Mutual Information Based Image Registration of Satellite Images Using PSO-GA Hybrid Algorithm

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Abstract : Registration is a fundamental task in image processing. It is used to transform different sets of data into one coordinate system, where data are acquired from different times, different viewing angles, and/or different sensors. The registration geometrically aligns two images (the reference and target images). Registration techniques are used in satellite images and it is important in order to be able to compare or integrate the data obtained from these different measurements. In this work, mutual information is considered as a similarity metric for registration of satellite images. The transformation is assumed to be a rigid transformation. An attempt has been made here to optimize the transformation function. The proposed image registration technique hybrid PSO-GA incorporates the notion of Particle Swarm Optimization and Genetic Algorithm and is used for finding the best optimum values of transformation parameters. The performance comparision obtained with the experiments on satellite images found that the proposed hybrid PSO-GA algorithm outperforms the other algorithms in terms of mutual information accuracy.

Keywords : image registration, genetic algorithm, particle swarm optimization, hybrid PSO-GA algorithm and mutual information

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