**活动轮廓模型**

1. **原理**

其中： ，k为曲率，N曲线单位法向量

1. **程序**

img = imread('test.jpg');

I = double(rgb2gray(img));

I = imresize(I,[300,300],'bicubic');

sigma = 0.5;

H = fspecial('gaussian',[3,3],sigma);

G = imfilter(I, H, 'replicate');

[dGx, dGy] = gradient(G);

g = 1 ./ (1 + dGx.^2 + dGy.^2);

N = 100; % number of points

M = 10000; % iterative times

R = 120;

x = zeros(N,1);

y = zeros(N,1);

gg = zeros(N,1);

[x0, y0] = deal(150, 150);

dgx = zeros(N,1);

dgy = zeros(N,1);

for i = 1:N

x(i) = round(R\*cos(2\*pi/N\*i) + x0);

y(i) = round(R\*sin(2\*pi/N\*i) + y0);

end

figure(1);

imshow(uint8(I));

for k = 1 : M

dx = diff([x(N);x]);

ddx = diff([dx;dx(1)])

dy = diff([y(N);y]);

ddy = diff([dy;dy(1)]);

Np = [-dy ./ sqrt(dx .^2 + dy .^2), dx./ sqrt(dx .^2 + dy .^2)];

K = (dx .\* ddy - dy .\* ddx) ./ power(dx.^2 + dy .^2, 1.5);

for i = 1 : N

x1 = round(x(i));

y1 = round(y(i));

gg(i) = g(x1, y1);

dgx(i) = g(x1, y1) - g(x1-1, y1);

dgy(i) = g(x1, y1) - g(x1, y1-1);

end

x = x + gg .\* K .\* Np(:,1) + sum([dgx,dgy].\*Np,2).\* Np(:,1);

y = y + gg .\* K .\* Np(:,2) + sum([dgx,dgy].\*Np,2).\* Np(:,2);

imshow(uint8(I));

hold on

plot(y, x);

pause(0.001);

hold off;

end

1. **实验结果**

 