LAB 3: DUE 28 OCTOBER 2015

In this assignment you will automatically "colorize" face images using a large data base of face images. The algorithm will procceed as follows. Given a grayscale query image, match that image to a large training set of color images. Transfer the color from matched image to the query image.

Task 1: Baseline Implementation (50 pts)

- Compute an image descriptor for the query face.
- Compute image descriptors for the training set of face images.
- Retrieve the training image that is most similar to the query.
- Transfer color from the matched training image to the query image.

Images in the testset directory are your grayscale query images. Images in the trainset directory are your large data base of color training images. Your task is to compute colorizations for each query image using the training data base.

For this task we will use Tiny Images (32x32 pixels images) as image descriptor and SSD as metric. For transferring the color, you can experiment with different color spaces. YCbCr, L*a*b*, HSV… You can use a library for this.

Task 2: Reduce dimensionality with PCA (50 pts)

In the Tiny Images paper, they use the first 19 principal components of the images to speed up the comparison process. This is a pretty large dataset, so the matrix will be big. Don't try with the whole data set before you get it working. Search for a decent implementation/library of PCA that can handle this amount of data. I tried sklearn in Python and it seems to handle it all right.

Extra

Experiment with different sizes of images and number of PCs, and different metrics, such as Normalised Cross-correlation.
You can also try to implement the GIST descriptor. Paper and a matlab implementation from the authors here: http://people.csail.mit.edu/torralba/code/spatialenvelope/

Deliverables

Code and images. You will demo it for marking during the next lab.
README file.

- How long did the assignment take?
- Issues and descriptions of your partial solution (for partial credit)
- Any extras?
- Collaboration acknowledgment.
- What was most unclear/difficult?
- What was most exciting?
- What conclusions do you extract from the use of different descriptors?