

Homework1 Report

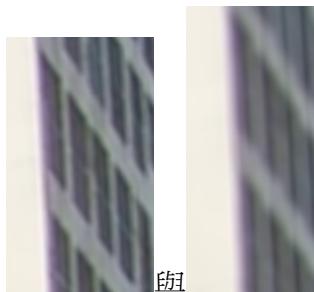
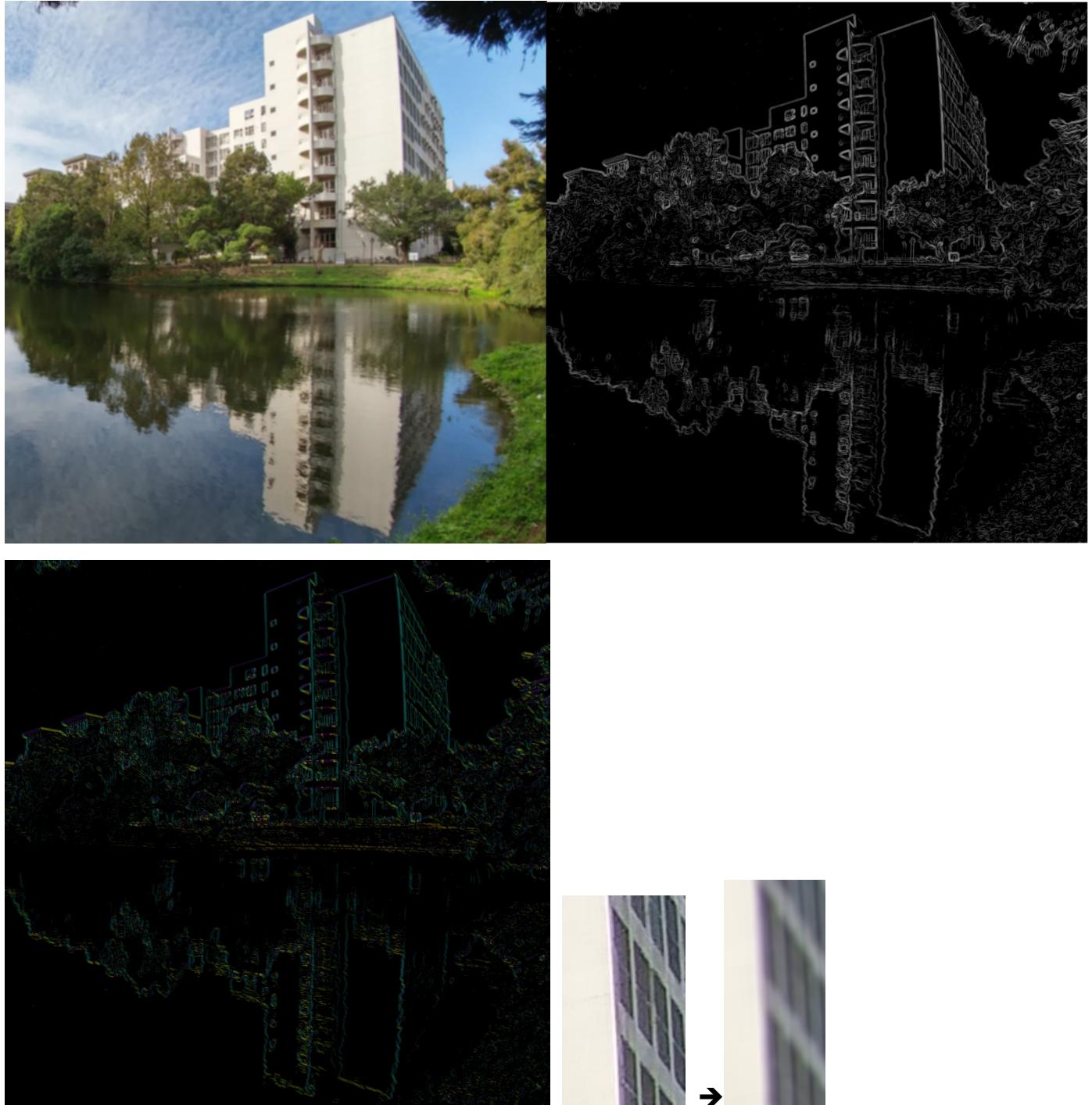
108062650 張聿程

Part 1. Harris Corner Detection

1. Kernel size = 5 and $\sigma = 5$



Kernel size = 10 and σ = 5



與相比 kernel size = 10 的時候，會比 kernel size = 5 時模糊。而且邊界的大小

kernel size =10 的會比 kernelsize = 5 還要小

2.



