

Name: _____

Score: /11

CSE 5524

Computer Vision for HCI

AU'19

Homework Assignment #5

Due: Monday 9/30

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- 1) Using the images (aerobic-[001-022].bmp) provided on the class WWW site, experiment with simple motion detection between consecutive frames using (abs) image differencing. Clean-up and remove any tiny regions (e.g., use techniques such as bwareaopen, median filtering, etc.). Experiment with different thresholds. [2 pts]
 - 2) Compute an MEI and MHI on the image sequence (using your best motion differencing approach from problem #1 above for each image pair i and $i-1$), simulating the current MHI “timestamp” for each image pair using the larger of the image pair index values (i.e., use i , not $i-1$). You will have difference images from $i=2$ to 22. The MEI/MHI duration should include all image diff results in the sequence into the final template. Use imagesc (Matlab) to show your results. Compute the 7 similitude moments for the final MEI and the MHI (make sure to *normalize* the MEI and MHI values to be between 0-1 before computing the moments using the given formula in the class notes: $\max[0, (i-1.0)/21.0]$ for this example). [4 pts]
 - 3) Create a 101x101 image with a black (0) background and a white (255) box of size 21x21, placing the upper-left corner at pixel (row=40, col=6). Create another new box image, but shift the box 1-pixel to the right and 1-pixel down. Compute the **normal flow** between the images. Use MATLAB’s quiver function to draw the vector motions on the image (call *imagesc*, then ‘*hold on*’, and lastly call *quiver*). (Make sure your gradient mask orientations/directions and the plot axes are consistent!!!) Make sure all masks are “correct” with proper scaling/normalization. Is the result what you expected? Why or why not? Comment on the flow for the 4 sides of the box and also the 4 corners. [5 pts]
 - 4) As usual, turn in all code, printouts of images, and discussion of results. Make a script (with the proper naming) to do the above tasks and call needed functions. Upload your code and images to Carmen.