

```

function [L,N, C] = MySLIC(I, I_gray, K, M, display)

[m,n] = size(I_gray);

% 计算 S

S = round(sqrt(m*n/K));

% 初始化 Label 和 Distance

Label = -1 * ones(m,n);

Distance = Inf * ones(m,n);

[H,w] = meshgrid(round(0.5 * S):S:m,round(0.5 * S):S:n);

H = reshape(H, 1, []);

w = reshape(w, 1, []);

N = size(H);

N = N(2);

% 初始化 Center

C = zeros(N,5);

for i = 1:N

    % 找 3*3 邻域梯度最小的设为初始中心

    if H(i)+1 > m

        img = I(H(i)-2:H(i),W(i)-1:W(i)+1,1);

        [Fx, Fy] = gradient(img);

        F = sqrt(Fx.^2 + Fy.^2);

        [h,w] = ind2sub([3,3],find(F == min(min(F))));

        C(i,1) = I(H(i)-3+h(1),W(i)-2+w(1),1);

        C(i,2) = I(H(i)-3+h(1),W(i)-2+w(1),2);

        C(i,3) = I(H(i)-3+h(1),W(i)-2+w(1),3);

        C(i,4) = H(i)-2+h(1);

```

```
C(i,5) = W(i)-2+w(1);
```

```
else
```

```
if W(i)+1 > n
```

```
img = I(H(i)-1:H(i)+1,W(i)-2:W(i),1);
```

```
[Fx, Fy] = gradient(img);
```

```
F = sqrt(Fx .^ 2 + Fy .^ 2);
```

```
[h,w] = ind2sub([3,3],find(F == min(min(F))));
```

```
C(i,1) = I(H(i)-2+h(1),W(i)-3+w(1),1);
```

```
C(i,2) = I(H(i)-2+h(1),W(i)-3+w(1),2);
```

```
C(i,3) = I(H(i)-2+h(1),W(i)-3+w(1),3);
```

```
C(i,4) = H(i)-2+h(1);
```

```
C(i,5) = W(i)-2+w(1);
```

```
else
```

```
img = I(H(i)-1:H(i)+1,W(i)-1:W(i)+1,1);
```

```
[Fx, Fy] = gradient(img);
```

```
F = sqrt(Fx .^ 2 + Fy .^ 2);
```

```
[h,w] = ind2sub([3,3],find(F == min(min(F))));
```

```
C(i,1) = I(H(i)-2+h(1),W(i)-2+w(1),1);
```

```
C(i,2) = I(H(i)-2+h(1),W(i)-2+w(1),2);
```

```
C(i,3) = I(H(i)-2+h(1),W(i)-2+w(1),3);
```

```
C(i,4) = H(i)-2+h(1);
```

```
C(i,5) = W(i)-2+w(1);
```

```
end
```

```
end
```

```
end
```

```
% 根据论文上的说法，循环最多 10 次即可收敛
```

```
for i=1:10
```

```
    for j = 1:N
```

```
        range = [max(C(j,4)-2*S,1), min(C(j,4)+2*S,m), max(C(j,5)-2*S,1), min(C(j,5)+2*S,n)];
```

```
        for h = range(1):range(2)
```

```
            for w = range(3):range(4)
```

```
                dc = sqrt((I(h,w,1)-C(j,1))^2 + (I(h,w,2)-C(j,2))^2 + (I(h,w,3)-C(j,3))^2);
```

```
                ds = sqrt((h-C(j,4))^2 + (w-C(j,5))^2);
```

```
                d = sqrt(dc^2 + ((ds/S)^2)*(M^2));
```

```
                if d < Distance(h,w)
```

```
                    Distance(h,w) = d;
```

```
                    Label(h,w) = j;
```

```
                end
```

```
            end
```

```
        end
```

```
    end
```

```
% 更新中心
```

```
    for j = 1:N
```

```
        index = find(Label == j);
```

```
        [h,w] = ind2sub([m,n], index);
```

```
        Sizeh = size(h);
```

```
        sum = zeros(1,5);
```

```
        for k = 1:Sizeh(1)
```

```
            sum = sum + [I(h(k),w(k),1), I(h(k),w(k),2), I(h(k),w(k),3), h(k), w(k)];
```

```
        end
```

sum = sum / Sizeh(1);
sum(4) = round(sum(4));
sum(5) = round(sum(5));
C(j,:) = sum;
end
% 显示每一次的过程
if display == 1
BW = boundarymask(Label);
imshow(imoverlay(lab2rgb(I),BW,'cyan'),'InitialMagnification',67);
end
end
L = Label;

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