lab12_HW

Q1

Write a `MATLAB` script to identify the contour of the rice grain in image `12SingleRice.jpg` . The program should be able to exclude the brush from the contour. Draw the contour on top of the rice grain in the image.

To black-white image

this is colored image
It should be classify by color then become black-white image
First, use `gaussian` filter to remove small point
second use `kmean` (a grouping function) to classify `hsv` color.
There are about three colors (black, gray and yellow)

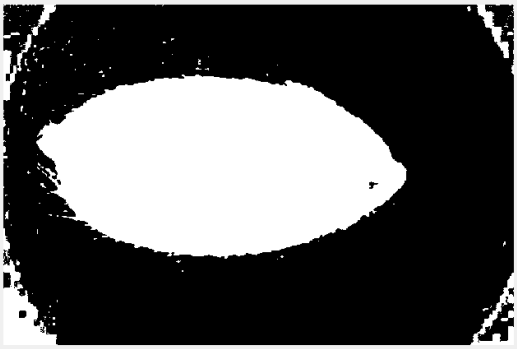
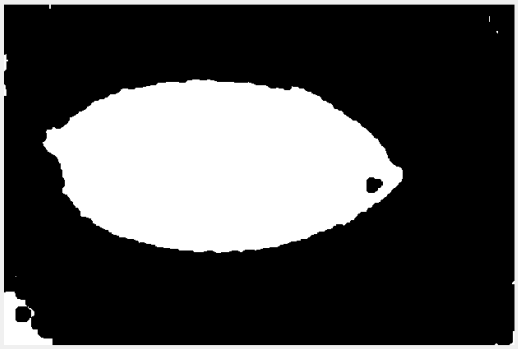
```
img = imread('12SingleRice.jpg');
r = size(img, 1);
c = size(img, 2);
img_gau = imfilter(img, fspecial('gaussian', 5, 5));
img_hsv = rgb2hsv(img_gau);
ind = kmeans(reshape(img_hsv(:,:,1), r * c, 1), 3);
```

well, it is great enough to become black-white image

black-white image analysis

use erosion to remove brush

and remove small component(keep biggest one)

dilate back and get the contour

use `bwmorph remove`

and draw on it

```
img_bw = ind == img_center_ind;
img_ero = imerode(img_bw, strel('disk', 5));
img_ero = imerode(img_ero, strel('disk', 5));
img_lb = bwlabel(img_ero);
img_max = img_lb == mode(img_lb(img_lb ~= 0));
img_di = imdilate(img_max, strel('disk', 5));
img_di = imdilate(img_di, strel('disk', 5));
img_edge = bwmorph(img_di, 'remove');
```

Good

Conclusion

see `rice_contour.jpg`

see `rice_contour.m`

`kmean` will change its value due to there does not exist perfect solution, so the result will change everytime,
I make it as stable as possible.

Q2

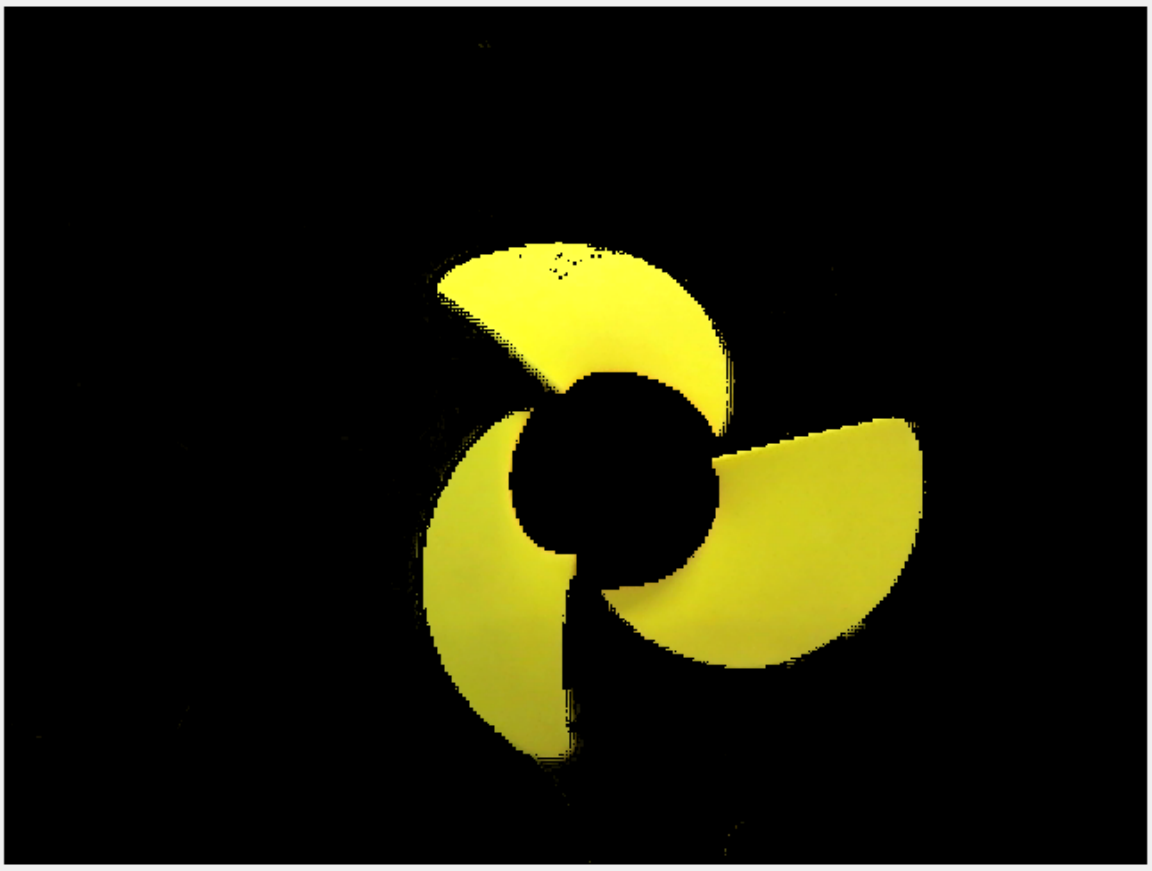
2. Calculate the area size of the yellow fan in image `12YellowFan.png` . Demonstrate the yellow fan area in a black and white image, where black pixels represent background and white pixels represent the fan area. Describe your image processing procedure and approach. How good do you think your results are?

