OpenCV 101

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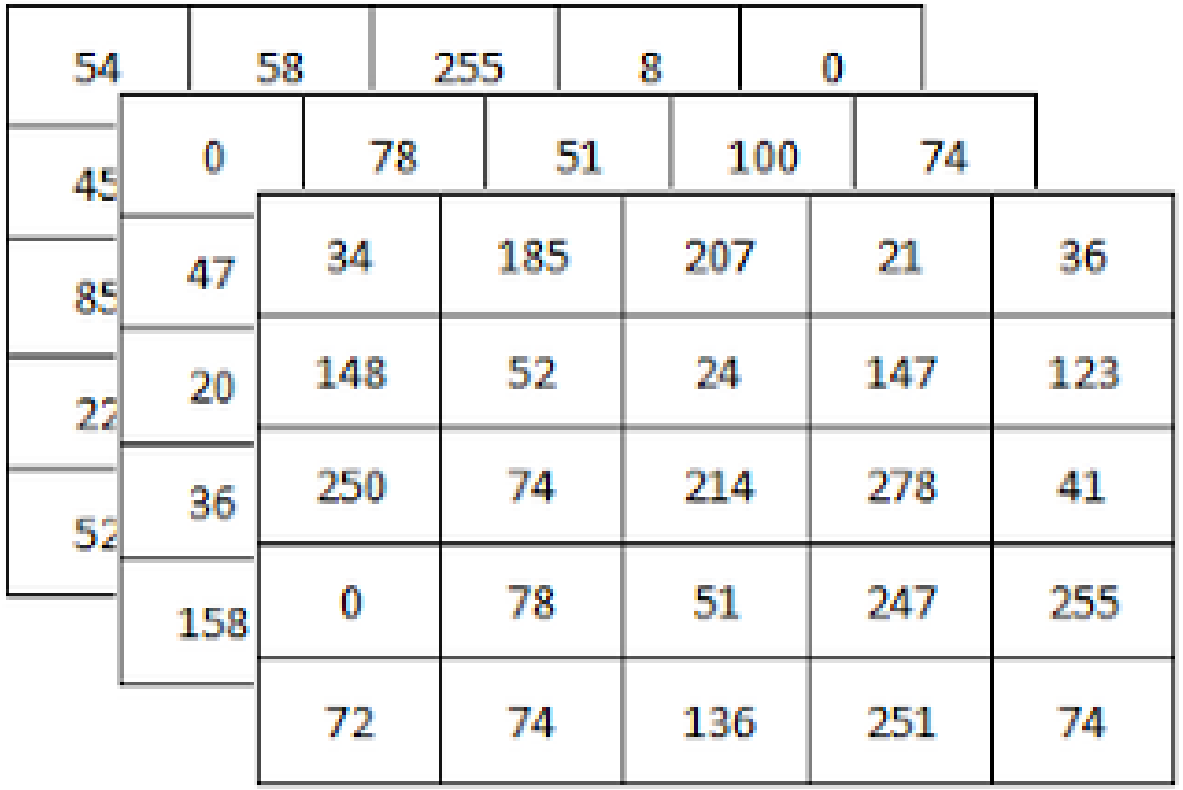
Que es OpenCV?

Como son procesadas las imágenes por un computador?



Procesar imágenes mas rápido

$$\text{RGB[A] to Gray:} \quad Y \leftarrow 0.299 \cdot R + 0.587 \cdot G + 0.114 \cdot B$$

https://docs.opencv.org/3.1.0/de/d25/imgproc_color_conversions.html

Leer y mostrar imágenes

```
import cv2
import numpy as np


'''
imread toma 2 parametros
direccion de la imagen
flag indicando como leer la imagen:
  1 = color (por defecto)
  0 = escala de grises
'''
img = cv2.imread('imagen.png', 1)
cv2.imshow('Titulo', img)
print(type(img), img.shape)

p = cv2.waitKey(5000)
print(p)

'''
Tambien podemos mostrar imagenes
con matplotlib:
  plt.imshow(image)
  plt.show()
'''

img_gray = cv2.imread('imagen.png', 0)
cv2.imshow('Gray Scale', img_gray)
print(img_gray.shape)

# Esperamos cualquier tecla sea presionada
# y destruimos la ventana con el nombre asociado
cv2.waitKey(0)
cv2.destroyWindow('Gray Scale')

cv2.waitKey(0)
cv2.destroyAllWindows()
```

