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GitHub link: https://github.com/VedasriNakka/Image-Processsing-Assignment/tree/main/Assignment%203

Description:

Rgb_to_hsl conversion: loop over all rows and colums of the pixels of the image. Then devided the *R*,*G*,*B* values by 255 to change the range from 0 - 255 to 0 -1. Caluculated Cmax, Cmin and delta = Cmax – Cmin. Calculated Luminance(l) by (Cmax + Cmin)/2, Saturation(s) by delta / (1 - abs(2 * l - 1)), if delta is 0 the S is 0. And Hue if delta == 0:h = 0, elif cmax == r: h = 60 * (((g - b) / delta) % 6), elif cmax == g: h = 60 * (((b - r) / delta) + 2), else: h = 60 * (((r - g) / delta) + 4)

Hsl_to_rgb conversion: Calculated c,x,m c = (1 - abs(2 * l - 1)) * s / 100, x = c * (1 - abs((h / 60) % 2 - 1)), m = l - c / 2 then R', G', M' with the conditions. Finally, calculated rgb. r, g, b = (R' + m) * 255, (G' + m) * 255, (B' + m) * 255

histogram_equalization Function: I calculated the image's histogram, then creatd a cumulative distribution function (CDF) from the histogram. The CDF is normalized to the range [0, 255], This process involves spreading out the different shades in the image more evenly, which makes the image look better by enhancing contrast and improving the clarity and details.

Visually compare the result of the two images after equalizing the histograms (RGB and HSL). What can you observe?

The equalization in RGB space results in more vivid and contrast-enhanced colors, and color shifts.

The equalization in HSL space mainly affects the brightness and contrast while preserving the hue (color) and saturation (intensity), resulting in a more natural color appearance. But After converting the result of HSL to RGB we can observe high contrast then original and less saturation