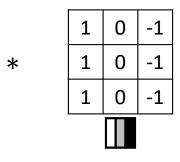


Convolutional Neural Networks

More edge detection

Vertical edge detection examples

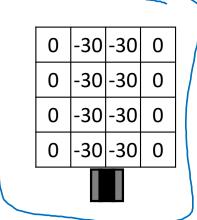
10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0



0	30	30	0		
0	30	30	0		
0	30	30	0		
0	30	30	0		
	0	0 30 0 30	0 30 30 0 30 30	0 30 30 0 0 30 30 0	

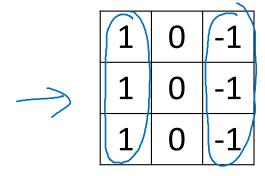
0	0	0	10	10	10
0	0	0	10	10	10
0	0	0	10	10	10
0	0	0	10	10	10
0	0	0	10	10	10
0	0	0	10	10	10
→ 					

	1	0	-1
*	1	0	-1
	1	0	-1



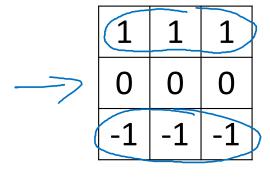
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Vertical and Horizontal Edge Detection



V	ertica	1
v	CI UICA.	T

	10	10	10	0	0	0
V	10	10	10	0	0	0
	10	10	10	0	0	0
	0	0	0	10	10	10
	0	0	0	10	10	10
	0	0	0	10	10	10
	LxI					



Horizontal

1	1	1
0	0	0
-1	-1	-1

0	0	0	0
30	10	-10	-30
30	10	-10	-30
0	0	0	0



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Learning to detect edges

1	0	-1
1	0	-1
1	0	-1
	1	

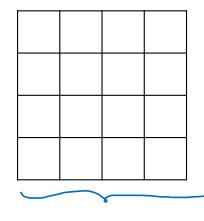
				_	
3	0	1	2	7	4
1	5	8	9	3	1
2	7	2	5	1/	3
0	1	3	1	7	8
4	2	1	6	2	8
2	4	5	2	3	9

	(0	-
7	2	0	-2
	(O	-1
'	2 D/	sel	filter

Con	ساص	iti u	1
	W ₁	$\widehat{w_2}$	W ₃
X	\widehat{W}_4	W ₅	$\overline{w_6}$
	$\overline{w_7}$	$\widehat{w_8}$	$\widehat{w_9}$
			· ·

	0	7
0	0	10
3	7	-3





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