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SEMINAR

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April 3, 2008  
304 Whitehead Hall  
Refreshments: 3:30 p.m.  
Seminar: 4:00 p.m.

REPRESENTATION AND STATISTICAL ESTIMATION OF  
DEFORMABLE TEMPLATE MODELS FOR PATTERN RECOGNITION  
AND COMPUTATIONAL ANATOMY

ABSTRACT

This presentation describes a framework for image analysis from a statistical point of view. Image analysis has been widely studied in the past decade, in particular the problem of geometric alignment between structures extracted from images. Such methods generally require the choice of a template and a deformation space equipped with a metric. Here, we propose a statistical model which allows learning these quantities as parameters of a model using two variations of the EM algorithm: one deterministic, using a mode approximation of the posterior density, and the second stochastic (SAEM), coupled with the use of MCMC methods. We prove that under this model, the parameter estimator is consistent and the stochastic algorithm is convergent. This approach is then generalized to a mixture of deformable template models to perform a clustering of the data which also enables consideration of the model as a classifier.