

Supplementary Material: Study Group Learning

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1 Quantitative and Qualitative Result

Table 1. Results of different label missing ratio r and fold number K on DRIVE.

r	K	Accuracy	AUC	Sensitivity	Specificity	DICE (F1)	Vessel IoU
1	1	0.9695	0.9867	0.8341	0.9827	0.8262	0.7041
	2	0.9701	0.9884	0.8432	0.9825	0.8309	0.7110
	4	0.9705	0.9887	0.8358	0.9836	0.8312	0.7115
	8	0.9705	0.9886	0.8380	0.9834	0.8316	0.7120
0.9	1	0.9697	0.9867	0.8262	0.9837	0.8260	0.7040
	2	0.9706	0.9884	0.8231	0.9850	0.8299	0.7095
	4	0.9706	0.9886	0.8323	0.9840	0.8310	0.7111
	8	0.9703	0.9887	0.8418	0.9828	0.8313	0.7116
0.7	1	0.9691	0.9858	0.8045	0.9852	0.8194	0.6945
	2	0.9696	0.9873	0.8102	0.9851	0.8224	0.6988
	4	0.9702	0.9879	0.8081	0.9860	0.8250	0.7024
	8	0.9701	0.9882	0.8104	0.9857	0.8251	0.7027

Table 2. Results of different label missing ratio r and fold number K on CHASE_DB1.

r	K	Accuracy	AUC	Sensitivity	Specificity	DICE (F1)	Vessel IoU
1	1	0.9769	0.9913	0.8502	0.9854	0.8232	0.6998
	2	0.9774	0.9920	0.8586	0.9855	0.8275	0.7060
	4	0.9769	0.9920	0.8632	0.9846	0.8248	0.7020
	8	0.9771	0.9920	0.8690	0.9843	0.8271	0.7054
0.9	1	0.9765	0.9901	0.8483	0.9851	0.8204	0.6957
	2	0.9761	0.9913	0.8716	0.9831	0.8211	0.6967
	4	0.9771	0.9915	0.8494	0.9856	0.8236	0.7004
	8	0.9768	0.9917	0.8652	0.9843	0.8246	0.7017
0.7	1	0.9759	0.9891	0.8182	0.9864	0.8111	0.6824
	2	0.9761	0.9904	0.8250	0.9863	0.8131	0.6852
	4	0.9761	0.9906	0.8341	0.9856	0.8155	0.6887
	8	0.9757	0.9910	0.8480	0.9843	0.8151	0.6881

