Face Recognition using Fourier Transforms

CMPT 412 Fall 2017

I've uploaded a paper to Canvas that describes a Fourier method of face recognition. This is just one of many different face recognition methods that have been developed over the last 25 years. It's an interesting and quite simple method that I hope will give you some experience with the Fourier transform and the topic of face recognition at the same time. The point of this assignment has more to do with getting experience with Fourier transforms than face recognition since there are many other more effective methods of face recognition.

I put a few post-it notes into the paper. Depending on what program you use to open the pdf they may or may not show up. If they don't appear try Adobe Reader.

You can download the database of images that the paper refers to from:

http://www.cl.cam.ac.uk/Research/DTG/attarchive/pub/data/att_faces.zip

The images are png and may or may not display on your regular image viewer; however, Matlab reads them easily.

It's not required, but if you're interested in trying the method on other face databases, you can find a whole bunch of them at

http://www.face-rec.org/databases/

Once you get the basic Fourier face recognition method working, I suggest doing a few more tests similar to the evaluations they include in the paper. In particular, what's the overall recognition rate? By that I mean, if you try identifying all 400 images what's the average rate of identifying the correct face? You also might try modifying the test set in various ways. For example, what happens when you rotate the images by a little (say 10 degrees) or a lot (90 or 180)? In terms of

the method itself, what happens if you consider comparing just the magnitude (see Matlab's abs) component of the Fourier transforms rather than the real and imaginary parts separately?

Please hand in via Canvas a single PDF file containing:

(1) Your Matlab code

(2) Documentation containing:

(2a) a description of your method and any variations on the basic method that you tried.

(2b) a description of your tests with the method and the results you got in terms of recognition rate.

(2c) your thoughts on this method and what else it might be good for (if anything).

Warning: You can buy code for this assignment on-line for about $70. I suggest you might want NOT to consider that option. I note also that plagiarism is a problem outside the university too. I see code at

http://social.technet.microsoft.com/wiki/contents/articles/27358.windows-phone-face-recognition-using-2d-fast-fourier-transform.aspx

that won a competition in 2012 while making no reference to the paper I've uploaded from 2000. It even includes a direct copy of Figure 2.