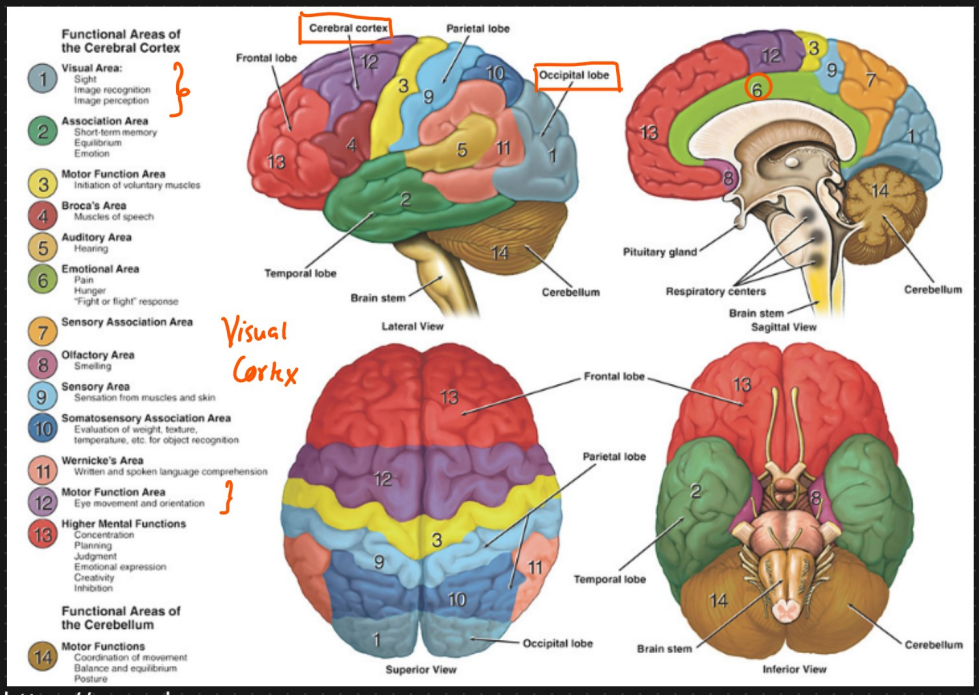
Convolutional Neural N/w



https://www.dana.org

① ANN → Supervised Learning → [Classification, Regression]

Dataset : I/p features O/p

② CNN : I/p => Images Eg: Image classification, Object Detection, Segmentation

② Cerebral Cortex And Visual Cortex

Visual Cortex (V1-V5) [Region of the brain that receives, integrates and processes visual information relayed from the retinas].

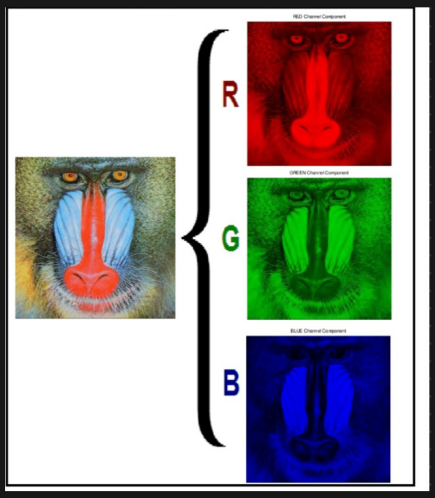
→ V1 → Primary Visual Cortex [Orientation of edges And Lines]

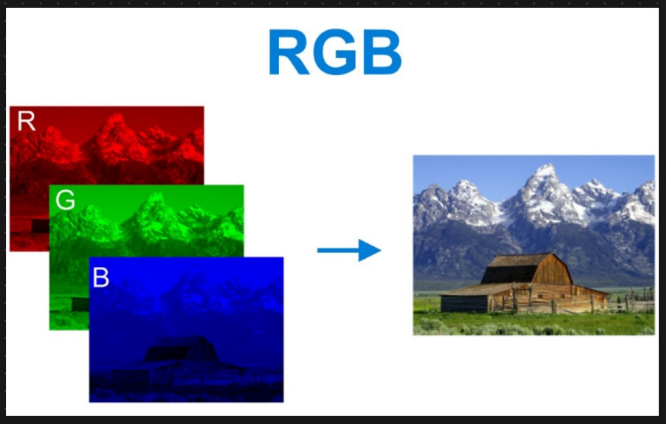
V2 [Differences in color, complex patterns, Object orientation]

