Image Processing Project #7

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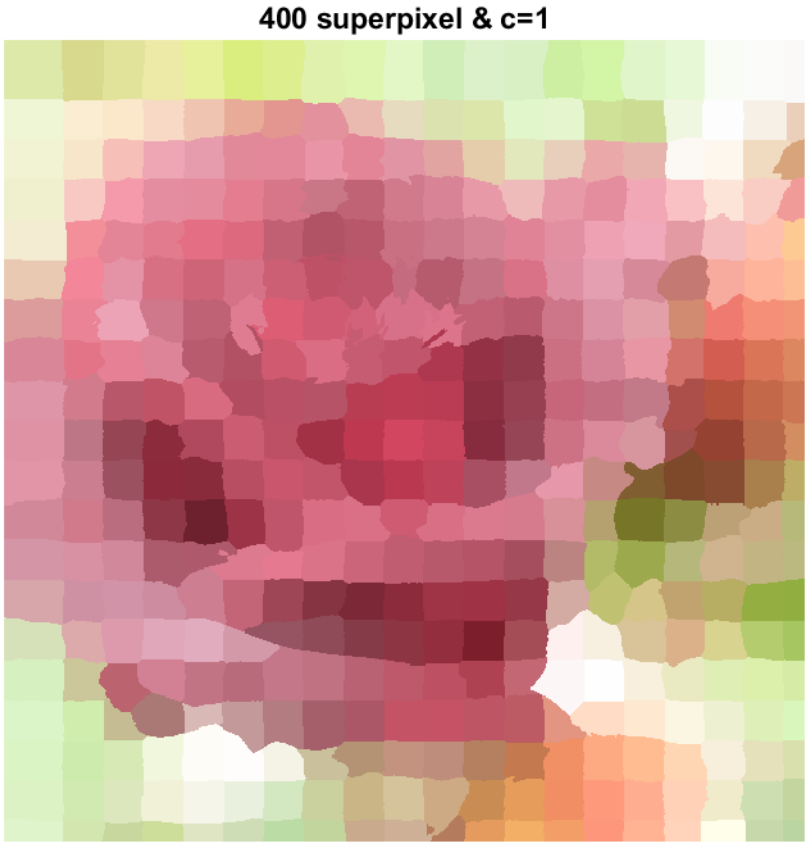
I. Source codes (With Matlab)

```
%%%%%%%%%%% load image %%%%%%%%%%%%%%%%
Img=im2double(imread('image-pj7c.tif'));
[w, h, ch] = size(Img);
red = Img(:,:,1);
green = Img(:,:,2);
blue = Img(:,:,3);
super = 400;
s = sqrt(w*h/super);
c = 1;
T = 10;
%%%%%%%%%%% init m %%%%%%%%%%%%%%%%
m = zeros(sqrt(super),5);
ti = 1;
for i = 1:s:w
    for j = 1:s:h
        m(ti,1:3) = Img(i+s-1,j+s-1,:);
        m(ti,4) = i+s-1;
        m(ti,5) = j+s-1;
        ti =ti+1;
    end
end
L = -1*ones(w,h);
d = Inf(w,h);
x = m(:,4);
y = m(:,5);
%%%%%%%%%%% do SLIC %%%%%%%%%%%%%%%%
new_m = zeros(super,3);
E = -Inf;
num=0;
while E < T
    for k = 1: super
        for i = x(k)-1*s+1:x(k)+s
            for j = y(k)-1*s+1:y(k)+s
                if i <= w && j <=h
                    dc = sqrt((Img(i,j,1)-m(k,1)).^2 + (Img(i,j,2)-m(k,2)).^2
+ (Img(i,j,3)-m(k,3)).^2);
```

