Sliding statistics switching median filter for the removalof low level mix impulse noise

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Abstract

A new nonlinearfiltering algorithm for effectively removing mix impulse noise in digital images, called twin sliding statistics switching median (TSSSM) filter is presented in this paper. The proposed TSSSM filter is made up of two subunits; i.e.impulse noise detection and noise filtering.At first,the impulse noise detection stage ofTSSSMalgorithm begins by processing the statistics of a localized detection window in sorted order and non-sorted order,concurrently. Next, the median of absolute difference (MAD) obtained from both statistics(i.e. sorted and non-sorted) will be further processed in order to classify any possible noise pixels.In addition, histogram based noise detector also used at this stage in order to increase the filter's robustness. Subsequently, the filtering stage will replace the detected noise pixels with the estimatedmedian value of the surrounding pixels. Extensive simulations results conducted on grayscale images indicate that the TSSSM filter performs significantly better than a number of well-known impulse noise filters existing in literature in terms of noise suppression and detail preservation.

Keywords: Image processing,impulse noise, digital image,nonlinear noise filtering.

1. INTRODUCTION

In the era of multimedia technology,many modern daily life applications such as geographical analysis and image based medical diagnosisinvolvedwith