

# Alignment of Hyperspectral Images Using KAZE Features

Experimental results related to the paper [Alignment of Hyperspectral Images Using KAZE Features](#) by Álvaro Ordóñez, Francisco Argüello, and Dora B. Heras, published in Remote Sensing.

## Abstract

Image registration is a common operation in any type of image processing, specially in remote sensing images. Since the publication of the scale-invariant feature transform (SIFT) method, several algorithms based on feature detection have been proposed. In particular, KAZE builds the scale space using a nonlinear diffusion filter instead of Gaussian filters. Nonlinear diffusion filtering allows applying a controlled blur while the important structures of the image are preserved. Hyperspectral images contain a large amount of spatial and spectral information that can be used to perform a more accurate registration. This article presents HSI-KAZE, a method to register hyperspectral remote sensing images based on KAZE but considering the spectral information. The proposed method combines the information of a set of preselected bands, and it adapts the keypoint descriptor and the matching stage to take into account the spectral information. The method is adequate to register images in extreme situations in which the scale between them is very different. The effectiveness of the proposed algorithm has been tested on real images taken on different dates, and presenting different types of changes. The experimental results show that the method is robust achieving image registrations with scales of up to 24.0x.

## Downloads

### Algorithm

Compiled program to register two hyperspectral images.

- HSI-KAZE algorithm: coming soon.

### Images

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

## Example



Example of registration considered in this work: a) Reference image (size 1096×715), b) Target image, and c) Result of the registration process showing the correctly registered superposition of the reference and target registered image (scale 23.0× and angle of rotation 60°).

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