Multi-Layer Perceptron and Radial Basis Function Neural Network Models for Classification of Diabetic Retinopathy Disease Using Video-Oculography Signals

Authors : Ceren Kaya, Okan Erkaymaz, Orhan Ayar, Mahmut Özer

Abstract : Diabetes Mellitus (Diabetes) is a disease based on insulin hormone disorders and causes high blood glucose. Clinical findings determine that diabetes can be diagnosed by electrophysiological signals obtained from the vital organs. 'Diabetic Retinopathy' is one of the most common eye diseases resulting on diabetes and it is the leading cause of vision loss due to structural alteration of the retinal layer vessels. In this study, features of horizontal and vertical Video-Oculography (VOG) signals have been used to classify non-proliferative and proliferative diabetic retinopathy disease. Twenty-five features are acquired by using discrete wavelet transform with VOG signals which are taken from 21 subjects. Two models, based on multi-layer perceptron and radial basis function, are recommended in the diagnosis of Diabetic Retinopathy. The proposed models also can detect level of the disease. We show comparative classification performance of the proposed models. Our results show that proposed the RBF model (100%) results in better classification performance than the MLP model (94%).

Keywords : diabetic retinopathy, discrete wavelet transform, multi-layer perceptron, radial basis function, video-oculography (VOG)

Conference Title : ICBE 2017 : International Conference on Biomedical Engineering

Conference Location : Barcelona, Spain

Conference Dates : November 02-03, 2017