

Code Explanation

From line 1 to 18, all the parameters according to the papers are defined. Then at line 21, an image to be tested is loaded. Then it is converted into grayscale because it helps to understand the image features better. At line 27-28, two special purpose filters are designed, one is gaussian filter with $\sigma = 3$ and second is filtered image through that filter. In line 31 to 34, O is defined for exchange function so that the image intensities can be normalized. Then from line 43 to 47, the level set function is initialized. Line 49 to 55 includes the displaying of that initial level contour we drew earlier and place it on the image. Finally in lines 57-73, the main function RSFKD is called to implement our proposed image segmentation algorithm, passed through the same special filter 'Ksigma' and iterated 500 times to get considerable results.

Now for the RSFKD function, first the standard Neumann Boundary conditions are defined and called. They alter the initial level set according to the boundary of the object. Then dirac delta function is defined in line 5 and Heaviside in line 6. Then a user made function of curv is called to complete the mathematical expression of curl of the gradient of level set function used in the level set equation. This function is used in finding length in line 8. Curv is also used in finding the limiting parameter as well. Later from line 11 to 17, local mean intensities are calculated according to the equations in the paper. At line 19, a user defined function 'exchange' is used which just shuffles the intensities for random optimization. From 21 to 26, Kernel difference is used within the RSFKD function to better optimize the code and make it faster. From line 28 to 36 RSF term is defined according to theory. Finally in line 38, a final level set equation is defined with our proposed fused energy of both RSF and KD operator.

Just run the code.m file to see results. Remember to alter the name and type of image in line 21 of file code.m which you want to test. Also the image and both the code files should be in the same folder as it is required by Matlab. Hope it reaches your expectations and Good Luck for your paper!

Papers used in this code for references:

1. Hybrid SPF and KD Operator-Based Active Contour Model for Image Segmentation
2. A Hybrid Active Contour Segmentation Method for Myocardial D-SPECT Images
3. Active contour model based on LIF model and optimal DoG operator energy for image segmentation