CLRS-720: Computational Vision Science

Assignment: Homework 2

Objective: This assignment is designed to familiarize you with the basics of file and image reading and plotting in MATLAB.

Instructions: You will submit one MATLAB m-file named `YourNameHW2.m` to the appropriate assignment folder in myCourses. Format and comment your MATLAB file in the same way as in HW1.

Questions:

1. Data file input and plotting:
    a. Read the file `MacbethColorChecker.xls` into a variable.
    b. Extract the list of wavelengths from the data into a variable called `wl`. Extract the reflectance data for the 24 patches into a variable called `MCCref`.
    c. Create a variable `MeanRef` that is the average reflectance for each of the 24 patches.
    d. Create a new figure, plot `MeanRef` with appropriate title and axis labels. (Bonus: based on the plot, which patches have the 3 highest values, and why? Provide answer in text using comments)
    e. Create a variable called `yel` that is the reflectance for each patch at wavelength 570 nm.
    f. Create a new figure, plot the reflectance at wavelength 570 nm for each patch with appropriate title and axis labels. (Bonus: based on the plot, which patches have the 4 highest values, and why? Provide answer in text using comments)

2. Image reading, data, and plotting:
    a. Read the image file `MCC24.jpg` into a variable called `imgSRGB`.
    b. Display the image from the data in `imgSRGB`.
    c. Display an achromatic image from only the B channel data in `imgSRGB`.
    d. Convert the data in `imgSRGB` to XYZ in a new variable called `imgXYZ`.
    e. Display an achromatic image from only the Y dimension in `imgXYZ`. (Bonus: which patches look the lightest in this image, and why? Hint: compare this image to the `MeanRef` plot from Q1. Provide answer in text using comments)