Edge Detection in Polarimetric SAR Image based on Bandelet Transform

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Abstract

Polarimetric Synthetic Aperture Radar is being used widely in order to extract the features of target image including civilian and military applications. Edge detection in PolSAR images is highly challenging task due to the occurrence of speckle noise in these images although widely used for the strategic applications. This paper presents a multi-resolution edge detection method for PolSAR images using the bandelet transform. Bandelet transform can provide flexible multiscale and directional decomposition of images including SAR images. Edge enhancement of the input image is done after decomposing it using bandelet transform and the resultant bandelet coefficients are modified through the maximisation of the polarimetric contrast between the adjacent subbands using Lagrangian methods. Taking advantage of the directional features of bandelet transform an algorithm is developed for retaining the geometrical features of images such as edges, boundaries etc present in SAR images while ensuring effective speckle noise removal. Here the geometrical features in images are enhanced in the bandelet domain by fusing the different directional subband coefficients at different scales. The performance of this method is verified using real PolSAR images.
result shows that proposed scheme eliminates speckle noise and retrieved edges are continuous and complete.

References


Index Terms

Computer Science Image Processing

Keywords

PolSAR, bandelet, speckle, directional subbands