

THE EFFECT OF IMAGE RESOLUTION ON THE PERFORMANCE OF AUTOMATIC CLASSIFICATION OF DIABETIC RETINOPATHY AND STORAGE MEMORY

ABDULLAHI I. M¹, ARULOGUN O. T², ADEYANJU I. A³, NUHU B. K⁴

^{1,4}Department of Computer Engineering, Federal University of Technology, Minna, Nigeria

^{2,3}Department of Computer Science and Engineering, Ladoko Akintola University of Technology, Ogbomoso Nigeria

ABSTRACT

Diabetic retinopathy (DR) is one of the major causes of blindness in the world which is caused by conditions associated with diabetes. Early detection and mass screening are required to reduce the risk of vision loss. Feature extraction and classification techniques reduce the computational complexity and improve the accuracy of classification. Extracting statistical features using Gray Level Co-occurrence Matrix (GLCM) from a high resolution images and large database increases the memory demand of a DR screening system; hence, there is need for reduction of the image resolution for memory reduction. In this paper, we investigated the effect pixel resolution reduction has on the performance of diabetic retinopathy classification and memory reduction. A feedforward back propagation neural network classifier was trained and tested using ten GLCM features extracted from one hundred fundus images with image comprising (fifty normal and fifty proliferative DR) for five different image resolutions (2240*1488, 1120*744, 560*372, 280*186, 140*93). The result shows that a 50% reduction in resolution leads to a 75% reduction in memory and 0% reduction in performance, which means that GLCM features, can be extracted from fundus images with lower image resolutions in lossless format for fast feature extraction without the fear of reduction in classification performance.

KEYWORDS: Diabetic retinopathy, Gray level co-occurrence matrix, Resolution, Artificial Neural Network, Fundus Image