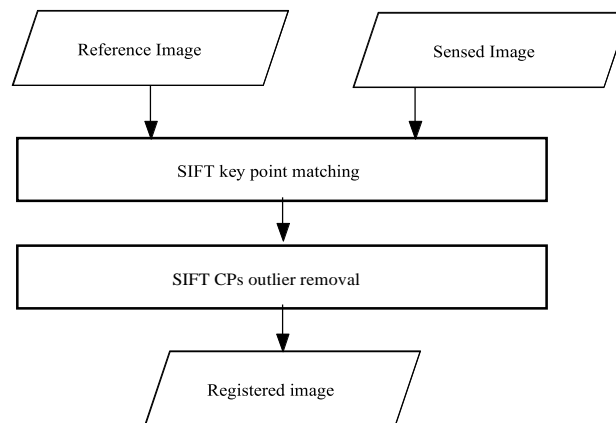# A Novel Coarse-to-Fine Scheme for Automatic Image Registration Based on SIFT and Mutual Information

Image registration is a vital process which determines the most precise match between two images of the same scene, which may have been acquired at the same or different times, by the same or different sensors, and from the same or different viewpoints. This process geometrically aligns the two images— the reference and sensed images. Image registration has been widely used in many fields such as computer vision, pattern matching, medical image analysis, and remote sensing image processing. Therefore, a fully automatic registration approach which is accurate, robust, and fast is required. In this mini project consists of a preregistration process (coarse registration) and a fine-tuning process (fine registration). To begin with, the preregistration process is implemented by the scale-invariant feature transform approach equipped with a reliable outlier removal procedure [1].

Objective:

1. Implement Coarse-to-Fine Scheme for Automatic Image Registration Based on SIFT and Mutual Information [1] preferably in MATLAB. You may leave the optimization module mentioned in III (E).
2. Test the performance from test image from reference [I,II] .

Reference:

[1] Gong, Maoguo, et al. "A novel coarse-to-fine scheme for automatic image registration based on SIFT and mutual information." IEEE Transactions on Geoscience and Remote Sensing 52.7 (2014): 4328-4338.

[2] Pluim, Josien PW, JB Antoine Maintz, and Max A. Viergever. "Mutual-information-based registration of medical images: a survey." *IEEE transactions on medical imaging* 22.8 (2003): 986-1004.

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