

## Optimum multilevel threholding hybrid ga-pso by algorithm./ Dwi Taufik Hidayat, Isnan, Muhammad Ali Fauzi

Dwi Taufik Hidayat, author

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### Abstrak

The conventional multilevel thresholding methods are efficient for bi-level thresholding. However, these methods are computationally very expensive for use in multilevel thresholding because the search of optimum threshold do in depth to optimize the objective function. To overcome these drawbacks, a hybrid method of Genetic Algorithm (GA) and Particle Swarm Optimization (PSO), called GA-PSO, based multilevel thresholding is presented in this paper. GA-PSO algorithm is used to find the optimal threshold value to maximize the objective function of the Otsu method. GA-PSO method proposed has been tested on five standard test images and compared with particle swarm optimization algorithm (PSO) and genetic algorithm (GA). The results showed the effectiveness in the search for optimal multilevel threshold of the proposed algorithm.

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Metode-metode multilevel thresholding bersifat sangat efisien untuk bi-level thresholding. Namun, metode-metode tersebut secara komputasional sangat mahal untuk digunakan dalam multilevel thresholding, karena pencarian threshold optimalnya dilakukan secara mendalam untuk mengoptimalkan fungsi objektifnya. Untuk mengatasi kelemahan ini, sebuah metode hybrid antara Genetic Algorithm (GA) dan Particle Swarm Optimization (PSO), yang disebut GA-PSO, berbasis multilevel thresholding disajikan dalam makalah ini. Algoritma GA-PSO digunakan untuk mencari nilai threshold yang optimal untuk memaksimalkan fungsi obyektif dari metode Otsu. Metode GA-PSO yang diusulkan diuji pada lima citra standar dan dibandingkan dengan algoritma Particle Swarm Optimization (PSO) dan Genetic Algorithm (GA). Hasil penelitian menunjukkan efektivitas dalam pencarian threshold multilevel optimal dari algoritma yang diusulkan.