

工程与应用

炭制品X光图像的缺陷边缘提取

周贤^{1,2}, 唐琴¹, 赵先琼¹

1.中南大学 机电工程学院, 长沙 410075

2.国防科技大学 机电工程学院, 长沙 410073

收稿日期 修回日期 网络版发布日期 2007-12-10 接受日期

摘要 针对炭制品X光图像的特点, 为快速准确地提取缺陷, 提出了基于迭代的阈值构造方法和数学形态学相结合的边缘提取算法。通过对传统形态学边缘提取方法的分析, 构造了基于形态学多结构元边缘提取算子, 该算子既有良好的边缘提取特性, 又很好地解决了噪声抑制和保持图像边缘细节之间的矛盾。在此基础上, 为进一步减少噪声干扰的影响, 采用基于迭代的分割阈值从图像中提取出缺陷区域, 然后利用多结构元边缘提取算子成功提取了缺陷区域的边缘, 并从理论上分析了噪声对缺陷边缘提取的影响情况。实验结果表明, 与目前的边缘检测算子相比, 该法能有效抑制噪声干扰的影响, 保证了缺陷边缘的连续性、完整性和精确定位。

关键词 [炭制品](#) [X光图像](#) [数学形态学](#) [迭代法](#) [边缘检测](#)

分类号

Defect edge extraction of X image on carbon product

ZHOU Xian^{1,2}, TANG Qin¹, ZHAO Xian-qiong¹

1.College of Mechanical and Electrical Engineering, Central South University, Changsha 410075, China

2.College of Mechanical and Electrical Engineering, National University of Defense Technology, Changsha 410073, China

Abstract

In order to extract defects quickly and exactly, threshold-construction method based on iteration and edge-extraction algorithm based on mathematics morphology is advanced regarding the characteristic of X-ray detection images of carbon product. Based on the analysis of traditional edge detection operator of mathematical morphology, a multi-structuring elements edge detection operator of mathematical morphology is constructed, which can suppress noise as much as possible while preserving fine details. Based on this, the threshold-construction method based on iteration is adopted to extract defect area in order to eliminate the effect of noise, the edge of defect area is extracted successfully using a multi-structuring elements edge detection operator of mathematical morphology and the effect of noise on defect edge-extraction is analyzed in theory. The experiment results indicate that the method can control the effect of noise jamming compared with actual edge detection algorithm, and the continuity, integrality and position with high precision of defect edge are ensured.

Key words [carbon product](#) [X image](#) [mathematics morphology](#) [iteration method](#) [edge detection](#)

DOI:

通讯作者 周贤 zhouxian@csu.edu.cn

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(761KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

▶ [加入我的书架](#)

▶ [加入引用管理器](#)

▶ [复制索引](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中 包含“炭制品”的 相关文章](#)

▶ [本文作者相关文章](#)

· [周贤](#)

· [唐琴](#)

· [赵先琼](#)