

Session -4

INTRODUCTION TO TRANSFER LEARNING

March 18, 2024

Transfer learning be like

when you start running the code
without reading the paper

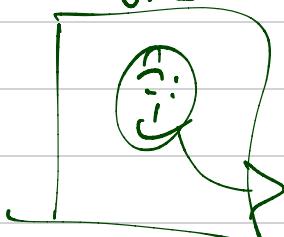


Agenda

① 1×1 Convolution

② Transfer Learnin.

Face classification
game



David Pal

Smiling
old/yo.
Freckles

Middle

2016
 \rightarrow Rajish

Eye, color

much much better

\rightarrow 3×3 Kern Rocky

a	b	c
d	e	f
g	h	i

b	c	d
e	f	g
h	i	j

$$(a \times b) + (b \times c) + (c \times d)$$



$$R \cdot F \times (2 \times 2)$$

1x1 CONVOLUTION

400x400x3 | (3x3x3)x32

| 398x398x32

Feature map
no of channel

398x398x32 | (3x3x32)x64

| 396x396x64

RF of 5x5

396x396x64 | (3x3x64)x128 | 394x394x128 RF of 7x7

394x394x128 | (3x3x128)x256 | 392x392x256 RF of 9x9

392x392x256 | (3x3x256)x512 | 390x390x512 RF of 11x11

Feature MaxPooling

195x195x512 | (?x?x512)x32 | ?x?x32 RF of 22x22

.. 3x3x32x64

RF of 24x24

.. 3x3x64x128

RF of 26x26

.. 3x3x128x256

RF of 38x28

.. 3x3x256x512

RF of 30x30

why??

ever more dense
72 Freq

195 x 195 x 512 \odot ($D \times D \times 512$) x 32
 Filter / Range?

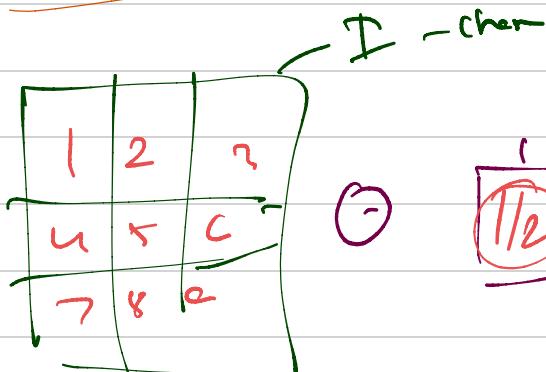
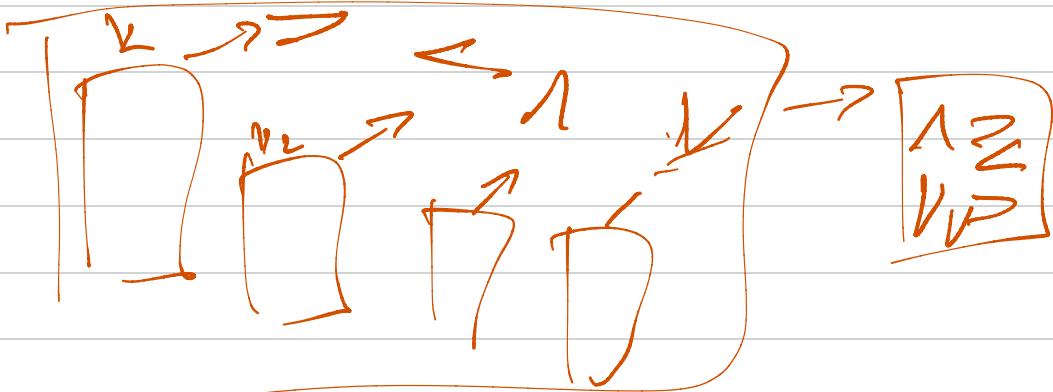
Before 2014

$$195 \times 195 \times 512 \circ (\boxed{3} \times \boxed{3} \times 512) \times 32$$

