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Morphology Operation and Discrete Wavelet Transform for Blood Vessels Segmentation in Retina Fundus

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Abstract : Vessel segmentation of retinal fundus is important for biomedical sciences in diagnosing ailments related to the eye. Segmentation can simplify medical experts in diagnosing retinal fundus image state. Therefore, in this study, we designed a software using MATLAB which enables the segmentation of the retinal blood vessels on retinal fundus images. There are two main steps in the process of segmentation. The first step is image preprocessing that aims to improve the quality of the image to be optimum segmented. The second step is the image segmentation in order to perform the extraction process to retrieve the retina's blood vessel from the eye fundus image. The image segmentation methods that will be analyzed in this study are Morphology Operation, Discrete Wavelet Transform and combination of both. The amount of data that used in this project is 40 for the retinal image and 40 for manually segmentation image. After doing some testing scenarios, the average accuracy for Morphology Operation method is 88.46 % while for Discrete Wavelet Transform is 89.28 %. By combining the two methods mentioned in later, the average accuracy was increased to 89.53 %. The result of this study is an image processing system that can segment the blood vessels in retinal fundus with high accuracy and low computation time.

Keywords : discrete wavelet transform, fundus retina, morphology operation, segmentation, vessel
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