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                                extract_region
function region_img = extract_region(input_img,N,region_matrix,region_ID)

% This function takes in an input image, and returns the portion of the image that
contains the feature identified by the region_ID

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);

[rows cols] = find(region_matrix == region_ID);
top_row = min(rows) - 1;
bottom_row = max(rows);
left_col = min(cols) - 1;
right_col = max(cols);

for i = 0 : N - 1
    for j = 0 : N - 1
        if(region_matrix(i + 1, j + 1) == region_ID)
            alpha = 1;
        else
            alpha = 0;
        endif
        temp_img = input_img(1 + i*row_length : (i+1)*row_length, 1 + j*col_length :
(j+1)*col_length, 1 : 3);
        input_img(1 + i*row_length : (i+1)*row_length, 1 + j*col_length :
(j+1)*col_length, 1 : 3) = alpha*temp_img;
    endfor
endfor

region_img = input_img(1 + top_row*row_length : bottom_row*row_length, 1 +
left_col*col_length : right_col*col_length, 1 : 3);

endfunction

```