (Institute of Informatics, Slovak Academy of Sciences, Bratislava, Slovakia) The paper presents an application of the method suitable for modeling and control of general discrete event dynamic systems (DEDS) to special kinds of communication systems is presented in this paper. The approach is based on Petri nets (PN) and directed graphs (DG).

Structural Tendencies in Complex Systems Development and their Implication for Software Systems by Andrzej Gecow (Institute of Paleobiology Polish Academy of Science, Poland), Mariusz Nowostawski and Martin Purvis (University of Otago, Dunedin, New Zealand). In the paper adaptive model inspired by biological phenomena is presented. This model represents a generic complex system subjected to long sequences of adaptive changes. The model was used for analysis of development processes and also structural tendencies. Some of these tendencies are

not desirable, for example bloat of the system. Some of the phenomena, however, show characteristics of changes that improve the system. These characteristics can be applied to optimization of self-producing and self-adapting algorithms of self-maintaining complex software systems.

At last, *The Language Grounding Problem and its Relation to the Internal Structure of Cognitive Agents* by Radoslaw Katarzyniak (Institute of Control and Systems Engineering, Wroclaw University of Technology, Poland). This paper presents an original approach to modeling internal structure of artificial cognitive agents and the phenomenon of language grounding. Some aspects of knowledge consistency have been analyzed.

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