(\rightarrow) This works

$3 \times 3 \rightarrow$ acts as scissors

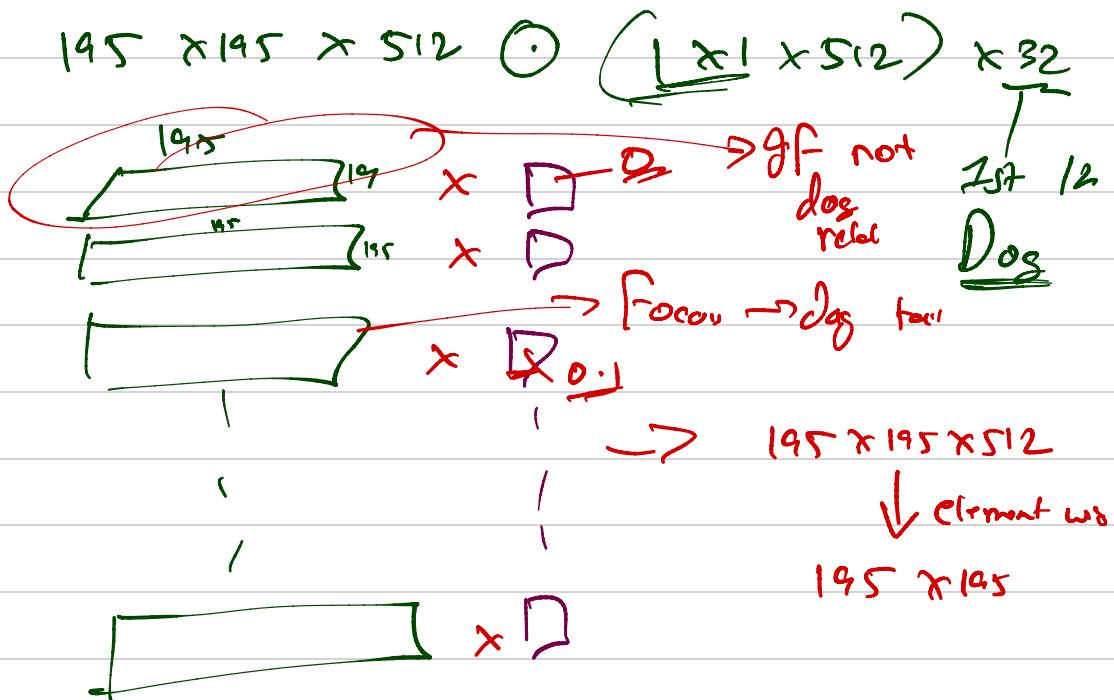
good for filter



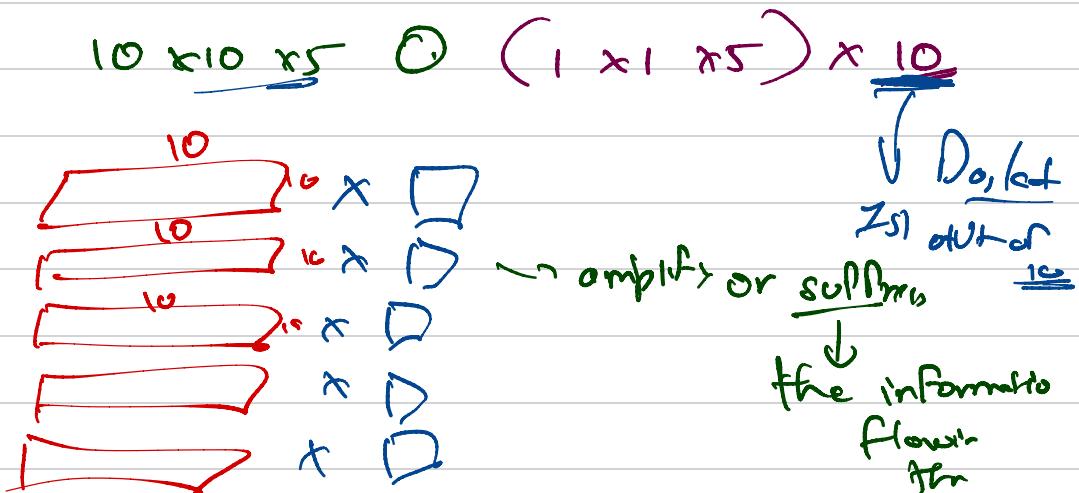
$$\boxed{\frac{1}{2}}_1$$

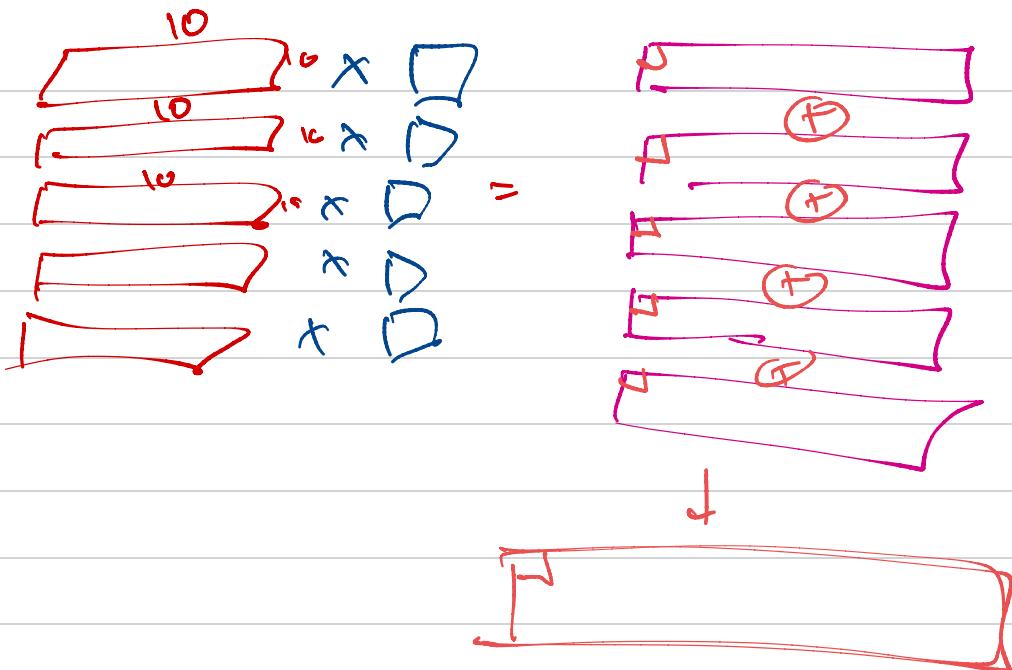
$$= \begin{array}{|c|c|c|} \hline & \frac{1}{2} & 1 & \frac{1}{2} \\ \hline \frac{1}{2} & & \frac{1}{2} & \frac{1}{2} \\ \hline \frac{1}{2} & \frac{1}{2} & 1 & \frac{1}{2} \\ \hline \end{array}$$

