

課程名稱：數位影像處理

Lab Assignment #2：影像縮放與內插

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1. 程式碼

```
close all;
clf;
clc;

img = imread("cameraman.tif");    % 讀取影像
img = im2double(img);             % 轉換成雙(單)精度浮點數資料型別

% 生成像素座標
[X, Y] = meshgrid(1:256, 1:256);
subplot(141); imshow(img); title("Origin image 256x256");

% 縮減像素採樣至影像解析度為 128 x 128
[down_x, down_y] = meshgrid(1:2:256, 1:2:256);
down_img = img(1:2:256, 1:2:256);
subplot(142); imshow(down_img); title("128x128");

% 運用鄰近值內插還原影像解析度
inter_nearest = interp2(down_x, down_y, im2double(down_img), X, Y,
    'nearest');
subplot(143); imshow(inter_nearest); title("nearest");
imwrite(inter_nearest, 'interpolation_nearest.tif');

% 運用雙線性內插還原影像解析度
inter_bilinear = interp2(down_x, down_y, im2double(down_img), X, Y,
    'bilinear');
subplot(144); imshow(inter_bilinear); title("bilinear");
imwrite(inter_bilinear, 'interpolation_bilinear.tif');

% 計算運用鄰近值內插還原解析度之影像與原始影像的平均絕對值誤差
difference_nearest = img - inter_nearest;
error_nearest = mae(difference_nearest);
```

```
sprintf("error_nearest = %f",error_nearest)
```

% 計算運用雙線性內插還原解析度之影像與原始影像的平均絕對值誤差

```
difference_bilinear = img - inter_bilinear;  
error_bilinear = mae(difference_bilinear);  
sprintf("error_bilinear = %f",error_bilinear)
```

2. 輸出之影像



interpolation_nearest



interpolation_bilinear

3. 輸出之平均絕對值誤差

error_nearest = 0.028428

error_bilinear = 0.020954