



Statistical Models of Shape and Appearance

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Abstract

Many objects of interest in images can be represented as deformed versions of some average structure - for instance faces, bones and many organs in medical images. This tutorial will describe methods of constructing statistical models of the variation in shape and appearance of such objects from annotated sets of examples.

Two widely used matching methods, Active Shape Models and Active Appearance Models, will be described in detail. Both are techniques for finding the model parameters which best fit to a given target image. The basic approach will be covered, as well as a number of recent developments integrating machine learning techniques into the general algorithm.

The tutorial will conclude with an overview of "Groupwise Registration" algorithms, which can automatically compute correspondences across large sets of 2D and 3D images. Such methods can be used to automatically construct shape and appearance models with minimal manual intervention.

The various methods will be demonstrated on a range of applications, including facial image interpretation and medical image analysis in 2D and 3D images, and a review of the state of the art will be given.

Syllabus: Shape Models, Active Appearance Models, Deformable Model Matching