Abstract

This paper proposes an approach for enhancement and de-noising of the images having fine edges and homogeneous smooth regions by using singular value decomposition filtering technique on the diffused image subspaces. The existing singular value decomposition based image de-noising technique faces the problem of selecting the optimum threshold parameter for
Image Enhancement and De-noising by Diffusion based Singular Value Decomposition

separation of noise subspace and noise-free image subspace. The proposed approach is a two stage process in which the diffused versions of the image are generated in the first stage using partial differential equation based linear isotropic diffusion to smooth the homogeneous regions and the inverse heat diffusion method for enhancement of the edge features. In the next stage, singular value decomposition is applied on the two oppositely featured diffused versions of the image with fixed threshold individually to remove noise. Experimental results were compared with respect to recently developed singular value decomposition method with minimum energy model and traditional block based singular value decomposition filtering method in terms of signal to noise ratio which shows that the proposed method is efficient for image enhancement as well as de-noising.

Reference


Index Terms

Computer Science

Signal Processing

Key words

Anisotropic diffusion

Isotropic diffusion

Singular value decomposition

Image enhancement

Image de-noising