Face databases

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In this document the formats of the various face image databases are described, which can be used for experiments with libface.

1 MIT face database

1.1 Image format and file name scheme

This database is the same as was used by Turk and Pentland (1991) in their famous work. The database was downloaded from ftp://whitechapel.media.mit.edu/ pub/images/ (URL accessed on December 10, 2002). The explanation of this format is mostly taken from the README file on the aforementioned site.

This image set of faces was taken October 15, 1989 at the MIT Media Laboratory. The subjects are 16 males (mostly grad students). Each subject sat on a couch and was digitized 27 times, varying the head orientation, the lighting, and the scale (camera zoom). The 480×512 images were then filtered and subsampled (via the OBVIUS command "gauss-out") to produce six levels of a gaussian pyramid. (Producing $432 \times 6 = 2592$ images.) This directory contains only the third pyramid level – $120(\text{width}) \times 128(\text{height})$ images. Each file contains raw 8-bit image data, by concatenating the rows.

The variations in lighting, etc. are not precisely calibrated, and no effort was made to keep the subjects from moving in between pictures. The images are coded as follows:

ijk.p

where

i (scale) 1 - full, 2 - medium, 3 - small

j (lighting) 1 - head-on, 2 - approx. $45°$, 3 approx. $90°$

k (head tilt) 1 - upright, 2 - right, 3 - left (approx. $22.5°$)

p (pyramid level) 0 - 480×512, 1 - 240×256, 2 - 120×128, 3 - 60×64, 4 - 30×32, 5 - 15×16

1.1.1 Viewing the images

In order to view the images from this dataset, the viewing tool IrfanView 3.75[1] can be used. For this purpose, the original file (e.g. *111.2*) should be renamed to **.raw* (e.g.

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[1]IrfanView is a freeware image viewing utility, available at http://www.irfanview.com/ (URL accessed on December 10, 2002).
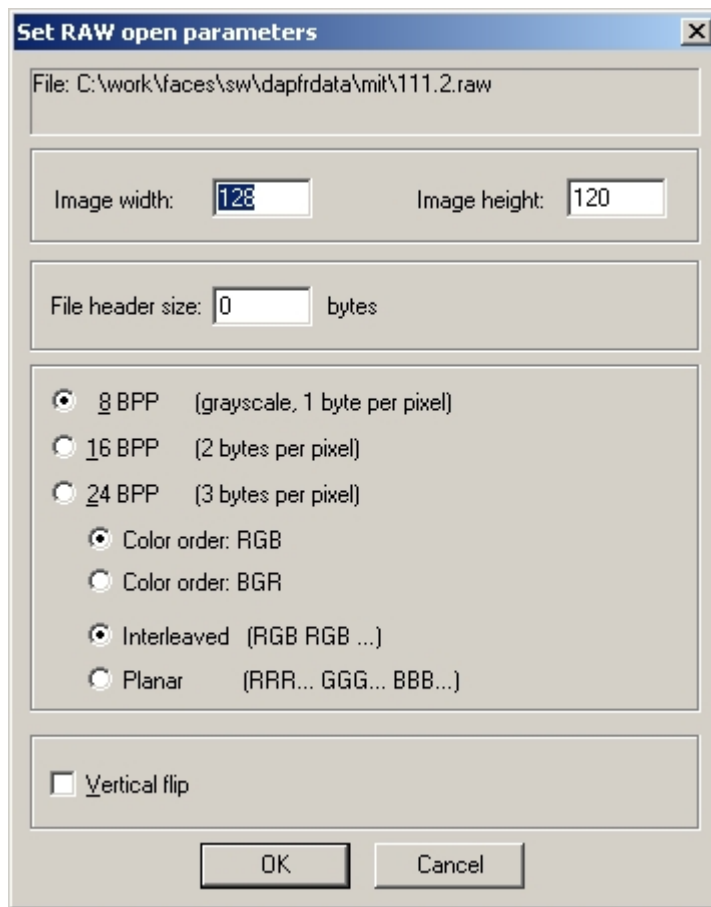
Figure 1: Settings in IrfanView for viewing one of the images (111.2) of the MIT face database

111.2.raw). Then this renamed file should be opened in IrfanView. As the extension *raw* indicates that the file is a raw image, IrfanView needs to know the exact parameters of the image stored in that file, so it displays a dialog box similar to the one shown in figure 1. Depending on the image parameters (width and height according to the file name), the width and height should be entered as shown in the text fields *Image width* and *Image height*. Further, bit rate should be set to *8 BPP*. Figure 1 shows the settings for viewing the image *111.2*.

