

198:676: Looking at People

Spring 2003

Tentative syllabus

Early Application Perspective:

- A. Pentland. [“Smart Rooms” Scientific American, Vol. 274, No. 4, pp. 68-76, April 1996](#)
- W.T. Freeman *et. al.* “Computer vision for computer games” (1994)

Looking at People - an overview:

- D. M. Gavrila “The visual Analysis of Human Movement: A Survey” *Computer vision and Image Understanding*. Vol 75, No. 1. (1999)

Human body modeling and Tracking

Early Papers:

- J.O'Rourke and Badler “Model-based image analysis of human motion using constraint propagation” (1980) *PAMI* 2(6)
- D. Hogg “Model-based Vision: a Program to see a walking person” (1983)
- Z. Chen and H. Lee “Knowledge-Guided Visual Perception of 3-D Human Gait from single Image Sequence” *SMC* (1992)
- J. Davis and M. Shah “Visual Gesture Recognition” (1993)
- K. Rohr “Towards Model-Based Recognition of Human Movements in Image Sequence” (1994)

From Video to Activities:

- R. Polana, R. Nelson “Low Level Recognition of Human Motion (Or How to Get Your Man Without Finding his Body Parts)” (1994)
- Niyogi and Adelson “Analyzing and Recognition Walking figures in XYT” (1994)
- Bobick and J. Davis “The recognition of Human Movement Using Temporal Templates” *PAMI* 2001
- Ross Cutler and Larry Davis. “Robust periodic motion and motion symmetry detection.” (2000)

2D Model-based Approaches

Humans as Blob:

- Christopher Wren, Ali Azarbayejani, Trevor Darrell, Alex Pentland “Pfinder: Real-Time Tracking of the Human Body” (1997) PAMI
- Ismail Haritaoglu, David Harwood, Larry S. Davis “W4: Real-Time Surveillance of People and Their Activities” (2000) PAMI

Humans as Contours:

- A. Blake, R. Curwen, and A. Zisserman. “A framework for spatio-temporal control in the tracking of visual contours” (1993) Int. Journal of Computer Vision,
- A.M. Baumberg, D.C. Hogg “An Efficient Method for Contour Tracking using Active Shape Models” (1994)
- T F Cootes, C J Taylor, D H Cooper, and J Graham. “Active shape models: Their training and application.” (1995) CVIU, 61(1):38-59
- M. Isard and A. Black “Contour tracking by stochastic propagation of conditional density” (1996) ECCV
- M. Isard and A. Black “Condensation – Conditional density propagation for visual tracking” (1998) IJCV
- J. MacCormic and A. Blake “A probability exclusion principle for tracking multiple objects” (1999) ICCV

Recovering 3D pose

Pose Estimation and Tracking:

- J. Rehg, T. Kanade “Visual Tracking of High DOF Articulated Structures: an Application to Human Hand Tracking” (1994) ECCV
- J. Rehg and Kanada “Model Based Tracking of self-Occluding Articulated Objects” (1995) ICCV
- D.M. Gavrila and L.S. Davis, “3-d model-based tracking of humans in action: a multi-view approach” (1996) CVPR
- Kakadiaris and Metaxas “Model-Based Estimation of 3D Human Motion with Occlusion Based on Active Multi-Viewpoint” (1996) CVPR

Fitting Models from Motion:

- Shanon X. Ju, M. Black, and Yaser Yacoob “Cardboard People: A Parameterized Model of Articulated Image Motion” (1996)
- Yaser Yacoob, Michael J. Black “Parameterized Modeling and Recognition of Activities” (1998)
- C. Bregler, J. Malik “Tracking People with Twists and Exponential Maps” (1998)
- Sidenbladh, M. Black and D. Fleet “Stochastic Tracking of 3D Human Figures using 2D Image Motion” (2000) ECCV

Learning Dynamics:

- Campell and Bobick “Recognition of Human Body Motion Using Phase Space Constraints” (1995)

- C. Bregler “Learning and Recognizing Human Dynamics in video Sequence” (1997) CVPR
- M. Black and A. Jepson “Recognizing Temporal Trajectories using the Condensation Algorithm” (1998)
- Howe, Leventon and Freeman “Bayesian Reconstruction of 3D Human Motion from single-camera video” (1999) NIPS

