Multithreaded Approach for Registration of Medical Images using Mutual Information in Multicore Environment and its Applications in Medical Imaging

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Abstract

Image Registration plays very crucial role in case of medical imaging to register different modalities of images like CT (Computed Tomography) and PET (Positron Emission Tomography) registration. CT is essential for structural information of anatomic and PET (Positron Emission Tomography) is for functional information. Basically it is the procedure of transforming dissimilar sets of data into one coordinate system. These sets of data can be acquired from multiple image modalities, different viewpoints, similar or dissimilar sensors. MI based image registration has been found to be reasonably useful methods of image registration. However, it is found to be quite computationally intensive and time consuming process for enormous size images and for different data sets of images. It involves steps for computation of joint histogram, marginal entropies, calculation and probability distribution. Main motive of this paper is to provide an intelligent method for image registration based on Mutual Information using multi core environment with maintaining the synchronization between different activated cores and processors. Proposed Method has been able to execute with different number of threads to achieve all the remuneration of the processors and gives significant speedup working with verity of images like gray scale, RGB and Dicom images with different size. Finally the
A designed algorithm has been used to register medical images of different modalities.

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Index Terms

Computer Science

Image Processing

Keywords

Image registration Parallel computing Mutual Information Medical Images

Multithreading

CT

PET.