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BME 4783 - Medical Imaging Modalities

```
Investigate Effects of Commutivity of Filters.


Daniel Amante, Jarel Cohen, Robert MacGregor, Ashutosh Priyadarshy
University of Virginia
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clear all
close all
```

File loading

Load an Image into a matrix I.

```
sample = imread('cell2.jpg');
%sample = imread(filename);
originalSample = sample;

% Convert the Image to grayscale.
sample = rgb2gray(sample);
originalSample = sample;

%%% Conditioning parameters.
% Pixel Neighborhood Size for median filter.
nhood = [9 9];    % Note: change each iteration?
% No. times we will median and adaptive histogram filter succesively.
filterCycles = 4;
% Binary thresholding of the grayscale image.
gray2bin = 190;
```

Perform Cascading Filtration.

Perform the medfilt2 filtration filterCycles times.

```
for cycle = 1:filterCycles

    % Apply Median Filtration pixel-wise in a n'hood of dim nhood.
    medFiltLast = medfilt2(sample, nhood);

    % Set the twice filtered image to be equal to the sample.
    sample = medFiltLast;

end
```

```
% Perform the adapthisteq filtration filterCycles times.
for cycle = 1:filterCycles

    % Apply Adaptive Histogram Equalization.
    adaptHistEqLast = adapthisteq(sample);

    % Set the twice filtered image to be equal to the sample.
    sample = adaptHistEqLast;

end
% Save the cascaded version as a seperate matrix.
sampleCascade = sample;
sampleCascadeBin = sampleCascade > gray2bin;
```

Perform back-to-back filtration (original method).

Reset to the originalSample.

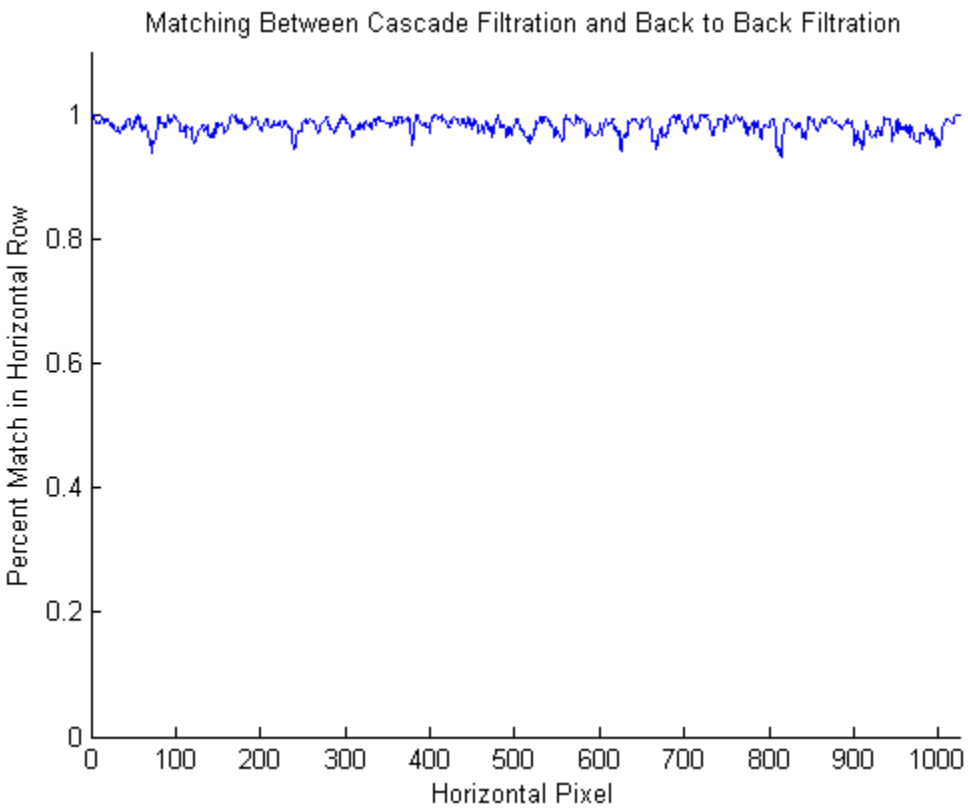
```
sample = originalSample;

% Perform the double filtration filterCycles times.
for cycle = 1:filterCycles

    % Apply Median Filtration pixel-wise in a n'hood of dim nhood.
    medFiltLast = medfilt2(sample, nhood);
    % Apply Adaptive Histogram Equalization.
    adaptHistEqLast = adapthisteq(medFiltLast);
    % Set the twice filtered image to be equal to the sample.
    sample = adaptHistEqLast;

end
% Save the back to back version as a seperate matrix.
sampleBack2Back = sample;
sampleBack2BackBin = sampleBack2Back > gray2bin;

hold on
plot(sum(sampleBack2BackBin == sampleCascadeBin)./768, 'b')
xlabel('Horizontal Pixel')
ylabel('Percent Match in Horizontal Row')
title('Matching Between Cascade Filtration and Back to Back Filtration');
axis([0 1024 0 1.1])
```



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