2022 NYCU Digital Image Processing - Homework 3 Report

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1 Chromatic Adaption

從這 4 張 input 圖片可以觀察到圖片的色溫有明顯的偏差，加上整體影像呈現偏暗的情況。因此，我先使用白平衡演算法將顏色校正回來，然後使用 gamma correction (gamma = 2.2)作為非線性轉換，將整體偏暗的圖片的亮度提升，最後再微調圖片的調亮度與對比度。

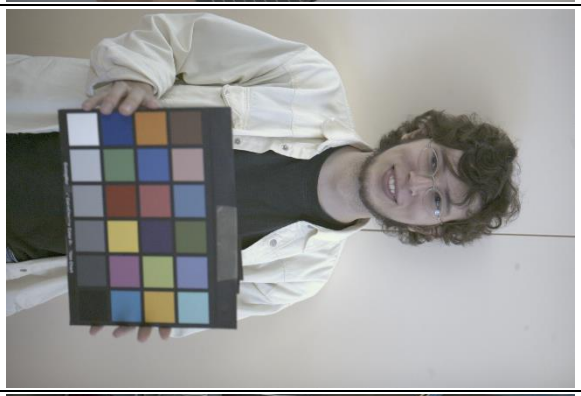
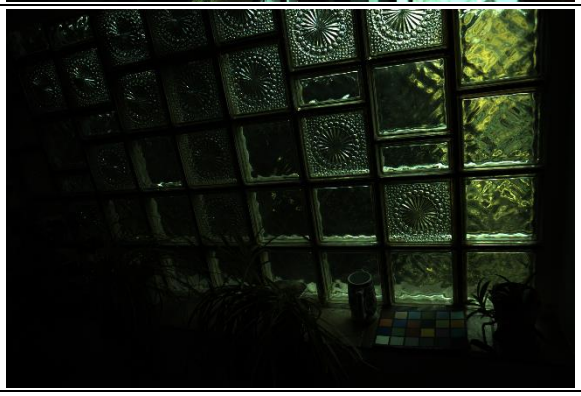
	Original	White Balance + Modify Brightness & Contrast
input1		
input2		
input3		
input4		

Table 1: Result of white balance with modifying brightness and contrast

Step1. Auto White balance

(1) 計算 R, G, B 三個通道個別的平均強度 (μ_b, μ_g, μ_r)

(2) 計算三個通道的增益係數

$K_B = (\mu_b + u_g + \mu_r) \ / \ (3 * \mu_b)$

$K_B = (\mu_b + u_g + \mu_r) \ / \ (3 * \mu_g)$

$K_B = (\mu_b + u_g + \mu_r) \ / \ (3 * \mu_r)$

(3) 將原使圖片的每個 pixel 乘上對應的增益係數

(4) 假設乘上增益係數後結果大於強度最大值，則設為最大值。

(5) 反之，乘上增益係數結果小於強度最小值，則設為最小值。

Step2. Gamma Correction

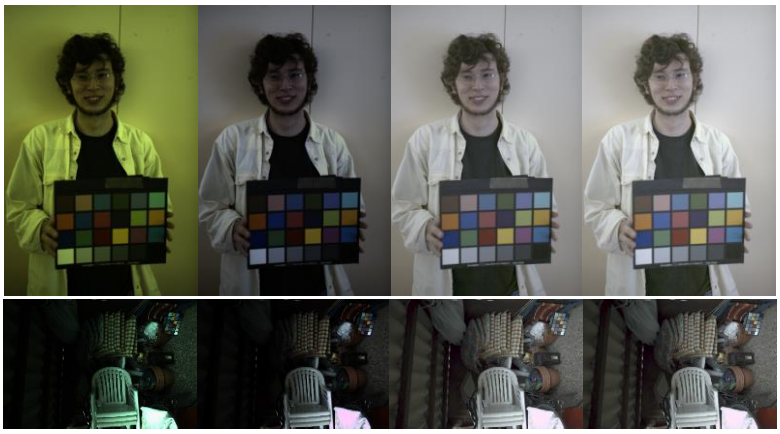
$$O = (\frac{I}{255})^{\frac{1}{\gamma}} \cdot 255$$

$\gamma = 2.2$

Step3. Modify Brightness & Contrast

$O(i, j) = \alpha * I(i, j) + \beta$

$\alpha = 1.1, \beta = 2.2$



Original **Step1.** **Step2.** **Step3.**

2 Image Enhancement

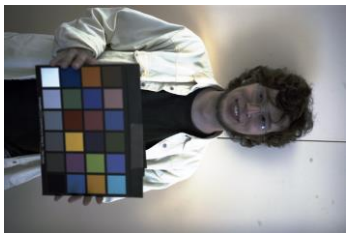
	output*_1	output*_2
Sharpness (Laplacian Filter)		
Contrast (Histogram Equalization)		
Denoise (Gaussian Blur)		
Brightness (gamma = 0.8)		

Table 2: Result of Image Enhancement