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AUTOMATED MACHINE LEARNING-BASED CLASSIFICATION OF PROLIFERATIVE AND NON-PROLIFERATIVE DIABETIC RETINOPATHY USING OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY VASCULAR DENSITY MAPS

Oral

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Purpose:

The study aims to classify the eyes with proliferative diabetic retinopathy (PDR) and non-proliferative diabetic retinopathy (NPDR) based on the optical coherence tomography angiography (OCTA) vascular density maps using a supervised machine learning algorithm.

Methods:

OCTA vascular density maps (at superficial capillary plexus (SCP), deep capillary plexus (DCP), and total retina (R) levels) of 148 eyes from 78 patients with diabetic retinopathy (45 PDR and 103 NPDR) was used to classify the images to NPDR and PDR groups based on a supervised machine learning algorithm known as the support vector machine (SVM) classifier optimized by a genetic evolutionary algorithm.

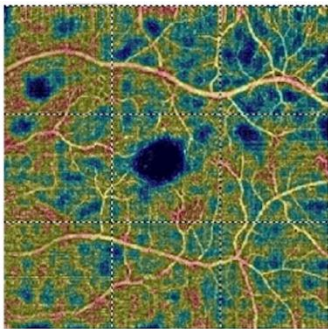
Results:

The implemented algorithm in three different models reached up to 85% accuracy in classifying PDR and NPDR in all three levels of vascular density maps. The deep retinal layer vascular density map demonstrated the best performance with a 90% accuracy in discriminating between PDR and NPDR.

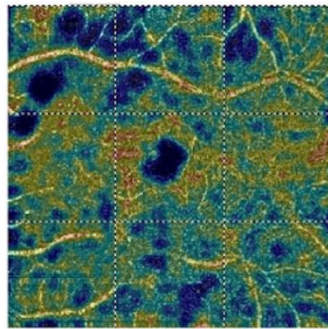
Conclusions:

The current study on a limited number of patients with diabetic retinopathy demonstrated that a supervised machine learning-based method known as SVM can be used to differentiate PDR and NPDR patients using OCTA vascular density maps.

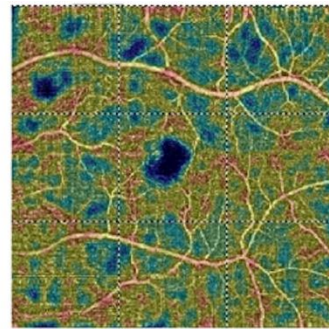
(1)



(a)

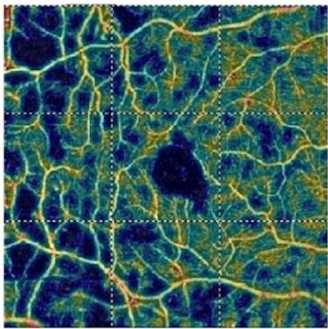


(b)

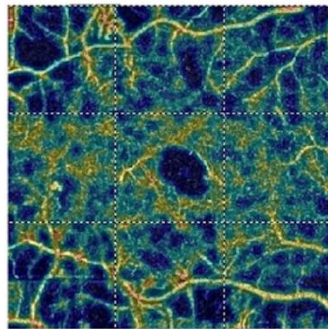


(c)

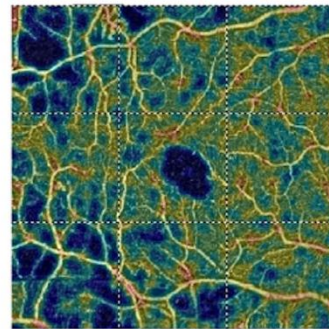
(2)



(d)



(e)



(f)