

ABSTRACT

The rock made of frozen mineral, so that type of rock can be divided based on mineral content formed, or called rock forming minerals. With the help of a microscope, the geologist could classify based on the characteristic which originated from amount of minerals. Rock will be sliced into thin sections, then put below a lens which are contained in a microscope. The result obtained with human eye with help of a microscope will be analyzed and made percentage of mineral content. But, the result obtained will depend on human's accuracy level and takes a long time. The weakness can be minimized with digital signal processing.

In this final project, the writer will simulate and design a digital signal processing based on matlab. That simulation can analyze and classify kind of rocks with faster, more accurate and more objective. Image objects that used for research is frozen rock with mineralogy optic cross nikol and parallel nikol. In general for identified type of rock, this system divided into two types, based on texture and rock's colour. In technical, frozen rocks based on texture will use Gray Level Co-occurrence Matrix (GLCM) method and decision tree as its classification method. The accuracy based on texture for cross nikol mineralogy is 82,6% with image size is 1024 x 684 pixel, with GLCM parameter distance 1 pixel, direction 45, quantization level 32, the computing time is 45,65 second. In parallel nikol is 80,37% with image size is 512 x 324 pixel, with GLCM parameter distance 4 pixel, direction 0, quantization level 32, the computing time is 57,08 second. Then identification of rocks colour use colour segmentation based on the determination of the number of colors specified by expert petrology with K-Means Clustering algorithm, which the output can calculate total mineral and rock's name based on QAP Petrology.

Keywords : Microscope, Image Processing, GLCM, Decision Tree, Cross Nikol, Parallel nikol.