

## ABSTRACT

The rock made of frozen mineral, so that type of rock can divided based on mineral content formed, or called rock forming minerals. With the help of microscop, the geologist could classify based on the characteristic which originated from amount of minerals. Rock will be slashed into thin incision, then put below lense which are contained in microscope. The result obtained with humans eye with help of microscop 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 designing a digital signal processing based on matlab. That simulation can analyze and classify kind of rocks with faster, more accurate and more objective. Image object 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 teture will use Gray Level Co-occurrence Matrix (GLCM) method and decicison tree as its classification method. The accuration 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 paralel 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. Than 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 calculated total mineral and rock's name based on QAP Petrology.

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