```
%The main steps followed in this image quantization process:

%Image Input:

%The image 'Dataset Img.png' is read into MATLAB.


%Grayscale Conversion:

%If the image is in color (RGB), it's converted to grayscale.
%If it's already grayscale, this step is skipped.


%Normalization:

%The grayscale image is normalized to the range [0, 1].
%This is done by converting the image to double precision and dividing by
255.


%Quantization:

%The normalized image is multiplied by 31 and rounded down to the nearest
integer.
%This effectively divides the range [0, 1] into 32 levels (0 to 31).


%Resizing:

%The quantized values are resized back to the original image dimensions.
%This step ensures the quantized image has the same size as the original.


%Rescaling for Display:

%The quantized image is rescaled to the range [0, 255] for proper display.
%This is done by multiplying by (255/31) and converting to uint8.


%Display:

%Both the original grayscale image and the quantized image are displayed
side by side for comparison.

%This process reduces the number of intensity levels in the image from
potentially 256 (in an 8-bit grayscale image) to just 32, creating a more
stylized, posterized effect while maintaining the overall structure of the
image.%}
```

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% Read the image
img = imread('apple.png');

% Convert the image to grayscale (if it's not already grayscale)
if size(img, 3) == 3  % Check if the image has 3 channels (RGB)
    img_gray = rgb2gray(img);  % Convert to grayscale
else
    img_gray = img;  % Already grayscale
end

% Normalize the grayscale image to range between 0 and 1
img_gray_normalized = double(img_gray) / 255;  % Convert to double and
normalize

% Quantize the image to 32 grayscale levels
% Resize the intensity levels to 32 (effectively performing quantization)
quantized_img = imresize(floor(img_gray_normalized * 31), [size(img_gray,
1), size(img_gray, 2)]);

% Scale the quantized image back to 0-255 range for display
quantized_img = uint8(quantized_img * (255 / 31));

% Display the original and quantized images
figure;
subplot(1, 2, 1), imshow(img_gray), title('Original Grayscale Image');
subplot(1, 2, 2), imshow(quantized_img), title('Quantized Image (32
Levels)');
```

Original Grayscale Image

Quantized Image (32 Levels)