

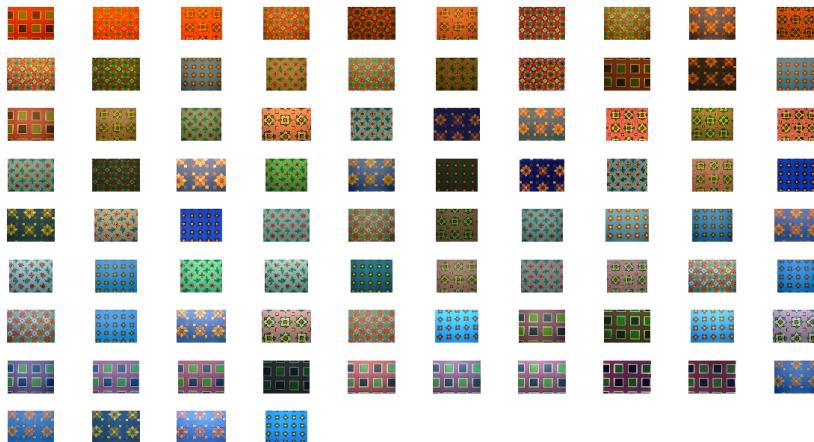
COC202 Computer Vision

Lab 9 – Colour constancy and colour invariance

In this lab, you will implement some colour constancy and colour invariant algorithms and use them for colour-based image retrieval.

If you have not yet finished the exercises from the previous lab, do them first.

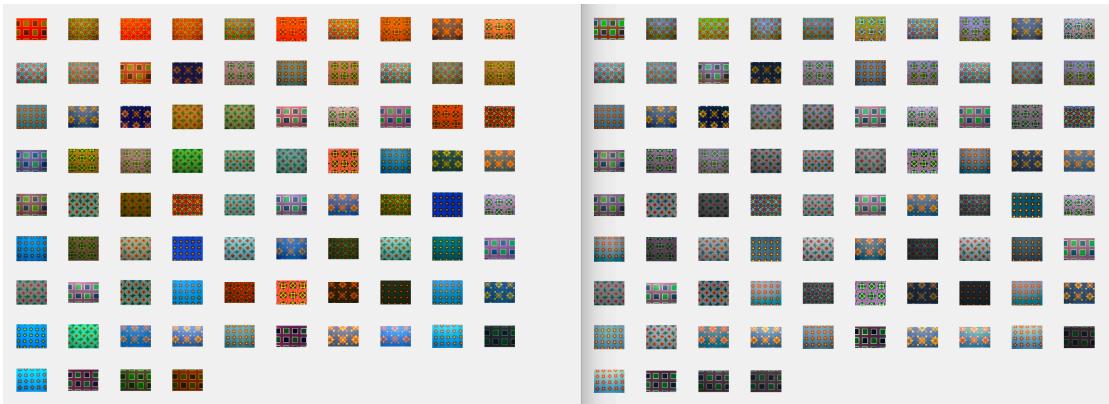
1. Download the image database for this lab, which contains images of the same design patterns taken (uncalibrated) using different devices (4 cameras and 2 scanners) and under different illuminations (A, D65 and TL84). Use your code (or the solution) from the CBIR lab to perform colour-based image retrieval. You should notice that it does not work well.



2. Write a function that is passed a colour image and returns an image white balanced using Greyworld colour constancy (that is, you estimate the illuminant using the Grayworld algorithm and then map the image as it would appear if taken under white light).

Test your function works correctly by taking one of the images and mapping it to a different illumination (i.e. by applying some (different) scaling factors to the R,G,B channels of the image). After colour constancy, both the original image and the mapped one should be virtually identical.

3. Perform colour-based CBIR as in Exercise 1 **but** by calculating colour histograms **after** Greyworld colour constancy. Retrieval performance should be improved, though not significantly so for some images.

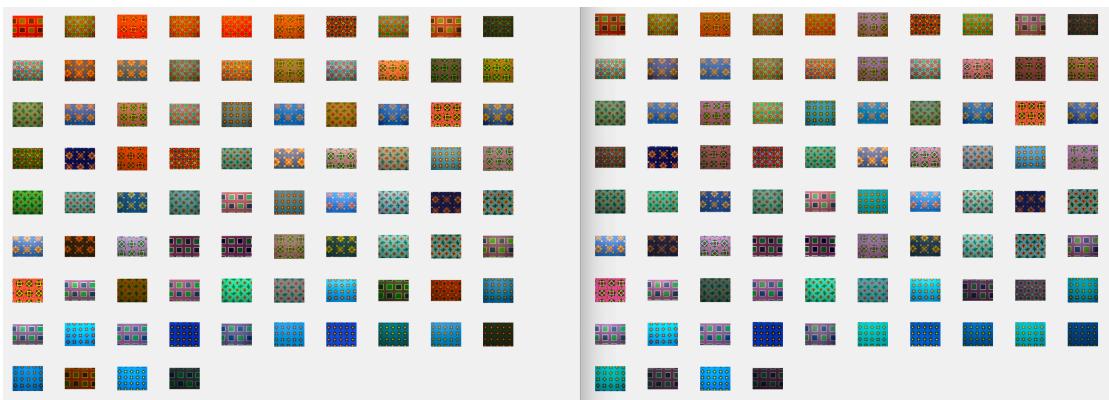


(left shows original images in retrieved order; right shows images after Greyworld)

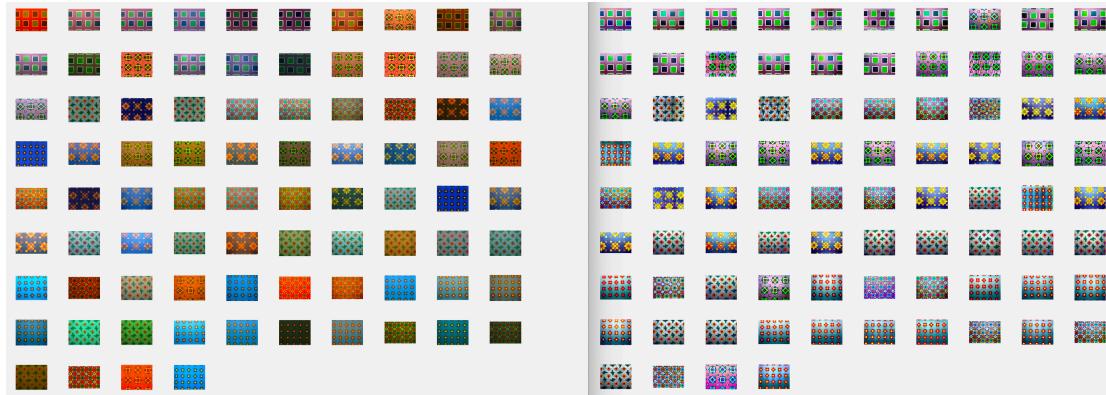
4. Write a function that is passed a colour image and returns an image white balanced by MaxRGB colour.

Test your function in the same way you have tested your Greyworld function.

5. Perform CBIR with MaxRGB as pre-processing technique.



6. Write a function that uses histogram equalisation (either your own code or Matlab's) to perform colour normalisation and use it for CBIR. Test your function as you have tested the Greyworld and MaxRGB functions.
7. Perform image retrieval on histogram equalised images. This should give the best retrieval results.



Once you have finished all exercises you may leave the lab.