

Wavelet Based Classification of Hyperspectral Images using Extended Morphological Profiles on Graphics Processing Units

Additional information and results related to the paper [Wavelet Based Classification of Hyperspectral Images using Extended Morphological Profiles on Graphics Processing Units](#) by Pablo Quesada-Barriuso, Francisco Argüello, Dora B. Heras, and Jón Atli Benediktsson, published in the *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, Feb. 2015. DOI:10.1109/JSTARS.2015.2394778.

Abstract

The availability of Graphics Processing Units (GPUs) provides a low-cost solution to real-time processing which may benefit many remote sensing applications. In this paper, a spectral-spatial classification scheme for hyperspectral images is specifically adapted for computing on GPUs. It is based on wavelets, Extended Morphological Profiles (EMPs) and Support Vector Machine (SVM). Additionally a pre-processing stage is used to remove noise in the original hyperspectral image. The local computation of the techniques used in the proposed scheme makes them particularly suitable for parallel processing by blocks of threads in the GPU. Moreover, a block-asynchronous updating process is applied to the EMP to speedup the morphological reconstruction. The results over different hyperspectral images show that the execution can be speeded up to 8.2x compared to an efficient OpenMP parallel implementation, achieving real-time hyperspectral image classification while maintaining the high classification accuracy values of the original classification scheme.

Downloads

Hyperspectral images

* University of Pavia dataset from Universidad del Pais Vasco: www.ehu.es

* Hekla volcano in Iceland from J. A. Benediktsson and I. Kanellopoulos, "Classification of multisource and hyperspectral data based on decision fusion," *IEEE Trans. Geosci. Remote Sens.*, vol. 37, no. 3, pp. 1367-1377, May 1999.

Execution Outputs

For information see the README.txt files in the archives.

* University of Pavia samples and maps : wt-emp-gpu-wiki-paviau.tar.gz

License



This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](https://creativecommons.org/licenses/by-nc-nd/4.0/).

From:

<https://wiki.citius.usc.es/> - **Wiki do CiTIUS**

Permanent link:

<https://wiki.citius.usc.es/hiperespectral:wt-emp-gpu>

Last update: **2016/05/11 16:17**

