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Quasi-oppositional-Based Whale Optimization Applied to Multilevel Image Thresholding

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Abstract

Due to the incorrect proportions between the exploitation and exploration phases, the whale optimization algorithm (WOA) gets stuck into the local optima, which causes premature convergence. To address this issue, quasi-oppositional-based learning is imposed with a whale optimization algorithm called quasi-oppositional WOA (QOWOA) to

improve the local search ability. Also, it enhances the possibility of producing excellent individuals in the random search stage of the algorithm. To verify the performance of this QOWOA, Otsu's and Kapur's entropy were used as the objective function to segment the different regions of images using multilevel threshold values on some grayscale images. The simulation and analysis results of different quality metrics validate the superiority and robustness of the proposed algorithm over the basic WOA algorithm.

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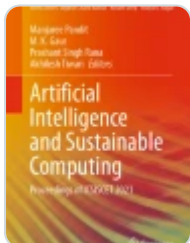
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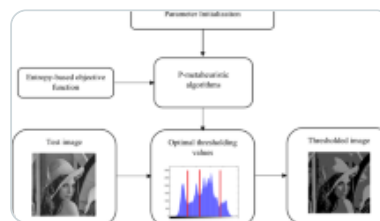
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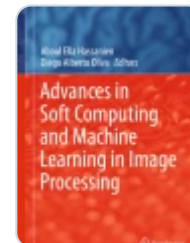
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