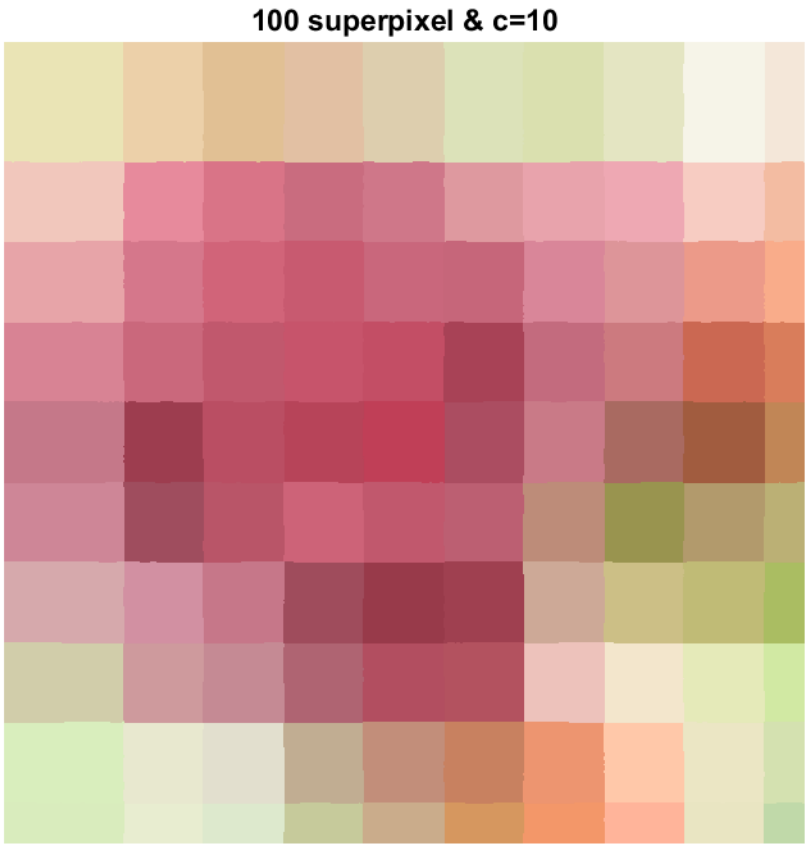
```
                        ds = sqrt((i-m(k,4)).^2 + (j-m(k,5)).^2);
                        D = sqrt(dc^2+c^2*(ds/s)^2);
                        if D<d(i,j)
                            d(i,j) = D;
                            L(i,j) = k;
                        end
                    end
                end
            end
            new_m(k,:) =
1/(sum(sum(L==k))).*[sum(red(L==k)),sum(green(L==k)),sum(blue(L==k))];
        end
        E = sum(sqrt(sum((new_m - m(:,1:3)).^2,2)));
        m(:,1:3) = new_m;
        num =num+1;
end
for k = 1:super
        red(L==k) = m(k,1);
        green(L==k) = m(k,2);
        blue(L==k) = m(k,3);
end
%%%%%%%%%%% assign the final result %%%%%%%%%%%%%%%%
result=zeros(w,h,3);
result(:,:,1)=red;
result(:,:,2)=green;
result(:,:,3)=blue;
%%%%%%%%%%% plot figure %%%%%%%%%%%%%%%%
figure;
imshow(result)
title([num2str(super) ' superpixel & c=' num2str(c)])
saveas(gcf,[num2str(super) ' superpixel & c=' num2str(c)],'png');

figure;
diff = Img-result;
imshow(diff);
title([num2str(super) ' superpixel & c=' num2str(c) ' origin-result difference'])
saveas(gcf,[num2str(super) ' superpixel & c=' num2str(c) ' origin-result
difference'],'png');
```

II. Figures of 400 superpixel images for c =1 and c =10



III. Figures of 100 superpixel images for c =1 and c =10

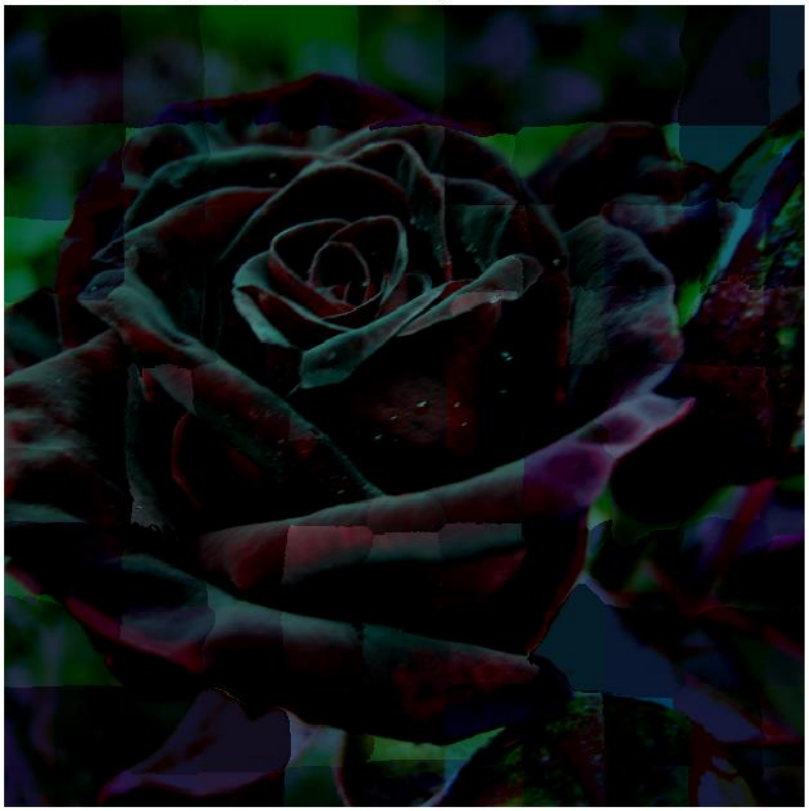


IV. Difference images between each of the four superpixel image and the original image

400 superpixel & c=1 origin-result difference

400 superpixel & c=10 origin-result difference

100 superpixel & c=1 origin-result difference



100 superpixel & c=10 origin-result difference