AP 187 Activity 5 – Color Image Capture (Group Activity)

Materials needed:

- Lightbox with lightsource
- Digital camera set to BW (need not be Raspi for now, you can use your smartphone or personal cameras)
- Tripod or camera holder
- Red, green and blue filter (cellophane or stained glass or camera filter)
- Colorful objects

Instructions:

1. Arrange your colorful objects inside your lightbox. Make sure all major hues are represented.
2. Set the camera to BW and mount on a tripod or stand.
3. Capture an image of your tableau 3 times, each time covering the camera with a colored filter. When you start capturing images make sure you do not nudge the camera or else the images will appear misaligned. If you are using cellophane you will need two or three layers to filter out the other colors effectively. You will also need a sufficiently bright light source to compensate for the attenuation of the filter.
4. Capture an image of your tableau with the camera set to color capture
5. Overlay your filtered images to make a colored image. This can be done in two ways:
   a. Through image processing software such as GIMP or Photoshop
      i. Use GIMP to load the three BW images
      ii. Using Color – Decompose – Compose, overlay the three images.
      iii. Enhance the image by clicking Color – Auto – White Balance.
   b. Through programming
      i. Read your images using your scientific software (python, Matlab, Scilab, etc.) . It will read it as a color image (MXNX3) but it will appear gray.
      ii. Since your filtered images are in grayscale each pixel the R,G,B channels have equal values . You only need to use one of the channels or you can just convert the image into gray so that each filtered image reduces to MxN.
      iii. Create a truecolor MxNx3 matrix I by assigning the red, green and blue channel to the corresponding grayscale image of the filtered scene. For example in Matlab or Scilab this can be done by I(:,:,1) = RedImage; I(:,:,2)=GreenImage; I(:,:,3) = BlueImage. You can then imshow I.
      iv. Enhance the image by applying white balancing techniques (refer to AP 186 activity 6).
6. Compare the quality of the color image you created with the actual color image captured by your camera.