ABSTRACT

In the modern epoch, lots of diseases are found affecting the normal human life. One such disease is diabetes. There are two ways of diabetes being affected, one is through diet and the other is through heredity. Diabetes is found affecting lots of organs in the human body like nerves, liver, heart, kidney and retina etc. 80 percent of the diabetics are found affecting their eyes first and later the other organs of the human body. In this process, diabetes can be identified with the retinal parameters such as extra blood vessels growth in the retina, exudates, microaneurysms, shape of the optic disc. By analyzing the ensuing parameters, vision can be protected from being affected by the diabetes and the rest of the other organs can also be protected from being affected in time.

Initially the retinal images are acquired with the fundus camera. The images are found full of noise, raw and unprocessed pictures, which is confiscated in the preprocessing stage using different types of filters. The filter performance can be calculated by using different types of parameters like signal to noise ratio (SNR), MSE (Mean Square Error), ISMI (Image Similarity Index), RMSE (Root Mean Square Error), PSNR (Peak Signal to Noise Ratio). The feature extraction can be accomplished by four parameters, such blood vessels, exudates, microaneurysms, shape of the optic disc with image processing algorithms. The image processing algorithms utilized in this procedure are proposed edge detection algorithm, modified fuzzy clustering algorithm, modified morphological algorithm and deformation method respectively. The proposed image processing algorithms accuracy is compared with the existed algorithms. The diabetic stages can be classified into mild, medium and severe using a SVM (Support Vector Machine) classifier technique. They are implemented to classify or for the reversion. Belonging to the group, they are administered with appraisal approaches. It is compared with existed classifiers and performance also given best classifier compred to existed classifier. The simulated results is compared with the clinically tested blood sample values. The compared results are found co-equal in both the contextual investigations. The comparison is illustrated in a tabular form representing the patients name, blood sugar values, retinal images, segmented results of retinal image and severity.
The extra blood vessels growth, exudates area, exudates perimeter, no of dots, optic cup to disc ratio are found using the Matlab software. The ensuing results are compared with the clinical blood sample values. With a proposed mathematical expression to show the relation between blood sugar values and retinal abnormal parameters using a polynomial coefficient. The correlation coefficient is calculated between the above two parameters and both are found correlated to each other.

The current ophthalmologists are still found utilizing the old methods such as the iris scanner, digitech technology. But this proposed evaluation and development of this software program will certainly facilitate and revolutionize the face of ophthalmology in discovering the retinal abnormalities from the blood sugar ranges.