

Committee neural networks with fuzzy genetic algorithm.

ABSTRACT

Combining numerous appropriate experts can improve the generalization performance of the group when compared to a single network alone. There are different ways of combining the intelligent systems' outputs in the combiner in the committee neural network, such as simple averaging, gating network, stacking, support vector machine, and genetic algorithm. Premature convergence is a classical problem in finding optimal solution in genetic algorithms. In this paper, we propose a new technique for choosing the female chromosome during sexual selection to avoid the premature convergence in a genetic algorithm. A bi-linear allocation lifetime approach is used to label the chromosomes based on their fitness value, which will then be used to characterize the diversity of the population. The label of the selected male chromosome and the population diversity of the previous generation are then applied within a set of fuzzy rules to select a suitable female chromosome for recombination. Finally, we use fuzzy genetic algorithm methods for combining the output of experts to predict a reservoir parameter in petroleum industry. The results show that the proposed method (fuzzy genetic algorithm) gives the smallest error and highest correlation coefficient compared to five members and genetic algorithm and produces significant information on the reliability of the permeability predictions.

Keyword: Back propagation neural network; Committee neural network; Fuzzy genetic algorithm; Reservoir properties.