Patent Search

Invention Title	Adaptive Switching Median Filter for Impulse Noise Removal in Images
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Abstract:

The invention relates to an adaptive switching median–based filtering system for removing impulse noise from corrupted digital images. The system extracts a local neighbourhood window around each pixel and employs a rank-based noise-detection criterion to determine whether the centre pixel is corrupted. Only pixels identified as are replaced, using a median or rank-ordered statistic computed exclusively from uncorrupted neighbouring pixels, thereby preserving edges and fine image details. An ac fallback mechanism ensures stable restoration under high noise densities where few uncorrupted pixels are available. The invention provides superior denoising accuracy structural preservation compared to traditional median and earlier switching filters, making it suitable for real-time and high-precision imaging applications.

Complete Specification

Description:FIELD OF THE INVENTION

[001] The present invention relates generally to the field of digital image processing, and more particularly to nonlinear filtering techniques for detecting and removing impulse noise—including salt-and-pepper noise—from grayscale and colour digital images. The invention concerns improvements in median-based switching filters thro the incorporation of enhanced noise-detection mechanisms using rank-ordered statistics and adaptive thresholding. More specifically, the invention provides a New Switching Median Filter (NSWM) framework capable of accurately distinguishing corrupted pixels from uncorrupted ones under varying noise densities, thereby ach

BACKGROUND OF THE INVENTION

[002] Digital images acquired through sensors, cameras, and transmission systems are frequently corrupted by impulse noise, particularly salt-and-pepper noise, which manifests as sharp, isolated pixels with intensity values at the minimum or maximum of the dynamic range. Such noise typically arises from faulty sensors, electromagne interference, malfunctioning camera elements, or transmission errors. When even a relatively small percentage of pixels become corrupted by impulse noise, the visual quality and interpretability of the image degrade significantly, adversely affecting downstream applications such as segmentation, feature extraction, edge detection, medical diagnostics, biometric recognition, and automated inspection systems. Accordingly, removal of impulse noise—without blurring or destroying important image structures—remains a persistent and technically challenging problem in the field of digital image processing

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