Image processing - III

- → Image scaling, Crop, Flip, Rotate
- → Video stream - webcam, video file
- → Filters in opencv
- → Assignment
- → Dataset - Image variation
- → NN, CNN

Filter →

2D matrix

$$\begin{bmatrix} 1 & 0 & 1000 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix} \rightarrow \text{enhance image}$$

3x3

Range of pixel - 0 - 255

Filter - kernel

Custom filter

→

$$\begin{bmatrix} 0 & -1 & 0 \\ -1 & 5 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

Filter - 20 →

Image - 30 - R, G, B → R', G', B'

filter

$$\begin{bmatrix} 10 & 20 & 1 \\ 40 & 60 & 3 \\ 10 & 1 & 2 \\ 90 & 90 & 70 \end{bmatrix}_{4\times3}$$

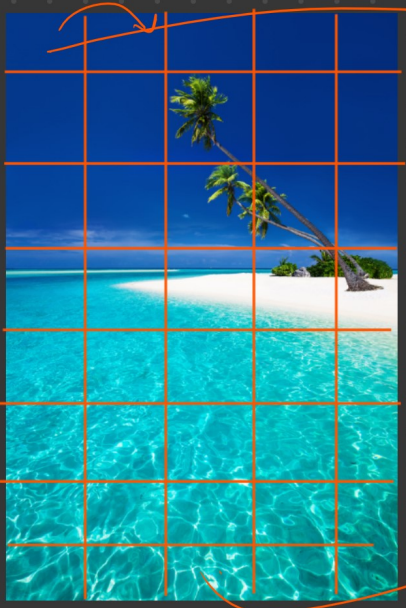
dark / bright

$$\begin{bmatrix} 0 & 100 & 0 \\ 0 & 100 & 0 \\ 0 & 100 & 0 \\ 0 & 100 & 0 \end{bmatrix}_{4\times3}$$

o/p

$$\begin{bmatrix} 10 & 120 & 1 \\ 40 & 160 & 3 \\ 10 & 101 & 2 \\ 90 & 180 & 70 \end{bmatrix}$$

$\begin{bmatrix} \cdot & \cdot \\ \cdot & \cdot \end{bmatrix}_{2\times2}$ $\begin{bmatrix} & \\ & \end{bmatrix}_{3\times3}$ $\begin{bmatrix} & \\ & \end{bmatrix}_{9\times9}$



Histogram → clip-limit
↓
equalize

→ Divide image into non-overlapping
→ equalise tile of image ; if bin exceeds the clip limit, it is redistributed to other bins
→ Higher clip limit → contrast enhancement
→ noise ↑

RGB BGR LAB
HSV Grayscale

R
G
B

L - lightness - 0 - 100
A — Green - Red
B — Blue - Yellow

Y

-100 ← 0 → 100

Adding Noise

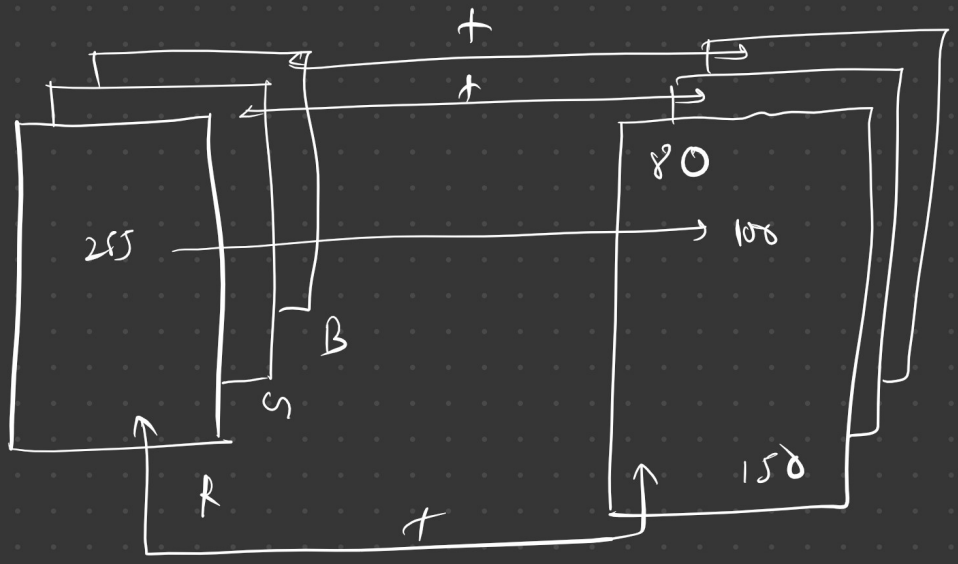
Q. To create a Video Analytics solution to detect Numer plate of car in highway.

