Proposal of Edge Preserving Image Noise Reduction Filter for Using L2-Norm

Yudai YAMAGUCHI[1], Ichiro YOSHIDA[2], Yuki KONDO[2]

1. HOSEI University, Graduate School of Science and Engineering, Major in Mechanical Engineering
2. HOSEI University, Faculty of Science and Engineering, Department of Mechanical Engineering

Backgrond

Images taken by digital cameras include noise.
Reducing noise is essential for improving the accuracy of image quality.

However,

Previous method has a low denoising performance for strong noise.
Therefore, the accuracy of feature detection of image recognition worsens

Aim

Develop of filter that is simultaneously achieve high denoising performance and edge preservation performance.

To contribute the improvement for image quality and, consequently, the accuracy of image recognition.

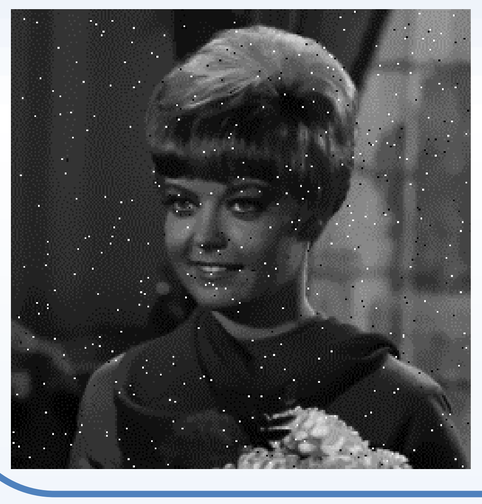
Comparison of previous method and proposed method

Noise-added image

Filter applied

Filter applied

Previous method(NLMF)



- Noise cannot be fully reduced.
- RMSE: 15.04
- processing time: 17.6[s]

Proposed method(L2GFI)

- High denoising and edge preservation performance
- RMSE: 5.20
- processing time: 0.2[s]

Conclusion

1. Visual and RMSE comparison of the experimental results showed that the L2GFI has better denoising and edge preservation performances than the NLMF.
2. The verification results showed that the processing time of the L2GFI was faster than that of the NLMF.

From these results, it can be said that the L2GFI combines high denoising, edge preservation, and high-speed processing performances compared to NLMF.

Correspondence: Ichiro Yoshida, HOSEI University, E-mail: yoshida.ichiro@hosei.ac.jp