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Automatic Construction of Deformable Models In-The-Wild

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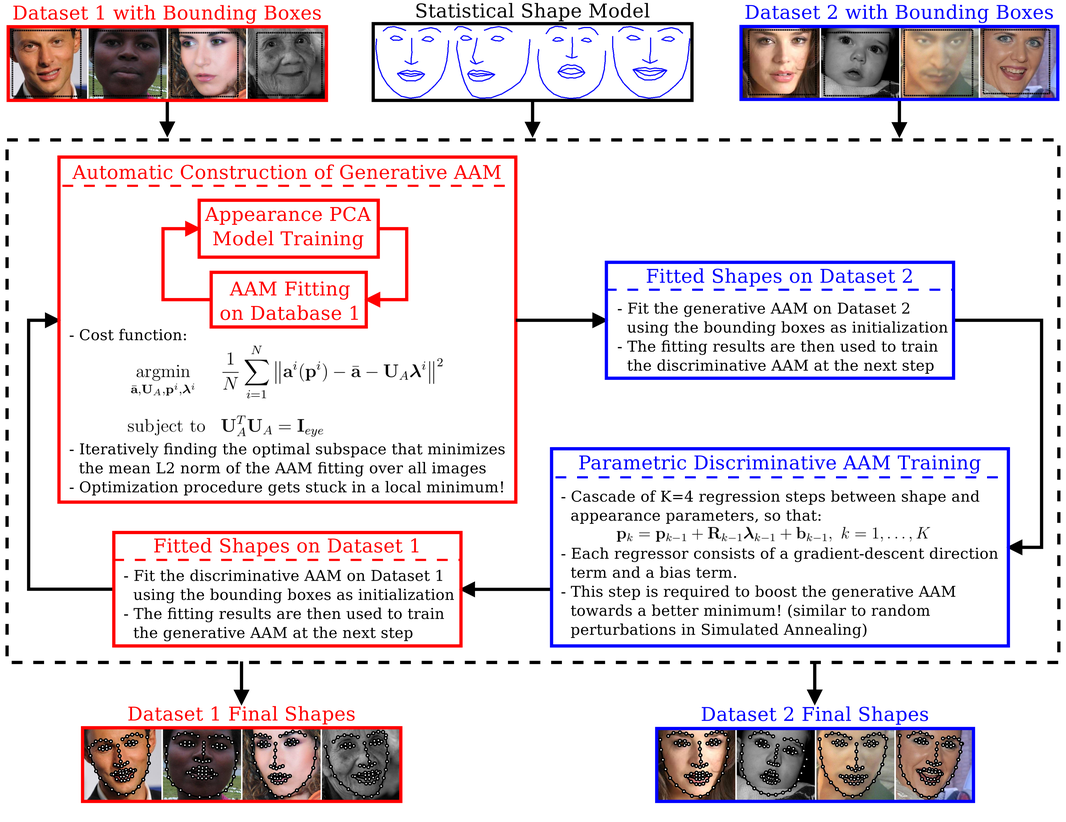
Problem Statement

We propose a methodology for the automatic construction of both a *generative* and a *discriminative* Active Appearance Model (AAM) and thus the automatic annotation of images given:

1) two disjoint datasets of images with the object's bounding boxes
   - Images downloaded from the web
   - Detector as simple as Viola-Jones (embedded in all digital cameras!)
2) a statistical shape model (Point Distribution Model) of the object
   - A facial shape model can be created from 40-50 shapes; a generic appearance model requires ~1000 images!

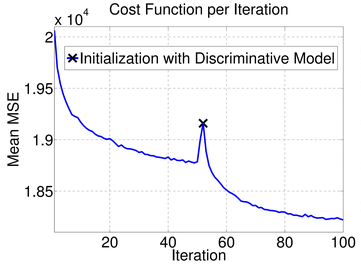


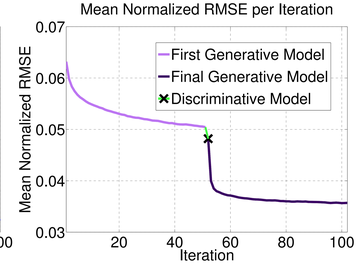
Convergence

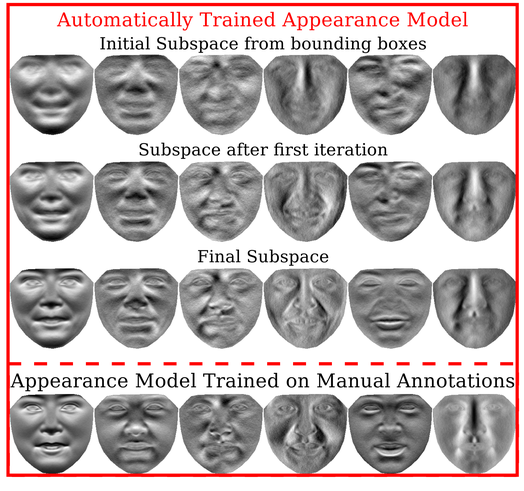
- We employ the robust kernel of normalized gradient orientations that cancels out outliers. It has trhe form:

$$\mathbf{g}(I)=\frac{1}{\sqrt{N_{pixels}}}\left[\cos\phi,\ \sin\phi\right]^T$$

- Our experiments on faces show that a single application of the discriminative model (single iteration) is adequate.







Experimental Results

- Usage of 2800 in-the-wild images of LFPW and Helen training sets
- Comparison with models trained on the manual annotations.
- Experiments on AFW, LFPW and Helen test sets (888 images).