Improved segmented image with PCNN and GA in Matlab

First, the image is segmented with PCNN and weights are obtained for the desired segment with the genetic algorithm of the two objectives to optimize the PSNR and MSE of the obtained image**.**

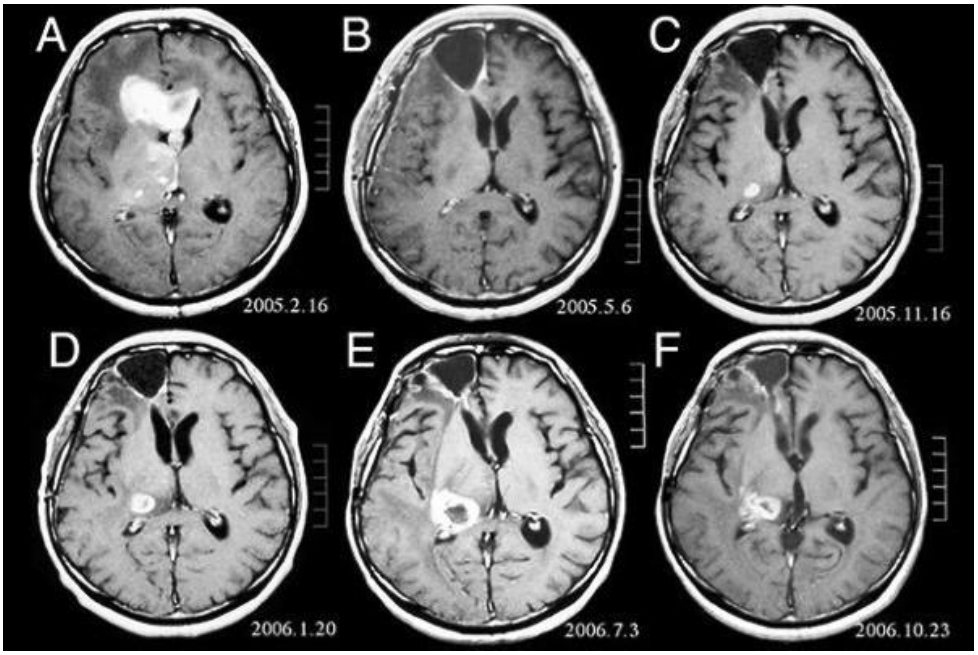

Figure 1: CT scan image of the brain

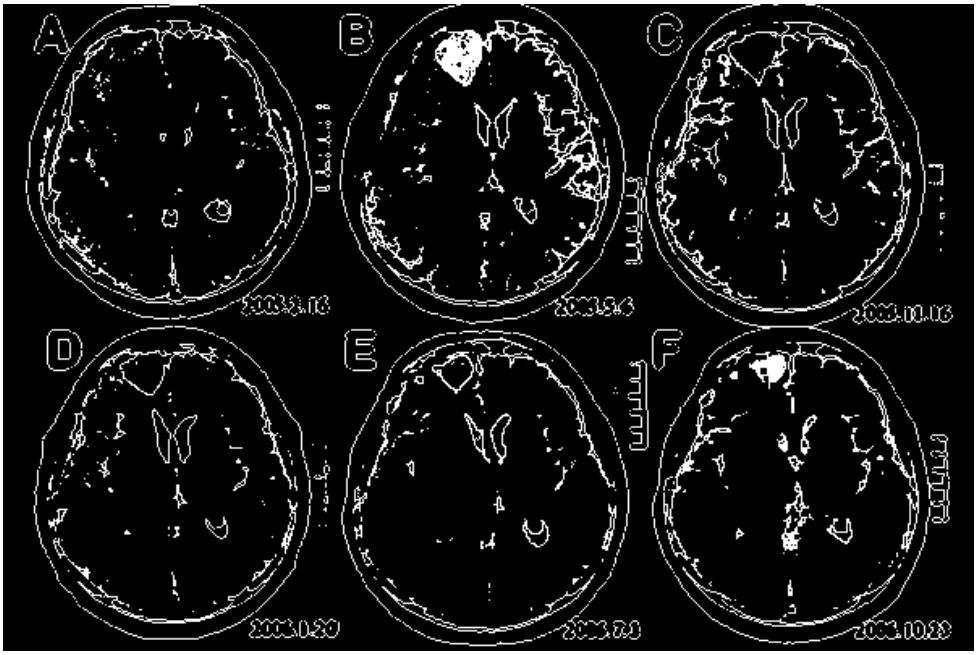

Figure 2: Image segmented with PCNN

```
iter =   1 BEST F1 = 12.0601 BEST F2  = 0.067613 NF1 = 10
iter =   2 BEST F1 = 12.0601 BEST F2  = 0.067613 NF1 = 10
iter =   3 BEST F1 = 12.0601 BEST F2  = 0.067613 NF1 = 10
iter =   4 BEST F1 = 12.0601 BEST F2  = 0.067613 NF1 = 10
iter =   5 BEST F1 = 12.0601 BEST F2  = 0.067613 NF1 = 10
iter =   6 BEST F1 = 12.0601 BEST F2  = 0.067613 NF1 = 10
iter =   7 BEST F1 = 12.0601 BEST F2  = 0.067613 NF1 = 10
iter =   8 BEST F1 = 12.0484 BEST F2  = 0.067613 NF1 = 10
iter =   9 BEST F1 = 12.0484 BEST F2  = 0.067613 NF1 = 10
