

Derivative and Application

Tính đạo hàm rời rạc

In [1]:

```
import numpy as np
# giảm sử cho một mảng arr
arr = np.array([3, 34, 435, 23, 56, 565, 3, 43, 644])
print(arr)
```

```
[ 3  34 435  23  56 565  3  43 644]
```

Đạo hàm tại x:

$$\frac{d}{dx} f(x) = \lim_{\Delta x \rightarrow 0} \frac{f\left(x + \frac{\Delta x}{2}\right) - f\left(x - \frac{\Delta x}{2}\right)}{\Delta x}$$

			x					
3	34	435	23	56	565	3	43	644
			↓					
			-1	0	1			

$$\Delta x = 2$$

$$\frac{d}{dx} f(x) = \frac{f(x+1) - f(x-1)}{2} = \frac{565 - 23}{2} = 542$$

Tính đạo hàm theo hướng

Tính đạo hàm trung bình theo hướng x

$$\begin{array}{|c|} \hline 1 \\ \hline 2 \\ \hline 1 \\ \hline \end{array} * \begin{array}{|c|c|c|} \hline -1 & 0 & 1 \\ \hline \end{array} = \begin{array}{|c|c|c|} \hline -1 & 0 & 1 \\ \hline -2 & 0 & 2 \\ \hline -1 & 0 & 1 \\ \hline \end{array}$$

weighted average x-derivative Sobel for x direction

Tính đạo hàm trung bình theo hướng y

$$\begin{array}{|c|} \hline 1 \\ \hline 0 \\ \hline -1 \\ \hline \end{array} * \begin{array}{|c|c|c|} \hline 1 & 2 & 1 \\ \hline \end{array} = \begin{array}{|c|c|c|} \hline 1 & 2 & 1 \\ \hline 0 & 0 & 0 \\ \hline -1 & -2 & -1 \\ \hline \end{array}$$

y-derivative weighted average Sobel for y direction

In []:

```

import cv2
from matplotlib import pyplot as plt
img = cv2.imread("image_1.jpg",0)
img = cv2.resize(img,(400,400))
cv2.imshow("image",img)

#compute sobel - x
X = cv2.Sobel(img, cv2.CV_64F, 1, 0)

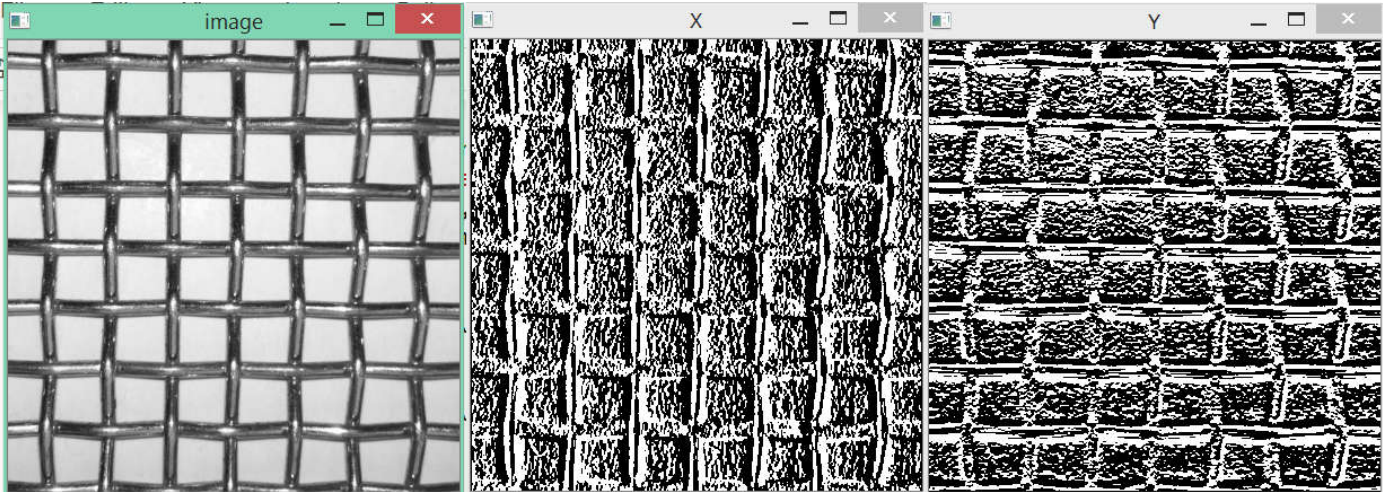
#compute sobel - y
Y = cv2.Sobel(img, cv2.CV_64F, 0, 1)

cv2.imshow("X",X)
cv2.imshow("Y",Y)

cv2.waitKey(0)
cv2.destroyAllWindows()

```

Khi đó nó sẽ làm nổi bật nên đường theo phương tương ứng



In []:

In []: