Abstract

Diabetic Retinopathy (DR) is a disease that affects up to 80% of diabetics around the world. According to the world health organization (WHO) report, India has 31.7 million diabetic subjects, and in 2030 it may be 79.4 million. Over all 210 million people have diabetes mellitus all over the world. Out of that 10-18 % would have had or develop DR. For that there is need to early detection of DR. In this research we mainly focus on Non proliferative diabetic retinopathy (NPDR). NPDR is an early stage of diabetic retinopathy. In NPDR increase blood sugar level causes swelling in the blood vessels and it leak in to the retina. NPDR categorize in three stages like mild, moderate and sever non-proliferative diabetic retinopathy. NPDR causes sudden blindness. From this research we can prevent the people from the vision loss. For detection of NPDR we are using fundus images. These fundus images are captured by the fundus camera. This technique is totally non-invasive technique. We have used standard database like HRF, DIARETDB0, DIARETDB1, and STARE. We have design new wavelet named as DR wavelet. All the work is done using two wavelets i.e. using HAAR and newly designed DR wavelet. In this research work we have simply done the localization part first. In that we have localize optic disc (OD) and macula. For localization of OD we got 92.24% accuracy using HAAR wavelet and 96.02 % using DR wavelet. For Macula localization we have got 86.85 % accuracy using HAAR wavelet and 92.24 % accuracy using DR wavelet. And in the second part we have done the extraction of NPDR lesions (MA and EX) and Blood vessels for detect abnormality in the retina using HAAR wavelet and new designed DR wavelet. After extraction of lesions and retinal blood vessels we have done the classification using SVM and KNN classifier. Accuracy is calculated using confusion matrix. We found that new designed wavelet (DR) gives the result as good as HAAR wavelet. And we got more accuracy using KNN classifier. SVM classifier gives 91.39 % accuracy for HAAR wavelet and 90.18% accuracy for DR wavelet, and KNN classifier gives 97.40 % accuracy for HAAR wavelet and 97.73% accuracy for DR wavelet.