SCE: Developing a New Edge-preserving Image Smoothing Algorithm for Impulse Noise

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1. Problem Statement

This research investigates techniques to enhance edge-preserving image denoising algorithms, in order to better restore images that have been corrupted with impulse noise, while maintaining sharp edges and fine details [2–4, 7].

2. Approach

The approach leverages the characteristics of impulse noise to enhance edge-preserving smoothing techniques [1, 5]. Noisy pixels will be detected then replaced using surrounding pixels, rather than indiscriminately filtering all pixels. This should better preserve edges compared to basic techniques like bilateral filtering.

3. Data

The image dataset will consist of photographs from the USC-SIPI image database corrupted with varying levels of salt and pepper noise. This will allow testing under different noise conditions [6].

4. Evaluation

The final results will be evaluated by benchmarking against common filtering techniques, including staple methods such as applying Gaussian, Bilateral, and Non-Local Means filters uniformly across all pixels. Quantitative metrics and visual inspection will compare output images to the originals, judging the performance of our proposed technique against these conventional benchmarks. This comparative analysis will reveal how well our approach preserves edges and details relative to establish filters applied indiscriminately without excluding noisy pixels.

References

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