

```

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);

Num = zeros(N);

Sum = 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;

Num(j) = Num(j) + 1;

end

end

end

end

% 更新中心

for j = 1:m

for k = 1:n

Sum(Label(j,k,:)) = Sum(Label(j,k,:)) + [I(j,k,1), I(j,k,2), I(j,k,3), j, k];

end

end

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

```
    C(j,:) = Sum(j,:) / Num(j);
```

```
    C(j,4:5) = round(C(j,4:5));
```

```
end
```

```
% 显示每一次的过程
```

```
if display == 1
```

```
    BW = boundarymask(Label);
```

```
    imshow(imoverlay(lab2rgb(I),BW,'cyan'),'InitialMagnification',67);
```

```
end
```

```
Num = zeros(N);
```

```
Sum = zeros(N,5);
```

```
end
```

```
L = Label;
```

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