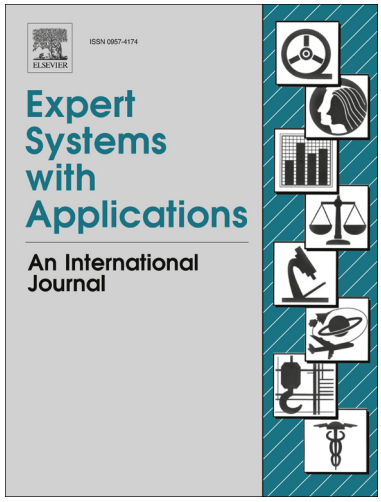

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Image thresholding segmentation based on a novel beta differential evolution approach

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Abstract
Image segmentation is the process of partitioning a digital image into multiple regions that have some relevant semantic content. In this context, histogram thresholding is one of the most important techniques for performing image segmentation. This paper proposes a Beta Differential Evolution (BDE) algorithm for determining the n-1 optimal n-level threshold on a given image using Otsu criterion. The efficacy of BDE approach is illustrated by some results when applied to two case studies of image segmentation. Compared with a fractional-order Darwinian particle swarm optimization (PSO), the proposed BDE approach performs better, or at least comparably, in terms of the quality of the final solutions and mean convergence in the evaluated case studies.

Keywords
Image segmentation, Otsu's method, optimization, evolutionary algorithms, differential evolution.

1. INTRODUCTION

Image processing covers various techniques that are applicable to a wide range of applications. Among the range of image processing tasks, image segmentation is considered as an important basic operation for meaningful analysis and interpretation of acquired image. The image segmentation process the partition of the image into a set of disjoint regions or sections. These regions usually have a strong correlation with the objects in the image.

Threshold or multithreshold selection based segmentation routines constitute an important field of research with many practical applications. A variety of thresholding approaches have been adopted for