

عنوان مقاله:

DABT-U-Net: Dual Attentive BConvLSTM U-Net with Transformers and Collaborative Patch-based Approach for Accurate Retinal Vessel Segmentation

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نویسندگان:

Y. Jalali - Faculty of Computer Engineering, Shahrood University of Technology, Shahrood, Iran

M. Fateh - Faculty of Computer Engineering, Shahrood University of Technology, Shahrood, Iran

M. Rezvani - Faculty of Computer Engineering, Shahrood University of Technology, Shahrood, Iran

خلاصه مقاله:

The segmentation of retinal vessels is vital for timely diagnosis. and treatment of various eye diseases. However, due to inherent characteristics of retinal vessels in fundus images such as changes in thickness, direction, and complexity of vessels, as well as imbalanced contrast between background and vessels, segmenting retinal vessels continues to pose significant challenges. Also, despite advancements in CNN-based methods, challenges such as insufficient extraction of structural information, complexity, overfitting, preference for local information, and poor performance in noisy conditions persist. To address these drawbacks, in this paper we proposed a novel modified U-Net named DABT-U-Net. Our method enhances discriminative capability by introducing Hierarchical Dilated Convolution (HDC), Dual Attentive BConvLSTM, and Multi-Head Self-Attention (MHSA) blocks. Additionally, we adopt a collaborative patch-based training approach to mitigate data scarcity and overfitting. Evaluation on the DRIVE and STARE datasets shows that DABT-U-Net achieves superior accuracy, sensitivity, and F_1 score compared to existing methods, demonstrating its effectiveness in retinal vessel segmentation. Specifically, our proposed method demonstrates improvements in accuracy, sensitivity, and F_1 score by 0.32% , 0.61% , and 0.14% , respectively, on the DRIVE dataset, and by 0.07% , 0.83% , and 0.14% on the STARE dataset compared to a less effective approach.

کلمات کلیدی:

Retinal vessels, Segmentation, Transformer, attention, U-Net, Collaborative Patch

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