

Sri Lankan Vein Graphite Classification Using Image Processing and Neural Network

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Image classification is an essential task in pattern recognition applications. Rock and mineral images are some of the typical examples for natural images, and their analysis is more important in rock and mineral industry. Ore mineral classification is based on specific visual descriptors extracted from the images. These textures are used to identify their visual similarity and categorise them accordingly. This research primarily addresses the problem of automatic measurement of graphite ore textures by image analysis in a way that it is relevant to mineral processing in Kahatagaha Graphite Lanka Limited, Sri Lanka. Specifically, it addresses three major hypotheses: Automatic separation of graphite ore by image analysis provides a feasible alternative to manual curing by mineralogists and labourers, Image analysis can quantify process mineralogy by physical parameters and Image analysis provides potential benefits to process mineralogy and better retains the information of manual logging. Traditionally, minerals are visually recognized and manually outlined prior to the digitizing and subsequent analysis. The preciseness of the outcomes is affected by the conventional methods. This limitation can be overcome by using multichannel methods of classification with Artificial Neural Network, in which the minerals in multichannel digital images are accurately recognized based on their unique spectral or elemental signatures, established by a training stage prior to classification. The technique is applied here for model analysis of images, which are digitized using a standard digital camera. In all case studies of the analysis of graphite lumps, the resulting mineral modes are sufficiently precise to identify significant compositional heterogeneities between groups of samples. This model can be readily applied to automated vein graphite ore classification in mineral processing industry.

Keywords: Mineral classification, Image processing, Neural network, Vein graphite classification