

Image Registration Techniques and its Applications to CAD

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In this talk we present a novel, fast and efficient rigid and nonrigid registration techniques for several medical applications concerning computer-aided diagnosis. First, we present a feature-based rigid registration and masking techniques for getting a clear arterial anatomy and easily detecting cerebral aneurysms, arterial stenosis, and other vascular anomalies in brain CT angiography. Second, to identify corresponding pulmonary nodules in serial CT scans for interval change analysis, we suggest an automatic registration technique using global and local matching. Third, to visualize regional air trapping in full-inspiration and expiration chest CT scans, we introduce a demon-based nonrigid registration technique. Fourth, to detect prostate cancer in MR images, we present a method for combining T2-weighted MR images with histopathologic findings using nonrigid registration. Finally, we propose a bone and cartilage registration technique to compare the knee cartilage of the same patient at different time.