

GPU-Accelerated Registration of Hyperspectral Images Using KAZE Features

Experimental results related to the paper [GPU-Accelerated Registration of Hyperspectral Images Using KAZE Features](#) by Álvaro Ordóñez, Francisco Argüello, Dora B. Heras, and Begüm Demir, published in Journal of Supercomputing.

Abstract

Image registration is a common task in remote sensing, consisting in aligning different images of the same scene. It is a computationally expensive process, especially if high precision is required, the resolution is high, or consist of a large number of bands, as is the case of the hyperspectral images. HSI-KAZE is a registration method specially adapted for hyperspectral images that is based on feature detection and takes profit of the spatial and the spectral information available in those images. In this paper, an implementation of the HSI-KAZE registration algorithm on GPUs using CUDA is proposed. It detects keypoints based on non-linear diffusion filtering and is suitable for on-board processing of high resolution hyperspectral images. The algorithm includes a band selection method based on the entropy, construction of a scale-space through of non-linear filtering, keypoint detection with position refinement, and keypoint descriptors with spatial and spectral parts. Several techniques have been applied to obtain optimum performance on the GPU.

Downloads

Algorithm

Compiled program to register two hyperspectral images.

- HSI-KAZE algorithm on GPU:

hsikazegpu.zip

Images

All images used in the paper are available in [Registration Repository](#)

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