Video

```python
import numpy as np
import cv2

# Para grabar con camaras conectadas al PC
# cap = cv2.VideoCapture(0)
cap = cv2.VideoCapture('video.mp4')

while(True):
    # Capture frame-by-frame
    ret, frame = cap.read()

    # Display the resulting frame
    cv2.imshow('frame', frame)
    if cv2.waitKey(30) & 0xFF == ord('q'):
        break

# When everything done, release the capture
cap.release()
cv2.destroyAllWindows()
```

Smoothing Images

- cv2.filter2D()
- cv2.blur()
- cv2.boxFilter()
- cv2.GaussianBlur()
- cv2.medianBlur()
- cv2.bilateralFilter()

https://docs.opencv.org/3.1.0/d4/d13/tutorial_py_filtering.html

Gaussian blur

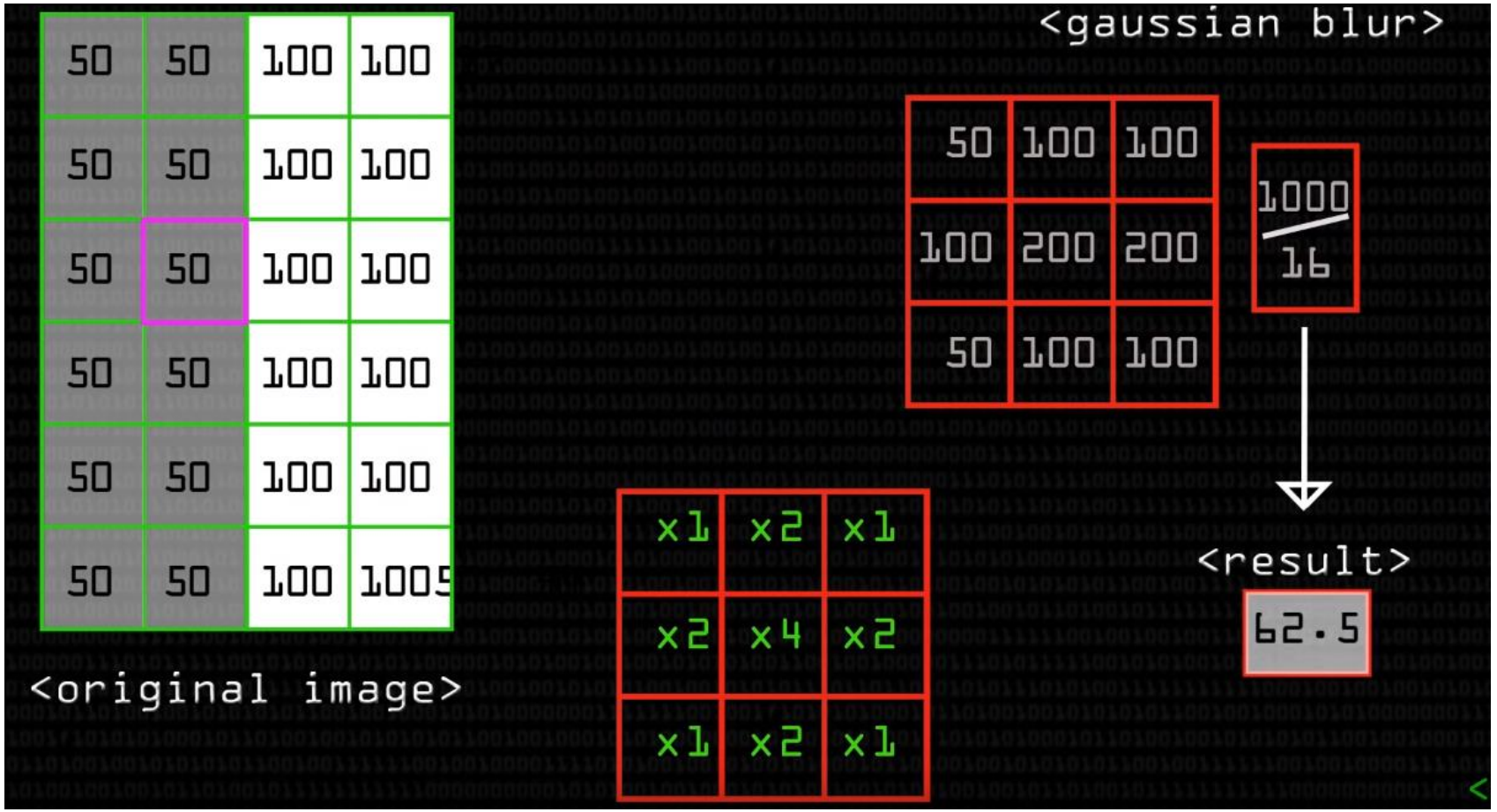
```
1 blur = cv2.GaussianBlur(img,(5,5),0)
```

