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% Created on 15/01/25
% Created by Aryan Agarwal, BT22ECE117
% First Practical to convert Color image to Grayscale.


clc;
clear;
close all;

% Load the image from file
image = imread('image_used.jpg');

% Get image dimensions
[rows, cols, channels] = size(image);
disp(['Image dimensions: ', num2str(rows), ' x ', num2str(cols), ' x ', num2str(channels)]);

% Display the intensity of a specific pixel or fallback to center pixel
specified_row = 1010;
specified_col = 505;
if rows >= specified_row && cols >= specified_col
    disp(['Pixel value at (', num2str(specified_row), ', ', num2str(specified_col), '): ', ...
        num2str(image(specified_row, specified_col, :))]);
else
    center_row = round(rows / 2);
    center_col = round(cols / 2);
    disp(['Center pixel value at (', num2str(center_row), ', ', num2str(center_col), '): ', ...
        num2str(image(center_row, center_col, :))]);
end

% Convert to grayscale using the red channel only
gray_single_channel = image(:, :, 1);

% Convert to grayscale using average method
red_channel = image(:, :, 1);
green_channel = image(:, :, 2);
blue_channel = image(:, :, 3);
gray_avg = uint8((red_channel + green_channel + blue_channel) / 3);

% Convert to grayscale using the luminosity method
gray_luminosity = uint8(0.299 * red_channel + 0.587 * green_channel + 0.114 * blue_channel);

% Create images highlighting individual color channels
image_red = image;
image_red(:, :, 2:3) = 0;

image_green = image;
image_green(:, :, [1, 3]) = 0;

image_blue = image;
image_blue(:, :, 1:2) = 0;

% Display original image and grayscale versions
figure(1);
subplot(2, 2, 1), imshow(image); title('Original Image');
subplot(2, 2, 2), imshow(gray_single_channel); title('Grayscale (Single Channel)');
subplot(2, 2, 3), imshow(gray_avg); title('Grayscale (Average Method)');
subplot(2, 2, 4), imshow(gray_luminosity); title('Grayscale (Luminosity Method)');

% Display original image and color-filtered versions
figure(2);
```

```
subplot(2, 2, 1), imshow(image); title('Original Image');
subplot(2, 2, 2), imshow(image_red); title('Red-Filtered Image');
subplot(2, 2, 3), imshow(image_green); title('Green-Filtered Image');
subplot(2, 2, 4), imshow(image_blue); title('Blue-Filtered Image');
```

```
Image dimensions: 399 x 599 x 3
Center pixel value at (200, 300): 70   91  122
```

Original Image

Grayscale (Single Channel)

Grayscale (Average Method)

Grayscale (Luminosity Method)

Original Image

Red-Filtered Image

Green-Filtered Image

Blue-Filtered Image

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