Tensor structure with window size = 3



Tensor structure with window size = 30

當 tensor structure 的 window size 愈大的時候，參考的鄰居範圍就會變得很大，過濾的點就會愈來愈多，所偵測到的邊角就會變得很少。

3.



上圖是未經過 NMS 處理的邊角偵測圖，下圖是經過 NMS 處理過的邊角偵測圖。NMS 可以把一大塊紅色的面積轉變成好幾個是邊角的點。

4.



左上圖是原始圖，右上圖是縮放 0.5 倍的結果圖，下圖是旋轉 30 度的圖，未做過任何放大縮小。當圖旋轉 30 度時，被偵測到的邊角會不一樣；縮放 0.5 倍時，偵測到的邊角也不一樣。

Therefore, Harris Corner Detection is rotation-invariant and scale-variant.

Part 2. Image Sensing Pipeline

a. 這樣才不會造成感光元件接收到其他光線的影響。拜爾濾光鏡就是將其他的光逕行過濾，把需要的光傳到感光元件，紅色的濾光鏡只將紅色的光傳到感光元件，綠色的濾光鏡只將綠色的光傳到感光元件，藍色的濾光鏡只將藍色的光傳到感光元件。

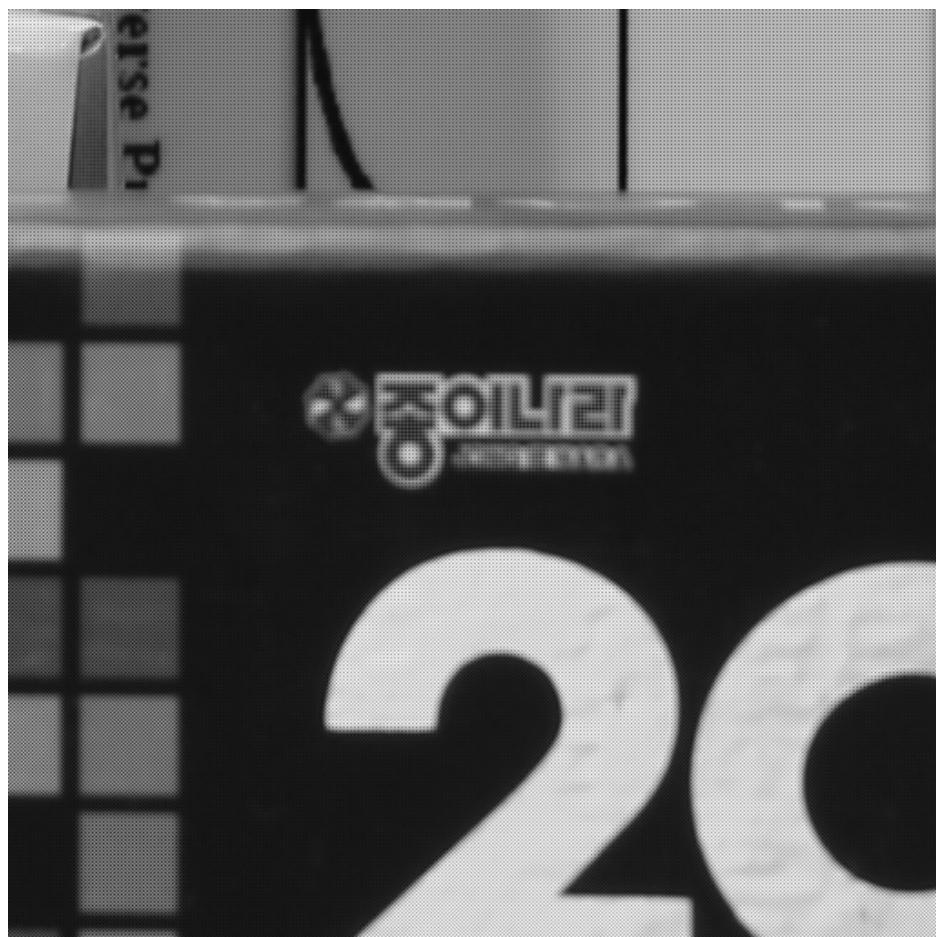
b.

Variable Number of Gradients (VNG) interpolation computes gradients near the pixel of interest and uses the lower gradients (representing smoother and more similar parts of the image) to make an estimate. It is used in first versions of ddraw, and suffers from color artifacts.

