

ABSTRACT

This paper investigates the use of Random Dynamic Neighborhoods in Particle Swarm Optimization (PSO) for the purpose of training fixed-architecture neural networks to classify a real-world data set of seismological data. Instead of the ring or fully-connected neighborhoods that are typically used with PSOs, or even more complex graph structures, this work uses directed graphs that are randomly generated using size and uniform out-degree as parameters. Furthermore, the graphs are subjected to dynamism during the course of a run, thereby allowing for varying information exchange patterns. Neighborhood re-structuring is applied with a linearly decreasing probability at each iteration. Several experimental configurations are tested on a training portion of the data set, and are ranked according to their abilities to generalize over the entire set. Comparisons are performed with standard PSOs as well as several static non-random neighborhoods.