

Segment an Image into Multiple Labels

In this problem, you will perform segmentation with code on the "Puzzle_06.jpg" image included in the course files. Your goal is to segment the image into a matrix of labels that differentiates the background, the red/orange puzzle pieces, and the blue puzzle pieces.

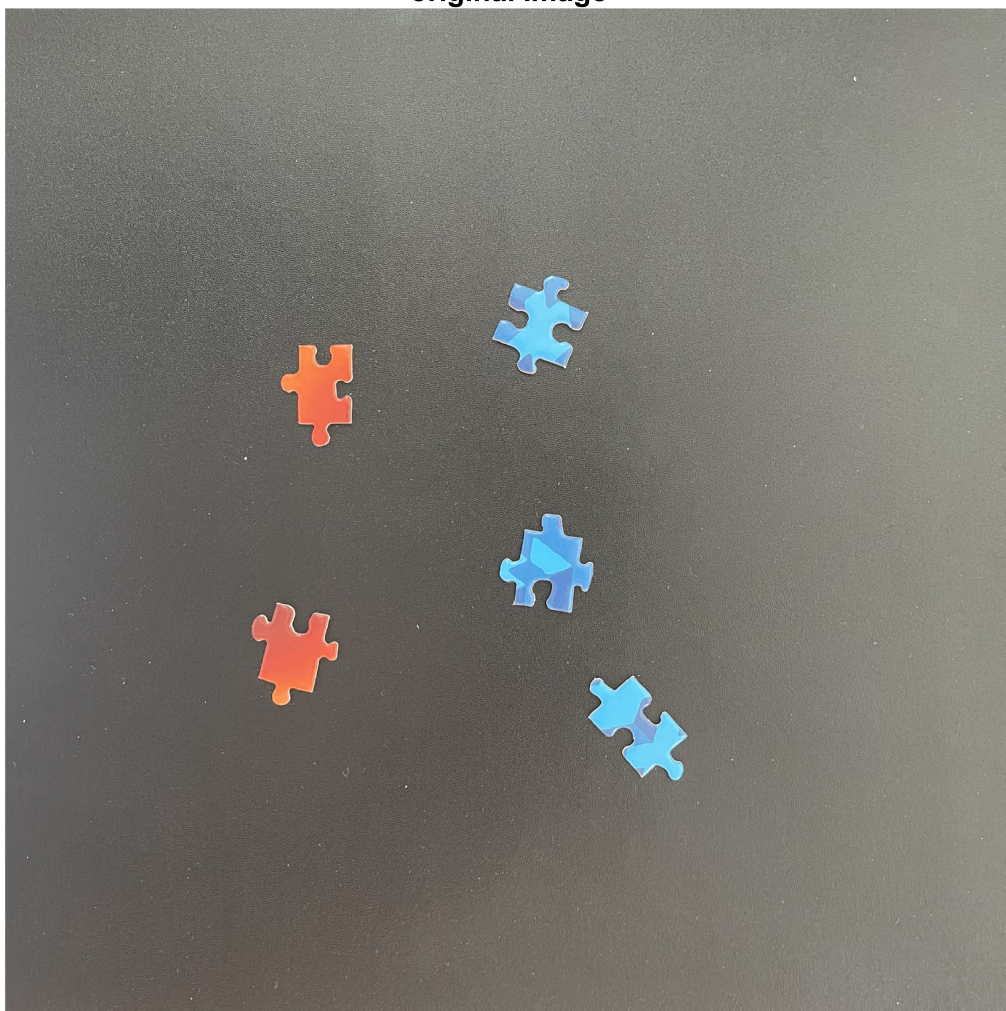
Your code should do the following:

1. Create a binary mask where the puzzle pieces are foreground and the rest of the image is background. Store this mask in the variable **BW**.
2. Segment the image by creating a labeled matrix with three groups, one for the background and one for each color. Store the result in the variable **labels**. **labels** should only contain the values 1, 2, and 3.

We recommend you work out a solution in MATLAB. If you get stuck, refer back to the "Segment Images with Code" reading or look at the code generated from the Apps for ideas.