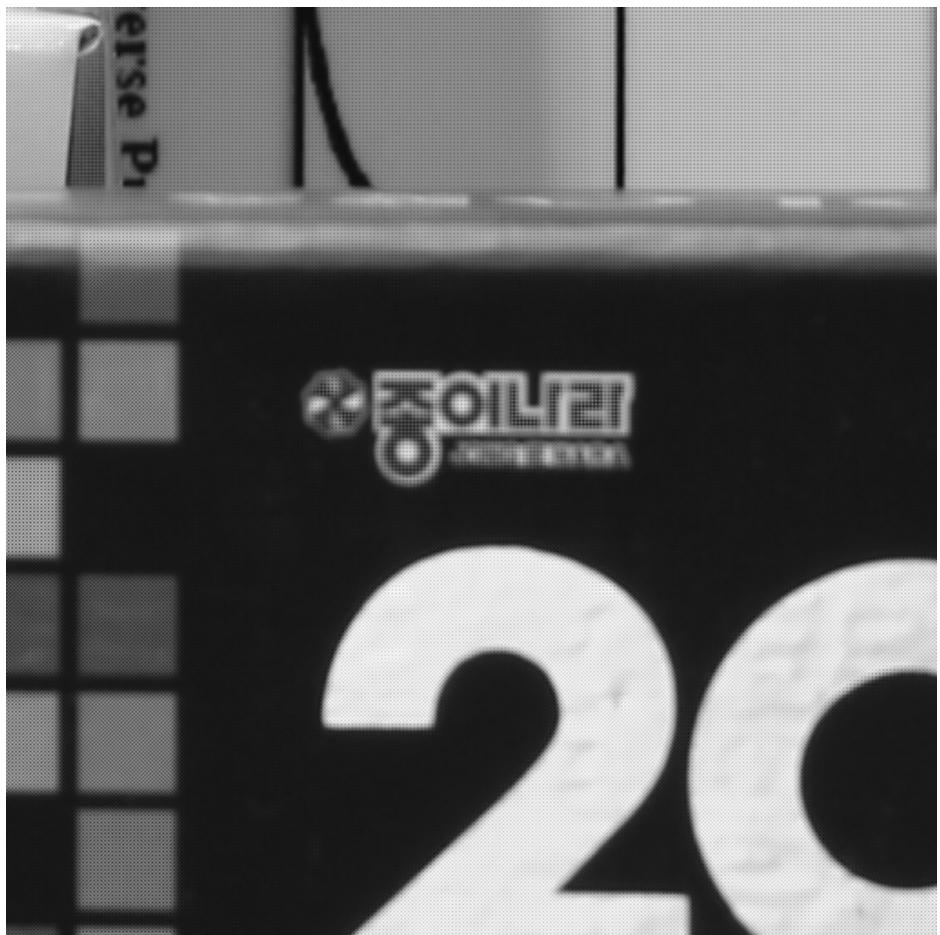
Pixel Grouping (PPG) uses assumptions about natural scenery in making estimates. It has fewer color artifacts on natural images than the Variable Number of Gradients method; it was introduced in ddraw from rel. 8.71 as "Patterned Pixel Grouping".

c.

