

Documents

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Improving brain MR image classification for tumor segmentation using phase congruency
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Abstract

Background: MRI which stands for Magnetic Resonance Imaging is commonly used to capture images of internal body organs, functionality and structure. Manual analysis is usually performed by Radiologists on a large set of MR images in order to detect brain tumor. Aims: This research aims to improve automated brain MR image classification and tumor segmentation using phase congruency. Methods: The skull part is removed from brain MR image by applying converging square algorithm and phase congruency based edge detection method. Features are then extracted from the segmented brain portion using discrete wavelet transforms. In order to minimize the extracted feature set, we applied the principal Component Analysis algorithm. The MR images are classified into tumorous and non-tumorous using Multilayer perceptron and compared with other classifiers such as K-Nearest Neighbor, Naive Bayes, and Support Vector Machines (SVM) along with discrete cosine and discrete cosine transform features. The tumor is segmented using Fuzzy C-mean and reconstructed tumor 3D model to measure the volume, location and shape accurately. Results & Conclusion: Experimental results are obtained by testing the proposed method on a dataset of 19 patients with a total number of 2920 brain MR images. The proposed method achieved an accuracy of 99.43% for classification which is higher as compared to other current studies. © 2018 Bentham Science Publishers.

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