A HYBRID WAVELET TRANSFORM-BASED AGRICULTURAL IMAGE DE-NOISING ALGORITHM

YANG FU ZENG[1]

[1] Y. FU ZENG, College of Mechanical & Electronic Engineering, Northwest A&F University, Yangling, Shaanxi, China, tianyanna1009@163.com.

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ABSTRACT In order to solve a problem that conventional de-noising methods do not address regarding agricultural images for their diversity and biology characteristics, a new de-noising method based on Generic Algorithm (GA) is proposed in this article. Wavelet de-noising has the advantage to keep the image details information and Wiener Filter can obtain an optimal solution. This algorithm synthesizes the advantages of Wavelet de-noising and Wiener Filter. Firstly, using the image de-noised by Wavelet de-noising as male parent of the Hybrid Wavelet Transformed initial population, and image de-noised by Wiener Filter as female parent. Then the individual images were evaluated with fitness function of maximum between-cluster variance. Through the hybrid and mutate operation to realize gene recombination, and then extracting the superior gene of the two images de-noised by Wavelet de-noising and Wiener Filter. Lastly, with the finite order hereditary algebra to obtain an offspring image which has both advantages of male parent (Wavelet de-noising) and female parent (Wiener Filter). The performance of this algorithm was tested for Red jujube images and wheat images. The results show that images de-noised by the proposed method in this paper have a higher PSNR (77.83 for red jujube and 79.89 for wheat) than those processed by conventional methods, and have both the characters for lower noise and clearer edge feature for the viewer.

Keywords: Agricultural image, Hybrid wavelet transform, Wiener Filter, Genetic Algorithm, Image de-noising.