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Improved PSO based Multi-Level Thresholding for Cancer Infected Breast Thermal Images using Otsu

N. Sri Madhava Raja[a,]*, S. Arockia Sukanya[b], Y. Nikita[a]

[a]*Department of EIE, St. Joseph's College of Engineering,Chennai 600 119, Tamil Nadu, India.*
[b]*Department of CIE, St. Joseph's College of Engineering,Chennai 600 119, Tamil Nadu, India.*

Abstract

In this paper, an Improved Particle Swarm Optimization (IPSO) algorithm based bi-level and multi-level thresholding is proposed to segment the cancer infected breast thermal images using Otsu's function. In the proposed image segmentation work, histogram of the image is analyzed and the optimal thresholds are attained by maximizing Otsu's between class variance function. The performance of IPSO based segmentation process is demonstrated by consideringthermograms, being compared with state-of-the-art alternatives, such as Particle Swarm Optimization (PSO) and Darwinian PSO (DPSO). The proposed image segmentation procedure is directly implemented on RGB images. The performance assessment between algorithms is carried out using parameters, such as objective function, PSNR, SSIM and CPU time. The results confirm that, IPSO shows an overall enhancement over the alternatives, illustrating a tradeoff betweenCPU time and performance measure values.

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Keywords: Thermogram; Otsu; Improved PSO; segmentation; PSNR; CPU time.

1. Introduction

Breast cancer refers to unreliable, uncontrolled growth and explosion of the cells that originate in the breast tissue. A

* Corresponding author. Tel.: +91-9790936295
E-mail address:nsrimadhavaraja@stjosephs.ac.in

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