

Object Detection Using Medial Axes

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We propose using medial axes in order to detect objects in scenes. The medial axis (or skeleton) of a shape is the set of points equidistant from at least two boundary points. We cluster points on the medial axis into parts by determining whether they belong to the ligature of the skeleton. From separate parts we extract a feature vector composed of the shape of the part and its position with respect to the main body. Using Principal Component Analysis (PCA) we recover a statistical model of the parts. This model contains most of the original shape information and can be used to accurately reconstruct shapes. Object detection is performed by reconstructing the mean shape of a class of objects. Once the mean shape has been fitted to the target image, we deform it using PCA in order to find the best match. We determine through a scoring function whether an instance of the object is present in the scene. Experimental results confirm that the proposed part-based representation has the potential to advance the state of the art in object detection by building robustness to articulation of parts, deformations of boundaries and scene clutter.