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function [ img_hh, img_hl, img_lh, img_ll ] = Haar_Deconstruct( img )

img = double( img );
[w,h] = size( img );

img_l = zeros(w, h/2);
img_h = zeros(w, h/2);

for i = 1:h/2

    img_l(:,i) = (0.5)*(img(:, 2*i) + img(:, (2*i)-1));
    img_h(:,i) = (0.5)*(img(:, 2*i) - img(:, (2*i)-1));

end

img_ll = zeros( w/2, h/2 );
img_lh = zeros( w/2, h/2 );
img_hl = zeros( w/2, h/2 );
img_hh = zeros( w/2, h/2 );

for i = 1:w/2

    img_ll(i,:) = (0.5)*(img_l(2*i,:) + img_l((2*i)-1, :));
    img_lh(i,:) = (0.5)*(img_l(2*i,:) - img_l((2*i)-1, :));

    img_hl(i,:) = (0.5)*(img_h(2*i, :) + img_h((2*i)-1, :));
    img_hh(i,:) = (0.5)*(img_h(2*i, :) - img_h((2*i)-1, :));

end

% img_trans = zeros(w,h);
% img_trans(1:w/2, 1:h/2) = img_ll;
% img_trans(1:w/2, (h/2+1):h) = img_hl;
% img_trans((w/2+1):w, 1:h/2) = img_lh;
% img_trans((w/2+1):w, (h/2+1):h) = img_hh;

% img_trans_show = zeros(w,h);
% img_trans_show(1:w/2, 1:h/2) = img_ll/max(img_ll(:));
% img_trans_show(1:w/2, (h/2+1):h) = img_hl/max(img_hl(:));
% img_trans_show((w/2+1):w, 1:h/2) = img_lh/max(img_lh(:));
% img_trans_show((w/2+1):w, (h/2+1):h) = img_hh/max(img_hh(:));
%
% figure;
% imshow( img_trans_show );

end

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