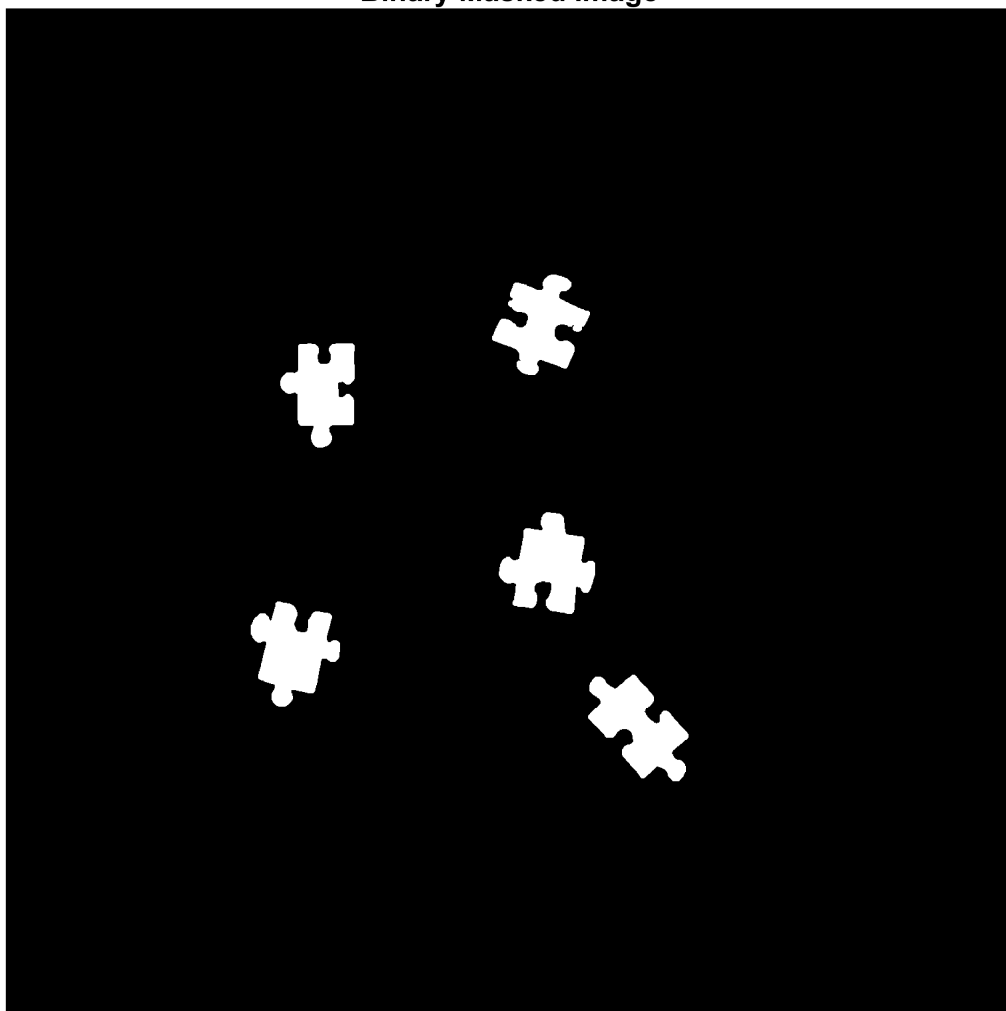
```
img=imread('Puzzle_06.jpg');  
imshow(img);  
title("original Image");
```

