For this project, write a version of the fixation-based graphcut algorithm. Segment an image into two regions, a foreground region and a background region.

Deliverables: Run your code on the two images provided, and at least two more images of your choice. Provide the code, and a short description.

Matlab code for the graphcut procedures is available at http://vision.csd.uwo.ca/code/

(For the minimization you will be using the maxflow code.)

Specifically, download the zip file : maxflow-v3.01.zip. This is C++ code .

Then download a matlab wrapper from:

code.http://www.mathworks.com/matlabcentral/fileexchange/21310-maxflow

Follow the instructions in the readme file. Most important, you should place the C++ maxflow code in a subdirectory <lib_home>/maxflow-v3.0

For your segmentation code:

As input to your program, provide the image and the x and y location of the fixation point, and an edge probability map. The edge probability map can be computed simply from an edge detector like Canny or your edge detector from homework 3, or it can be derived from the Berkeley edge detector.

The segmentation should consist of two steps.

In a first step, use unary weights only for a small set of pixels. Specifically, use a value *D* to connect the pixels at the boundary of the image to the sink, and to connect the fixation point to the source. Set all other weights to 0. For the binary weights use a function of the difference of the edge probabilities at neighboring points times the weight. The weight, as discussed in class, should be 1/r, with r being the distance from the midpoint between two neighboring points p and q, and the fixation point. The function of the difference of edge probabilities could be exp(- k * (edge_probability (p) + edge_probability(q))/2). (The zip file also contains mat files of the edge gradients obtained with the Berkeley edge detector.)

After having derived a segmentation, in a second step, compute a color model of the foreground and a color model of the background in form of a histogram, and use the probabilities from these histograms as unary terms. Use the previous binary terms, and re-segment.