Multimedia

Assignment 2

Image Media Type

In this assignment, we want to analyze the structure of digital images.

You may use MATLAB or Python (pillow library) for implementation.

Open the sample image, follow the steps below, answer the questions:

1. Print the dimensions of the image. Assuming that RGB color space (24 bits) has been used of this image, what is the compression rate?
2. RGB color model combines color and light intensity. To have a brighter image, we can use YCbCr color model. Convert the image into YCbCr model, increase the value of Y component, convert the image back to RGB. What happened?
3. Assume you are interested in selecting areas having shades of Red. You may consider a specific range for Red component. Change the Cr values of these pixels to zero. Put your image back in RGB and display it. Show your results. **Hint:** Use YCbCr color space.
4. In jpeg compression method, Cb and Cr components are down-sampled. Apply the algorithm to Cb and Cr components. Then up-sample both components and reconstruct the image. Do you see and sensible quality change?
5. Repeat step 4, down-sampling all three components. How does the quality change?

Deliverable

Report the result of all steps. Discuss your results. Include your code for each step.