Abstract

The fuzzy c-partition entropy technique for threshold selection is one of the best image thresholding techniques, but its complexity increases with the number of thresholds. In this paper, the selection of thresholds (fuzzy parameters) was seen as an optimization problem and solved using particle swarm optimization (PSO), differential evolution (DE), genetic (GA) algorithms. The proposed fast approaches have been tested on many images. For example, the processing time of four-level thresholding using PSO, DE and GA is reduced to less than 0.4s. PSO, DE and GA show equal performance when the number of thresholds is small. When the number of thresholds is greater, the PSO algorithm performs better than GA and DE in terms of precision and robustness. But the GA algorithm is the most efficient with respect to the execution time.

References

- M. Sezgin, B. Sankur, "Survey over image thresholding techniques and..."

Index Terms
Keywords

Entropy  Histograms  Optimization  Particle swarm optimization  Thresholding  Fuzzy c-partition

Differential Evolution Algorithm