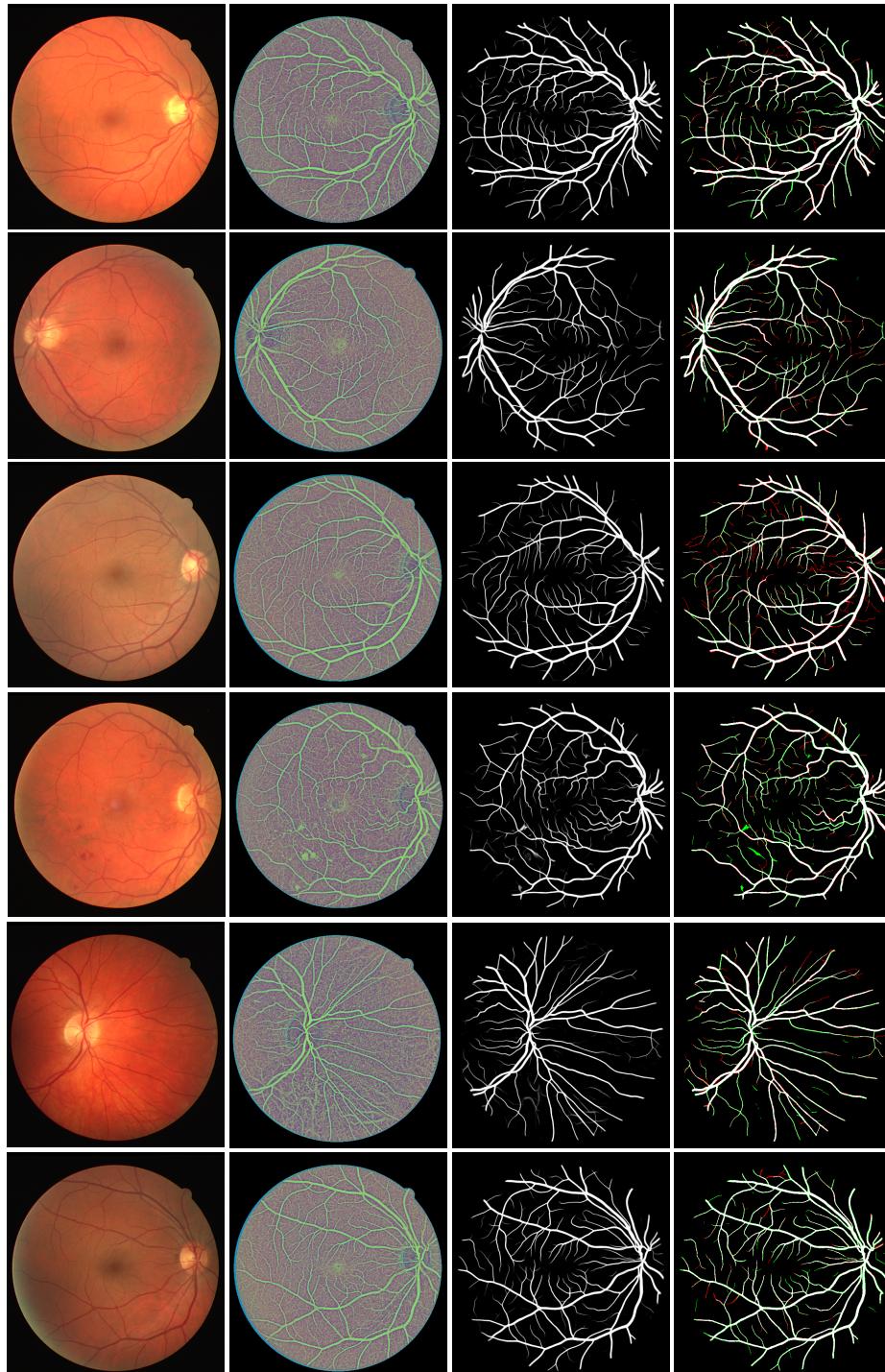


Fig. 1. Enhancement and segmentation results on DRIVE. From left to right: the raw retinal image, the learned enhanced image, the probability map, and the binary segmentation result. Red color indicates false negative, and green color indicates false positive. Thin vessels are still very challenging to be segmented.

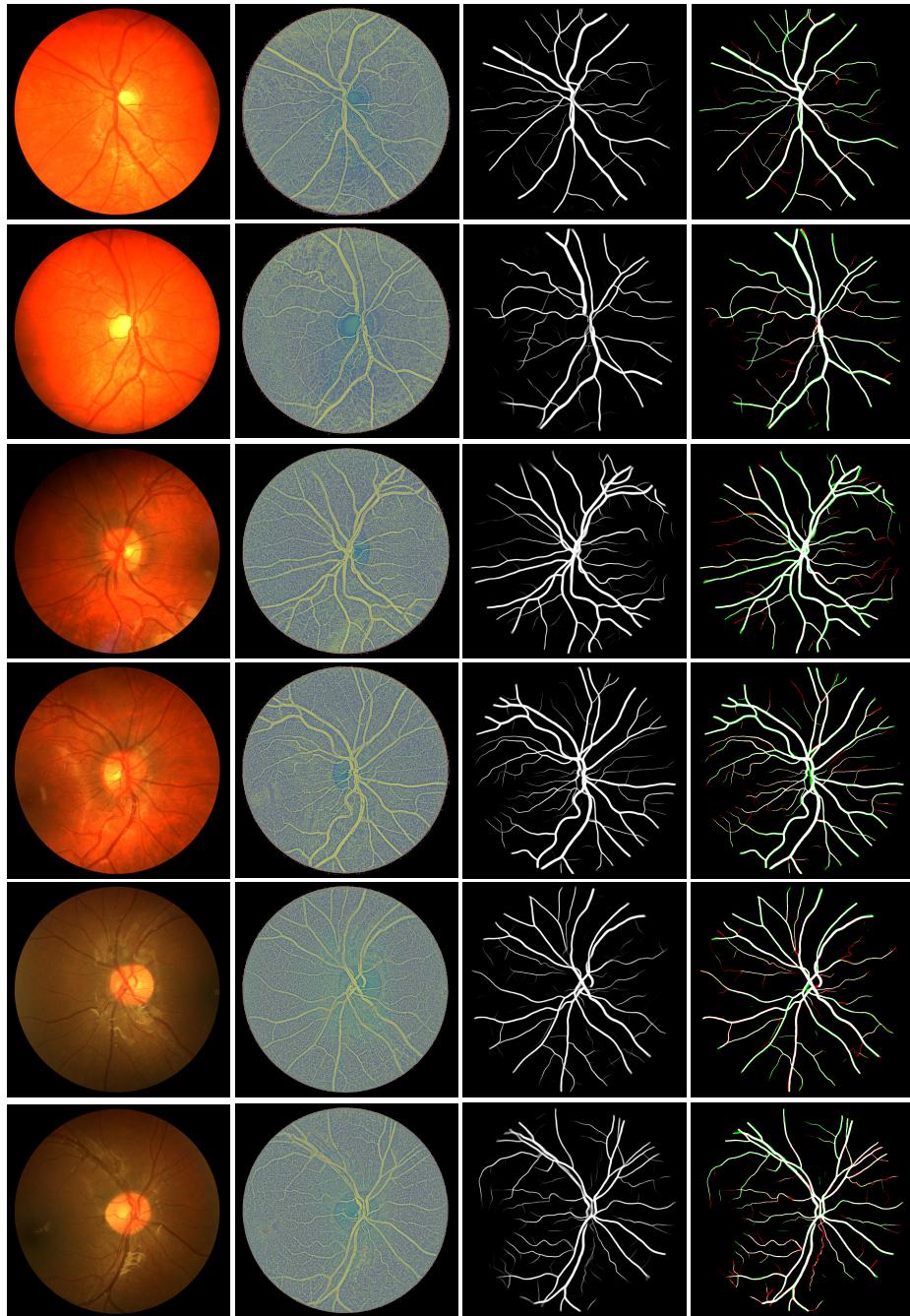


Fig. 2. Enhancement and segmentation results on CHASE_DB1. From left to right: the raw retinal image, the learned enhanced image, the probability map, and the binary segmentation result. Red color indicates false negative, and green color indicates false positive.