IMAGE FUSION USING THE WAVELET AND CURVELET TRANSFORMS APPLIED TO THE ALGERIAN SATELLITE ALSAT-2 IMAGES

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Abstract: In remote sensing community, different image sensors provide different data with different spectral and spatial resolution. Multispectral imaging sensors collect poor spatial resolution multispetral data, while panchromatic imaging ones provide adequate spatial resolution panchromatic data. The fusion of images is the process of combining two or more images into a single image retaining important features from each. Ideally, the method used to merge data sets with high-spatial and high-spectral resolution should not distort the spectral characteristics of the high-spectral resolution data. This paper compares the results of two different methods based on the curvelet and wavelet transforms. The central idea of all image fusion methods based on multiresolution analysis is to extract the panchromatic image the spatial detail that is not present in the multispectral image in order to insert it later in the latter. These fusion methods, as well as curvelet and wavelet based methods have been used to merge images of Algerian Alsat-2 satellite with a ratio 4 : 1. We have estimated the validity of each fusion method by analyzing, visually and quantitatively, the quality of the resulting fused images.