Convolutional Neural Network :- [CNN]

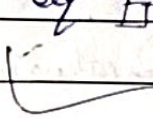
Neural n/w works with grayscale image
$28 \times 28 \times 1$
↳ channel.

CNN works with both grayscale & colored image
RGB

$28 \times 28 \times 3$ $\qquad$ $28 \times 28 \times 8$

Feature Extraction $\qquad$ classification.

ip → Convolution + Pooling (Downscaling) → Convolution + Pooling → flatten → normal neural n/w.

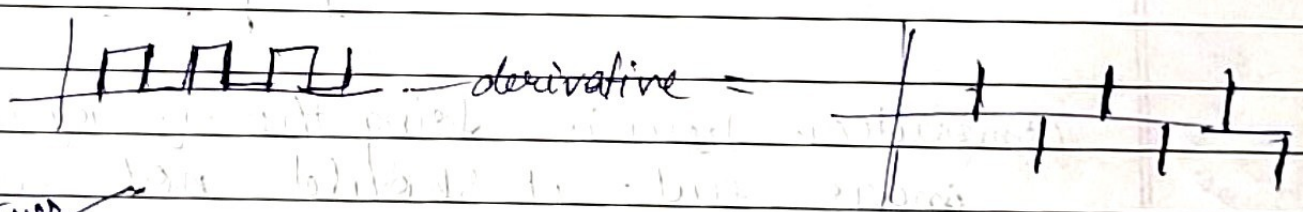


Neural n/w

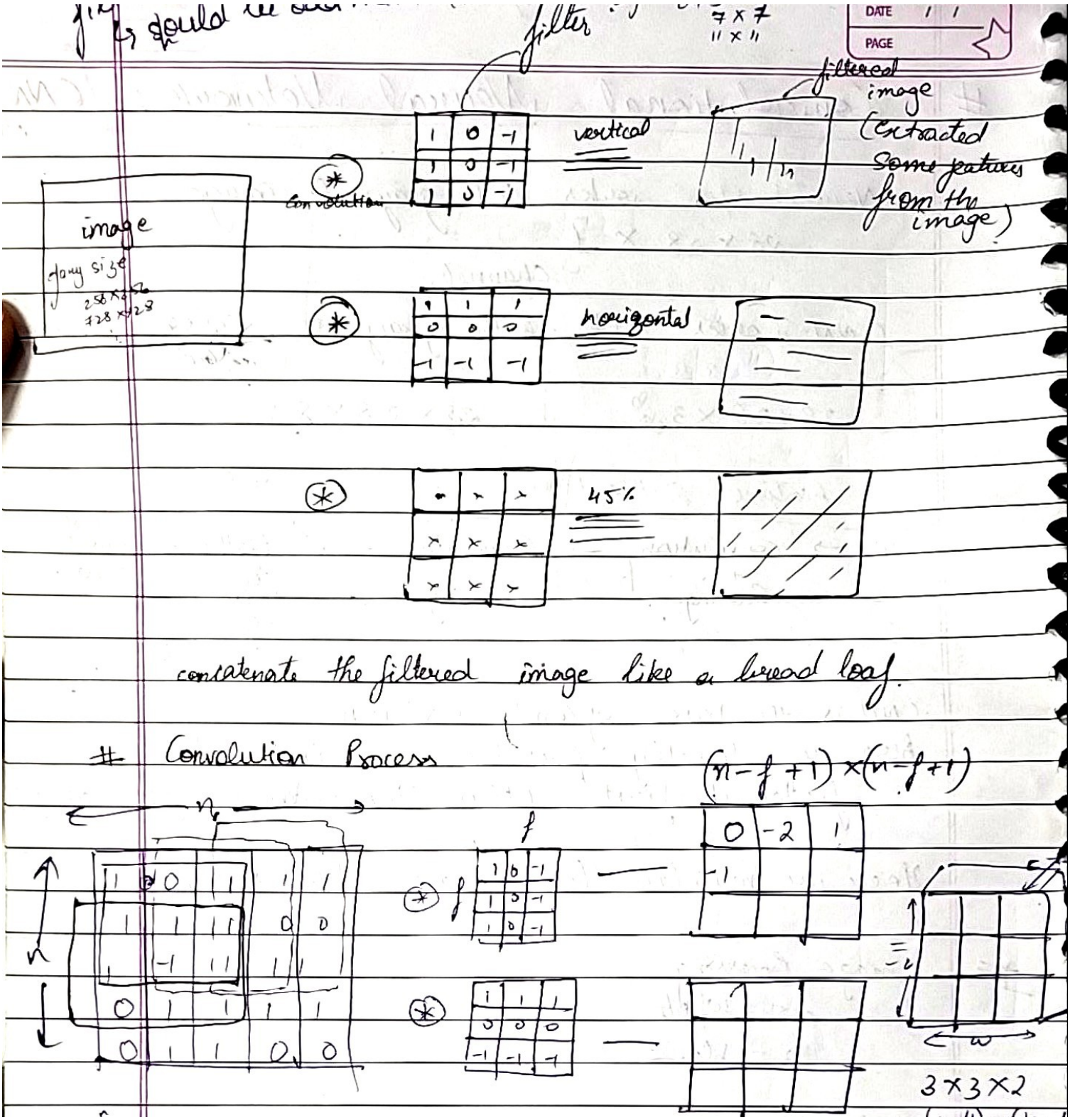
CNN is the base of computer vision
Here we directly pass the image instead to flatten it first (this step comes afterwards)

Here we maintain the correlation b/w the pixels.

