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%Pratap Luitel
%ENGS 111
%HW 5, Problem 1
%
%This script loads im1.png and mr2.png, converts them to type double,
%calls micomp function and plots the output of the function.
%
%
filename1 = 'mr1.png';
filename2 = 'mr2.png';

image_1 = im2double(imread(filename1)); %convert to double
image_2 = im2double(imread(filename2)); %convert to double

%=====
%shift = 0, rotation = 0
a = 0;r = 0 ; c = 0;
imTest = imrotate(image_1,a,'nearest','crop');
imTest = circshift(imTest,[r c]);

[imTest,imRef] = thresholdImage(imTest,image_1);
[val,jointHist1] = micomp(imTest,imRef);

%overlapping images
subplot(3,2,1)
imshow(imfuse(imRef,imTest));
title(['MI=' num2str(val) ', r=' num2str(r) ', c=' num2str(c) ', a=' num2str(a)]);

subplot(3,2,2)
idx=find(jointHist1>0.00001);
hh=jointHist1;
hh(idx)=1;
imshow(hh,[]);
title('Joint PDF Im1 & Im1');
%=====

%=====
%shift = 0, rotation = 5
a = 5;r = 0 ; c = 0;
imTest = imrotate(image_1,a,'nearest','crop');
imTest = circshift(imTest,[r c]);

[imTest,imRef] = thresholdImage(imTest,image_1);
[val,jointHist1] = micomp(imTest,imRef);

%overlapping images
subplot(3,2,3)
imshow(imfuse(imRef,imTest));
title(['MI=' num2str(val) ', r=' num2str(r) ', c=' num2str(c) ', a=' num2str(a)]);

subplot(3,2,4)
idx=find(jointHist1>0.00001);

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hh=jointHist1;
hh(idx)=1;
imshow(hh,[]);
title('Joint PDF (Iml, rot. Iml)');
%=====

%=====
%shift = 10,10, rotation = 15
a = 15;r = 10 ; c = 10;
imTest = imrotate(image_1,a,'nearest','crop');
imTest = circshift(imTest,[r c]);

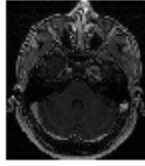
[imTest,imRef] = thresholdImage(imTest,image_1);
[val,jointHist1] = micomp(imTest,imRef);

%overlapping images
subplot(3,2,5)
imshow(imfuse(imRef,imTest));
title(['MI=' num2str(val) ', r=' num2str(r) ', c=' num2str(c) ', a=' num2str(a)]);

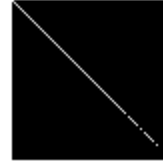
subplot(3,2,6)
idx=find(jointHist1>0.00001);
hh=jointHist1;
hh(idx)=1;
imshow(hh,[]);
title('Joint PDF (Iml, rot. shifted Iml)');
%=====
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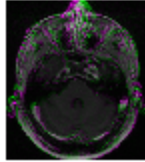
MI=4.9475, r=0, c=0, a=0



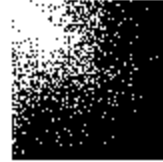
Joint PDF Im1 & Im1



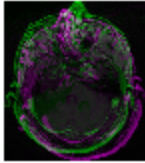
MI=0.85389, r=0, c=0, a=5



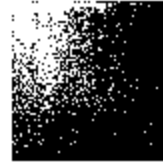
Joint PDF (Im1, rot. Im1)



MI=0.70019, r=10, c=10, a=15



Joint PDF (Im1, rot. shifted Im1)



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