## IMAGE ENHANCEMENT OF X RAY IMAGES

**CODE**

% Step 1: Read and preprocess the X-Ray image

xray\_img = imread('shoulder\_xray.jpg');

if size(xray\_img, 3) == 3

xray\_img = rgb2gray(xray\_img); % Convert to grayscale if RGB

end

% Step 2: Noise reduction using bilateral filter

noise\_reduced\_img = imbilatfilt(xray\_img);

% Step 3: Contrast enhancement using CLAHE

contrast\_enhanced\_img = adapthisteq(noise\_reduced\_img);

% Step 4: Edge detection using Canny

edges = edge(contrast\_enhanced\_img, 'Canny');

% Step 5: Create an edge mask and blend with the original

edge\_mask = imdilate(edges, strel('disk', 1)); % Dilate edges for visibility

masked\_img = uint8(edge\_mask) .\* contrast\_enhanced\_img;

% Step 6: Combine the original image with enhanced features

fused\_img = imfuse(contrast\_enhanced\_img, masked\_img, 'blend');

% Step 7: Sharpen the final image

sharpened\_img = imsharpen(fused\_img, 'Radius', 2, 'Amount', 1.5);

% Step 8: Display results

figure;

subplot(2, 3, 1); imshow(xray\_img); title('Original X-Ray');

subplot(2, 3, 2); imshow(noise\_reduced\_img); title('Noise Reduced');

subplot(2, 3, 3); imshow(contrast\_enhanced\_img); title('Contrast Enhanced');

subplot(2, 3, 4); imshow(edges); title('Edges Detected');

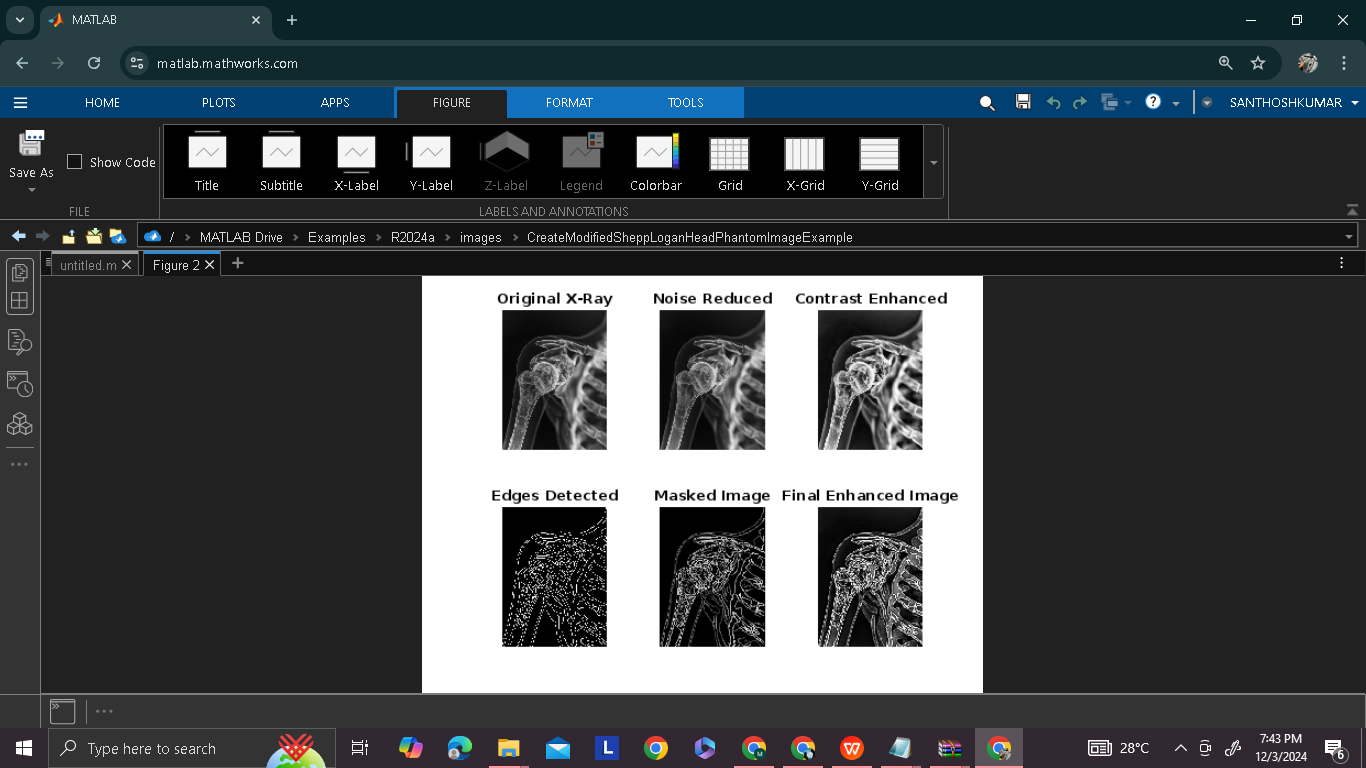
subplot(2, 3, 5); imshow(masked\_img); title('Masked Image');

subplot(2, 3, 6); imshow(sharpened\_img); title('Final Enhanced Image');

% Save the final enhanced image

imwrite(sharpened\_img, 'enhanced\_xray\_with\_edges.jpg');

**OUTPUT**

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