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Assessment of Sparse-based Inpainting for Retinal Vessel Removal

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Abstract

Some important eye diseases, like macular degeneration or diabetic retinopathy can induce changes visible on the retina, for example as lesions. Segmentation of lesions, or extraction of textural features from the fundus images are possible steps towards automatic detection of such diseases which could facilitate screening as well as provide support for clinicians. For the task of detecting significant features, retinal blood vessels are considered as being interference on the retinal images. If these blood vessel structures could be suppressed, it might lead to a more accurate segmentation of retinal lesions as well as a better extraction of textural features to be used for pathology detection. This work proposes the use of sparse representations and dictionary learning techniques for retinal vessel inpainting. The performance of the algorithm is tested for grayscale and RGB images from the DRIVE and STARE public databases, employing different neighbourhoods and sparseness factors. Moreover, a comparison with the most common inpainting family, diffusion-based methods, is carried out. For this pourpose, two different ways of assessing the quality of the inpainting are presented and used to evaluate the results of the non-artifical inpainting, i.e. where a reference image does not exist. The results suggest that the use

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