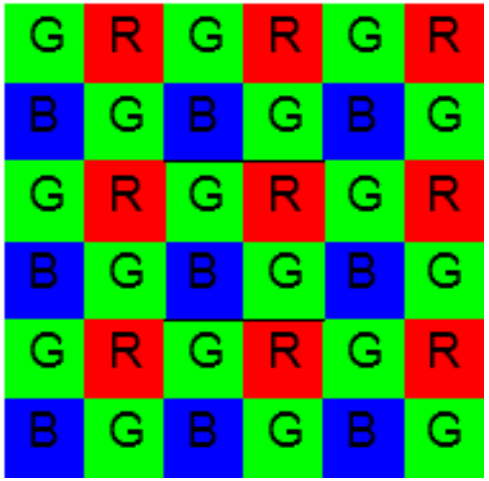
CS357000 HW1檢討

2011/04/15

HW1-1 Demosaicing

- The Bayer filtered image : Only one of the three channels contains values in each pixel
- Interpolate the missing pixel values by its nearest neighbors.
- Compute the average of the missing point's nearest neighbors of that channel.



HW1-1 PSNR

- PSNR

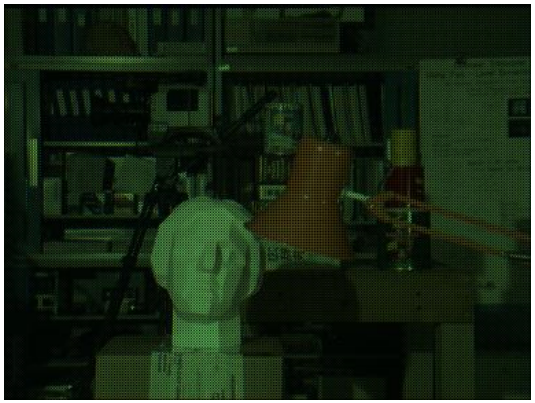
$$MSE = \frac{1}{m\,n}\sum_{i=0}^{m-1}\sum_{j=0}^{n-1}[I(i,j) - K(i,j)]^2$$

$$PSNR = 10 \cdot \log_{10}\left(\frac{MAX_I^2}{MSE}\right)$$
$$= 20 \cdot \log_{10}\left(\frac{MAX_I}{\sqrt{MSE}}\right)$$

I: interpolated image
K: ground truth
MAX_I:255

HW1-1 Result

PSNR = 28.3482 31.9865 27.8325



PSNR = 27.0158 33.9831 28.6289

HW1-1 Common Problems

- Boundary pixels
- PSNR
  - Round your result to integers first and then convert to double
  - Compute PSNR for each channel
  - Which images to use?

Your result

g.t.

filtered.

HW1-1 Common Problems

- For a 200x300x3 image
  - [r c h] = size(img) =>[200 300 3]
  - [r c] = size(img) =>[200 900]
- We have two images!
- Put results in report
- Discussion(5%)

HW1-2 Results

2x2

PSNR: 22.3 dB

4x4

PSNR: 26.7 dB

8x8

PSNR: Inf dB

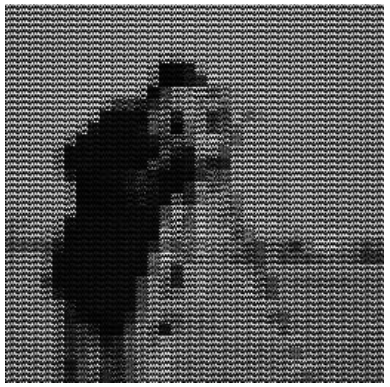
HW1-2 Error - DCT, IDCT

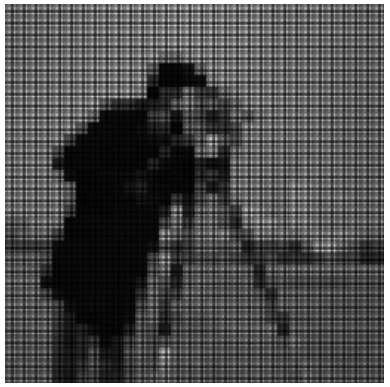
- 2D DCT -> six for loops
- Twice1D DCT -> two for loops

$$F(u) = \sum_{r=0}^{M-1} \frac{2C(u)}{\sqrt{M}} f(r) \cos\left(\frac{(2r+1)u\pi}{2M}\right)$$

  - 1D DCT : A*f
  - 2D DCT : A*f*A'

- Index, image size, retain, time





HW1-2 Error – PSNR

$$MSE = \frac{1}{m\,n}\sum_{i=0}^{m-1}\sum_{j=0}^{n-1}[I(i,j) - K(i,j)]^2 \quad PSNR = 10 \cdot \log_{10}\left(\frac{MAX_I^2}{MSE}\right)$$

$$= 20 \cdot \log_{10}\left(\frac{MAX_I}{\sqrt{MSE}}\right)$$

- 利用IDCT還原的影像，型態為double，需轉換為uint8再計算PSNR
  - PSNR: 22dB, 27dB, 307dB
- 計算PSNR時，I(I,j), K(I,j)型態須為double，否則相減不會有負數
- $MAX_I = 255$

Report 50%

- Method(15%)
  - ✓Summarize algorithms and formulas clearly step by step
  - ×Only formulas
- Results(20%)
- Discuses(10%)
  - ✓Answer questions in homework assignment
  - ✓Write down what you observe
- How to execute?(5%)

Copy

- Program -> 0
  If you have any problem ->綜二館714

HW2 – function

- function GammaTransform(filename, gamma)
- function interpolation(filename, ratio)

- Office hours
  - 4/19(二) 7:30~9:30 PM
  - 4/20(三) 7:30~9:30 PM