Comparison of particle swarm optimization and genetic algorithm for molten pool detection in fixed aluminum pipe welding

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Abstrak

This paper proposes a study on the comparison of particle swarm optimization with genetic algorithm for molten pool detection in fixed aluminum pipe welding. The research was conducted for welding of aluminum alloy Al6063S-T6 with a controlled welding speed and a Charge-couple Device (CCD) camera as vision sensor. Omnivision-based monitoring using a hyperboloidal mirror was used to detect the molten pool. In this paper, we propose an optimized brightness range for detecting the molten pool edge using particle swarm optimization and compare the results to genetic algorithm. The values of the brightness range were applied to the real time control system using fuzzy inference system. Both optimization methods showed good results on the edge detection of the molten pool. The results of experiments with control show the effectiveness of the image processing algorithm and control process.