

Agenda

- Introduction
- Returning to normal schedule next week
- Discussion of paper



University of Rochester
Computer Vision Seminar

March 30th, 2007

“Learning to Parse Images of Articulated Bodies”

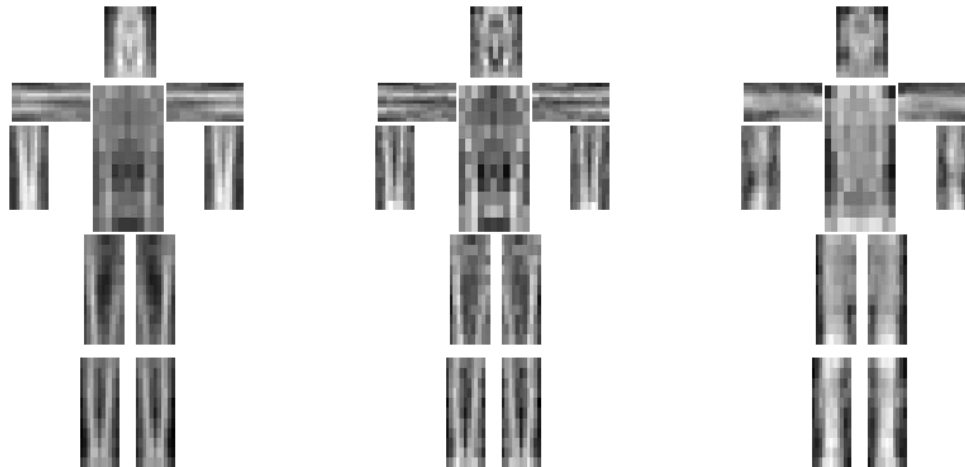
(D. Ramanan)

Overview and Discussion

Slides available at <http://www.cs.rochester.edu/~ardis/seminar.html>

Comparison to Last Week

- “Deformable” vs. “Loose-Limbed”
 - * Fully-poseable range of motion for all connections
 - * Uses training to determine more accurate probability of observation (at expense of computational complexity)



Comparison to Last Week

- Edges vs. Segmentation
 - * Uses edge matching instead of foreground segmentation (allowing for cluttered/moving background, focus on single-image work)
- Only focuses on 2D models



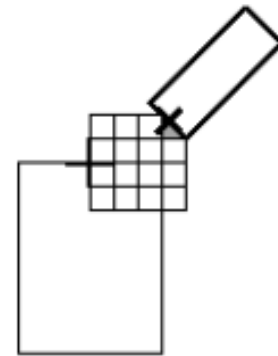
New Stuff

- Learning better models for each limb
 - * Once a rough approximate location has been determined, use region model to determine foreground/background segmentation within all plausible regions (color histogram)
 - * Then, re-parse and repeat (local maxima)
 - * Only learn 1 model for symmetric parts



New Stuff

- Discrete binning of relative configurations
 - * Alignment of two joints is discretized, prior is built from occurrences of particular alignments in training data
 - * Additional “preference” parameter α_i
- Conditional Random Fields used for learning from training set (rather than ML approximation)
- Extension to horses (same body part labels, learn new priors)



New Stuff

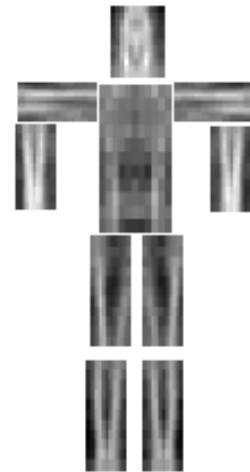
- Message-passing modification
 - * Each “message” is a binary image
 - * Messages computed by convolution of children's messages with imaging model (which is obtained by convolving the edge image with the limb filter)

$$m_i(l_j) \propto \sum_{l_j} \psi(l_i - l_j) a_i(l_i)$$

$$a_i(l_i) \propto \phi(l_i) \prod_{k \in kids_i} m_k(l_i)$$



with



Thoughts for Discussion

- Usefulness of full probability distribution of 2D poses?
- Tendency towards local maxima instead of global?
- Full occlusion of a body part (overlap situations)?
- Assumptions about parts
 - * Ratio of height/width?
 - * Scale compared to whole body?



Related Material

- Simultaneous pose estimation & segmentation
 - * “Posecut” (P. Kohli, P. Torr)
 - * “Obj. Cut” (M. Kumar, P. Torr, A. Zisserman)
 - * “Recovering Human Body Configurations” (G. Mori, X. Ren, A. Efros, J. Malik)
- Detailed 3D models
 - * Lorenzo Torresani (just visited)

*Computational complexity
is still a serious problem*

