Improved fast fuzzy C-mean and its application in medical image segmentation

ABSTRACT

Image segmentation is a preliminary stage in diagnosis tools and the accurate segmentation of medical images is crucial for a correct diagnosis by these tools. Sometimes, due to inhomogeneity, low contrast, noise and inequality of content with semantic, automatic methods fail to segment image correctly. Therefore, for these images, it is necessary to use user help to correct method's error. We proposed to upgrade FAST FCM method to use training data to have more accurate results. In this paper, instead of using pixels as training data which is usual, we used different gray levels as training data and that is why we have used FAST FCM, because the input of FAST FCM is gray levels exist in image (histogram of the image). We named the new clustering method improved fast fuzzy C-mean (FCM). We use two facts to improve fast FCM. First, training data for each class are the member of the class. Second, the relevance distance of each input data from the training data of a class show the distance of the input data from the class. To cluster an image, first, the color image is converted to gray level image; then, from histogram of image, user selects training data for each target class, afterwards, the image is clustered using postulated clustering method. Experimental result is demonstrated to show effectiveness of the new method.

Keyword: Image segmentation; Supervised methods; MRI