Abstract

Segmentation of brain tissues is one important process prior to many analysis and visualization tasks for magnetic resonance (MR) images. Clustering is one of the unsupervised techniques for doing the segmentation. Clustering is done with probabilistic, possibilistic and plausibilistic approaches. Most of segmentation techniques have relied on multi channel characteristics of MR images while a few studies have reported segmentation from single channel MR images. Owing to operator performance, limitation of equipment and environmental conditions MR images contain noise. This noise can lead to serious inaccuracies in the segmentation result. We conduct the research in measuring the performance of crisp and fuzzy clustering algorithms with probabilistic, possibilistic and plausibilistic approach in different noise level for single channel MR image. To validate the accuracy and robustness of the result of clustering algorithms we carried out experiments on simulated MR brain scans. The performance of algorithms is analyzed form three measures namely: number of iterations required, misclassification error and per class (tissue) misclassification error in different noise level present in the single-channel MR image.
Reference

- D. G. M. Murphy, C. DeCarli, M. B. Schapiro, S. Rapoport, Horwitz, Age-related differences in volumes of subcortical nuclei, brain matter, and cerebrospinal fluid in healthy men as measured with magnetic resonance imaging, Arch. Neurol. 49 (1992) 839-845.
- L. Zadeh, Fuzzy sets as a basis for a theory of possibility, Fuzzy sets and systems 100 (1999) 9-34.

Index Terms
Performance Analysis of Unsupervised Probabilistic, Possibilistic & Plausibilistic Clustering Algorithms for Brain Tissue Segmentation

Computer Science

Soft Computing

Key words

Single-channel MR image

segmentation

unsupervised clustering algorithm

brain tissue classification