→ Dataset → google → scrap
robollow → collect
custom →
↓
Cleaning
↓
HD - 4K

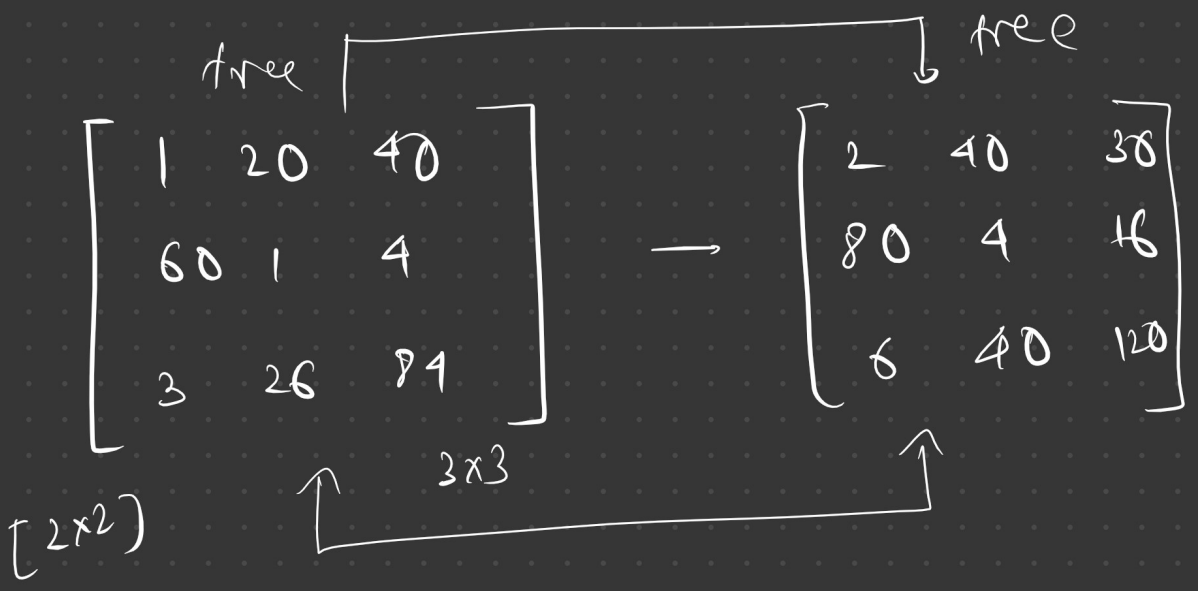
CCTV → dslr quality → X
→ noisy
→ real world

→ wide
→ noisy → evening, night

255.0 255



255+100
355
255
0 255



600 × 400 × 3 → 300 × 300 × 3

h w c h w c

cv2.resize(img, (300, 300),

↓ 8 time

9 → 4 (lose detail)

4:3

600 × ?

