Practical 3 Part 2 Seperate the blue sky

February 16, 2021

Jaya Parmar, MATLAB filename boats.m

1 Introduction

Our aim is to show an approach to seperate blue sky from the rest of the image 'boats.jpg'

2 Method

We start by reading inthe image and equalising its histogram for contrast enhancement between the sky and other blue objects,

$$i = imread('boats.jpg') \tag{1}$$

$$H = histeq(i) \tag{2}$$

Convert the equalized image to grayscale

$$im = rgb2gray(H) \tag{3}$$

and then binary,

$$bw = im2bw(im) \tag{4}$$

The original binary image is shown in Figure 1.

$$figure(1), imshow(bw), title('Original\ binary') \tag{5}$$

Calculate the Euclidian distance of the background, in our case sky, by

$$D = bwdist(\ bw) \tag{6}$$

Remove the foreground objects from calculation by

$$D(bw) = -Inf \tag{7}$$

See the results in Figure 2.

$$figure(2), imshow(D, []), title('Eucilidiandistnace'); \tag{8}$$

Now make a big white filter of 30X30 considering the shape of the binary image.

$$filt = ones(30, 30) \tag{9}$$

The idea is when this filter will convolve on the image in Figure 2, it will make black all pixel values in the final masked image.

$$f = conv2(D, filt) \tag{10}$$

The seperated sky is shown in Figure 3.

