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Minerals boundary detection in petrographic thin sections image using ArcGIS software

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Abstract: In this paper, a new method for mineral boundary detection is proposed using a model prepared in ArcGIS ModelBuilder tool. Required data for this method are gray scale images taken from petrographic thin sections. The images are captured in 19 numbers through 90° polarizers and lambda plate rotation with 5° intervals while the microscope table is fixed. Mineral boundaries are detected using the ArcGIS software by comparison of colour intensity amongst the adjacent minerals in sequential images. The presented method is fast and accurate to detect favorite grain boundaries from thin sections, and is able to create a powerful database containing grain shape characteristics. Petrographic study on four rock samples demonstrates that the results of grain boundary detection by the model without operator intervention, are more than 80 percent correlated with manual boundary detection method.

Keywords: *Boundary detection, ArcGIS ModelBuilder, Thin section, Image processing, Petrography.*