Overview
Pictorial Structures have been a popular model for human pose estimation because of its use of a strong geometric prior, and fast inference techniques. However, the basic PS model does not incorporate image information into part-compatibility costs, and uses parametric distributions which limit expressivity. We propose a way for the model to adapt to each test example by replacing model parameters with a richer set of exemplars. Our method improves state-of-the-art sparse set of exemplars by using an arbitrary expressive kernel based on image data, while keeping the fast inference and geometric constraints. We also learn a sparse set of exemplars to improve and speed up parameter regression estimates. We propose a basic PS model and its use of a strong geometric prior did not incorporate image information into part-compatibility costs, and uses parametric distributions which limit expressivity. Geometric prior does not incorporate image information into part-compatibility costs, and uses parametric distributions which limit expressivity. Geometric prior does not incorporate image information into part-compatibility costs, and uses parametric distributions which limit expressivity.

Adaptive Pose Priors for Pictorial Structures
Ben Sapp Chris Jordan Ben Taskar

Basic Pictorial Structures (PS)

PS model parameters:

\[ \mathbf{\mu}, \mathbf{\Sigma} \]

Adaptive PS

Adaptive PS model:

\[ \mathbf{\mu}^{ij}, \mathbf{\Sigma}^{ij} \]

Error Measures

Percentage of Correct Parts (PCP):

\[ \text{PCP}(\mathbf{p}) = \sum_i \frac{\text{Fraction of correct parts}}{\text{Number of parts}} \]

NJE (joint 2):

\[ \text{NJE}(\mathbf{p}) = \sum_i \frac{||\mathbf{p} - \mathbf{p}_{\text{gt}}||_2}{||\mathbf{p}_{\text{gt}}||_2} \]

Normalized Joint Error (NJE):

\[ \text{NJE}(\mathbf{p}) = \sum_i \frac{||\mathbf{p} - \mathbf{p}_{\text{gt}}||_2}{||\mathbf{p}_{\text{gt}}||_2} \]

Shape-based Similarity Kernel

\[ K(x,y) = \exp(-\frac{1}{2}||x-y||_2^2) \]