

Computer Aided Diagnostic Tool for Cancer Detection using MRI Images of Brain



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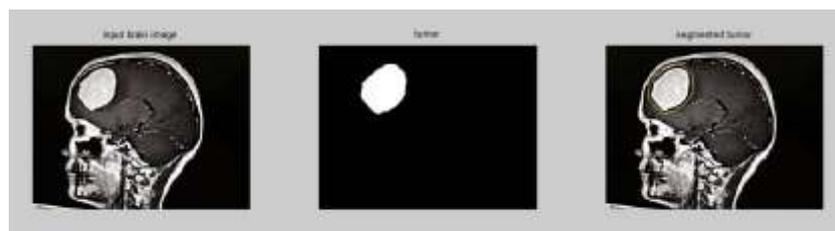
Keywords: CAD, Discrete Wavelet Transform, Gray Level Co-occurrence Matrix, Support Vector Machine

Abstract:

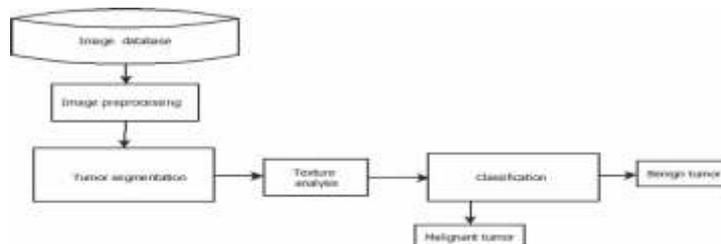
The brain is one of the vital organ of the body where it is the custodian of the involuntary and voluntary actions like walking, vision, memory. Thus there is a need to diagnose the disorders of the brain where the diagnosis is done by studying the radiological images obtained from different modalities. The best available choice to acquire images is through imaging modalities in terms of Computed tomography (CT), Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET) images which helps in treatment of Cancer by detecting the tumour located in the tissues of brain. The use of CAD tools helps in studying the different problems of brain like aneurysms, mental disorders etc. The impact of this CAD tool for diagnosis of cancer in brain helps the doctors, radiologists to determine whether the tumor is malignant or benign. The method used to segment the tumor is thresholding process and morphological dilation by which the tumor is segmented. In the next step the image is decomposed using 2D DWT technique and then the features are optimized using PCA method. Thus the optimized data set are fed to SVM classifier for classification of tumor into benign or malignant. The classifier accuracy is obtained by using 3 kernels that is RBF, Linear and Polynomial kernel. The GUI is designed in MATLAB to simulate the CAD tools. The system is checked for 25 benign and 15 malignant images, the tabulation is done for respective type of images. The kernels yield classification accuracy in the range 50-70% and the thresholding segmentation technique with morphological operator is used for large tumor images. The classification process is a combination of DWT, PCA and SVM method.



GUI of brain tumor detection and classification system



Segmented brain tumor



Block diagram of brain tumor detection and classification system

Conclusion: The work can be further extended to different modalities.