Motion recognition with biologically plausible spiking neural networks

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Abstract

Although artificial deep learning based neural networks have recently achieved impressive results on a range of realistic pattern recognition problems, it is still not completely clear how this problem is solved by the hierarchy of spiking neurons in the brain which has inspired the deep learning approach in the first place. To achieve high accuracy on real-world problems artificial deep neural networks are trained using backpropagation, which is known to be biologically implausible. Recently Lillicrap et al. have proposed Feedback Alignment as a more biologically realistic algorithm able to train a deep hierarchy of spiking neurons. In this work we examine whether a spiking deep neural network using such a biologically plausible learning algorithm is able to achieve good recognition accuracy on realistic motion recognition tasks.