

Image Enhancement in the Spatial Domain

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學號 : 109321019 姓名 : 涂价弘

Lab-5 (last week)

```
clf('reset');
video = VideoReader('./video/fruit_fly.avi');

i=0;
while hasFrame(video)
frame = readFrame(video);
frame = frame(1:400, 1:500, :);
imshow(frame);
break
% i = i + 1;
end
```



```
clf('reset');
video = VideoReader('./video/fruit_fly.avi');

frame = readFrame(video);
frame = frame(1:400, 1:500, :);
```

```
imshow(frame);
```

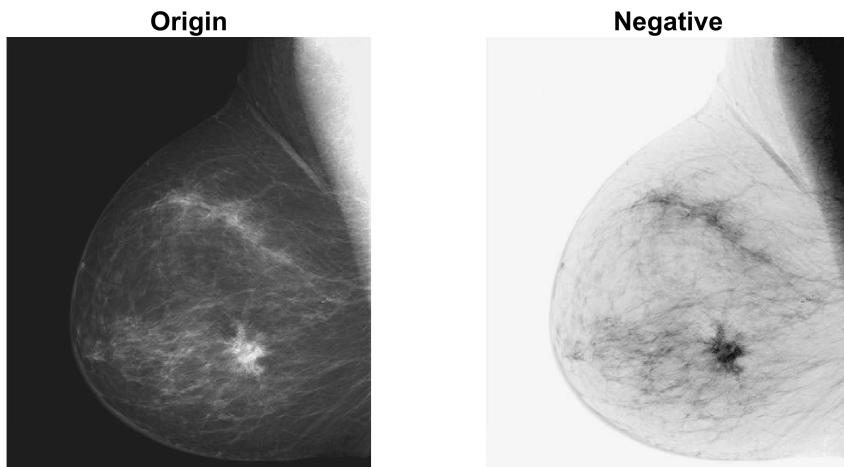


```
% impixelinfo
```

Exercise-1

```
clf('reset');
img = imread('./images/3/Fig3.04(a).jpg');

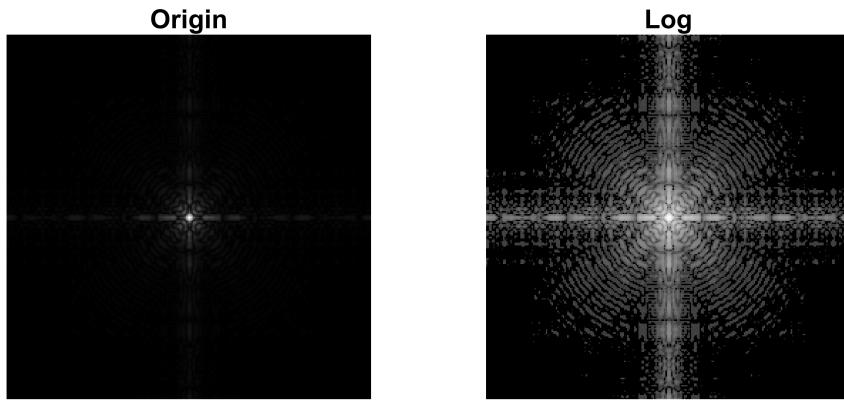
subplot(1, 2, 1), imshow(img)
title("Origin")
negative = 255.0 - double(img);
subplot(1, 2, 2), imshow(negative, [])
title("Negative")
```



Exercise-2

```
clf('reset');
img = imread('./images/3/Fig3.05(a).jpg');

subplot(1, 2, 1), imshow(img)
title("Origin")
c = 255 / log(256);
transform = c * log(1 + double(img));
subplot(1, 2, 2), imshow(transform, [])
title("Log")
```



Exercise-3

```

clf('reset');
img = imread('./images/3/Fig3.08(a).jpg');

subplot(2, 2, 1), imshow(img)
title("origin")

% LUT: 預先計算好每個 pixel 的結果
% 目標圖像輸入的 pixel 當 index 來查找計算結果

tic
test = double(img).^0.6;
toc

```

Elapsed time is 0.004349 seconds.

```

tic
LUT1 = (0:255).^0.6;
toc

```

Elapsed time is 0.001406 seconds.

```

% LUT faster than dot calculation

LUT2 = (0:255).^0.4;

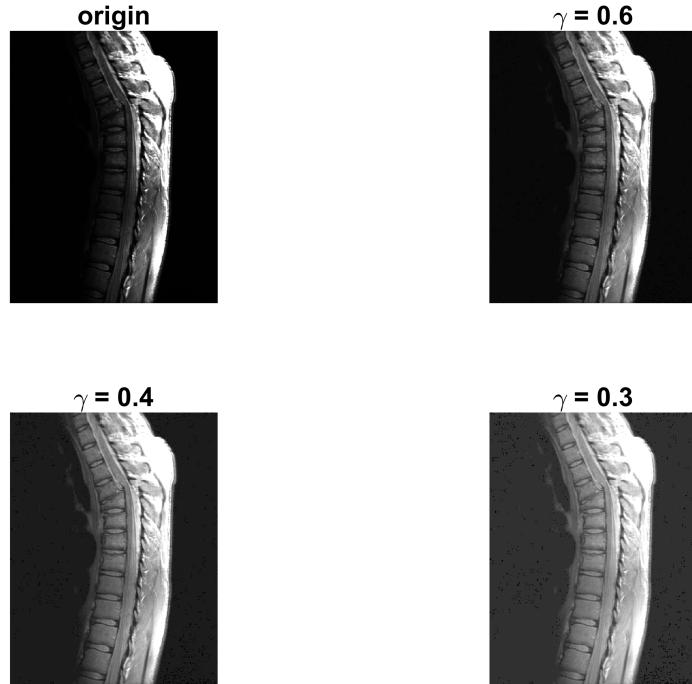
```

```

LUT3 = (0:255).^0.3;

subplot(2, 2, 2), imshow(LUT1(img + 1), [])
title("\gamma = 0.6")
subplot(2, 2, 3), imshow(LUT2(img + 1), [])
title("\gamma = 0.4")
subplot(2, 2, 4), imshow(LUT3(img + 1), [])
title("\gamma = 0.3")

```



```

clf('reset');
img = imread('./images/3/Fig3.09(a).jpg');

subplot(2, 2, 1), imshow(img)
title("origin")

LUT1 = (0:255).^3;
LUT2 = (0:255).^4;
LUT3 = (0:255).^5;

subplot(2, 2, 2), imshow(LUT1(img + 1), [])
title("\gamma = 3")
subplot(2, 2, 3), imshow(LUT2(img + 1), [])
title("\gamma = 4")
subplot(2, 2, 4), imshow(LUT3(img + 1), [])
title("\gamma = 5")

```

origin



$\gamma = 3$



$\gamma = 4$



$\gamma = 5$

