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El Departamento de Control Automático

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A Brain-like Multi-Hierarchical Modular Neural Network

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Abstract: With the aim of solving the problem of long training time and local minimum in fully coupled neural networks, a Brain-Like Multi-Hierarchical Modular Neural Networks (BMNN) was proposed. Unlike most of the traditional modular neural network, BMNN owns a brain-like multi-hierarchical architecture and uses a collaborative learning approach. In BMNN learning process, each input sample is learned by multiple sub-sub-modules in different sub-modules and the result of BMNN is the integration of the multiple sub-sub-modules learning results, which helps to improve the BMNN's learning accuracy and generalization ability. The learning algorithm of the sub-sub-modules is an algebraic method which greatly improves the BMNN's learning speed. Applied BMNN to different complex problems and the simulation results compared with BP neural network and RBF neural network, the experimental results demonstrated that BMNN can heighten the approximating ability effectively to handle complicated problems, and the training time is shorter than with fully coupled neural networks.

Biography: Zhang Zhaozhao received the B.S. and M.S. degrees from the Dept. of Computer Science, Liaoning Technical University, China, in 1998 and 2005, respectively, and the Ph.D. degree from the Dept. of Electronic and Control Engineering, Beijing University of Technology, in 2013. From 2003 to 2012, he worked as a lecturer at Liaoning Technical University. Since 2012, he has been an associate professor at Liaoning Technical University. Dr. Zhang Zhaozhao serves as member of the IEEE Computational Intelligence Society, the International Neural Network Society, and the Youth Work Committee of the Chinese Artificial Intelligence Association.