

THANONGSAK SA-NGIAMRAT : MULTIWAVELET-BASED IMAGE
DENOISING USING GENETIC ALGORITHM. THESIS ADVISOR :
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IMAGE DENOISING/MULTIWAVELET TRANSFORM/GENETIC ALGORITHM

This thesis presents an efficient image denoising algorithm using multiwavelet transform and thresholding process. The genetic algorithm and cross validation technique are applied to search for optimal threshold value for each high-frequency image subband resulting from multiwavelet decomposition because previous study has shown that the threshold values have direct effects to the quality of output image. Since both soft thresholding and hard thresholding yield output image with different properties by considering the bias value and the variance of the output image, we apply both thresholding processes in the genetic algorithm to balance the bias value and the variance in order to obtain optimal threshold values. To perform thresholding process, the semi-soft thresholding is selected because this method has more advantage than the typical soft thresholding and hard thresholding. In addition, the translation invariant technique is applied to the noisy image to reduce the effect caused by Gibbs phenomenon. Experimental results show that the proposed method yields the output images with higher quality as compared with the ones from previous works.

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Academic Year 2007

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