

## Extended attribute profiles on GPU applied to hyperspectral image classification

**Título** Extended attribute profiles on GPU applied to hyperspectral image classification

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**Abstract** Extended profiles are an important technique for modelling the spatial information of hyperspectral images at different levels of detail. They are used extensively as a preprocessing stage, especially in classification schemes. In particular, attribute profiles, based on the application of morphological attribute filters to the connected components of the image, have been shown to provide very good results. In this paper we present a parallel implementation of the attribute profiles in CUDA for multispectral and hyperspectral imagery considering the attributes area and standard deviation. The profile computation is based on the max-tree approach but without building the tree itself. Instead, a matrix-based data structure is used along with a recursive flooding (component merging) and filter process. Additionally, a previous feature extraction stage based on wavelets is applied to the hyperspectral image in order to extract the most valuable spectral information, reducing the size of the resulting profile. This scheme efficiently exploits the thousands of available threads on the GPU, obtaining a considerable reduction in execution time as compared to the OpenMP CPU implementation.

**Palabras clave** Remote sensing, Hyperspectral, Attribute profiles, Supervised classification, Real-time, GPU

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