

ECE 6283

Homework 3

Fall 2004

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1. Implement the content-based image retrieval (CBIR) texture algorithm by Manjunath and Ma, as described in paper [7] on the course reading list.
2. Use the Gabor filterbank we have been discussing in class (see the class handouts available on the course web site) with an image size of 128×128 pixels. Use parameter choices $r_0 = 9.6$ cycles per image (cpi), $R = 1.8$, $B = 1.0$, and $\eta = 0.5$. This should give a filterbank with 32 channels arranged at eight orientations with four filters per orientation.
3. For the image database, use the images available on the course web site by following the links for **Images->Brodatz**. There are 21 Brodatz and Brodatz-like texture images in this directory. Each image is 256×256 pixels, where each pixel is represented by a one-byte unsigned char. These are raw files: there are no headers and the pixel data are stored in row major order. In other words, each file contains all the pixels for the first row from left to right, then all the pixels for the second row, and so on.
4. Divide each image into four tiles of size 128×128 . These 84 tiles will constitute the database against which queries should be performed. Use each of the 84 tiles as the query image. Return the top four matches from the database and compute the retrieval rate as the percentage of these four returns that came from the same original as the query tile. Average the retrieval rate defined in this way over the four tiles for each original image and also over the total set of all 84 trials of the experiment. Compare your experimentally determined retrieval rates to those reported in the paper [7].

DUE: 10/26/2004