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**Improved hybrid incremental extreme learning machine algorithm.** (Chinese. English summary)

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Summary: Focusing on the problem that redundant nodes in incremental extreme learning machine (I-ELM) can lead to ineffective iteration increases and reduce the learning efficiency, an improved I-ELM algorithm based on Delta test (DT) and chaotic optimization algorithm (COA) is proposed. The COA is used to optimize the hidden layer neuron parameters of I-ELM by global searching ability, and is combined with the DT algorithm which tests the output error of model to determine the effective hidden layer neurons number. The learning efficiency of the algorithm is improved by reducing the network complexity, and the DCI-ELM with kernel can enhance the online prediction ability of network. The simulations show that the DCI-ELMK algorithm with more compact network structure has higher prediction accuracy and better ability of generalization compared with other algorithms.

**MSC:**

68T05 Learning and adaptive systems in artificial intelligence

**Keywords:**

extreme learning machine; incremental learning algorithm; delta test; chaotic optimization algorithm

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