2   The UMIST Face Database

The UMIST face database (see Graham (2002) and Graham and Allinson (1998)) contains 564 images of 20 people taken from various positions. The images are in the PGM format and can be viewed with IrfanView 3.75 without any additional settings.

3   The Yale Face Database

The Yale Face Database was downloaded from `ftp://plucky.cs.yale.edu/CVC/pub/images/yalefaces/` (URL accessed on December 10, 2002). It contains 165 GIF images of 15 subjects. As the format is GIF, it can be viewed with any good image viewing tool or with a browser such as Internet Explorer. One only has to rename the files, so that they have a **.gif* extension.

4   Shimon Edelman's face database

This database was downloaded from `ftp://ftp.wisdom.weizmann.ac.il/pub/FaceBase/` (URL accessed on December 10, 2002). Here, the files have to be renamed to **.raw* in order to be able to view them in IrfanView (necessary settings see figure 2).

References

D. Graham. The UMIST Face Database, 2002. URL `http://images.ee.umist.ac.uk/danny/database.html`. (URL accessed on December 10, 2002).

D. B. Graham and N. M. Allinson. Characterizing virtual eigensignatures for general purpose face recognition. In H. Wechsler, P. J. Phillips, V. Bruce, F. Fogelman-Soulie, and T. S. Huang, editors, *Face Recognition: From Theory to Applications*, volume 163 of *NATO ASI Series F, Computer and Systems Sciences*, pages 446–456. 1998.

M. Turk and A. Pentland. Eigenfaces for recognition. *Journal of Cognitive Neuroscience*, 3(1), 1991. URL `http://www.cs.ucsb.edu/~mturk/Papers/jcn.pdf`. (URL accessed on November 27, 2002).
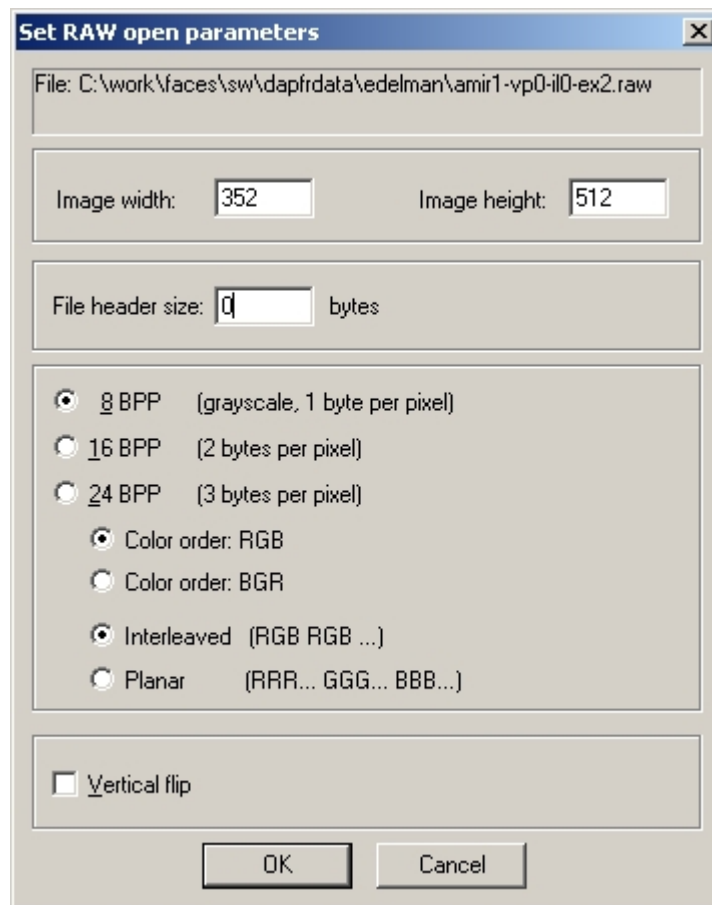
Figure 2: IrfanView settings required for viewing one of the image of the Shimon Edelman's face database