Brain Magnetic Resonance Images Segmentation via Wavelet-Based Neural Network Approach

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Abstract

A fast, effective and robust wavelet-based neural network approach is realized for the purpose of segmentation of magnetic resonance images in the present research. It should be noted that magnetic resonance image shaves to be considered as reference image in clinical research currently. The segmentation of magnetic resonance images of brain is aimed the researchers to specify the structure of its original tissues precisely. The nature of brain can basically be divided into three parts: firstly, the white matter, secondly, the gray matter and, thirdly, the cerebrospinal fluid, as well. The segmentation of magnetic resonance images of brain is here carried out using the following steps: a set of images, collected as the reference data, at first. Each part of the brain in these images as well as the background of the images is then cut and the cut pieces are placed in four separate classes. Subsequently, in the next step, features are extracted from each of these classes by the method of wavelet coefficients and Laws filter, and are given to the neural network for training. Neural network with wavelet transfer function also performs the segmentation process.

Keywords: Feature extraction, Segmentation, Wavelet transform, Magnetic Resonance Image (MRI), Neural network.