

CS 736: Medical Image Processing

Assignment 4 : Question 1

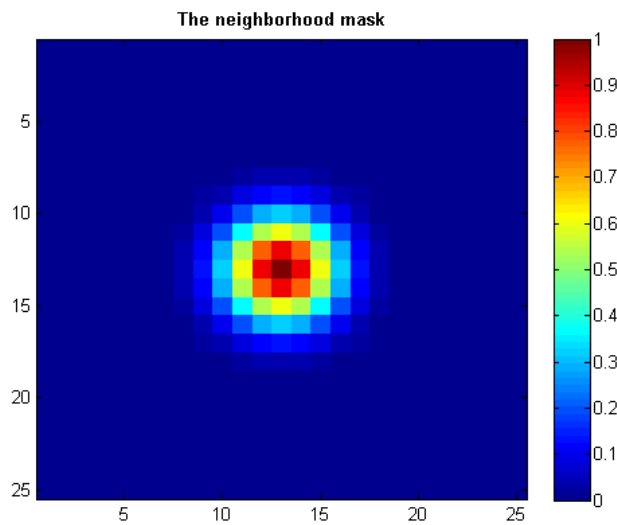
Segmenting a Brain Magnetic Resonance (MR) Image

Praveen Agrawal 12D020030

Aditya Kumar Akash 120050046

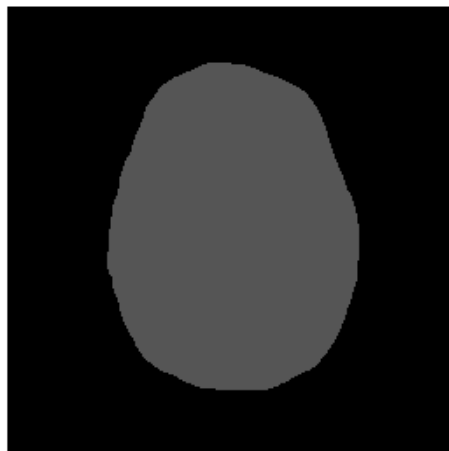
(a) The chosen value for q is 4.

(b) The neighbourhood mask w_{ij} seen as an image:



(c) The initial membership for each pixel was taken as $1/3$. So, all the three images look identical as below. The reason for choosing this initialization was to avoid any dominance of any class and it is a natural condition to begin with such initializations.

Membership Initialization for each class



(d) The initial class means were taken as 0, 0.5, 1.0. This was done so as to maximize the distance between the means and to make sure that they are well separated.

(e) The value of the objective function at each iteration:

