Assignment 4 (100 points)

Visual Tracking by Particle Filtering

Due 6/1 (Fri) 11:59PM

1. **(Particle Filter Tracking: 100 points)** Implement a tracking algorithm based on particle filtering. Follow the algorithm in

   [PerezECCV2004] P. Perez et al., Color-Based Probabilistic Tracking, ECCV 2004
   http://www.irisa.fr/vista/Papers/2002/perez_hue_eccv02.pdf.

   You need to track the face in the "Dudek" sequence, and the video sequence can be found at http://www.cs.toronto.edu/~dross/ivt/. Use the mat file made for Matlab 7+ version. The state space for your tracker is in the three dimensional space for location and scale, i.e., (x, y, s). The initialization for the first frame is given manually. The motion model (process model) is random-walk—zero mean Gaussian, and you need to make your own observation model. One of the easiest method as the observation model is to compute the distance between the histograms of target model and candidates as suggested in [PerezECCV2004].

   The groundtruth is posted in the class webpage; the upper-left corner and lower-right corners are given for each bounding box. You need compute the overlapping ratio between the bounding boxes of ground-truth and your tracker output, and draw a graph based on the ratios in each frame.

Submission: Submit your source code and result to class afs submission directory using ftp. You may hand in your report in hard or soft copy.