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ECCS 4361

Homework 5

10/11/17

clc;

clear all;

im = imread('lena.bmp');

im = rgb2ycbcr(im);

im = im(: , :, 1);

figure(1);

imshow(im);

[C, S] = wavedec2 (im, 5, 'bior3.3');

% Compute start indexes for each portion of the image.

% The portion that the start index is for is specified by the comment

% to the right.

startIndexes = zeros(17, 1);

startIndexes(1) = 1; % Approximation

startIndexes(2) = 1 + S(2, 1)\*S(2, 1); % HD5

startIndexes(3) = startIndexes(1) + S(2, 1)\*S(2, 1); % VD5

startIndexes(4) = startIndexes(2) + S(2, 1)\*S(2, 1); % DD5

startIndexes(5) = startIndexes(3) + S(2, 1)\*S(2, 1); % HD4

startIndexes(6) = startIndexes(4) + S(3, 1)\*S(3, 1); % VD4

startIndexes(7) = startIndexes(5) + S(3, 1)\*S(3, 1); % DD4

startIndexes(8) = startIndexes(6) + S(3, 1)\*S(3, 1); % HD3

startIndexes(9) = startIndexes(7) + S(4, 1)\*S(4, 1); % VD3

startIndexes(10) = startIndexes(8) + S(4, 1)\*S(4, 1); % DD3

startIndexes(11) = startIndexes(9) + S(4, 1)\*S(4, 1); % HD2

startIndexes(12) = startIndexes(10) + S(5, 1)\*S(5, 1); % VD2

startIndexes(13) = startIndexes(11) + S(5, 1)\*S(5, 1); % DD2

startIndexes(14) = startIndexes(12) + S(5, 1)\*S(5, 1); % HD1

startIndexes(15) = startIndexes(13) + S(6, 1)\*S(6, 1); % VD1

startIndexes(16) = startIndexes(14) + S(6, 1)\*S(6, 1); % DD1

startIndexes(17) = 275278; % End index

% Thresholds to be used in compressing Lena.

thresholds = zeros(16, 1);

thresholds(1) = 1; % Approximation

thresholds(2) = 51; % HD5

thresholds(3) = 41; % VD5

thresholds(4) = 26; % DD5

thresholds(5) = 11; % HD4

thresholds(6) = 11; % VD4

thresholds(7) = 21; % DD4

thresholds(8) = 11; % HD3

thresholds(9) = 11; % VD3

thresholds(10) = 31; % DD3

thresholds(11) = 11; % HD2

thresholds(12) = 6; % VD2

thresholds(13) = 16; % DD2

thresholds(14) = 6; % HD1

thresholds(15) = 8; % VD1

thresholds(16) = 33; % DD1

% Thresholded C

cThresholded = zeros(1, 275278);

% Threshold each portion of the image and create the new C

for i = 1:16

portion = C(startIndexes(i):startIndexes(i+1));

portion(find(abs(portion)<thresholds(i))) = 0;

cThresholded(startIndexes(i):startIndexes(i+1)) = portion;

end

% Reconstruct Lena from the thresholded C

imCompressed = waverec2(cThresholded, S, 'bior3.3');

figure(2)

imshow(uint8(imCompressed));

disp(length(find(cThresholded==0)));