

论文

基于小波的煤岩图像特征抽取与识别

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摘要:

针对目前采掘工作面是事故易发多发地带和煤岩界面的识别基本由人工来完成的现状, 为了减少人员伤亡以及实现采矿自动化, 研究了煤岩的自动识别技术。介绍了煤岩图像识别基础和小波变换原理, 讨论了小波函数以及滤波长度、分解尺度的设置情况, 提出利用Daubechies小波对煤岩图像进行分解, 构造相应的纹理导向度, 获得特征值参数表, 最后通过Minkowski距离计算公式, 得到待测样品与煤岩样品的空间距离, 根据距离大小来实现对待测样品的识别。结果表明: 该方法通过小波分解再抽取相应的特征值充分表达了煤岩图像的纹理特征信息, 而且能成功识别煤岩图像获得了比其他分解方法更高的识别准确率。研究结果可为煤岩界面的自动识别提供理论参考, 提供了新的思路。

关键词: 煤岩; 图像; 小波; 特征抽取; 识别

Wavelet-based coal-rock image feature extraction and recognition

Abstract:

At present Mining work face was the accident prone areas and identifying coal rock interface was done by people. In order to reduce the casualties and the realization of mining automation, the automatic identification technique of coal and rock image was researched. The basis of the coal rock image recognition and the principle of wavelet transform were introduced. The wavelet function and the establishment of decomposition scale and filter length were discussed. Coal rock image was decomposed with use of Daubechies wavelet and texture orientation degrees were structured. In order to recognize coal and rock, spatial distance of the sample to be tested and the coal samples was achieved by Minkowski formula and parameters table. The results showed the method expressed the texture information of coal rock image fully and could not only accurately identify the coal and rock, but also achieved better accuracy rate than other ways. Research results could provide a new idea and the basis for the coal rock interface automatic recognition.

Keywords: coal rock; image; wavelet; feature extraction; identification

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