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Computer Aided Diagnostic System for Detection and Classification of a Brain Tumor through MRI Using Level Set Based Segmentation Technique and ANN Classifier

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Abstract : Due to the acquisition of huge amounts of brain tumor magnetic resonance images (MRI) in clinics, it is very difficult for radiologists to manually interpret and segment these images within a reasonable span of time. Computer-aided diagnosis (CAD) systems can enhance the diagnostic capabilities of radiologists and reduce the time required for accurate diagnosis. An intelligent computer-aided technique for automatic detection of a brain tumor through MRI is presented in this paper. The technique uses the following computational methods; the Level Set for segmentation of a brain tumor from other brain parts, extraction of features from this segmented tumor portion using gray level co-occurrence Matrix (GLCM), and the Artificial Neural Network (ANN) to classify brain tumor images according to their respective types. The entire work is carried out on 50 images having five types of brain tumor. The overall classification accuracy using this method is found to be 98% which is significantly good.

Keywords : brain tumor, computer-aided diagnostic (CAD) system, gray-level co-occurrence matrix (GLCM), tumor segmentation, level set method
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