

ular Spike Detection Approach for Noisy Neuronal Data

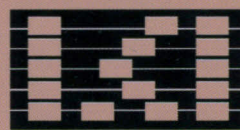
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Initial, named spike, plays an important role in central nervous systems. Neuronal spike detection is due to the effect of strong noise and non-stationary data. Two main problems for almost all conventional methods. First, a filtering approach is often followed for noisy data. Selection of the filter parameters is a time-consuming task. To overcome this problem we suggest utilizing Empirical Mode Decomposition (EMD) and a modified adaptive filter which is tuned automatically. The second problem is that the detection method is signal dependent and the performance is considerably lower when the data changes. To tackle this problem, we propose an approach which utilizes the data distribution information. This method exploits the fuzzy set theory to combine a set of factors to achieve a higher performance. The experimental results show the superiority of the proposed method.

Adaptive Parameter Selection in Comprehensive Learning Particle Swarm Optimizer

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The widespread usage of optimization heuristics such as Particle Swarm Optimizer (PSO) imposes huge challenges on parameter adaption. One variant of PSO is Comprehensive Learning Particle Swarm Optimizer (CLPSO), which uses all individuals' best information to update their velocity. The novel strategy of CLPSO enables the population to read from exemplars for specified generations which is called refreshing gap m . In this paper, we develop two classes of Learning Automata (LA) in order to study the learning ability of automata for CLPSO refreshing gap tuning. In the first class, a learning automaton is assigned to the population and in the second one each particle has its own personal automaton. We also compare the proposed algorithm with CLPSO and CPSO-H algorithms. Simulation results show that our algorithms outperform their counterpart algorithms in terms of performance, robustness and convergence speed.



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