RAW



AWB



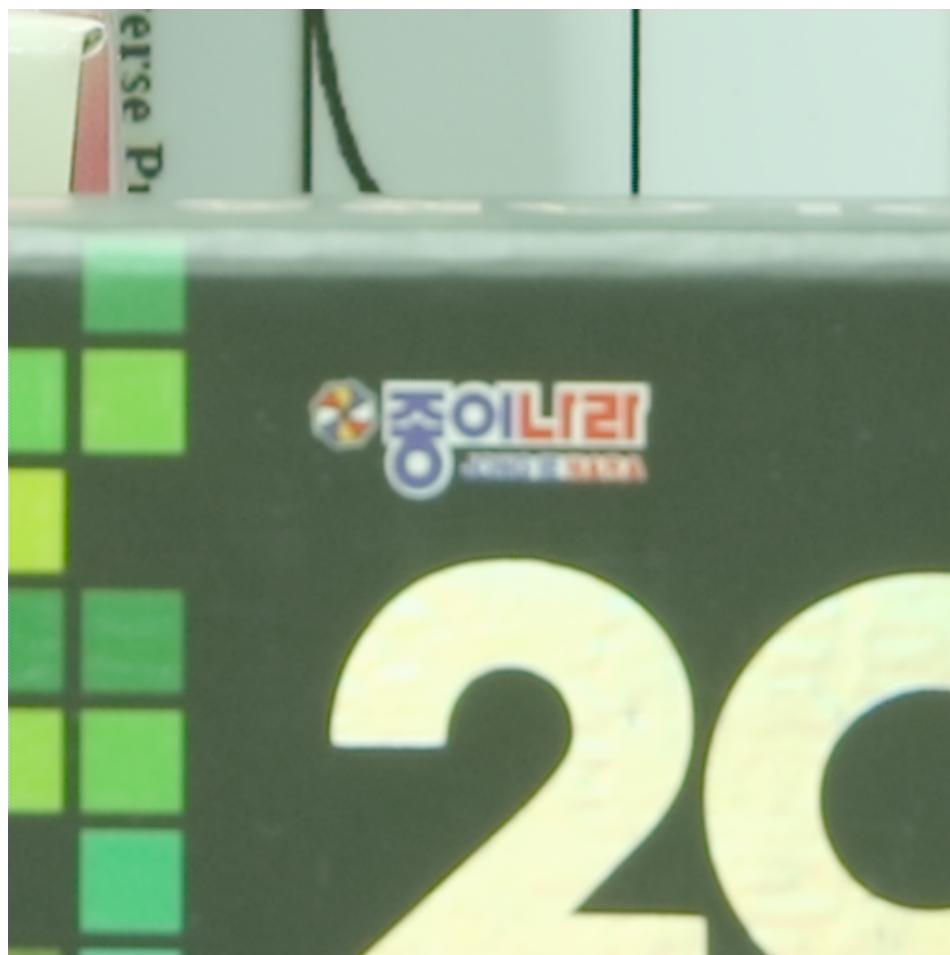
Demosaic



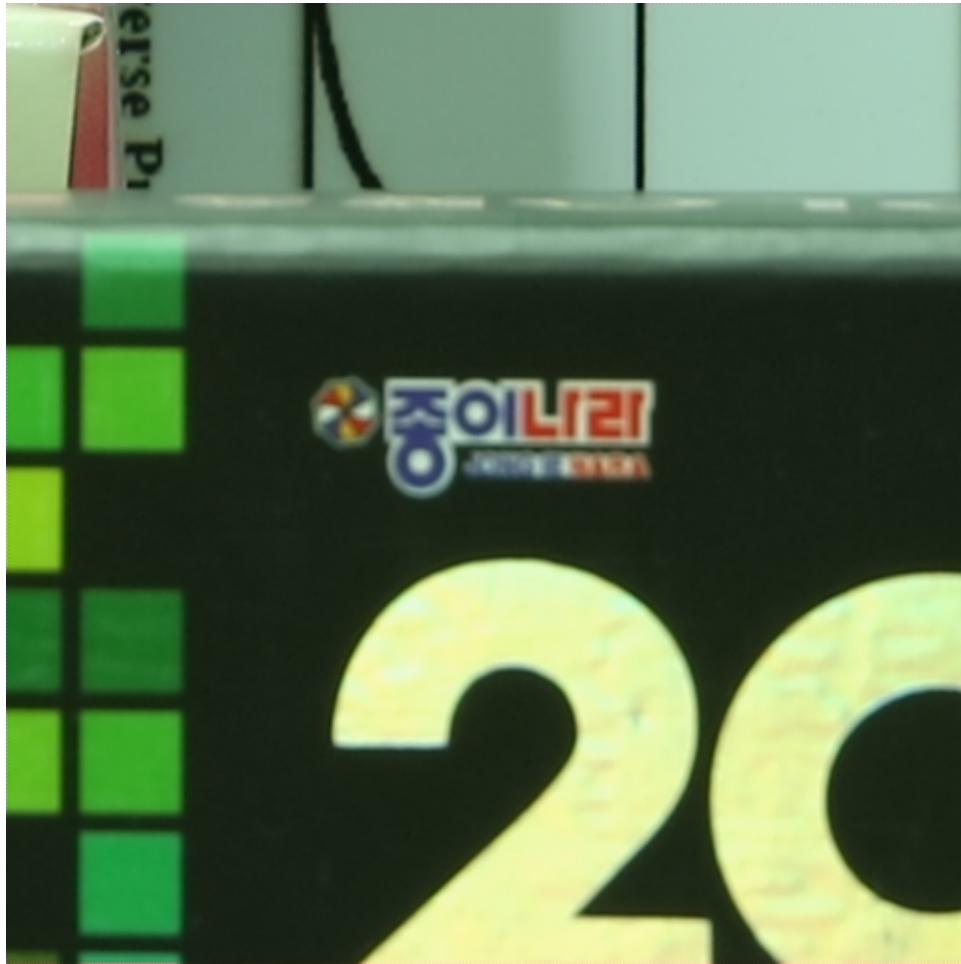
Color Correction



XYZ2RGB



Tone Mapping



d.

因為 RAW domain 的 depth 為 1，可以視為一張灰階圖，在座 demosaic 的時候對於輸出的影像顏色不會改變很大。如果使用 RGB 做雜訊處理的話，去除過雜訊後的影像可能會讓整張影像的顏色改變。