```
%1/ ****Zaid Lynda****
clc
clear all
close all
%2/ ****Importing the image****
A = imread('irm_1.jpg');
imshow(A)

% Store the image into matrix
% Extracting first plan
P=A(:,:,1);
b = double(P); % b becomes vector
% some actions with binary vector
du =double(P);
du = reshape(du,size(P)); % converting vector du to 3d Image array
imwrite(uint8(du), 'du.jpg'); %save our du to file du.jpg

I = imread('du.jpg'); %test if it saved correctly
imshow(du)

%3/Initialization of the weighting parameters
%############# Definitions##################
% Elasticity:ability to change and adapt; adaptability.
% Rigidity :inability to be changed or adapted.
% viscosity :the state of being thick, sticky, and semi-fluid in
 consistency.
% external force: a perimeter tension, and a local surface
 minimization.
% Balloon force snake model: is sensitive to the location of initial
 contour and has the shortcoming of weak boundary leakage
% Resampling frequency:number of repeated samples from the original
 pixel to define a new position.
% total number of iterations:the number of iteration we need to reach
 all the object's countours that we want to segment.
% max and min distances for contour resampling :Is the interval that
 limits the choice of  our  samples

% 4/ Gaussian filtering
  B = fspecial('gaussian',[3 3],0.3)
  X = imfilter(A,B);
  x=rgb2gray(X)
  montage({A,x})
  title('Original Image (Left) Vs. Gaussian Filtered Image (Right)')

 % 5/ Gradient forces
  [Px,Py] = imgradientxy(x);
  imshowpair(Px,Py,'montage')
  title('Directional Gradients Px and Py')
 %Normalizing the gradient
  Pxy = sqrt(Px.^2+Py.^2);
  quiver(Px(1:3:end,1:3:end),Py(1:3:end,1:3:end));
  quiver(Px,Py);
```

```
  title('gradient forces')
 % 6/ Snake deformation
   subplot(2,2,1)
    A = imread('irm_1.jpg');
   imshow(A);title('original image')
   subplot(2,2,2)
   [Px,Py] = imgradientxy(x);
   imshow(Px);title('Gradients X')
   subplot(2,2,3)
   [Px,Py] = imgradientxy(x);
    imshow(Py);title('Gradients Y')
%  Calling snakinit function
    imshow(Px)

%   Snake deformation
    imshow(Px)
    delta=1;
%  Draw the lv "les fonctions "snakeini","snakedeforme","snakeinterpe"
 puisque je les ai enregestré comme ça sur mon laptop"
   [x,y]= snakeini(delta);
% Snake parameter
   alpha=1.5;
   beta=0.7;
   gamma=0.20;
   kappa=0.21;
   Kappap=2.3;
   Iter=20;
   Niter=37;
%  Closing the snake
   x=[x;x(1)];
   y=[y;y(1)];
   for i=1:Iter
       [x,y]=snakedeforme(x,y, alpha, beta,gamma, kappa, Kappap,Px,Py,
 Niter);
       hold on ;plot(x,y,"green");hold off;
       pause(0.5)
       snakeinterpe(x,y,dmax,dmin);
       i=i+1;
   end
 %  Closing the snake
   x=[x;x(1)];
   y=[y;y(1)];
   hold on ;plot(x,y,"x-g");title(" image segmented");
%  Displaying number of iteration
```

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