Abstract

This paper presents two robust FCM algorithms to segment the brain tissues from MRI volume. The core regions of human brain are white matter (WM), gray matter (GM), cerebrospinal fluid (CSF) and others known as background (BCK). Usually, to classify the given data, random initial seeds are selected and then the FCM procedure is iterated until the centroids of cluster converge. The first proposed FCM, named as FCM-EXPERT, make use of the expert knowledge about the brain tissue properties to select the initial seed points. Experimental results on brain portions extracted from large MRI database show that this method is faster by 1.3 to 1.7 times than that of the traditional FCM in segmenting brain tissues. FCM-EXPERT has been again modified by making use of the correlation existing between brain regions in adjacent slices of MRI for centroid initialization and named as FCM-EXPERT-E. Experimental results of the second method show that this is faster by 2 to 4 times than that of traditional FCM.

References

- http://www.cma.mgh.harvard.edu/ibsr/index.html
- http://www.med.harvard.edu/AANLIB/home.html

Index Terms

Computer Science
Artificial Intelligence

Keywords

FCM clustering; brain tissues segmentation; centroid initialization; brain continuity; slice correlation; MRI scans.