ABSTRACT

Diabetic Retinopathy has been found to be a foremost cause of irrecoverable blindness due to the leakage of blood vessels in the retina. These damaged blood vessels lead to leakage and spreading of blood at the retinal which causes visible impairment and is in all likelihood to result in permanent blindness. The increase in the number of diabetic affected people and the demand for efficient measurement techniques of various retinal parameters have been focused by many researches in the past few decades. Retinal biometrics involves the scanning of retinal and studying the nature of blood vessels in the posterior of the eye.

A novel luminous preserving intensity based RGB image has been generated from which grey scale conversion is carried out. The pre-processing work is intensified by applying a robust median filter to remove the fine grained noises. After the noise removal, it may erode some sharp edges and artefacts; a Contrast-Limited Adaptive Histogram Equalization is employed to improve the local contrast ration of the pre-processed image. This methodology addresses on small regions in the image, called tiles or blocks, rather than the entire image. The work is further investigated by calculating Mean Square Error Rate and Peak Signal to Noise Ratio.

Retinal images can be classified by a novel computer aided clinical and decision support system using enhanced SVM and Fuzzy. The work focuses more on applying appropriate filtering and image enhancement techniques cautiously not to lose fine-grain information. The important task is to remove the normal features such as Optic disc and Blood vessels precisely without compromising the background data. Since the abnormal features such as Exudates resembles as Optic Disc and the branches of blood vessels makes it
hard to extract Micro-aneurysms, the task of segmenting the normal features prevails as a vital step.

The abnormal features such as Micro-aneurysms, Exudates and Haemorrhages have been extracted by applying a variety of morphological techniques. By using enhanced Support Vector Machine (SVM) classifier, affected eye images were filtered out from the healthy eye images. A novel Clinical Decision support system based on Fuzzy partition algorithm is then employed to find out the severity of the disease with respect to the extracted feature set values. The performance of the proposed model is analyzed with the help of quality metrics such as Specificity, Sensitivity, Accuracy, Precision, Recall and F-Measure.

With experimentation results, it is clear that the proposed model works better whenever the features are fused together like Optic Disc, Blood Vessels, Micro-aneurysm, exudates and total Number of black and white pixels. Also from the previous results, the images those were pre-processed with second Order Discrete Curvelet Transform gives better result than using Wavelet Transform. The proposed Clinical Decision System is planned to be implemented and further tested to fine tune the model for the public use.