

EqPropNEAT

Extending NEAT with equilibrium propagation

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Abstract—Artificial neural networks have been employed successfully to solve a great variety of tasks over the past decade. In most applications, network architecture is usually decided with a trial-and-error process, relying on empirical experience. The neuroevolution of augmenting topologies algorithm (NEAT) proposes a solution to finding well fitting network architectures to a given task, however for learning weights, it only uses a simple genetic mutation rule.

This paper proposes an extension of NEAT with an additional learning step employing equilibrium propagation for learning edge weights. We claim that the resulting novel technique needs less iterations for convergence, as weights are adjusted by a method which was specifically invented for such task. Our experimental results show a significant reduction in training times on common neural network benchmark tasks, while achieving similar prediction quality.

Index Terms—neuroevolution, neat, equilibrium propagation.