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%written by Shiv Kumar Gurjar (BT23ECE084)
% bitslicing, and reconstruction
clc;
clear;
close all;

% Read image
I = imread('ronaldo.jpeg'); % Color image

% Convert to grayscale if RGB
if size(I,3) == 3
    I = rgb2gray(I);
end

I = im2uint8(I);

% Display original image
figure;
imshow(I);
title('Original Grayscale Image');

% Bit Plane Slicing
figure;
bit_planes = zeros([size(I), 8]); % Store bit planes

for k = 1:8
    bit_planes(:, :, k) = bitget(I, k);

    subplot(2,4,k);
    imshow(bit_planes(:, :, k) * 255); % Scale for visibility
    title(['Bit Plane ', num2str(k)]);
end

% Reconstruction using ALL bit planes
reconstructed_full = zeros(size(I), 'uint8');

for k = 1:8
    reconstructed_full = reconstructed_full + ...
        uint8(bit_planes(:, :, k) * 2^(k-1));
end

figure;
imshow(reconstructed_full);
title('Reconstructed Image (All Bit Planes)');

% Reconstruction using MSB planes (6,7,8)
reconstructed_msb = ...
    bit_planes(:, :, 8)*128 + ...
    bit_planes(:, :, 7)*64 + ...
    bit_planes(:, :, 6)*32;

figure;
imshow(uint8(reconstructed_msb));
title('Reconstructed Image (MSB Bit Planes Only)');

```

Original Grayscale Image



Bit Plane 1



Bit Plane 2



Bit Plane 3



Bit Plane 4



Bit Plane 5



Bit Plane 6



Bit Plane 7



Bit Plane 8



Reconstructed Image (All Bit Planes)



Reconstructed Image (MSB Bit Planes Only)