$$figure(3), imshow(f, []), title('Skyseperatedfromimage') \tag{11}$$

3 Results

Figure 1

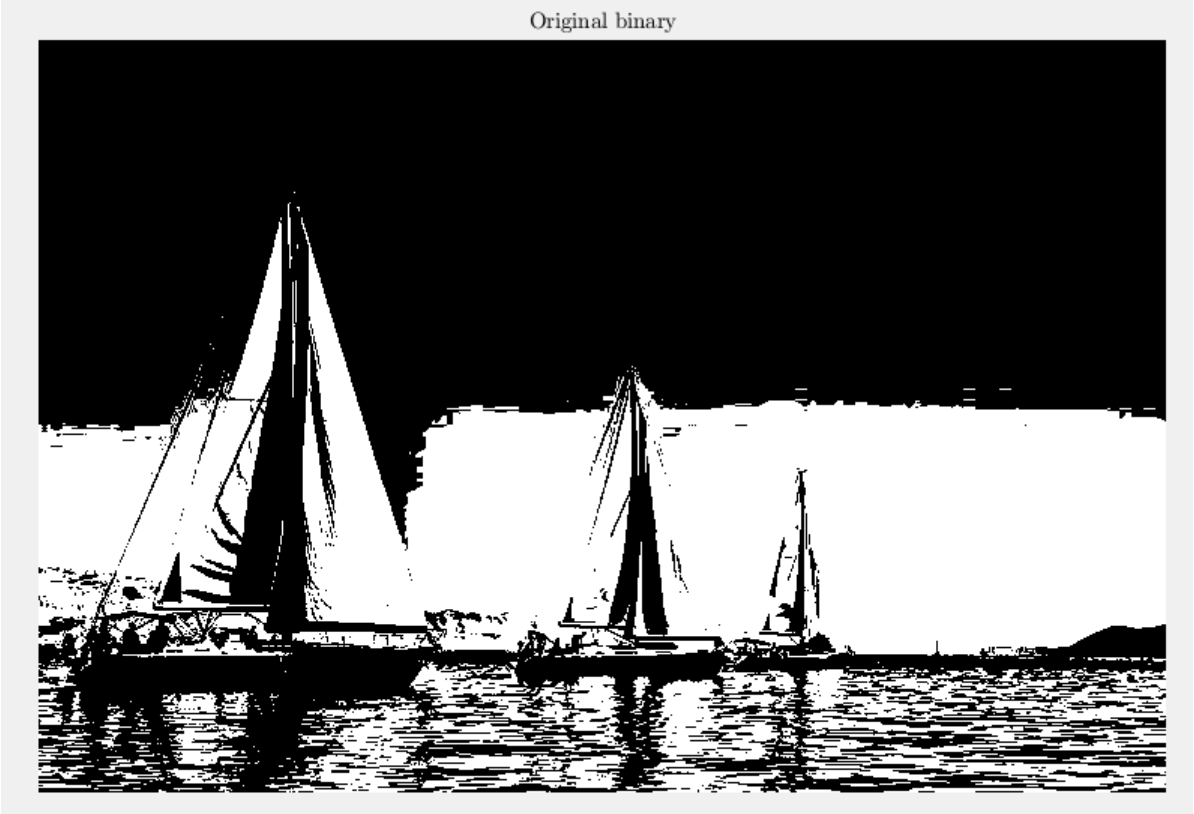
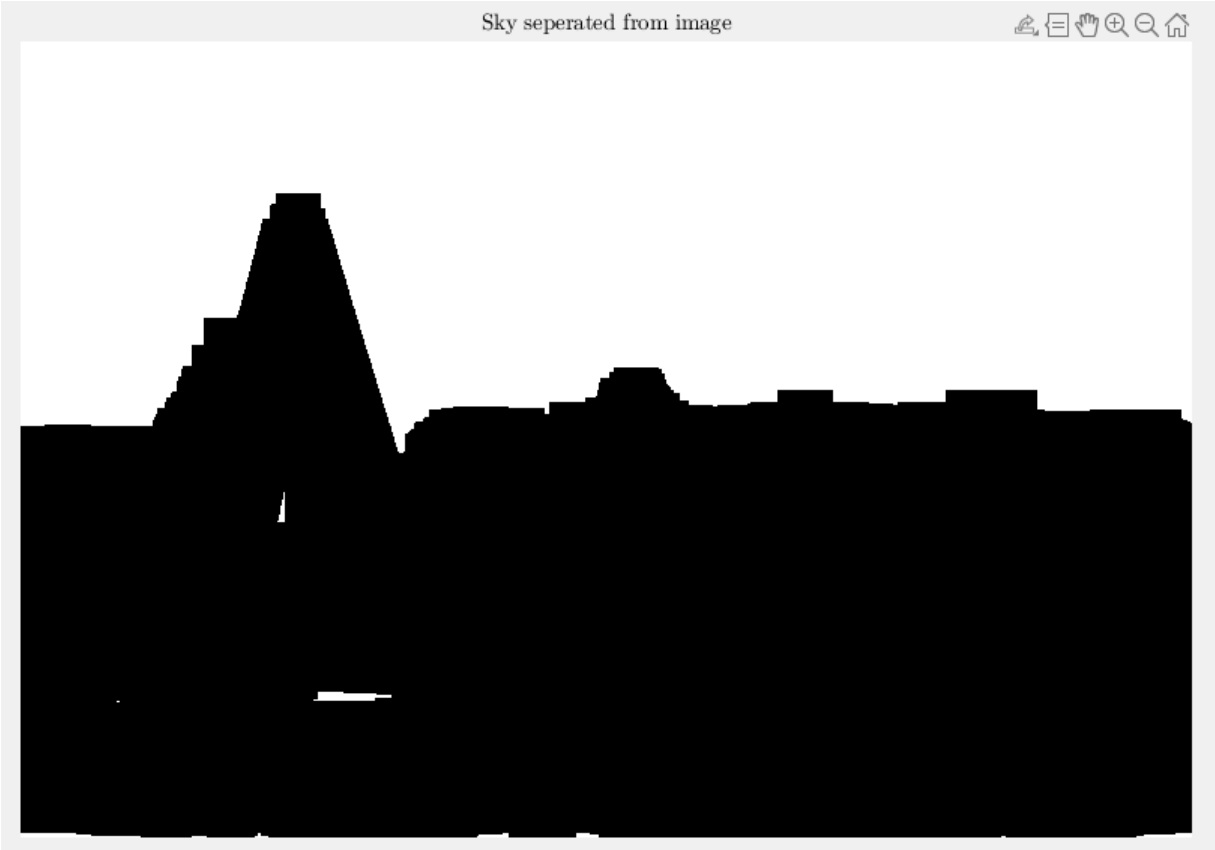


Figure 2

Figure 3



4 Discussion

It is interesting to see how the masking changes by changing the filter values. For example, filt = ones(10,10) will leave white areas in the foreground objects and filt = ones(300,300) will cover a part of the sky. One could also try edge segmenting and overlaying the images over one another; or other segmentation techniques to see the results.

5 Appendix

```
set(0, 'defaulttextinterpreter','Latex');
i = imread('boats.jpg');
H=histeq(i); %Contrast enhancement
im = rgb2gray(H);
bw=im2bw(im);
figure(1),imshow(bw),title('Original binary');
```

```
D = bwdist(~bw);
D(bw) = -Inf;
figure(2),
imshow(D,[]),title('Eucilidian distnace');

filt = ones(10,10); %Mask with a big white filter
f = conv2(D,filt);

figure(3),
imshow(f,[]),title('Sky seperated from image');
```