Result:

image

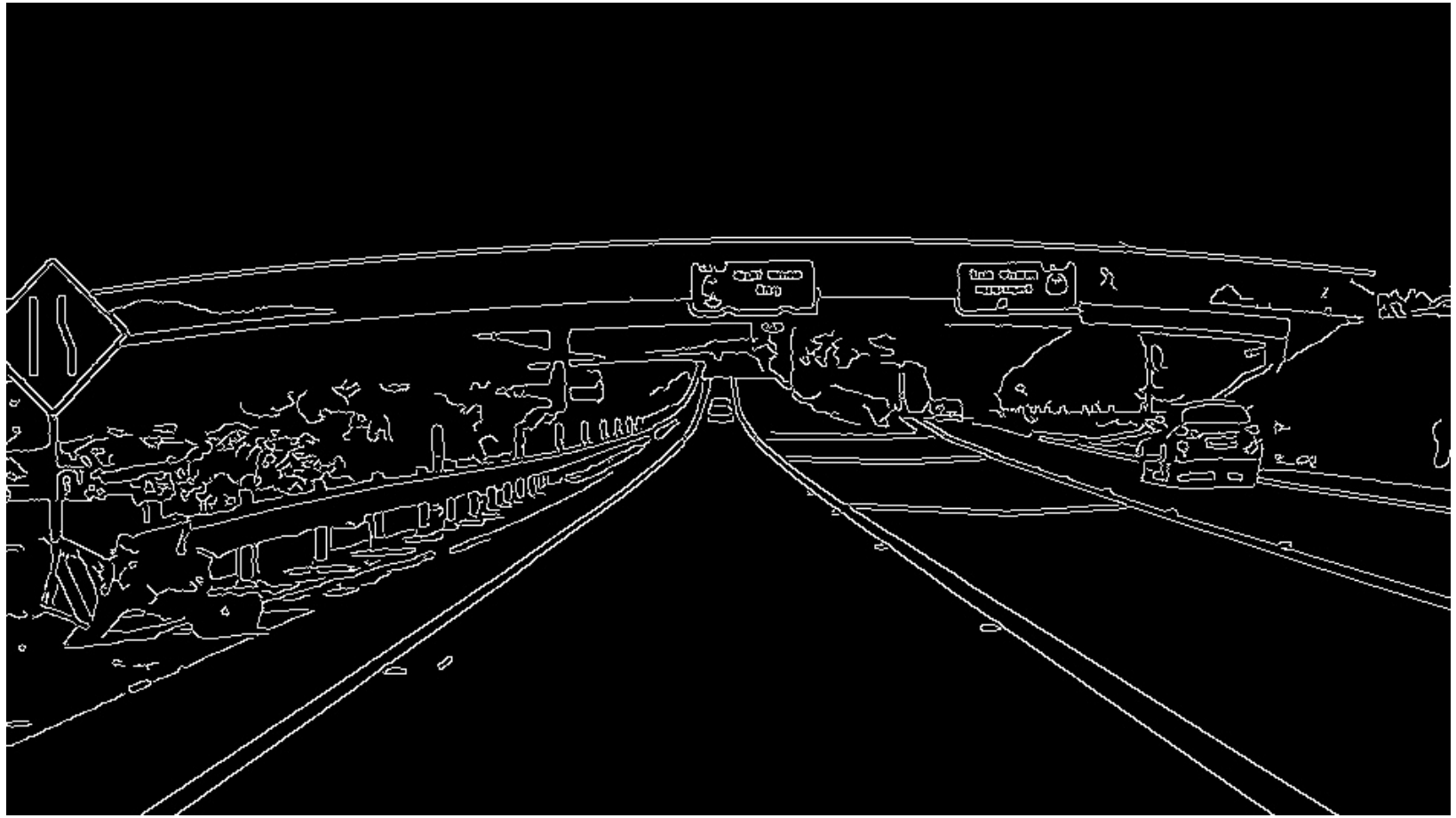
https://docs.opencv.org/3.1.0/d4/d13/tutorial_py_filtering.html

