

ABSTRACT

The natural process of rocks is very much a result of its kind, is generally consist of 3 main processes, first process is crystallization that that generates the type of igneous rock, second process is metamorfisme that produces a type of metamorphic rock, the deposition process that produces a type of sedimentary rock. Of each type of rock above also produces different of rock such as sedimentary rocks consist of konglomerat, sandstone, limestone rocks and so forth, igneous rocks are also divided as granite, rocks of andesite and basalt rocks. And the type of metamorphic rock are also divided consist of marble rocks and slite. See the large number of different types of rocks above, as geologists in determining the types of rocks using a sense of sight certainly has its disadvantages.

In this final Task, the writer will design a software using MATLAB expected the system capable of detecting the kind of rocks. This system will be provided with input in the form of a digital image of the rock that will be detected, which will then be carried out standardization process image. The system will first work with the extraction of characteristics to obtain information in the image through one type of Wavelet transform that is Discrete Wavelet Transform (DWT). After obtained characteristic image, next is the classification of the image through the nearest distance method or the K-Nearest Neighbor (KNN) which will then be grouping in vulnerable image.

From the test results, the system that has been developed able to detect rocks with a DWT level used is level 1, with the best accuracy was 98.33%. In this system, changes the type of the mother wavelet is not too influential. And for the best component in this system is a component of LL in the DWT with 98.33% accuracy. While in the process of K-NN classification type of the distance that can be used is the best kind of Euclidean and the best accuracy with Cityblock 98.33% with the best parameters there are at $k = 1$ and $k = 3$.

Keywords: *Rock Type, Image Detection, Discrete Wavelet Transform, K-Nearest Neighbor.*