Assignment 1

Topic: Background Segmentation

Due on or before: (To be Announced)

Maximum Marks: 9

Here is a video [please click on the above image to play/save/download the video] of two people loitering about aimlessly in a parking lot in front of the A. V. Williams Building, University of Maryland, College Park. (You may perhaps recognise the 6-footer in a greyish-blue shirt and dark trousers: he was quite lean and thin at that time...and healthy!)

Are you sick of him? Shoot him (with a camera)... Eliminate him from the picture...

Can you perform background subtraction on this video?
Use the idea of motion segmentation, from the papers below. To segment out the foreground, you may use the Sequential Labelling algorithm. Or K-Means, for that matter. Please generate *two* videos (in terms of the frames, and the video file as well) -

- the background, and
- one with the foreground objects

Please also submit an ASCII .txt file, which contains a description of the specific parameters used. The recommended programming language is C/C++/Java/Python, and the recommended software environment is OpenCV. No MATLAB for this assignment, please. This assignment aims at getting experience with Machine Learning algorithms which can easily be coded up. (There are many which cannot, and may be used as black boxes). Even in OpenCV (and other places), one may find numerous versions of the source code: for Gaussian Mixtures, K-Means, and Stauffer and Grimson's Background subtraction itself. Please do not copy/cut-and-paste code from the Internet: this will be penalised, as mentioned on the course webpage (the front page). You may read up different implementations, but please code from scratch.

- C. Stauffer, W. E. L. Grimson. Adaptive Background Mixture Models for Real-Time Tracking. *Proc. IEEE Computer Society Conference on Computer Vision and Pattern Recognition,* vol. 2, pp. 246 - 252, 1999.
- C. Stauffer, W. E. L. Grimson. Learning Patterns of Activity Using Real-Time Tracking. *IEEE Transactions on Pattern Analysis and Machine Intelligence,* vol. 22, no. 8, pp. 747 - 757, 2000.

How does one handle MPEG videos?
Please feel free to use any video player to play MPEG video, and any decoder/encoder of your choice, on an operating system of your choice. You can download free MPEG software from the MPEG website at http://www.mpeg.org/
This contains links to many resources - free, and otherwise. Of particular importance to you may be the UC Berkeley MPEG player mpeg_play, and the MPEG Software Simulation Group's MPEG encoder and decoder mpeg2encode, and mpeg2decode, all of which are downloadable through the links - including the source code!
Internal Links [IIT Delhi]

Demo Schedule:

Venue: (to be announced)
Demos:

(To be announced) Those who stay outside the campus and may have some difficulty in manitaining the above timings, are to contact the TAs over email, well in advance. Ditto for others, who may have a valid reason for not adhering to the above schedule. Their demos will be rescheduled appropriately.

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