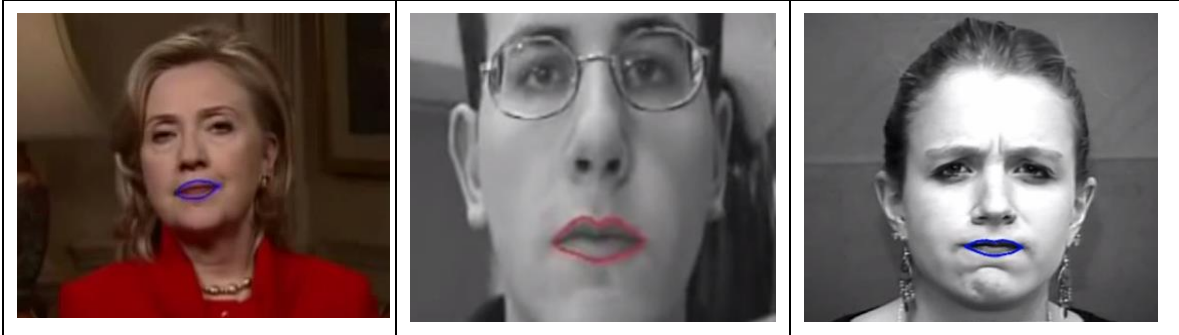


Homework Assignment #2

DUE: 5:00pm, Sunday February 10th (Electronic turnin required)



You are to implement a lip tracking program using the Snake or a flexible template. Take a look at the following Youtube videos to see what your program should do:

<https://www.youtube.com/watch?v=j7jr7sh5fmQ>, and
<https://www.youtube.com/watch?v=772p4mTIVs4>

Sample test images can be found in <http://www.cs.ucsb.edu/~cs181b/testimages/prog2/> (or follow the local image archive link from the class web page). Make sure that your programs work on images in that directory.

Your program must

- (1) Create a lip template (Matlab ginput function should help here) based on some sample image(s) of the test videos. Note that you should submit your flexible template with your program for grading, as the reader will not re-create the template for you. Hence, your template should be able to properly initialize itself and track lip motion in the test video sequences in the local archive.
- (2) Be able to track the mouth motion with the following deformation and change
 - a. Talking
 - b. Laughing, fawning and other common expressions
 - c. Slight camera zoom in or out
 - d. Slight rotation and translation of the head
 - e. Slight change in the environmental illumination

Your program should accept four arguments: (directory, root, idx1, idx2, lip_template). "directory" is the data directory, "root" is the root image filename, idx1 is the starting index, and idx2 is the end index. Or the images in the video are named root_idx1.jpg to root_idx2.jpg, increment by 1. The image index will always be 5 digits long, with 0 padding if necessary, e.g., 00001, 00010, 00100, etc. lip_template is the file that stores your initial lip template. You should output, for each input frame, the corresponding output frame with the lip tracking result highlighted in color.

BONUS: If you implement additional functionalities, e.g., a more detailed template, other facial templates (e.g., eye), ability to tolerate large and sudden scale, lighting and pose changes, etc., you should turn in your program with your own video sequences (if necessary) to demonstrate the advanced capabilities. Please provide a README file so the TA knows what to look for.

While such a deformable tracking function might appear primitive, it is actually not trivial to get it right (remember, one common criticism of traditional CV programs is that they often lack

“robustness”). Hence, you should include a README file to let reader know how to test your program. That is, you should tell the reader the (directory, root, idx1, idx2, lip_template) combinations that you are confident that your program will work successfully.