After 2014 \rightarrow 1×1 conv



$10 \times 10 \times 5 \rightarrow 2$ channels





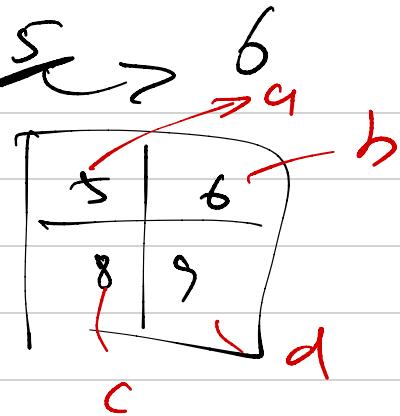
Post-hoc intuition $(1 \times 1 \text{ word})$

~~Resnet~~ — Sof
~~Inception Net~~ — Obolo
Image simila

Now
 ↗ Cat dog R

1	2	3
4	5	c
7	8	a

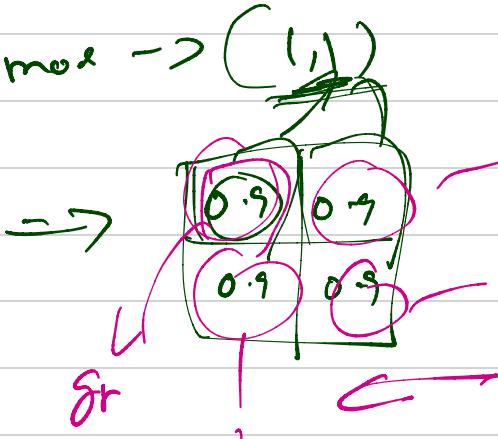
→ Mat



a	0	c
0	c	b
0	c	d

0	0.1	0.1	0.5
1	0.2	0.7	0.8
2	0.4	0.6	0.1

mod → (1,1)



