Liver Cancer Identification using Adaptive Neuro-Fuzzy Inference System

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Abstract

This paper describes the application of adaptive neuro-fuzzy inference system (ANFIS) model for classification of liver tumor as benign or malignant by analyzing CT liver images. Decision making was performed in four stages: in the first stage, image is enhanced to improve its quality. In the second stage, the liver is extracted based on thresholding and boundary extraction algorithms. Then it is given as input to Fuzzy C-mean (FCM) clustering algorithm to segment it's inside tumor object. In the third stage, texture features and Discrete Wavelet Transformation features are extracted. In the fourth stage, the ANFIS classifier is trained by these extracted features using the backpropagation gradient descent method in combination with the least squares method. To evaluate the effect of each type of features on the tumor classification process, these two sets of features are trained separately to take the right decision to classify the liver tumor as malignant or benign. The performance of the proposed approach was tested and evaluated using a group of patient's CT images and the experimental results confirmed that the proposed approach has potential in identifying the tumor type.
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