

COLLOQUIUM

Understanding Non-rigid Registration: Some Theory and Applications

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Abstract: Algorithms for rigid and non-rigid registration are widely used, but a conceptual and theoretical framework for understanding non-rigid registration has been scarce. Research presented in this talk suggests that viewing registration algorithms from a geometric point-of-view provides a basis for understanding registration. In this framework, intra- and inter-modality registration appear on common ground and the fundamental role of the geometric volume form becomes clear. Different volume forms give registration algorithms with different properties. Four properties of registration objective functions are identified as useful, and a unique volume form is shown to impart these properties. Experimental results confirm that the theoretical results hold in practice, even the presence of noise in the images. Numerical techniques as well as applications to registration of Cardiac and Brain MRI will also be presented.

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