A novel mean-median filter is proposed for the suppression of impulse noise and various artifacts from the digital images. Leading Diagonal Sorting Algorithm is used with the fixed 3x3 size working window to compute the median. Truncated mean is computed by defining the boundaries and truncating the pixel values in the filtering window that fall outside the defined boundary. Noise detection is carried in two steps: In the first step the reference pixel is tested for the presence of impulses with Min-Max detection strategy. In the second stage of detection, edge preserving unique criteria is employed to further classify the pixel under test as noisy or edge belonged. This intelligent edge preserving decision criterion decides whether the test pixel deserves the restoration or not and facilitates the restoration of the noisy pixel either by the truncated mean or by the window median based on the decision threshold. Performance of the proposed filter algorithm is studied on a large number of images with varying amounts of salt and pepper noise and several types of artifacts and their combinations. Simulation results prove that the proposed algorithm (PA) effectively suppresses the high density salt and pepper noise (SPN) and in addition, it performs excellent in suppressing image artifacts such as strip lines (both white and black), drop lines (both white and black), missing bands and noise blotches. The novelty of the proposed mean-median filter lies in the fact that it attempts to simultaneously...
suppress impulsive noise and artifacts with good edge preservation (as the maximum size of the filtering window is restricted to $3 \times 3$ only) and also because a two stage detection mechanism is employed. The goodness of the proposed algorithm lies in replacing several independent filter schemes required for suppression of noise and artifacts of several types without much distorting the vital features of the image under test. The performance evaluation of the proposed algorithm is done in terms visual appearance and quantitative measures such as Mean Square Error (MSE), Peak Signal to Noise Ratio (PSNR), Image Enhancement Factor (IEF) and the Computation Time (CT). Simulation results are compared with other state of art algorithms to derive the meaningful conclusions.

References


**Index Terms**

Computer Science

Image Processing
Keywords

Noise  Artifacts  Sorting  Truncated Mean  Impulse noise  Strip Lines  Blotches  
Drop lines

Missing bands

PSNR

MSE

Run time

IEF.