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Study Group: (none)

ABSTRACT

TITLE: Automatic prediction of capillarity patterns on Optical Coherence Tomography Angiography images
ABSTRACT BODY:
Purpose: Optical Coherence Tomography Angiography (OCTA) has allowed the opportunity to study the pattern of retinal vasculature in greater detail. As a new technology, OCTA presents some challenges in the interpretation of angiographic patterns. In recent years, there has been increased interest in deep learning, a promising class of machine learning that utilizes Convolutional Neural Network (CNN) to extract data in a nonlinear and automatic fashion. CNN has been used successfully for pattern recognition, signal processing and statistical analysis. Additionally, CNN have facilitated breakthroughs in image processing. It has important clinical implications, particularly with regards to interpretation of results from medical images. The purpose of this study was to determine the accuracy of CNN to identify nine capillary patterns on OCTA images
Methods: A cross-sectional study was made. A designed end-to-end model based on CNN for automatical analysis of parameters related to OCTA images was employed. The proposed model used as an input an OCTA images (superficial retinal circulation 3 x 3 mm scan size). The total experimental dataset contained 100 OCTA images. Two random split datasets were built as follows, 70 images for training and 30 images for test. Whole image capillarity, foveal capillarity (1 mm central circle), parafoveal capillarity (3 mm central circle), upper half capillarity, lower half capillarity, temporal parafoveal aspect capillarity, superior parafoveal aspect capillarity, nasal parafoveal aspect capillarity and inferior parafoveal aspect capillarity patterns were automatically assessed and estimated by the CNN
Results: The experimental results showed that the proposed model is able to estimate the whole image, foveal, parafoveal, upper half, lower half, temporal parafoveal, superior parafoveal, nasal parafoveal and inferior parafoveal capillarity with a mean absolute percentage error of 2.6%, 19%, 3.7%, 5%, 4.9%, 3.8%, 7%, 6% and 5.5% respectively
Conclusions: CNN showed an outstanding performance measuring capillarity patterns in OCTA images. Deep learning methods have the ability to find and interpret associated features for measuring capillarity in parts of the OCTA image. Future studies with a major number of OCTA images, different retinal conditions and parameters are required to validate the model in the parameter prediction task that could be used clinically
(No Image Selected)

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AFFIRMATIONS

Affirmations: Affirmation that submission of this abstract has been approved by the Principal Investigator.
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