Abstract

Brain tumors are one type of malignant tumor that occurs because there is abnormal cell division activity and uncontrolled. There are several ways to diagnose brain tumors, for example use MRI images. Through the MRI images, the radiologist can see the brain anatomy without perform surgery. However, this process is still done manually and could lead to misdiagnose. In addition, the characteristics of brain tumor is diverse that makes the diagnose more difficult. Therefore, we need a system of Computer-Aided Diagnostic (CAD) that will help radiologist in identifying brain tumors.

In general, the CAD system consists of two major processes, namely image segmentation and feature extraction and classification. One example of segmentation is Region Growing that which will classify the pixels based on certain criteria. However, these methods have a drawback in the selection of seed points that must be done manually. An example of feature extraction methods are Fuzzy Symmetric Measure (FSM), and First and Second Order Statistics. FSM values can be used to calculate the symmetry of the image brain, while the first and second order is texture feature in the image. As for the classification, Artificial Neural Network Backpropagation method is widely used because of its ability to resolve nonlinear dan complex problems.

This final project will implement CAD system that uses Region Growing, Symmetric Fuzzy Measure, and Backpropagation Neural Network for the detection and classification of brain tumors. In addition, this task will modify converging square algorithm to select a seed point automatically. After testing, the system generates a 100% accuracy and BER i s 0 in the case of distinguishing between normal brain with a tumor. While the classification of types of brain tumors, the average accuracy achieved is 89.72 % , the BER 0.1 for training data, and the average accuracy of 84.44 %, BER 0,16 for the test data.

key words : brain tumor, medical resonance imaging, region growing, fuzzy symmetric measure, artificial neural network *backpropagation*