Name of the Research Scholar: Deepti Gupta

Name of the Supervisor: Prof. Musheer Ahmad

Name of the Co-Supervisor: Prof. Abul Hasan Siddiqi

Department: Department of Applied Sciences & Humanities

Title of the Thesis: Applications of Support Vector Machine and Wavelets for Solving Real World Problems

Keywords: Magnetic Resonance Imaging (MRI), Support Vector Machine (SVM), Fuzzy C Means (FCM), Image Denoising, Wavelets.

Abstract

Magnetic Resonance Imaging (MRI) is the most significant approach, in sensing the life-threatening illness like brain tumor. An innovative hybrid approach based on the merger of Support Vector Machine (SVM) and fuzzy c-means is suggested in this work for brain tumor classification. In this process enhancement techniques such as spatial domain method and frequency domain method are used to enhance the picture. Skull striping is performed by mathematical morphology methods and Fuzzy c-means (FCM) clustering is applied for the segmentation of the picture to expose the incredulous domain in brain MRI pictures. The Gray Level Co-occurrence Matrix (GLCM) method is used for extracting texture features from the brain pictures, subsequently SVM method is applied to categorize Tumor and Non-Tumor brain MRI pictures, which gives furnish and more efficacious outcome for classification of brain MRI pictures.

Process of evacuating noise from an image or signal which arise during imaging due to the ambiguity of measurements or instruments is Image Denoising. It is an essential preprocessing expedient for image analysis. The goal of image denoising is removal of noise and preserve the useful information of an image. Image denoising through support vector machine is an excellent approach because it removes unwanted noise, by possessed the image detail. This work explores image denoising using Support Vector Machine with the help of coding in MATLAB. To understand the procedure, Brain MRI images were introduced with a set of known noises and then denoised. The same procedure was repeated to denoise four brain MRI images with salt and

pepper noise. Experimental results display peak to noise ratio (PSNR) of proposed method is much better than the conventional method, this method remove noise and preserve the important image detail to restore the original image.

Images must be clear and noise free, to achieve better accuracy in classification results of brain tumor from magnetic resonance imaging (MRI). But in the process of collection of medical images, the picture gets noisy, inadvertently. Deletion of noise from images is known as wavelet shrinkage or thresholding. An ingenious and compatible method is proposed for the valuation of thresholding parameters, hinge on the information of wavelet coefficients. For the better illustration of the process brain MRI was introduced with Gaussian noise at the different level of variances and then denoised using Wavelet Transform with coding in MATLAB. The same procedure was repeated to denoise three brain MR Images with the brain tumor. Proposed method helps in embellished off the edge and texture details of the images. The image quality of brain MR images is assessed in terms of peak signal-to-noise ratio (PSNR). Experimental results represent that this method attain preferable denoised image with improved PSNR.

Purpose of this paper is a sophisticated classification technique to acknowledge Tumor and Non-Tumor MRI brain image. CT-scan, MRI images and ECG are used to checkup of human being disease efficiently. However, radiologist also used visual examination based manual analysis of tumor which may be wrong classification. To avoid the human error for analysis of variety of MRIs an automatic classification is suggested. During chapter five support vector machines (SVM) are proposed in place of MRI magnetic resonance imaging to classify brain image. Feature extraction from MRI pictures will be given by fusion of GLCM and GLRLM with GA as feature reduction during this paper. Higher recognition rate minimized the error rates of MRI of brain tumor differentiation by classifier Support Vector Machine.