iter =   10 BEST F1 = 12.0484 BEST F2  = 0.067613 NF1 = 10
iter =   11 BEST F1 = 12.0262 BEST F2  = 0.067613 NF1 = 10
iter =   12 BEST F1 = 12.0262 BEST F2  = 0.067613 NF1 = 10
iter =   13 BEST F1 = 12.0262 BEST F2  = 0.067613 NF1 = 10
iter =   14 BEST F1 = 12.0262 BEST F2  = 0.067613 NF1 = 10
iter =   15 BEST F1 = 12.0262 BEST F2  = 0.067613 NF1 = 10
```

best =

Columns 1 through 7

0.31397 0.8461 0.38619 0.71603 0.34684 0.84996 0.88434

Columns 8 through 14

0.32251 0.4124 0.4554 0.49679 0.73771 0.85338 0.29079

Columns 15 through 18

0.10674 0.51145 0.87251 0.28637

By running the program 15 times, as seen above, the values of F1 and F2 are equal to PSNR and MSE, respectively. The best matrix is the optimal weight obtained after running the program 15 times.

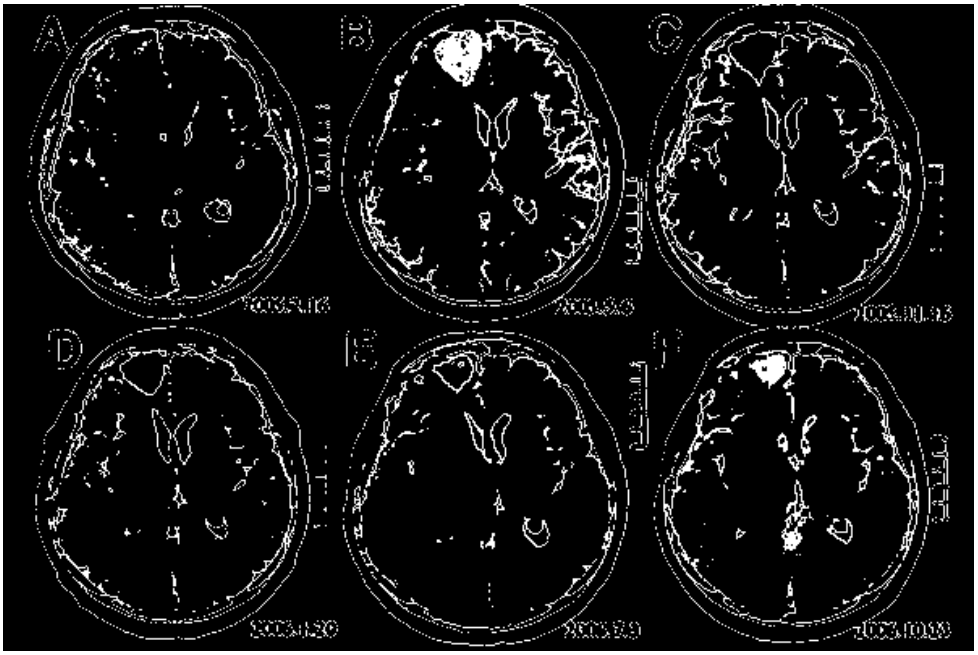

Figure 3: Improved image with PCNN and genetic bi-objective algorithm after 15 times of program execution