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original_image = imread('moon.tif');
if size(original_image, 3) == 3
    original_image = rgb2gray(original_image);
end

[rows, cols] = size(original_image);
[X, Y] = meshgrid(1:cols, 1:rows);
centerX = cols / 2;
centerY = rows / 2;
radius = min(rows, cols) / 4;
binary_mask = ((X - centerX).^2 + (Y - centerY).^2) <= radius^2;

h_gaussian = fspecial('gaussian', [5 5], 2);
low_pass_gaussian = imfilter(original_image, h_gaussian);

h_average = fspecial('average', [5 5]);
low_pass_average = imfilter(original_image, h_average);

h_laplacian = fspecial('laplacian', 0.2);
high_pass_laplacian = imfilter(original_image, h_laplacian);
h_prewitt = fspecial('prewitt');
high_pass_prewitt = imfilter(original_image, h_prewitt);

figure;
subplot(3, 2, 1);
imshow(original_image);
title('Original Image');

subplot(3, 2, 2);
imshow(binary_mask);
title('Binary Mask');
subplot(3, 2, 3);
imshow(low_pass_gaussian);
title('Low Pass Gaussian Filtered Image');

subplot(3, 2, 4);
imshow(low_pass_average);
title('Low Pass Average Filtered Image');
subplot(3, 2, 5);
imshow(high_pass_laplacian);
title('High Pass Laplacian Filtered Image');
subplot(3, 2, 6);
imshow(high_pass_prewitt);
title('High Pass Prewitt Filtered Image');

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sgtitle('Image Processing with Filters');
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Image Processing with Filters

Original Image



Binary Mask



Low Pass Gaussian Filtered Image Low Pass Average Filtered Image



High Pass Laplacian Filtered Image High Pass Prewitt Filtered Image

