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                                ent_contrast_darken
function adjusted_img = ent_contrast_darken(input_img,N,region_matrix, S_mat)
im_size = size(input_img);
num_rows = im_size(1);
num_cols = im_size(2);
row_length = floor(num_rows/N);
col_length = floor(num_cols/N);
[a b max_val] = find_max(region_matrix);
colors = zeros(1,max_val);
for k = 1 : max_val
    avg = 0;
    count = 0;
    for i = 0 : N - 1
        for j = 0 : N - 1
            if(region_matrix(i + 1,j + 1) == k)
                avg = avg + S_mat(i + 1,j + 1);
                count = count + 1;
            endif
        endfor
    endfor
    colors(k) = avg/count;
endfor

for i = 0 : N - 1
    for j = 0 : N - 1
        temp_img = input_img(1 + i*row_length : (i+1)*row_length, 1 + j*col_length :
(j+1)*col_length, 1 : 3);

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```
                                ent_contrast_darken
temp = region_matrix(i + 1,j + 1);

alpha = colors(temp);

input_im(1 + i*row_length : (i+1)*row_length, 1 + j*col_length :
(j+1)*col_length, 1 : 3) = alpha*temp_im;

endfor

endfor

adjusted_img = input_im;

endfunction
```