Gaussian blur

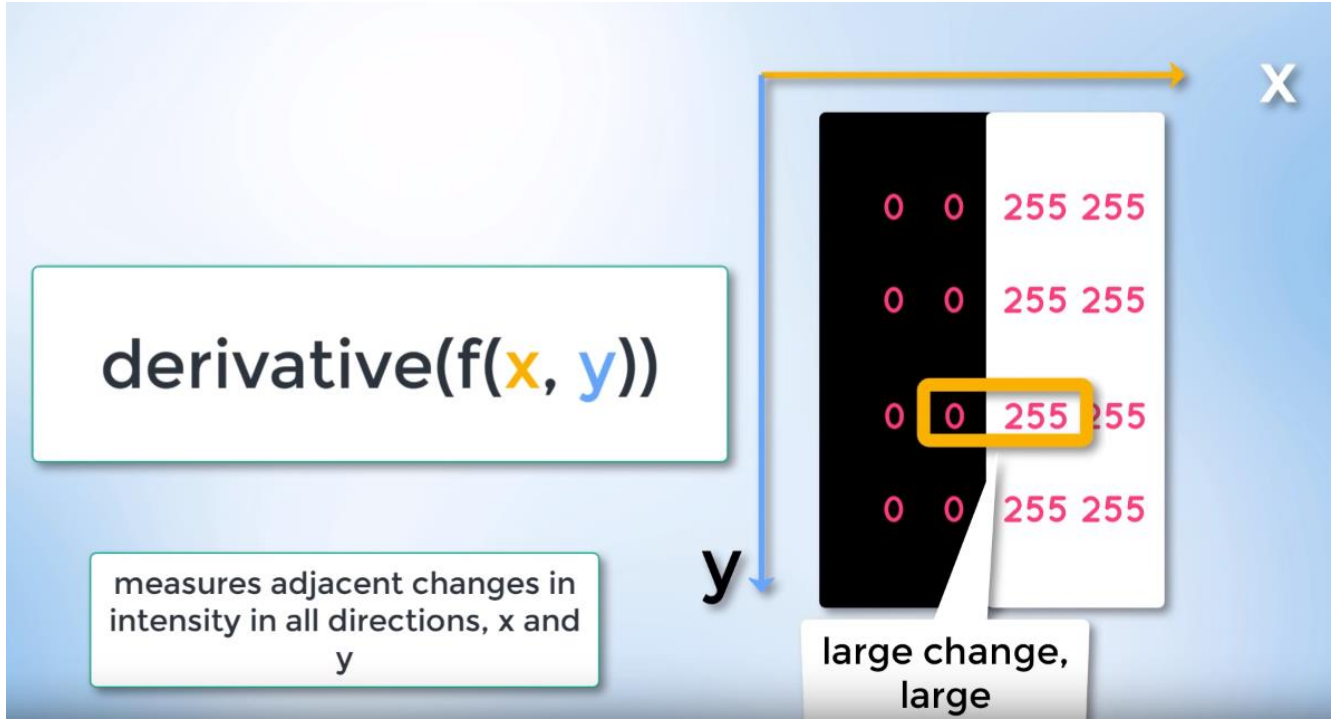


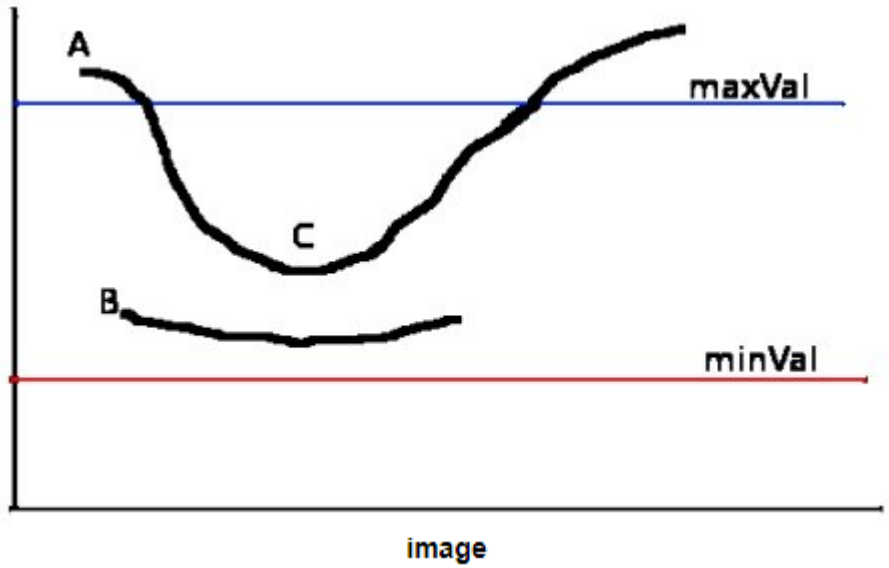
https://www.youtube.com/watch?v=C_zFhWdM4ic

