Biologically-inspired On-chip Learning in Pulsed Neural Networks

Self-learning chips to implement many popular ANN (artificial neural network) algorithms are very difficult to design. We explain why this is so and say what lessons previous work teaches us in the design of self-learning systems. We offer a contribution to the "biologically-inspired" approach, explaining what we mean by this term and providing an example of a robust, self-learning design that can solve simple classical-conditioning tasks. We give details of the design of individual circuits to perform component functions, which can then be combined into a network to solve the task. We argue that useful conclusions as to the future of on-chip learning can be drawn from this work.