

BANQUET KEYNOTE TALK
Tuesday, December 13, 2016
7:00 PM – 8:00 PM / (Ballrooms TBD)

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Analyzing Dense Crowds

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Abstract

In this talk, first I will present a new approach for counting people in extremely dense crowds. Our approach relies on multiple sources of information such as low confidence head detections, repetition of texture elements (using SIFT), and frequency-domain analysis to estimate counts, along with confidence associated with observing individuals, in an image region. In addition, we employ a global consistency constraint on counts using Markov Random Field. This caters for disparity in counts in local neighborhoods and across scales.

Next, I will discuss how we explore context for human detection in dense crowds in the form of locally-consistent scale prior which captures the similarity in scale in local neighborhoods and its smooth variation over the image. Using the scale and confidence of detections obtained from an underlying human detector, we infer scale and confidence priors using Markov Random Field. In an iterative mechanism, the confidences of detections are modified to reflect consistency with the inferred priors, and the priors are updated based on the new detections. The final set of detections obtained are then reasoned for occlusion using Binary Integer Programming where overlaps and relations between parts of individuals are encoded as linear constraints.

Finally, I will present a method for tracking in dense crowds using prominence and neighborhood motion concurrence. Our method begins with the automatic identification of prominent individuals from the crowd that are easy to track. Then, we use Neighborhood Motion Concurrence to model the behavior of individuals in a dense crowd, this predicts the position of an individual based on the motion of its neighbors.



Speaker Bio-Sketch: Dr. Mubarak Shah, Agere Chair Professor of Computer Science, is the founding director of Center for Research in Computer Visions at University of Central Florida (UCF). He is a co-author of five books (Motion-Based Recognition (1997); Video Registration (2003); Automated Multi-Camera Surveillance: Algorithms and Practice (2008); Modeling, Simulation and Visual Analysis of Crowds (2013); and Robust Subspace Estimation Using Low-Rank Optimization (2014), all by Springer. He has published extensively on topics related to visual surveillance, tracking, human activity and action recognition, object detection and categorization, shape from shading, geo registration, visual crowd analysis, etc. Dr. Shah is a fellow of IEEE, IAPR, AAAS and SPIE. In 2006, he was awarded the Pegasus Professor award, the highest award at UCF, given to a faculty member who has made a significant impact on the university. He is ACM Distinguished Speaker. He was an IEEE Distinguished Visitor speaker for 1997-

2000, and received IEEE Outstanding Engineering Educator Award in 1997. He received the Harris Corporation's Engineering Achievement Award in 1999, the TOKTEN awards from UNDP in 1995, 1997, and 2000; SANA award in 2007, an honorable mention for the ICCV 2005 Where Am I? Challenge Problem, and was nominated for the best paper award in ACM Multimedia Conference in 2005 and 2010. At UCF he received Scholarship of Teaching and Learning (SoTL) award in 2011; College of Engineering and Computer Science Advisory Board award for faculty excellence in 2011; Teaching Incentive Program awards in 1995 and 2003, Research Incentive Award in 2003 and 2009, Millionaires' Club awards in 2005, 2006, 2009, 2010 and 2011; University Distinguished Researcher award in 2007 and 2012. He is an editor of international book series on Video Computing; editor in chief of Machine Vision and Applications journal, and an associate editor of ACM Computing Surveys journal. He was an associate editor of the IEEE Transactions on PAMI, and a guest editor of the special issue of International Journal of Computer Vision on Video Computing. He was the program co-chair of IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2008.