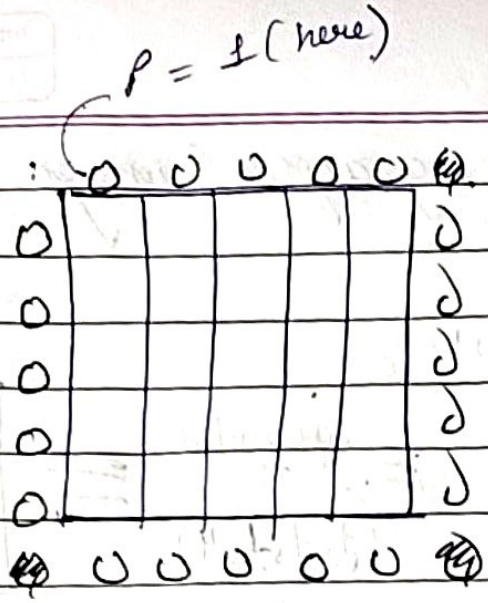
# image Processing
255 = white
0 = black.



- Features
Edges, vertical edges, horizontal edges ... etc are features of an image.
These features are arranged like a linked list for CNN convolution


filter
7 × 7
11 × 11
DATE
PAGE
filtered image
(extracted some features from the image)
vertical
convolution
image
grey size
256 × 256
128 × 128
horizontal
45%
concatenate the filtered image like a bread loaf.
Convolution Process
$(n-f+1) \times (n-f+1)$
3 × 3 × 2

RANKA
DATE / /
PAGE



after padding the 5×5 matrix will become 7×7.

p = padding
n = size of the image
f = size of filter

So size of the Convoluted image after filter operation is $n + 2p - f + 1$

If p is not given. $n + 2p - f + 1 = n$

$$p = \left\lfloor \frac{f-1}{2} \right\rfloor$$

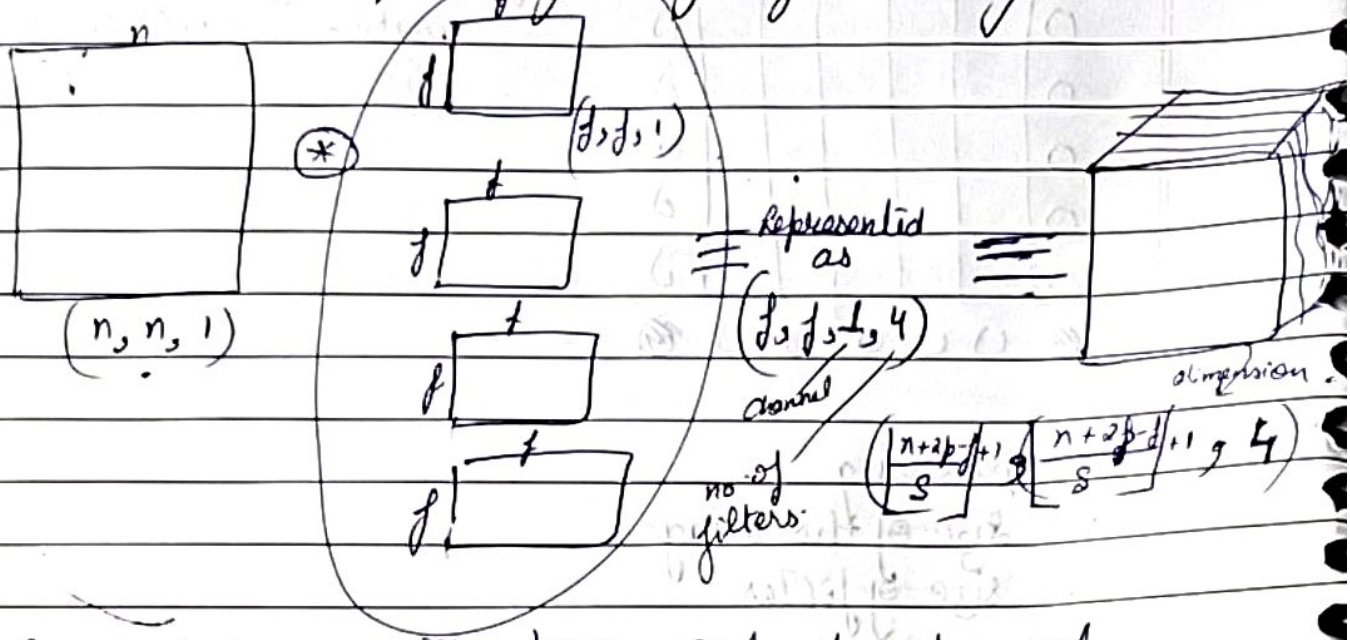
Stride → The no. of steps (pixels) by which the filter moves (right or down)

So size of the Convoluted image after filter operation is

$$\left\lfloor \frac{n + 2p - f + 1}{2} \right\rfloor$$

floor operation

Convolution oper^n for a grayscal image.



Grayscale image will have only 1 channel

Convolution oper^n for a RGB image.