2010 → 2012

lots and lots
of data ws

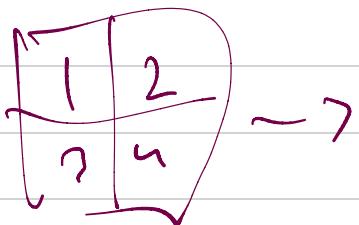
2015 → Alea

graphed

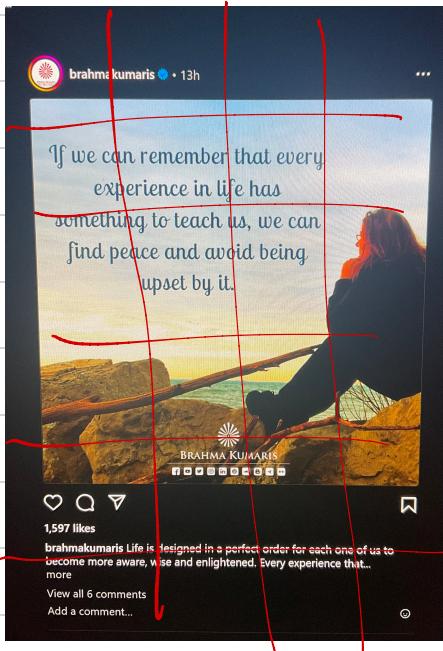
front
and/or

1 million

1000
clone

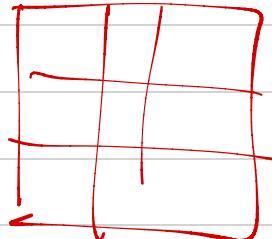


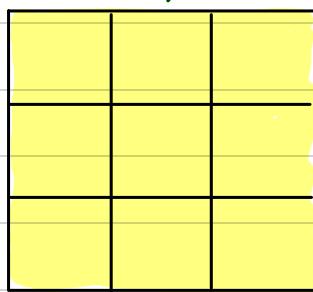
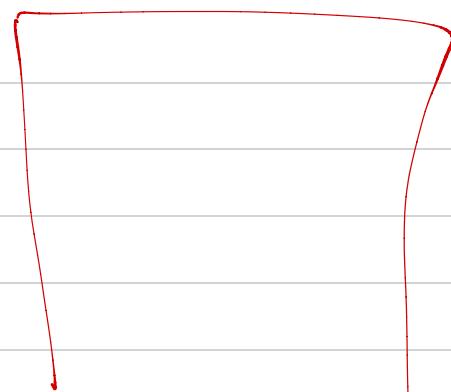
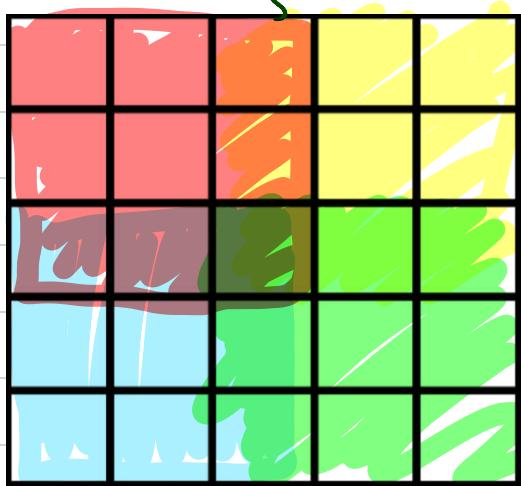
1	1	2	2
1	1	L	
?	?	4	4
?	?	4	4



Softm $\leftarrow 0.2$ 10
No

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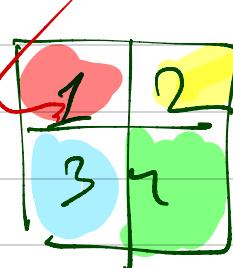
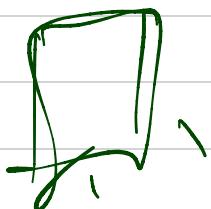




3

$$\begin{array}{|c|c|} \hline 0 & 0 \\ \hline 0 & 0 \\ \hline \end{array}$$

2×2



3×3

5×5