original Image



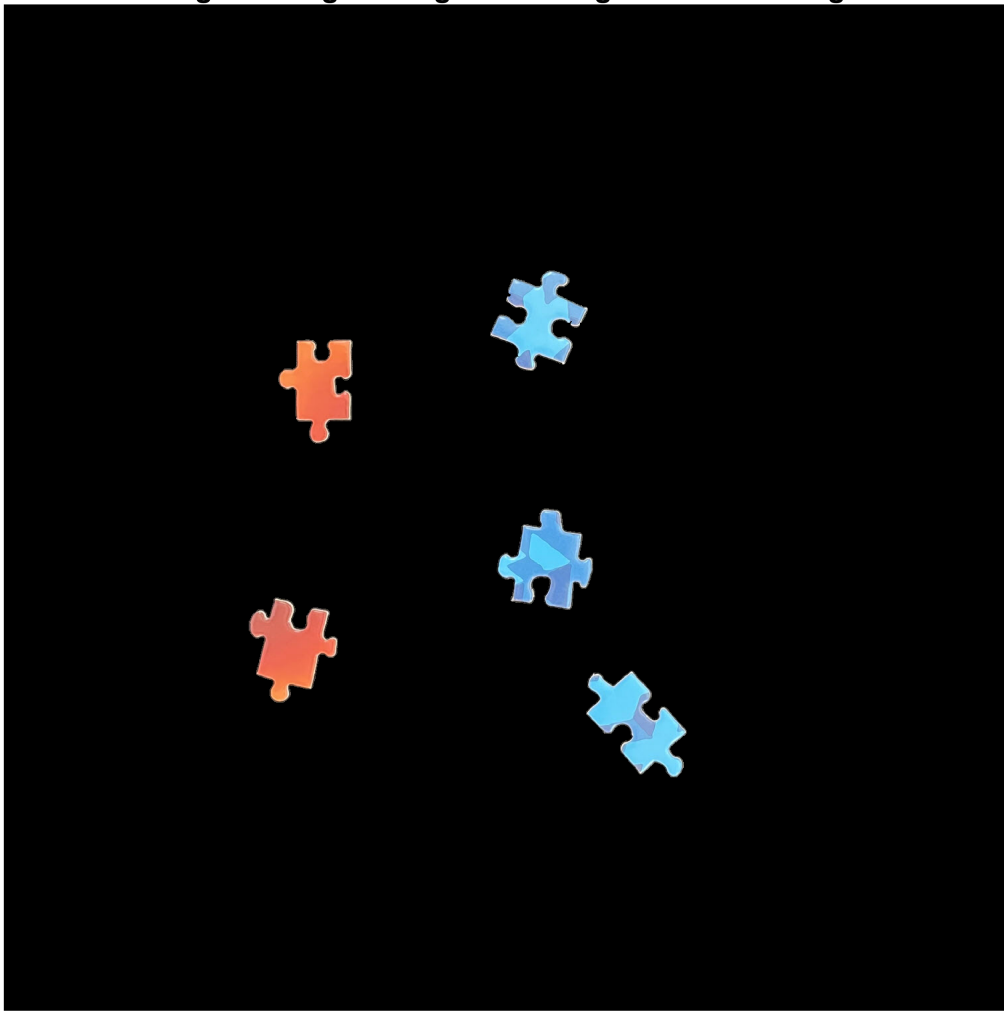
```
img2 = im2gray(img);  
[BW, maskedImage] = segmentImageEx(img2);  
imshow(BW);  
title("Binary Masked Image");
```

Binary Masked Image

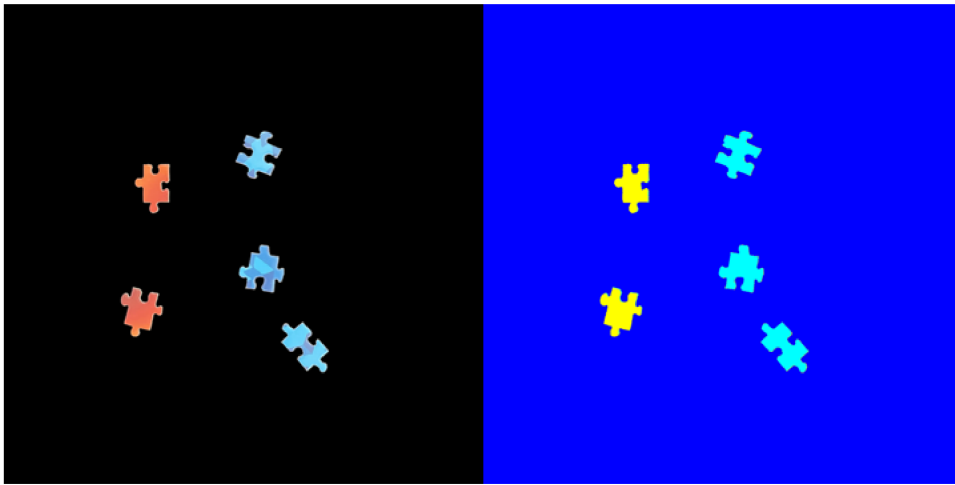


```
img repmat(~BW,1,1,3)=0;  
imshow(img);  
title("Original Image Background Merged with BW Image")
```

Original Image Background Merged with BW Image



```
k = 3;  
labels = imsegkmeans(img,k);  
montage({img,label2rgb(labels)});
```



```
function [BW,maskedImage] = segmentImageEx(X)

%segmentImage Segment image using auto-generated code from Image Segmenter app
% [BW,MASKEDIMAGE] = segmentImage(X) segments image X using auto-generated
% code from the Image Segmenter app. The final segmentation is returned in
% BW, and a masked image is returned in MASKEDIMAGE.

% Auto-generated by imageSegmenter app on 31-Dec-2022
%-----

% Threshold image - adaptive threshold
BW = imbinarize(im2gray(X), 'adaptive', 'Sensitivity', 0.500000, 'ForegroundPolarity', 'bright');

% Open mask with disk
radius = 3;
decomposition = 8;
se = strel('disk', radius, decomposition);
BW = imopen(BW, se);

% Dilate mask with disk
radius = 2;
decomposition = 0;
se = strel('disk', radius, decomposition);
BW = imdilate(BW, se);

% Create masked image.
maskedImage = X;
maskedImage(~BW) = 0;
end
```

