IEEE SMC Hiroshima Chapter Invited Special Talk

Date:
Nov. 11, 2017

Time:
16:00 to 17:30

Location:
Tatemachi Campus, Hiroshima University of Economics

2-25, Tatemachi, Naka-ku, Hiroshima, Japan
http://www.hue.ac.jp/access.html#tatemachi

Space is limited

Free to participate, but the registration is required. Please contact us by e-mail:

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Hardware/Software co-design SoC-system for a Neural Network trained by Particle Swarm Optimization

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Abstract

NN system for SoC is one topic in the world. Recently, SoC combines AI technique by Python. When we consider Intelligent system on SoC, the co-design software and hardware is significant. Avoiding premature convergence while keeping performance is a challenge in training the neural network (NN), especially in a case of large NNs or a large number of training data. In this case, one problem is a huge memory and processing power. We propose an improved particle swarm optimization (PSO) algorithm called the PSOseed2 algorithm for training NN. The PSOseed2 algorithm solves the premature convergence of the standard PSO (SPSO) algorithm by slightly modifying the velocity update function without adding many computational tasks to the SPSO algorithm. We evaluated this algorithm on field programmable gate array (FPGA)-based NN and software-based NN and trained these NNs with different PSO algorithms that are SPSO, PSOseed, PSOseed2, and dissipative PSO. Experimental results with different datasets confirmed that the NNs trained by the proposed PSOseed2 algorithm had better recognition rates and lower global learning errors than the NN trained by other PSO algorithms.

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