

## Fuzzy Population-Based Meta-Heuristic Approaches for Attribute Reduction in Rough Set Theory

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**Abstract :** One of the global combinatorial optimization problems in machine learning is feature selection. It concerned with removing the irrelevant, noisy, and redundant data, along with keeping the original meaning of the original data. Attribute reduction in rough set theory is an important feature selection method. Since attribute reduction is an NP-hard problem, it is necessary to investigate fast and effective approximate algorithms. In this paper, we proposed two feature selection mechanisms based on memetic algorithms (MAs) which combine the genetic algorithm with a fuzzy record to record travel algorithm and a fuzzy controlled great deluge algorithm to identify a good balance between local search and genetic search. In order to verify the proposed approaches, numerical experiments are carried out on thirteen datasets. The results show that the MAs approaches are efficient in solving attribute reduction problems when compared with other meta-heuristic approaches.

**Keywords :** rough set theory, attribute reduction, fuzzy logic, memetic algorithms, record to record algorithm, great deluge algorithm

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