Abstract

Image restoration and enhancement are the major research areas in digital image processing. The main objective of image restoration is to reduce noise and improve resolution loss on digital images in any real-time domains. Many images like photographs, medical images, satellite images and aerial images suffer from poor contrast and noises due to various reasons such as lightening, bad weather or flaw in the equipment. It is necessary to restore the image by removing impulse noises and to increase the image quality by using image parameters. Number of image restoration filters have been introduced in the past decades and tested on standard images to prove their efficiency. This study proposes a new fuzzy logic decision based adaptive directional weighted median filter for the restoration of impulse corrupted digital images. The proposed filter includes fuzzy logic based decision to model the uncertainties, while detecting and correcting impulses. The proposed correction scheme provides weight to the uncorrupted pixels that show much similarity with other uncorrupted pixels in the 3×3 kernel window while replacing impulses. The proposed fuzzy filter adapts to various noise level and image conditions and is capable of suppressing noise while preserving image details. The experimental outcome
in terms of subjective and objective metrics favour the proposed algorithm than many other major filters in the literature.

References

Index Terms

Computer Science  Fuzzy Systems

Keywords

Gaussian noise, salt & pepper noise, image parameters, edge preservation, fuzzy logic.