$\frac{900}{600} = \frac{16}{9}$

16:9

900

600

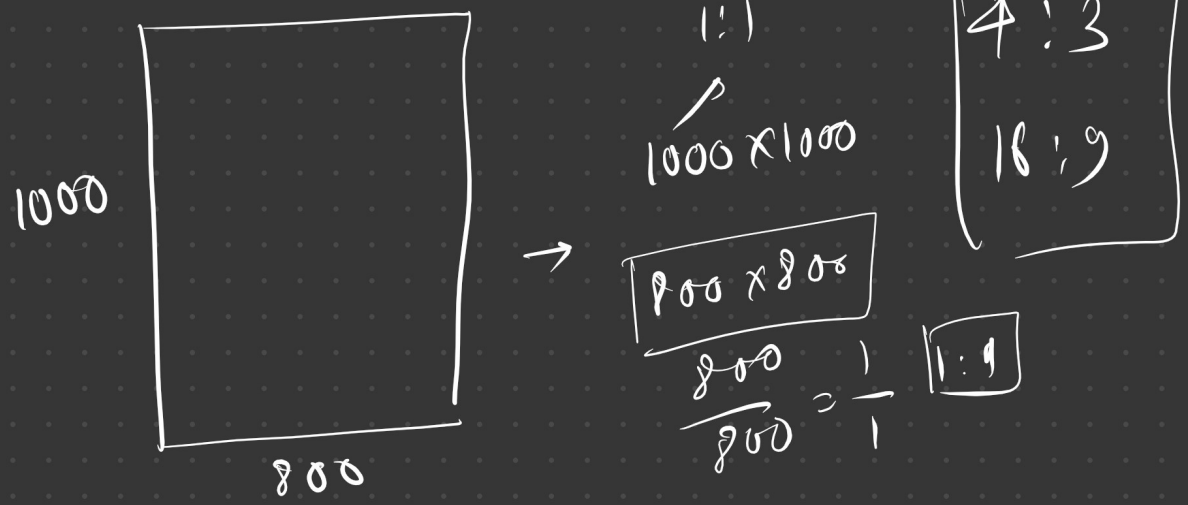
100 × 1.33

100

Yolo → Square 1:1

h, w h == w

640, 640



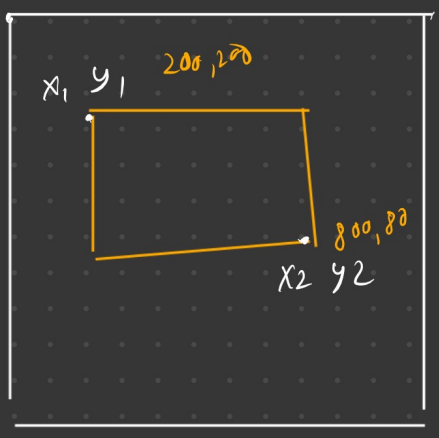
Cropping

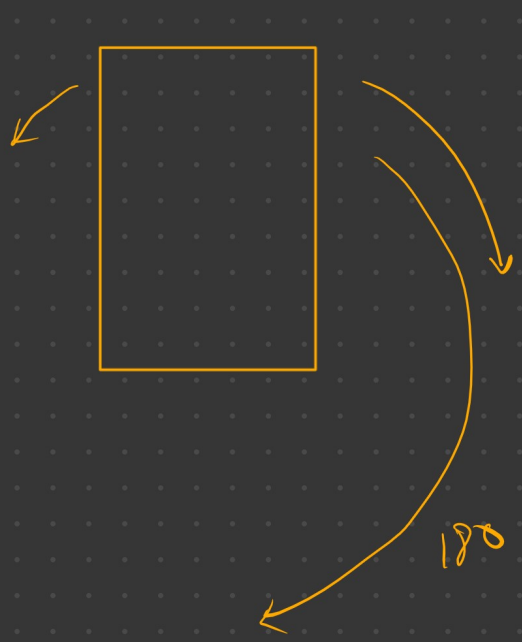
numpy slicing

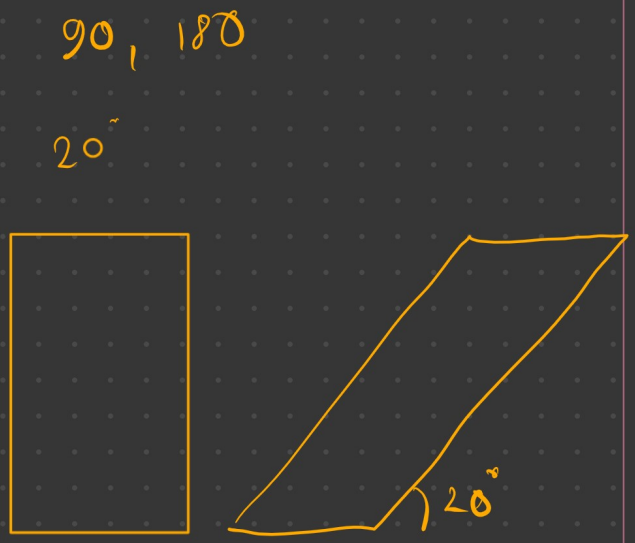
image [y1:y2, x1:x2]

