

# 基于双鸟群混沌优化的 otsu 图像分割算法

吴军, 王龙龙

(江西理工大学, 信息工程学院, 江西 赣州 341000)

**摘要:** 为了提高鸟群图像分割算法在求取图像最佳阈值时的准确性与稳定性, 提出了一种双鸟群混沌优化图像分割算法. 在求取图像二维 otsu 阈值时对两个种群求得的二维解进行交叉互换, 并加入混沌扰动, 加强了搜索能力. 为了减少噪声对图像分割结果的影响, 使用一种改进的自适应选择中值-均值滤波法对图像进行预处理, 增强了图像分割时对噪声的鲁棒性. 实验结果表明双鸟群混沌优化图像分割算法在求取一维、二维 otsu 阈值时的准确度和稳定性要优于其他算法, 且无论在低噪声污染还是高噪声污染下都能对图像进行较为准确的分割.

**关键词:** 鸟群算法; 混沌扰动; 最大间类方差法; 图像分割; 图像去噪

## An Otsu Image Segmentation Algorithm Based on Chaos Optimization of Two BSA

WU Jun, WANG Long-long

(School of Information Engineering, Jiangxi University of Science and Technology,  
Ganzhou 341000, China)

**Abstract:** In order to improve the accuracy and stability of bird swarm image segmentation algorithm in finding the optimal threshold of image, a two-bird swarm chaos optimization image segmentation algorithm is proposed. The two-dimensional solutions obtained by two populations are cross-exchanged when the image two-dimensional otsu threshold is calculated, chaos disturbances are added to enhance the search capability. In order to reduce the influence of noise on the image segmentation results, an improved adaptive selection median-mean filter method is used to preprocess the image, which enhances the robustness to noise during image segmentation. Experimental results show that the two-bird swarm chaos-optimized image segmentation algorithm is superior to other algorithms in obtaining the one-dimensional and two-dimensional otsu thresholds, The image can be accurately segmented regardless of low noise pollution or high noise pollution.

**Key words:** bird swarm algorithm; chaotic disturbance; otsu; Image segmentation; Image denoising

**作者简介:**

吴军男, (1963-), 硕士, 副教授. 研究方向为嵌入式系统及应用、数字图像处理.

王龙龙 (通信作者) 男, (1992-), 硕士研究生. 研究方向为数字图像处理. E-mail: 1240279637@qq.com.