

# Special Issue: Hybrid Intelligence for Bio-Medical Informatics

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This special issue includes a selection of papers presented at the 2nd International Workshop on Hybrid Artificial Intelligence Systems (HAIS 2007), carried out at the University of Salamanca, Spain. The four papers selected present a different approach about solving some important Bioinformatics and medical informatics problems. The papers present novel models that combine symbolic and sub-symbolic techniques to construct more robust and reliable problem solving models applied to bioinformatics or biotechnology environments.

Bioinformatics and medical informatics are two research fields that serve the needs of different but related communities. Both domains share the common goal to provide new algorithms, methods and technological solutions to biomedical research and contribute to the treatment and cure of diseases. While bioinformatics has been traditionally focused on the intersection between computer science and biological research, medical informatics has been centered on the intersection between computer science and clinical medicine. In this context, recent studies have shown how biomedical informatics has emerged as a new area to describe the technology that brings both disciplines together to support genomic medicine.

Hybrid intelligent systems are becoming popular due to their capabilities in handling many real world complex problems, involving imprecision, uncertainty and vagueness, high-dimensionality. They provide us with the opportunity to use both, our knowledge and raw data to solve problems in a more interesting and promising way. This multidisciplinary research field is in continuous expansion in the artificial intelligence research community.

It is commonly accepted that there are two parts to health sciences, the study, research, and knowledge of health and the application of that knowledge to improve health, cure diseases, and understand how humans function. This configuration (theory elicitation and theory application) is analogous with the know-how managed by physicians that apply a mixture of objective knowledge and subjective knowledge. The global purpose of HAIS conferences has been to provide a broad and interdisciplinary forum for Hybrid Artificial Intelligence Systems and Associated Learning Paradigms, which are playing increasingly important roles in an important number of applications fields. These application intelligence bases models are been used intensively for the resolution on

Bioinformatics problems with success. This issue meant to be an overview of the possibilities offered by the AI community in the resolution of distributed problems, classification, prediction, pre-processing, or data dimension reduction. This special issue also presents an ambient intelligent model developed with hybrid artificial intelligent systems. Such distributed biotechnology applications is an innovative solution to provide medical care to dependent people that may be embedded in any administration system of a hospital or medical centre.

### **Guest Editor Biographies**

**Emilio Corchado** is Associated Professor of CS at the University of Burgos, Spain. He received his Ph.D. in Computer Science from University of Salamanca (Spain). His research interest centers on ANN, multiple classifier and Hybrid Systems. He has published around twenty papers in peer reviewed international journals, and around seventy papers in international Editorial Boards of IJCIA and International Journal of Reasoning-based Intelligent Systems (IJRIS). He has also served as a reviewer for several international journals and is reviewer for the 6th FP, EC. He chaired and organised several international conferences and sessions and is member of several IPC.

**Juan M. Corchado** is the Dean of the Faculty of Science at the University of Salamanca. Received a Ph.D. in Computer Science from the University of Salamanca in 1998 and a Ph.D. in Artificial Intelligence from the University of the West of Scotland (UK) in 2000. At present he is Director of the Biomedicine, Intelligent Systems and Educational Technology Group (<http://bisite.usal.es>) and Director of the MSc Programs in E-commerce and Digital Animation of the University of Salamanca (Spain), previously he was Sub-director of the Escuela Superior de Ingeniería Informática of the University of Vigo (Spain, 1999-00) and Researcher at the University of Paisley (UK, 1995-98). He has been a research collaborator with the Plymouth Marine Laboratory (UK) since 1993. He has worked on several Artificial Intelligence (AI) Research projects sponsored by Spanish and European public and private Institutions and has supervised seven Ph.D. students. He is the co-author of over 200 books, book chapters, journal papers, technical reports, etc. most of them present practical and theoretical achievements of AI Systems.

**Ajith Abraham** received PhD degree from Monash University, Australia. He works in a multi-disciplinary environment involving computational intelligence, network security, e-commerce, Web intelligence, Web services, scheduling, data mining and applied to various real world problems. He has published over 400 publications and given more than 20 plenary lectures and conference tutorials in these areas. Currently he works with the Norwegian University of Science and Technology, Trondheim, Norway. He serves the editorial board of over 30 International journals and has also guest edited 29 special issues on various topics. He is actively involved in the Hybrid Intelligent Systems (HIS); Intelligent Systems Design and Applications (ISDA) and Information Assurance and Security (IAS) series of International conferences. More information at: <http://www.softcomputing.net>