Iteration 1 -> 14.8189

Iteration 2 -> 8.4991

Iteration 3 -> 6.9211

Iteration 4 -> 6.2595

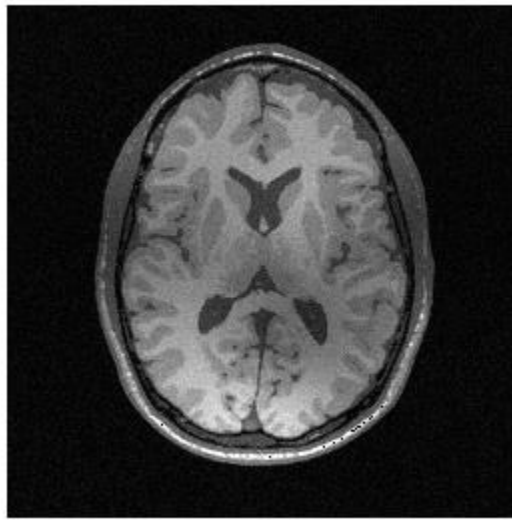
Iteration 5 -> 5.9189

Iteration 6 -> 5.7633

Iteration 7 -> 5.7184

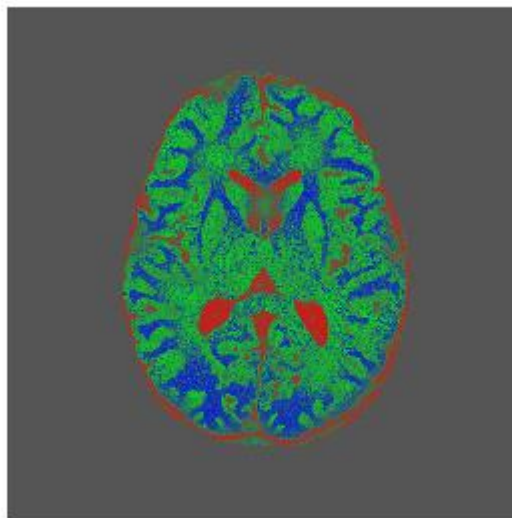
(f) Corrupted image provided:

Image Data

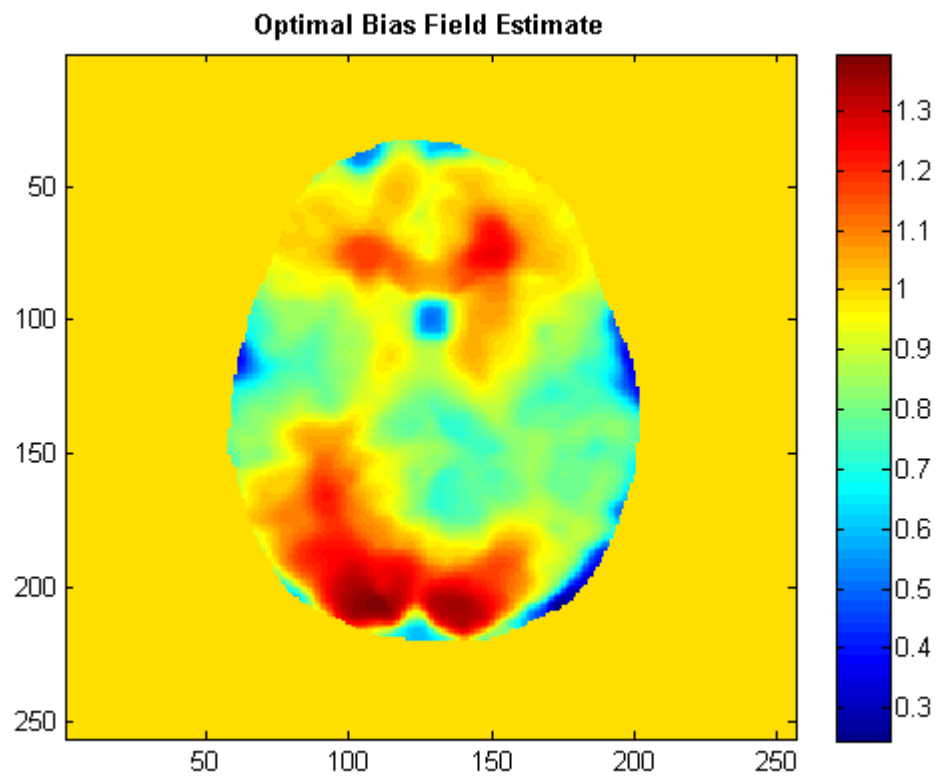


Optimal class membership image estimates:

