A Brain-inspired Algorithm for Motion Recognition

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Abstract:

Deep neural networks (DNNs), which mimic the hierarchical information processing in the ventral visual pathway, have achieved great success in object recognition. DNNs mainly capture the feedforward framework of the visual system for extracting features of objects layer by layer, from simple to complex. Compared to DNNs, however, the real neural system has much richer structures and can perform much more complicated functions. Through gaining inspirations from the brain, we may be able to develop new advanced computational algorithms.

In this study, we aim to develop a brain-inspired algorithm for motion recognition. Motion recognition is a challenge task in Artificial Intelligence, whose difficulty comes from that to recognize a movement pattern, it needs to integrate the spatial and temporal information of moving images over time, and the current artificial neural networks lack such kind of strategy. Inspired by the structures and functions of the neural system, we propose a new computational model to carry out this task. Specifically, the model consists of three functional modules, which are detection network, a large-size reservoir network, and a decision-making network. We test it on a gait recognition task and demonstrate that it works well.