Learning Pose:

- Romer Roasales and Stan Sclaroff “Inferring Body Pose without Tracking Body Parts” (2000) CVPR
- Romer Roasales and Stan Sclaroff “Specialized Mapping and the Estimation of Human Body Pose from a Single Image” (2000) Human Motion Workshop

Human Detection:

- M. Oren, C. Papageorgiou, P. Sinha, E. Osuna, and T. Poggio “Pedestrian Detection using wavelet templates” (1997) CVPR
- C. Papageorgiou, T. Evgeniou, T. Poggio “A Trainable Pedestrian Detection System” (1998)
- D. Gavrila and V. Philomin “Real-time Object Detection for Smart Vehicles” (1999) ICCV. also D. Gavrila, “Pedestrian Detection from a Moving Vehicle” (2000) ECCV
- Y. Song, X. Feng, and P. Perona “Towards Detection of Human Motion” (2000) CVPR

Gesture Recognition - ASL Recognition:

- V. Pavlovic, Sharma and T. Huang “Visual Interpretation of Hand Gestures for Human Computer Interaction: A Review”
- T. Starner and A. Pentland “Real-Time American Sign Language Recognition from Video Using Hidden Markov Models” (1995)
- C. Vogler and D. Metaxas “Adapting Hidden Markov Models for ASL Recognition by Using Three-dimensional Computer Vision Methods” (1997). Also C. Vogler and D. Metaxas “Parallel Hidden Markov Models for ASL Recognition” (1999) ICCV
- A.D. Wilson and A. Bobick “Recognition and Interpretation of Parametric Gesture” (1998)

Looking at Faces:

Face Detection:

- G. Yang and T. Huang “Human Face Detection in a Complex Background” (1994) PR
- Rowley, Baluja, and T. Kanada “Neural Network-Based Face Detection” (1998) PAMI

- Schneiderman and Kanada “Probabilistic Modeling of Local appearance...” (1998) CVPR
- Viola and Jones “Robust real-time Object Detection” (2001)

Facial Expression Recognition:

- I. Essa and A. Pentland “Coding, Analysis, Interpretation and Recognition of Facial Expressions” (1995) PAMI. Also “Facial Expression Recognition using a Dynamic Model and Motion Energy” (1995) ICCV
- Yaser Yacoob and Larry S. Davis “Computing Spatio-Temporal Representations of Human Faces” (1994) CVPR 94
- Michael Black and Yaser Yacoob “Tracking and Recognizing Facial Expressions in Image Sequences, using Local Parameterized Models for Image Motion” (1995) ICCV
- M. Rosenblum, Yaser Yacoob and Larry S. Davis “Human Expression Recognition from Motion Using a Radial Basis Function Network Architecture” (1996) TNN

Face Recognition:

- Zhao, R. Chellappa “Face Recognition: a literature survey”
- R. Brunelli and T. Poggio “Face Recognition: Features versus Templates”
- Matthew Turk and Alex Pentland “Eigenfaces for Recognition”
- Etemad and R. Chellappa “Discriminant analysis for Recognition of human face images”

Recent Papers 2001+:

- M. Isard, J. MacCormic “BraMBLe: A Bayesian Multiple-Blob Tracker” (2001) ICCV
- Kentaro Toyama and Andrew Blake “Probabilistic Tracking in a Metric Space” (2001) ICCV
- Plankers and Pascal Fua “Articulated Soft Objects for Video-based Body Modeling” also “Tracking and Modeling People in Video Sequences” (2001)
- Fablet and M. Black “Automatic Detection and Tracking of Human Motion with a View-Based Representation” (2002) ECCV
- Jepson, D. Fleet, M. Black “A Layered Motion Representation with Occlusion and Compact Spatial Support” (2002) ECCV
- Sidenbladah, M. Black and L. Sigal “Implicit Probabilistic Models of Human Motion for Synthesis and Tracking” (2002) ECCV

- Greg Mori and Jitendra Malik “Estimating Human Body Configurations using Shape Context Matching” (2002) ECCV
- J. Sullivan and S. Carlsson “Recognizing and Tracking Human Action” (2002) ECCV