Canny



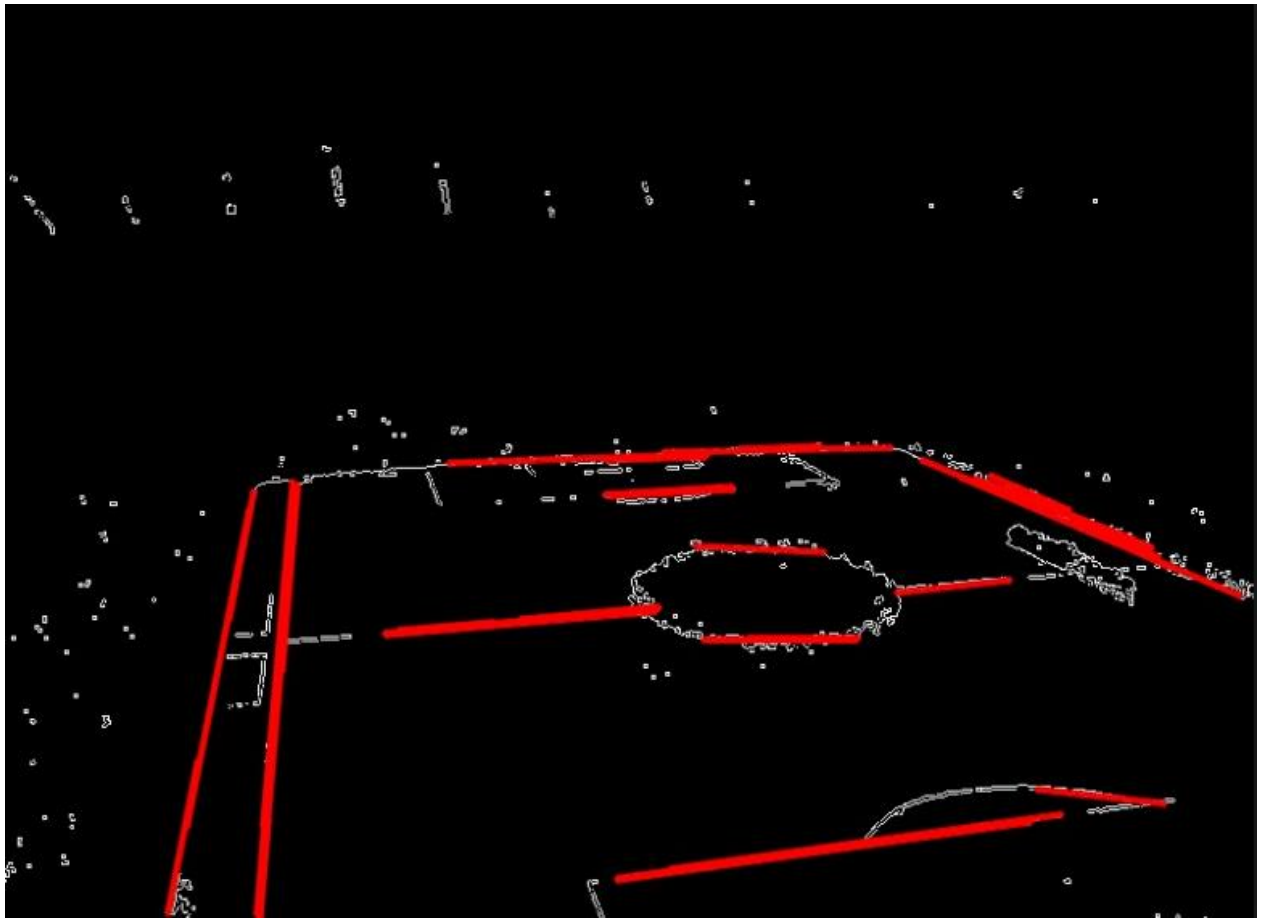
Canny





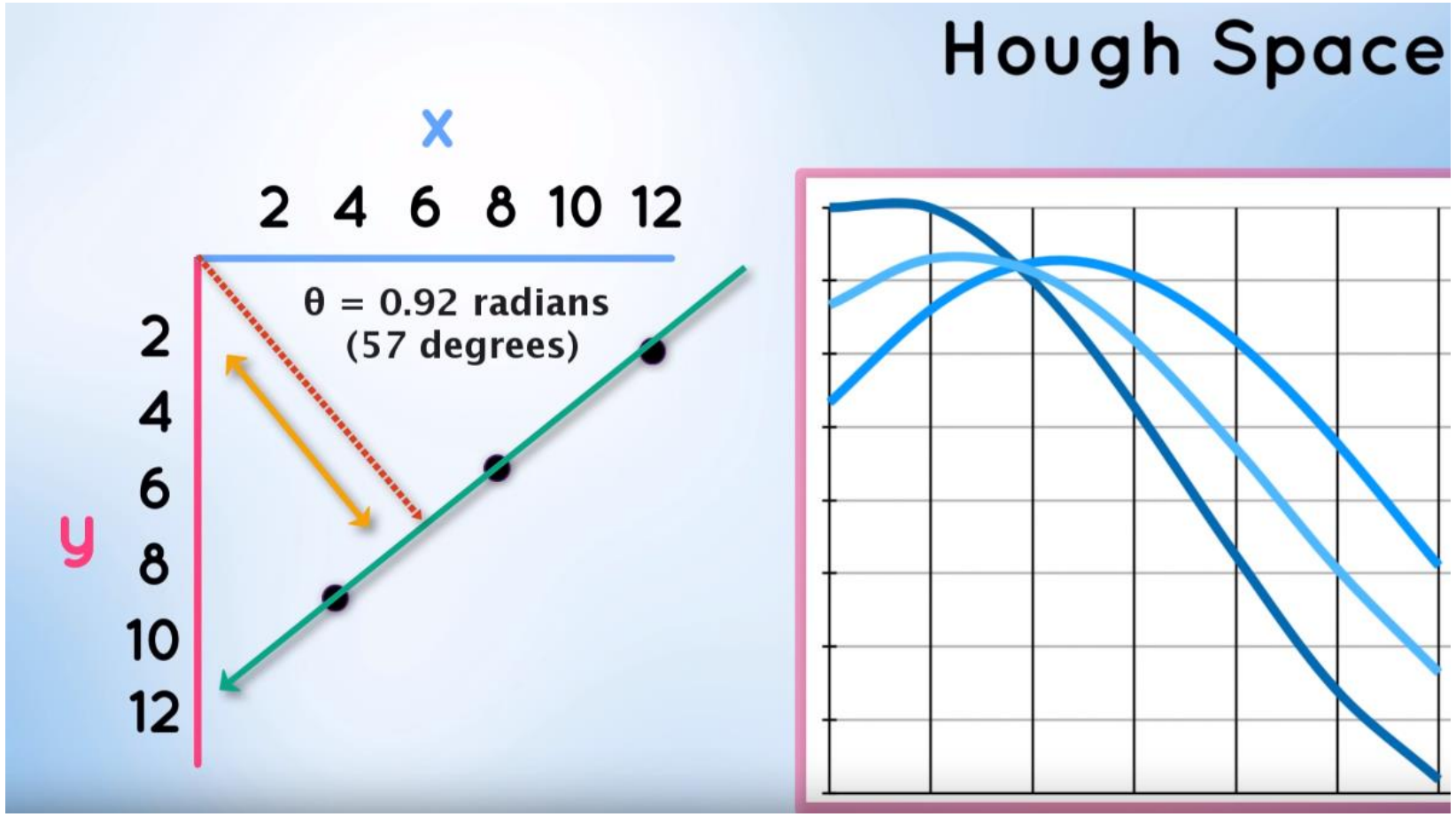
https://docs.opencv.org/3.4.3/da/d22/tutorial_py_canny.html

Hough transform



https://docs.opencv.org/3.4/d9/db0/tutorial_hough_lines.html

Hough transform



https://www.youtube.com/watch?v=eLTLtUVuuy4