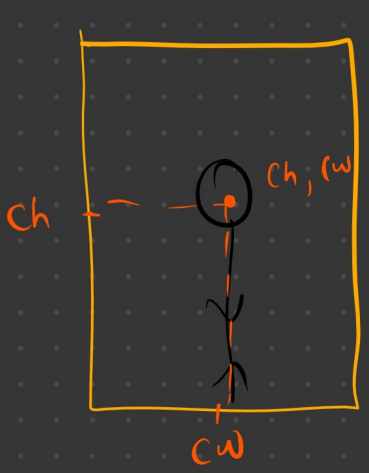
→ x1, y1, x2, y2

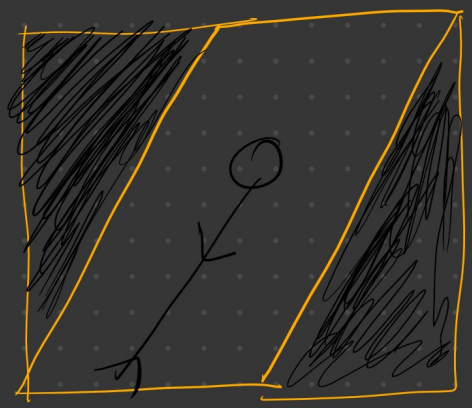
→ x1, y1, w, h

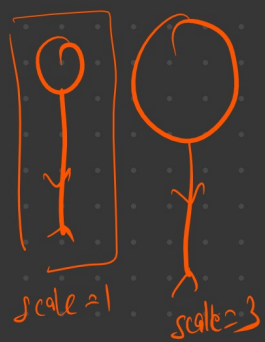


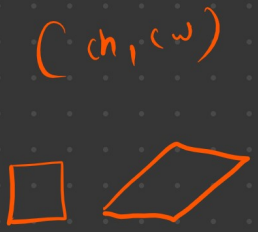

90, 180
180

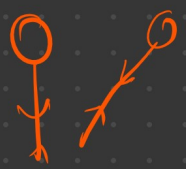

20°
120°

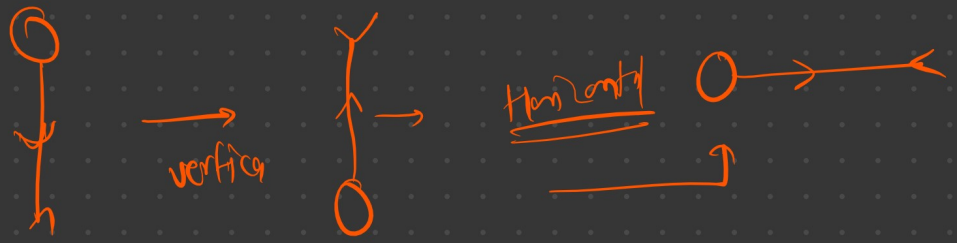

ch
ch, cw
cw

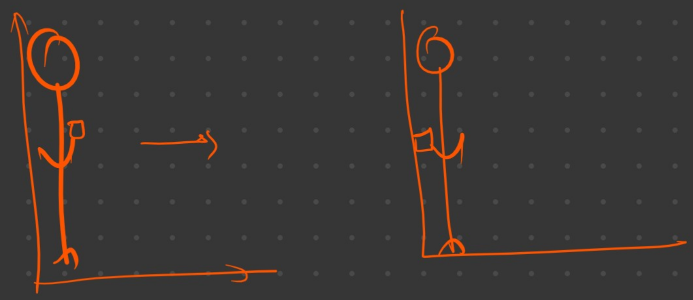



scale=1
scale=3


(ch, cw)




verifica
Horizontal



1 min

ret = false