Rough Set Reduction: A Novel Orthogonal Learning-based Grey Wolf Optimization Strategy

Ali Asghar Heidari - School of Surveying and Geospatial Engineering College of Engineering, University of Tehran Tehran, Iran
School of Surveying and Geospatial Engineering College of Engineering, University of Tehran Tehran, Iran
Rahim Ali Abbaspour - School of Surveying and Geospatial Engineering College of Engineering, University of Tehran Tehran, Iran

Rough set theory can be regarded as a unique paradigm that can be effectively used in dealing with uncertain, inaccurate also vague quantities. This theory has been extensively investigated in several fields of science as an operational attribute reduction model, which can sustain the decisive characteristics of an initial set through discarding its redundant features. Current heuristic-based reduction approaches cannot perform efficiently in some cases. Hence, more enhanced, new stochastic optimizers are required to determine more better-quality reductions. Grey wolf algorithm is a new robust meta-optimizer that mimics the idealistic social dominance of wolves in nature. In this research, a novel orthogonal learning-based grey wolf approach is proposed to solve rough set reduction tasks. Based on presented technique, a minimal attribute reduct is discovered and validated efficiently. Several experiments are performed on well-known UCI datasets. The obtained results demonstrate competency and effectiveness of the proposed orthogonal learning-based GWO in tackling reduction tasks.

Keywords: optimization; data mining; feature selection; grey wolf optimizer; rough set theory

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