Fitness same for BAT and FCM:

FCM: PC:0.655-CE:0.891-SC:0.001-S:162.231

BAT+FCM PC:0.669-CE:0.861-SC:0.001-S:4.515

FCM: PC:0.657-CE:0.900-SC:0.002-S:50.515

BAT+FCM PC:0.663-CE:0.876-SC:0.001-S:5.377

New window code using im2col

FCM: PC:0.651-CE:0.901-SC:0.001-S:33.311

BAT+FCM PC:0.664-CE:0.869-SC:0.001-S:2.681

Lambda = 0.1

% Calculate the traditional FCM objective function

fcmObjective = sum(sum((dist.^2) .\* max(memFcnMat, eps)));

% Calculate the custom fitness value

fitnessValue = calculateFitness(center, data, options);

% Combine the traditional FCM objective and fitness function

objFcn = fcmObjective + lambda \* fitnessValue;

FCM: PC:0.657-CE:0.879-SC:0.001-S:681.885

BAT+FCM PC:0.664-CE:0.879-SC:0.001-S:9.285

fitness = intra\_cluster + SC + 1/PC + CE;

FCM: PC:0.657-CE:0.894-SC:0.002-S:64.919

BAT+FCM PC:0.669-CE:0.861-SC:0.001-S:5.367

alpha: 1.00-beta: 0.50-zeta: 1.50

Iteration count = 10, obj. fcn = 35.6136

Maximum iteration reached.

FCM: PC:0.650-CE:0.899-SC:0.001-S:4075.199

BAT+FCM PC:0.666-CE:0.869-SC:0.001-S:3.424

Laplacian

Iteration count = 10, obj. fcn = 11.0384

Maximum iteration reached.

FCM: PC:0.594-CE:1.179-SC:952.624-S:7230226.627

BAT+FCM PC:0.594-CE:1.175-SC:1.305-S:11907.358

Prewitt Filter

Iteration count = 10, obj. fcn = 127.896

Maximum iteration reached.

FCM: PC:0.609-CE:1.096-SC:0.008-S:291645.757

BAT+FCM PC:0.669-CE:0.919-SC:0.003-S:44.663