Vascular intersection detection in retina fundus images using a new hybrid approach

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Abstract

The use of vascular intersection aberration as one of the signs when monitoring and diagnosing diabetic retinopathy from retina fundus images (FIs) has been widely reported in the literature. In this paper, a new hybrid approach called the combined cross-point number (CCN) method able to detect the vascular bifurcation and intersection points in FIs is proposed. The CCN method makes use of two vascular intersection detection techniques, namely the modified cross-point number (MCN) method and the simple cross-point number (SCN) method. Our proposed approach was tested on images obtained from two different and publicly available fundus image databases. The results show a very high precision, accuracy, sensitivity and low false rate in detecting both bifurcation and crossover points compared with both the MCN and the SCN methods.