

APMA 990 Wavelets — Project

Report by Friday, March 1, 2002

This Matlab assignment is the start of a possible course project.

Write a Matlab code which will create an image box for a gray (or colour) image. For starters use the moving average low-pass filter, and the moving difference high-pass filter.

Sample images are provided at the Course Web page - look for the Project page.

If your image is stored in a $2m$ by $2m$ matrix A , then apply your filters first to all the rows of A , and do the usual downsampling by 2; this will give you the low frequency parts in the left-hand $2m$ by m block A_L , and the high frequency parts in the right hand $2m$ by m block A_H . Apply the same procedure to the columns of (A_L, A_H) to obtain the first recursion level of your image box.

$$A \rightarrow [A_L|A_H] \rightarrow \begin{bmatrix} A_{LL} & A_{HL} \\ A_{LH} & A_{HH} \end{bmatrix}$$

You can then repeat the whole procedure with the smooth part A_{LL} of your image.

- Implement the filtering and creation of image boxes in Matlab. Write your code for “arbitrary” filters.
- Run your code with the Haar filters.
- Experiment with some simple compression ideas.
- Put your code, explanations, and pictures on a Web Page.
- Feel free to cooperate!