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# SPOT IMAGERY: A FOURIER-BASED APPROACH TO PANCHROMATIC AND MULTISPECTRAL DATA INTEGRATION

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## ABSTRACT

An interesting characteristic of the forthcoming SPOT satellite is the opportunity of its HRV sensors to work either in multispectral mode (with 20 m spatial resolution) or in panchromatic mode (10 m resolution). It can be expected that a new product consisting of the merge in a single data set of the two types of images from the same ground area reveals useful particularly for a photointerpretation approach. This problem can be brought back to that of reconstruction of multi-spatial image data.

Approaches usually adopted work in the real space. First step is resampling, by some interpolator, of low resolution image to achieve the higher resolution; second step modifies generated pixels according to the more detailed information existing in higher resolution image.

Proposed approach is based on Fourier techniques; it reduces subjectivity in the choice of interpolation function and of modality of using highly detailed information.

Multispectral and panchromatic images by the same area are transformed. Having the panchro image dimensions which are double of the other one, the same is for transforms in the frequency space. The 20 m image transform is then added all around of a frame extracted by 10 m image transform and representing the high frequency content of the image itself. Continuity of added frame with respect to original transform has to be guaranteed. Inverse transform in the real space produces the integrated data set.

Data used for method testing came from SPOT simulated imagery produced during a simulation campaign organized by CEE in Southern Italy in May 1982.

Comparison of the method with the other developed approaches is carried out with respect to quality of results in the specific SPOT case. Its applicability to the more general problem of integration of different resolution images also by different platforms is evaluated.