ICS 311 Digital Signal Processing

Lab 8_Digital Image Processing

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2021BCS0036

1. Reading an Image

2. Conversion to greyscale or binary

3. Apply Filtering

4. Take the gradient of image

Code:

```
% 2021BCS0036
% Abhishek Harsh

% Load an image
originalImage = imread('two.jpg');

% Display the original image
figure;
subplot(3, 4, 1);
imshow(originalImage);
title('Original Image');

% Convert the image to grayscale
grayImage = rgb2gray(originalImage);
subplot(3, 4, 2);
imshow(grayImage);
title('Grayscale Image');

% Convert the image to HSV color space
hsvImage = rgb2hsv(originalImage);
subplot(3, 4, 3);
imshow(hsvImage);
title('HSV Image');

% Convert the image to YCbCr color space
ycbcrImage = rgb2ycbcr(originalImage);
subplot(3, 4, 4);
imshow(ycbcrImage);
title('YCbCr Image');

% Convert the grayscale image to binary using a threshold
threshold = 128; % You can adjust this threshold value
binaryImage = imbinarize(grayImage, threshold / 255);
```

```
subplot(3, 4, 5);
imshow(binaryImage);
title('Binary Image');

% Apply average filtering to grayscale image
averageFiltered = imfilter(grayImage, fspecial('average', [5, 5]));
subplot(3, 4, 6);
imshow(averageFiltered);
title('Avg Filtered(Gray)');

% Apply median filtering to grayscale image
medianFiltered = medfilt2(grayImage, [5, 5]);
subplot(3, 4, 7);
imshow(medianFiltered);
title('Median Filtered(Gray)');

% Apply Laplacian of Gaussian (LoG) filtering to grayscale image for edge
detection
logFiltered = imfilter(grayImage, fspecial('log', [5, 5], 0.5));
subplot(3, 4, 8);
imshow(logFiltered);
title('LoG Filtered(Gray)');

% Perform edge detection using the gradient method (Sobel) on grayscale image
gradientMag = imgradient(grayImage, 'sobel');
subplot(3, 4, 9);
imshow(gradientMag);
title('GradientMagnitude:(Gray)');


% Perform edge detection using the gradient method (Sobel) on HSV and YCbCr images
gradientMagHsv = imgradient(hsvImage(:,:,3), 'sobel');
subplot(3, 4, 10);
imshow(gradientMagHsv);
title('(HSV)');

gradientMagYcbcr = imgradient(ycbcrImage(:,:,1), 'sobel');
subplot(3, 4, 11);
imshow(gradientMagYcbcr);
title('(YCbCr)');
```

Output:


Grayscale Image


HSV Image


YCbCr Image

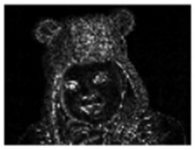

Binary Image


Avg Filtered(Gray)


Median Filtered(Gray)


LoG Filtered(Gray)


GradientMagnitude:(Gray)


(HSV)


(YCbCr)