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## Abstract

This paper presents an enhanced non-linear adaptive filtering technique for removing high density salt-and-pepper noise from digital images. The proposed filtering technique integrates statistical analysis of local features with a median-based noise adaptive filter, which differentiates the corrupted and uncorrupted pixels and processes only the corrupted ones in order to preserve the fine details of the image. The adaptive behavior of this filter enables it to adjust the filtering window based on the local noise density and facilitates the estimation of noise-free median values. Moreover, while most of the existing filters simply replace a corrupted pixel with the average or median of the last processed pixels when the maximum window size is

reached, the proposed technique employs further statistical analysis to obtain a more accurate correction term. Experimental results show that, the proposed technique performs better than some state-of-the-art non-linear filters, suppressing noise level as high as 95%, while preserving signal-to-noise ratio, visual quality and necessary details.

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**Index Terms**

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