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A Hybrid Optoelectronic ART-1 Neural Processor

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A Hybrid Optoelectronic ART-1 Neural Processor

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Abstract

Adaptive resonance theory (ART) neural networks are becoming an important component of neural network applications in today's industrial environment. Hardware implementation is needed due to the scaling properties of these massively parallel systems. In this paper, a new implementation of ART-1 is proposed that efficiently combines optical and electronic devices. All parallel computations are performed by the optics, while serial operations are performed in electronics. One possible physical implementation of this architecture is proposed.

Analytical Weight Shifting Models for Self-Recovery Networks

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Abstract

An efficient self-recovery technique of a neural network called *weight shifting* and its analytical models are proposed. The technique is applied to recover a network when some faulty links and neurons occur during the operation. The proposed model is suitable for VLSI inclusion with the network in terms of quick recovery time and silicon area.