Abstract: Maximum A-posteriori Signal Recovery for OCT Angiography Image Generation

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Optical coherence tomography angiography (OCTA) is a clinically promising modality to image retinal vasculature. For this end, optical coherence tomography (OCT) volumes are repeatedly scanned and intensity changes over time are used to compute OCTA images. Because of patient movement and variations in blood flow, OCTA data are prone to noise. To address this issue, we propose a novel iterative maximum a posteriori (MAP) signal recovery algorithm which generates OCTA volumes with reduced noise and improved image quality [1]. The proposed algorithm is based on the OCTA signal model and maximum likelihood estimate (MLE) by Ploner et al. [2]. The MLE was extended into a MAP estimate by using wavelet shrinkage and total variation minimization as regularizers. Reconstruction results are compared against ground truth OCTA data which were merged from six co-registered OCTA scans [3]. Significant improvements in signal-to-noise ratio and structural similarity were observed. The presented method is, to the best of our knowledge, the first use of Bayesian statistics for OCTA image generation.

References

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