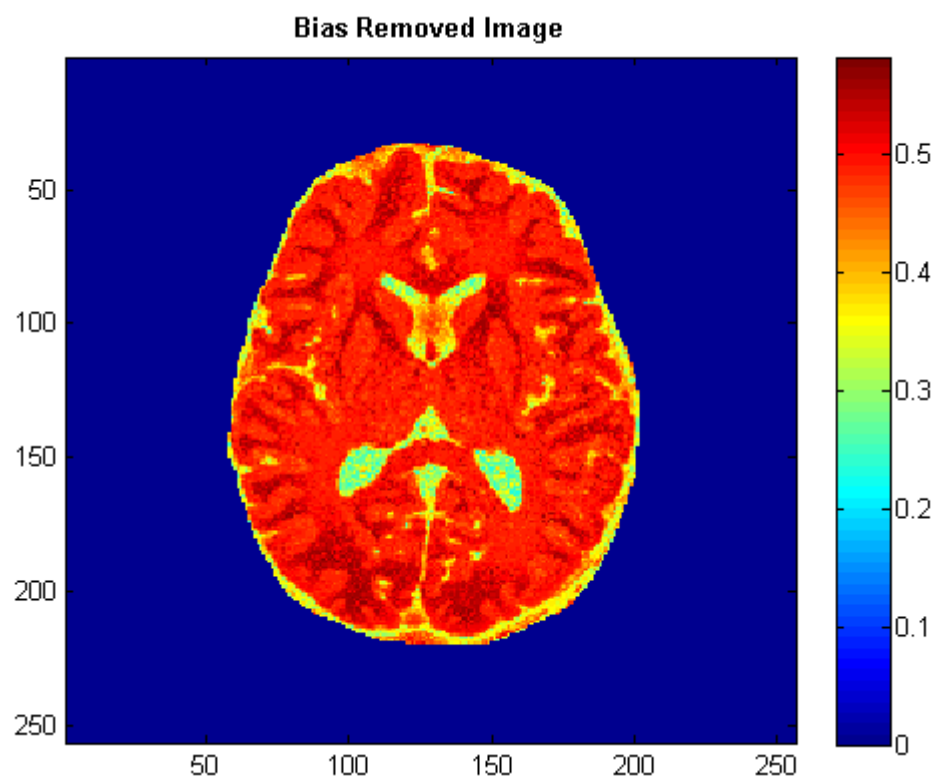
Optimal Class Memberships



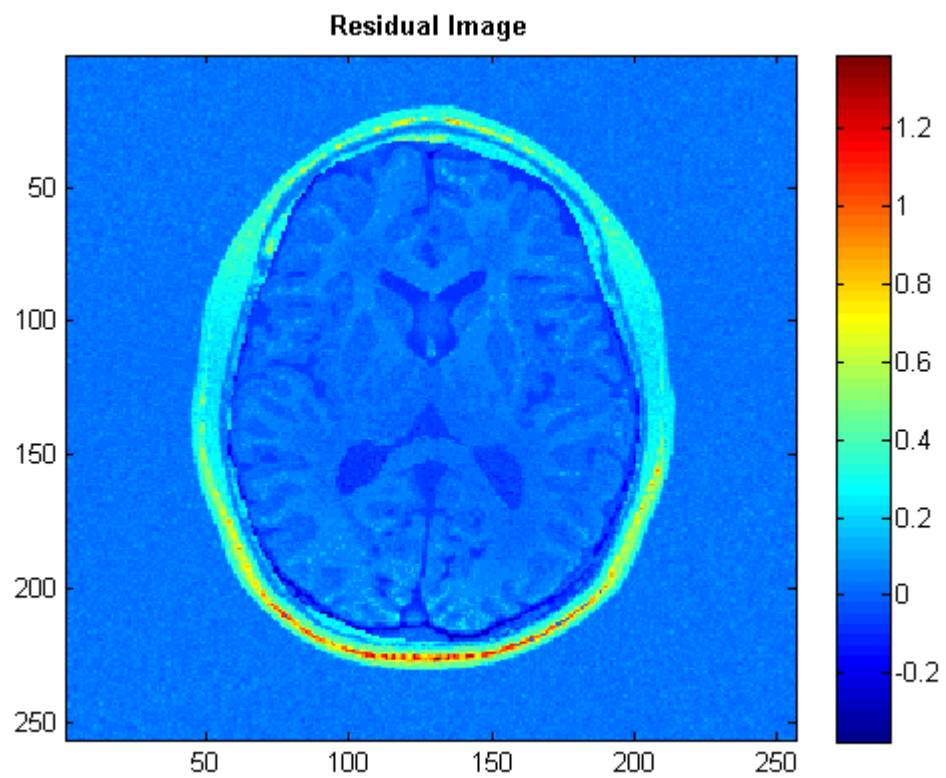
Optimal bias-field image estimate



Bias removed image



Residual Image



- (g) Optimal estimate for class means:
0.2035, 0.4909, and 0.6036