Literature Survey - MRI

With the increasing size and number of medical images, the use of computers in facilitating their processing and analysis has become necessary. In particular, as a task of delineating anatomical structures and other regions of interest, image segmentation algorithms play a vital role in numerous biomedical imaging applications such as the quantification of tissue volumes, diagnosis, study of anatomical structure, and computer-integrated surgery. Classically, image segmentation is defined as the partitioning of an image into non-overlapping, constituent regions which are homogeneous with respect to some characteristics such as intensity or texture. However, a drawback of these kernel clustering algorithms using the dual representation for clustering prototypes (that is, each prototype is formulated as a linear sum of after-mapped dataset elements, and hence the parameters to be optimized are not original prototypes anymore but linearly-combined coefficients) is that the clustering prototypes lie in high dimensional feature space and hence clustering results lack clear and intuitive descriptions as in the original space. The paper on kernelized fuzzy C-means (KFCM) algorithm compensates for such a lack and is then applied to the MR image segmentation. It is realized by replacing the original Euclidean distance in the FCM algorithm with a kernel-induced distance [1].

For an image with clear objects in the background, the bi-level thresholding method can easily divide the object from the background. But to segment complex images, a multilevel threshold method required. The multilevel threshold segments the pixels into several distinct groups in which the pixels of the same group have gray levels within a specific range. However, when the thresholding method is extended to multi-level thresholding, the computation time grows exponentially with the number of thresholds. Many threshold methods have been proposed to solve this problem. Single (bi-level) or multiple thresholding is a straightforward and effective technique for image segmentation and computer vision. However, it requires an adequate threshold value to extract objects of interest from their background, since the objects in an image have their own distinct gray-level distributions. Thresholding is widely used in many image processing applications. A hybrid algorithm based on a self-adaptive thresholding method is proposed to optimize the threshold of the Otsu’s method [2].