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Preface

The 4th International Conference on Hybrid Artificial Intelligence Systems (HAIS 2009), as the name suggests, attracted researchers who are involved in developing and applying symbolic and sub-symbolic techniques aimed at the construction of highly robust and reliable problem-solving techniques, and bringing the most relevant achievements in this field. Hybrid intelligent systems have become increasingly popular given their capabilities to handle a broad spectrum of real-world complex problems which come with inherent imprecision, uncertainty and vagueness, high-dimensionality, and nonstationarity. These systems provide us with the opportunity to exploit existing domain knowledge as well as raw data to come up with promising solutions in an effective manner. Being truly multidisciplinary, the series of HAIS conferences offers an interesting research forum to present and discuss the latest theoretical advances and real-world applications in this exciting research field.

This volume of *Lecture Notes in Artificial Intelligence* (LNAI) includes accepted papers presented at HAIS 2009 held at the University of Salamanca, Salamanca, Spain, June 2009.

Since its inception, the main aim of the HAIS conferences has been to establish a broad and interdisciplinary forum for hybrid artificial intelligence systems and associated learning paradigms, which are playing increasingly important roles in a large number of application areas.

Since its first edition in Brazil in 2006, HAIS has become an important forum for researchers working on fundamental and theoretical aspects of hybrid artificial intelligence systems based on the use of agents and multiagent systems, bioinformatics and bio-inspired models, fuzzy systems, artificial vision, artificial neural networks, and optimization models.

HAIS 2009 received 206 technical submissions. After a thorough peer-review process, the International Program Committee selected 85 papers, which are published in these conference proceedings. In this edition a special emphasis was put on the organization of special sessions. Eight special sessions, containing accepted 44 papers, were organized related to actual topics: Real-World HAIS Applications and Data Uncertainty, Applications of Hybrid Artificial Intelligence in Bioinformatics, Evolutionary Multiobjective Machine Learning, Hybrid Reasoning and Coordination Methods on Multi-agent Systems, Methods of Classifiers Fusion, Knowledge Extraction Based on Evolutionary Learning, Hybrid Systems Based on Bioinspired Algorithms and Argumentation models and Hybrid Evolutionary Intelligence in Financial Engineering. In addition, a tutorial with the title "Evolutionary Algorithms for Clustering" was included. The selection of papers was extremely rigorous in order to maintain the high quality of the conference and we would like to thank the Program Committee for their hard work in the reviewing process. This process is very important to the creation of a conference of high standard and the HAIS conference would not exist without their help.

The large number of submissions is certainly not only a testimony to the vitality and attractiveness of the field but an indicator of the interest in the HAIS conferences themselves.

As a follow-up of the conference, we anticipate further publication of selected papers in special issues of the *Journal of Information Science*. Our thanks go to the keynote speaker, Witold Pedrycz from the University of Alberta (Canada). We would like to fully acknowledge support from the BISITE Group at the University of Salamanca. We especially thank Juan Manuel Corchado for his support in the organization of this conference and also Ajith Abraham for his guidance and continuing support of the HAIS series of conferences.

We wish to thank Alfred Hoffman, Anna Kramer and Ursula Barth from Springer for their help and collaboration during this demanding publication project.

June 2009

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