

## C2 Design, Evaluation and Refinement of Intelligent Systems

Time: Monday, 13.09.2010, 3:50 p.m.

Location: Humboldt-Building, Lecture Room 129/Foyer

<b>Poster Session:</b>
<b>Chairmen: M. Atzmüller (DE-Kassel), R. Knauf (DE-Ilmenau)</b>
M. Schneider, F. Calcagno, M. Stieglitz, U. Lehmann, J. Krone (DE-Iserlohn)
<b>Higher Generalization Performance of Artificial Neural Networks without Reducing Large Databases</b>
<p>At the training of artificial neural networks (ANN) by using a large data base of complex processes is often the problem, that the trained ANN has a good generalization only for partial data. Furthermore, the time required for the training of a large number of data sets and according to training algorithm increases huge. A lesser amount of data per neuron reduces the training time and increases the model precision. This can be achieved by reducing the data base, where data reduction is as well always associated with data loss. This can be prevented if the existing data base is divided into several submodels, which together form a complete model. The large amount of data sets is divided into several subsets without losses of data sets. An individual sorting is needed per input neuron because only with the help of this individual sortings it is possible to simulate an unknown data set. Having multiple output neurons, it is helpful to train an ANN for each output neuron to reduce the model error. Thus, the entire model consists of <math>T * S * A</math> several ANN. <math>T</math> = number of data subsets <math>S</math> = number of input neurons <math>A</math> = number of output neurons During simulation for each sorting the appropriate partition is determined for the new data set. Thus, a calculation is accomplished with the ANN of the respective partition. Per output neuron as many results can be calculated as input neurons are present. These are combined excluding extrem values by the mean value is calculated over the remaining parts of the partial solutions. By this way of the distribution of the process knowledge the generalization performance of the complete model could be increased. In addition the complete training duration could be shortened.</p>