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Improved incremental extreme learning machine based on multi-learning clonal selection algorithm. (Chinese. English summary) Zbl 1363.68132

Control Theory Appl. 33, No. 3, 368-379 (2016).

Summary: The great number of redundant nodes in an incremental extreme learning machine (I-ELM) may lower the learning efficiency of the algorithm, and complicate the network structure. To deal with this problem, we propose the improved I-ELM with kernel (I-ELMK) on the basis of multi-learning clonal selection algorithm (MLCSA). The MLCSA uses Baldwinian learning and Lamarckian learning to exploit the search space by employing the information of antibodies, and reinforce the exploitation capacity of individual information. The proposed algorithm can limit the number of hidden layer neurons effectively to obtain more compact network architecture. The simulations show that MLCSI-ELMK has higher prediction accuracies online and off-line, while providing a better capacity of generalization compared with other algorithms.

MSC:

68T05 Learning and adaptive systems in artificial intelligence
68T20 Problem solving in the context of artificial intelligence (heuristics, search strategies, etc.)

Keywords:

clonal selection algorithm; Baldwinian learning; Lamarckian learning; neural networks; incremental extreme learning machine

Full Text: DOI