our target is colorful and the backgronud is simple
I think it is very easy

hsv filter

turn rgb to hsv
and this yellow color is

- H(hue) value betwen 30 ~ 45(yellow)
- S(saturation) value bigger than 0.5(really yellow)
- V(value) > 0.6 (not black)

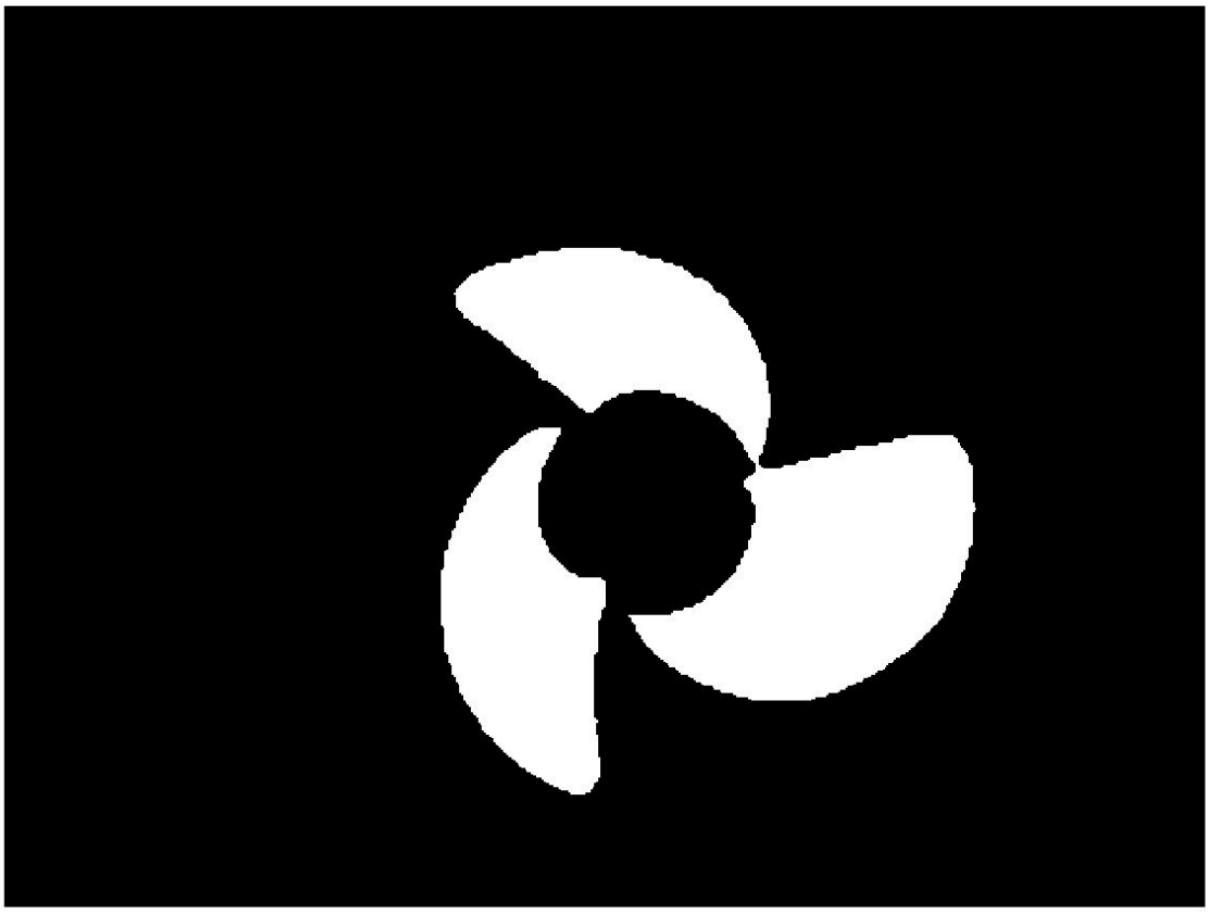


than we find out answer very closing to what question want
to closing to make image perfect

