AUTOMATIC GEOREFERENCING FOR PHILPPINES' FIRST MICROSATELITE DIWATA LCTF PAYLOAD IMAGERY

J. A. Amado [a,*] , B.J.D. Jiao [a], B.J.P. Magallon [a,b] , M.K.F. Ramos [a], R.K.D. Aranas [a], A.M. Tamondong [a], and M.E.A. Tupas [a]

[a] University of the Philippines, Diliman, Quezon City, 1101, Metro Manila, Philippines, (jaamado,bdjiao,bpmagallon,mframos,rdaranas,amtamondong, matupas)@up.edu.ph
[b] Space Mission Center, Creative Research Institution, Hokkaido University benjamin@ep.sci.hokudai.ac.jp

KEY WORDS: Image registration, Automatic Georeferencing, Keypoint Extraction, Descriptors, SIFT, SURF

ABSTRACT:

Feature extraction method was used to automatically register the incoming DIWATA LCTF imagery. The feature-based detection and matching was done using Scale-Invariant Feature Transform (SIFT) and Speeded-up Robust Feature (SURF) algorithms to identify the invariant descriptors of the two same-scene images. Images were preprocessed to adjust the contrast non-uniformity inherent to LCTF images. This step enabled better discrimination of features during keypoint extraction. Random sample consensus (RANSAC) was used to eliminate fall-out matches and ensure accuracy of the feature points from which the perspective transformation parameters were derived. The transformed (slave) image was compared to the reference (master) image and sub-pixel accuracy of the keypoint locations was computed. Geometrically corrected DIWATA images were laid in cartographic coordinates by having a fully-georeferenced master image for comparison and using the keypoints as ground control points. Given the nature of the images, adjustments of characteristic thresholds (e.g. Hessian and keypoint distance) were varied to obtain the optimum matched features between two images. The DIWATA LCTF images were also matched with other images to test the sensor-invariance of the SIFT and SURF detectors.

* Corresponding author