V3 V4 V5 [Object Recognition]

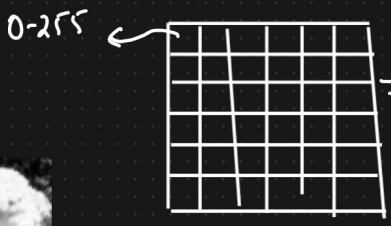
Visualize the Image

③ RGB Images And Gray Scale Images

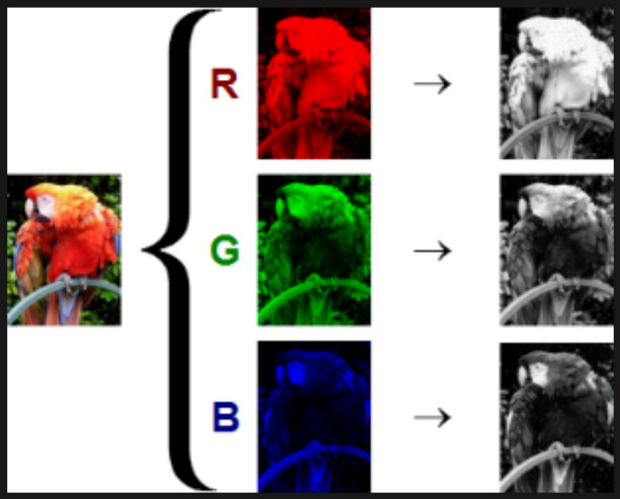




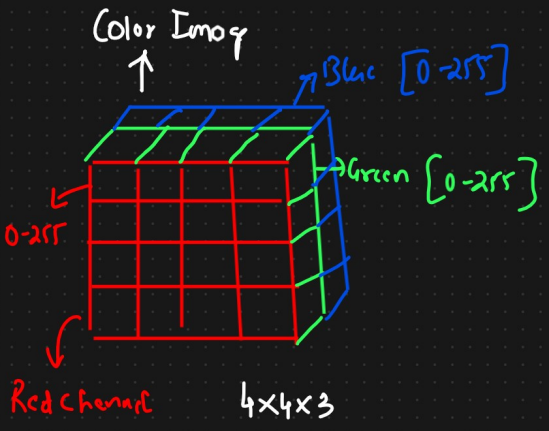
https://www.researchgate.net/



6x6x1



https://commons.wikimedia.org/



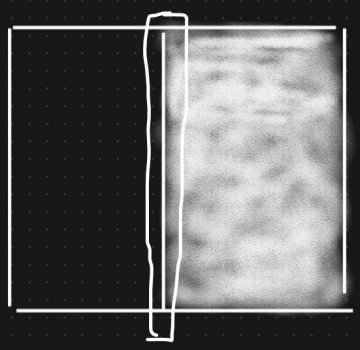
4x4x3

④ Convolution Operation In CNN

→ (0,1)

0	0	0	255	255	255
0	0	0	255	255	255
0	0	0	255	255	255
0	0	0	255	255	255
0	0	0	255	255	255
0	0	0	255	255	255

6x6x1



Step 1

(1) Normalize

Divide by 255

+1	+2	+1
0	0	0
-1	-2	-1

Convolution operation

Stride=1

0	0	0	1	1	1
0	0	0	1	1	1
0	0	0	1	1	1
0	0	0	1	1	1
0	0	0	1	1	1
0	0	0	1	1	1

6 x 6 x 1

n = 6

*

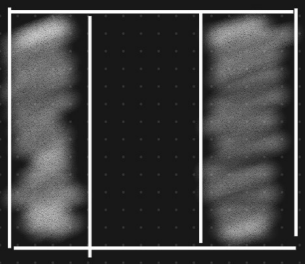
f = 3

+1	0	-1
+2	0	-2
+1	0	-1

3 x 3

filters

Vertical edge filters



⇐

2rr	0	0	2rr
2rr	0	0	2rr
2rr	0	0	2rr
2rr	0	0	2rr

=

0	-4	-4	0
0	-4	-4	0
0	-4	-4	0
0	-4	-4	0

4 x 4

O/p = 4

$n - f + 1 =$

$= 6 - 3 + 1 = 4$