Guest editorial

Special issue on fundamental and information processing aspects of neurocomputing

Since its first occurence in 1993, the European Symposium on Artificial Neural Networks ESANN has become a reference for research on fundamental and theoretical aspects of artificial neural networks. Each year, about 100 specialists from all parts of the world attend and contribute to ESANN. The eighth ESANN symposium was organized in the medieval city of Bruges in Belgium from 26 to 28 April 2001. In total, 67 contributed or invited papers were presented, that were all reviewed. Within the broad array of research, there was a particularly strong collection of papers related to the applications of mathematics and statistics to the learning, modelling, data analysis and information processing. Based on these reviews and on proposals by the scientific committee, the authors of many high quality papers were invited to prepare a journal version of their contribution. These papers were thoroughly reviewed by three independent experts. Finally, 22 papers were accepted for this special issue of Neurocomputing on fundamental and information processing aspects of artificial neural networks.

In this special issue, the 22 papers are grouped around six main topics: algorithms and learning, model selection, data analysis, forecasting, vision and signal, and image processing.

Progress on neural network architectures, and learning is explored in the first topic with eight papers. Biologically inspired neural networks and their learning are studied in the first two papers. These deal with spiking neurons learning and nonsynaptic connections. Stability and optimisation properties are introduced in the next two papers. Support vector machines are further investigated in the next two papers. An interesting deformable feature map is introduced for pattern analysis in the next paper. The last paper in this section presents iterative neural network learning for control.

Resampling or bootstrap techniques are presented in two papers of the second topic related to neural network model section.

The third important topic includes four papers related to the analysis of data sets. Two papers deal with the visualisation and the network growth for high-dimensional data sets. The dependencies between variables are analysed using self-organizing maps in another paper. Recent neural network developments for the analysis of medical data sets are reviewed in a fourth paper.

Four papers report about the important progress achieved in the development of advanced neural network methods (local averaging, wavelets, non-linear projection, long-term dependencies) for prediction and forecasting.

There are two papers related to vision and learning, one for biologic vision systems and another for robotic vision systems.

In the last section, two papers are presented, that introduce new neural network methods for signal and image processing.

Our sincere thanks are due to the Editor, Dr. David Sanchez, for his enthusiastic support of this special issue and to the anonymous reviewers and the program committee of ESANN for the reviews and paper selection. We hope that this issue can serve as a further reference and encouragement in this promising scientific domain. We stimulate the interested readers to contribute to new version of ESANN that are under way. More information is available at http://www.dice.ucl.ac.be/esann.

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