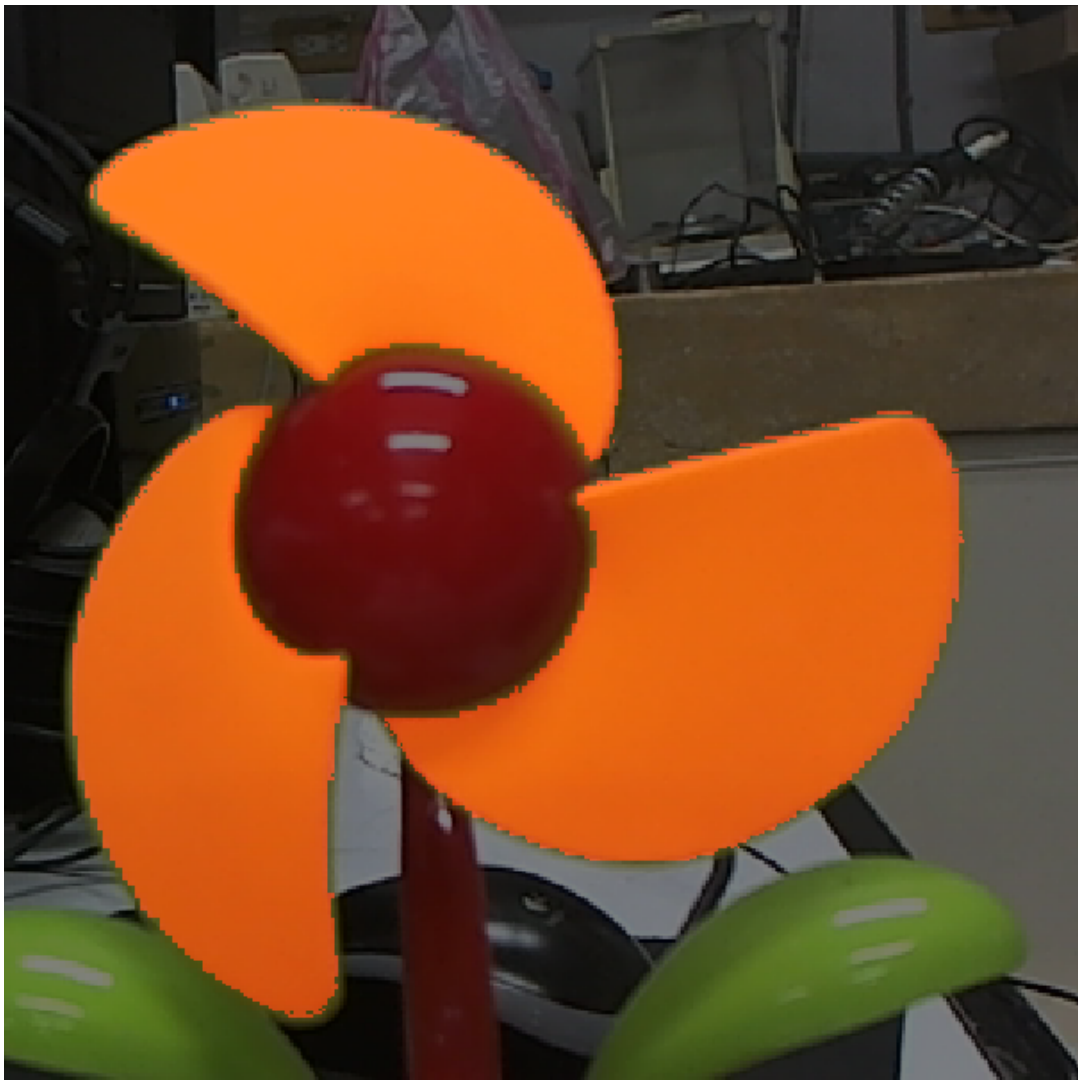
```
img_cond = 30/256 < img_h & img_h < 45/256 & img_s > 0.5 & img_v > 0.6;
img_big = bwareaopen(img_cond, 50, 4);
img_close = imclose(img_big, strel('disk', 5));
```

see `find_fan.m`

see `find_fan.jpg`



combind together (yellow + red = orange)



looks perfect

Thank you for reading

This is the last chapter of matlab in summercourse of NTU BIME Lab304.

star me on Github
linnil1 (https://github.com/linnil1/Lab304_2017summer)

Test on ubuntu16.04 + Matlab R2017a academic use