CS 545 De-Mosaic Assignment - Updated

Materials Due: November 2, 2015, 8:00 AM

Overview

Create a webpage to de-mosaic RAW images (RGB panes).
Input may be a set of 3 panes, or a single overlaid image. Examples should be available online.
However, you may want to obtain or create your own color panes to use for additional testing.

Details

Create an html (text) file that ends with the extension ".html"
Create an associated JavaScript (text) file that ends with the extension ".js"

- **For content**
  - The page should ask the viewer to load either:
    - ONE RAW image = overlaid color panes
    - or THREE RAW images = 3 separate color panes
  - The page should then display the loaded image/panes
  - The page should display a Final combined image of the 3 interpolated panes
- **Requirements**
  - Page must be able to load user input image/panes
  - Page must display the input images "as-is"
  - Page must display the final image
  - HTML and JS files must be in human readable form using "good" coding style
- **Bonus**
  - Provide options for the user to select different interpolation methods
  - Ask the user for the "actual" final image and display it next to the calculated final image
  - Post the page to your personal website (provide URL in a text file when turned in)

Turn-In (to the appropriate D2L dropbox)

The finalized "page"
  Minimally this should be 2 files:
    The .html file and the .js file

  Optionally you may also use css and additional images
    Thus there may also be additional files

  Optionally you may post this page to your personal webpage
    Provide a text (.txt) file with the URL if you do so
    You still must provide the above zipped materials as well

Zip all files together before turning them in.
Be certain when unzipped the page will display correctly by double clicking on the html file.
Page should display correctly using any web browser
Likely Firefox will be used for grading

Background/Context

Digital cameras capture a color image by overlaying a color filter array in front of the camera's image sensors. The color filter array is often in the form of a Bayer pattern. This type of filter contains red, green, and blue filters arranged in 2x2 blocks, such as: $\begin{bmatrix} R & G \\ G & B \end{bmatrix}$.

The camera thus produces a RAW image. The process to convert a RAW image into full color is called demosaicing. You must implement a method of demosaicing. It is suggested you begin with a simple linear interpolation method defined as: for each pixel in each color channel, fill in the missing values by averaging either the four or two nearest neighbor values:
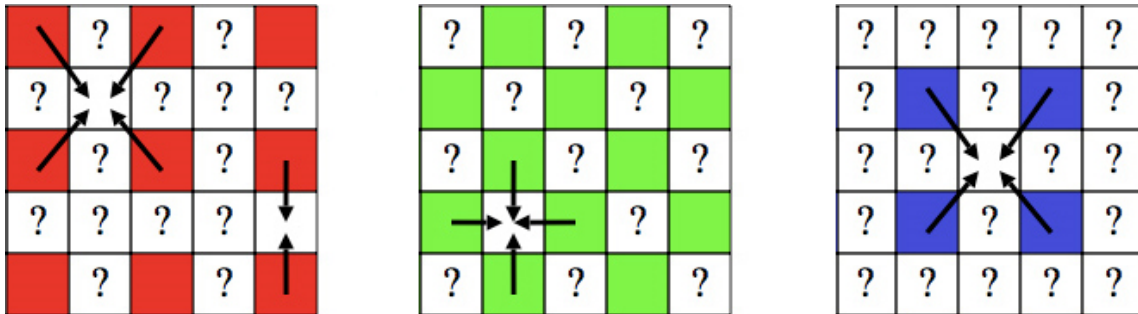
You may assume you have 1 input image with all 3 channels overlaid together (will appear to be greyscale) OR you may assume you have 3 input panes, one for each color. How you program for this is up to you.

The output image should be the same size as the input image (but will properly set the RGB vector).

To test your resulting image you can compute the squared difference between the original/official color image and the one your program calculated/constructed for each pixel in each color channel. Add the three color components together to obtain an output grayscale image. This should make the differences visible.

You may also want to explore additional methods of interpolation. It seems probable that as the green channel is done at a higher sampling rate, that the information contained there could be better used.