



A new indexation strategy for the recognition of rocks based on the sparse representation of the signals combined with the texture spectrum of Wang

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Rock recognition is extremely difficult because of the heterogeneity of rock properties. Today, in the area of petrography, the recognition of rocks is usually done by photo interpretation alongside which other techniques exist such as spectroscopy, microscopy and geochemistry. But with the rise of computer vision, automatic recognition has become possible from digital images of rocks and much research has gone in that direction. Some methods such as image indexation compare the image introduced by the user through a similarity search query in an image database. Other methods such as PCA, SVM, K-means, neural networks and k-nearest neighbors etc, based on classification strategies have also been studied to identify objects or rocks. In this paper, we have proposed a new method of rocks recognition based on a sparse representation of the signals named K-SVD combined with the spectra of textures of the rocks. Our approach consists, first to develop through the K-SVD from the initial image, to estimate the dictionary D1 of the parsimonious matrix X1 and the reconstruction error ER1. Then a Wang texture descriptor is applied to the original image to produce a new texture image. Then the K-SVD algorithm is used again on the new image to produce a new D2 dictionary, a new parsimonious X2 matrix and a new ER2 reconstruction error. The selected signature parameter aimed at characterizing a rock in a discriminant manner is the reconstruction error vector obtained from the two previously calculated errors. The algorithm of the proposed approach has been applied to different direct view images of rock. The experimental results obtained show the relevance of the identification strategy developed. The reconstruction error was chosen here as our discriminating factor.

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