CNN Excercises

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Microsoft

Convolution

Generate a 512 x 512 matrix with random numbers between 0 and 8.

Convolve the matrix with 3 x 3 kernel (eg; Prewitt operator) to calculate edges.

35	19	25	6	9	7	3	2	4	6	1	3	11	20	23	18	9	2	4	6
13	22	16	53	26	4	3	6	0	4	4	6	35	19	25	6	26	13	22	24
4	3	7	10	15	22	6	8	2	12	6	9	13	22	16	53	15	8	4	3
0	8	1	3	8	4	9	2	1	9	8	12	4	3	7	10	8	5	6	1
14	15	16	17	18	6	12	11	13	20	9	16	0	8	1	3	18	11	13	19
9	7	3	2	12	13	16	35	19	25	6	18	9	7	3	2	4	6	1	3
26	28	11	19	16	1	18	13	22	16	53	20	26	14	11	18	0	11	10	19
15	10	35	22	19	23	20	4	3	7	10	24	15	18	2	10	2	22	3	22
8	17	13	3	15	18	15	0	8	1	3	21	8	24	20	23	1	13	17	3
54	55	56	57	58	59	70	35	19	25	6	17	16	17	18	19	20	21	22	23
46	47	48	49	51	50	71	13	22	16	53	9	10	11	12	4	5	6	11	14
40	41	42	43	44	45	72	4	3	7	10	12	14	2	3	7	8	9	10	13
25	26	27	28	29	30	73	0	8	1	3	74	78	79	80	52	53	54	55	56
24	23	22	21	20	19	61	62	63	64	65	66	67	68	69	31	32	33	34	35
35	19	25	6	35	19	25	6	35	19	25	6	35	19	25	6	35	19	25	6
13	22	16	53	13	22	16	53	13	22	16	53	13	22	16	53	13	22	16	53
4	3	7	10	4	3	7	10	4	3	7	10	4	3	7	10	4	3	7	10
0	8	1	3	0	8	1	3	0	8	1	3	0	8	1	3	0	8	1	3

Microsoft

Prewitt Operator

$$G_x = \begin{bmatrix} -1 & 0 & +1 \\ -1 & 0 & +1 \\ -1 & 0 & +1 \end{bmatrix} * A \qquad G_y = \begin{bmatrix} -1 & -1 & -1 \\ 0 & 0 & 0 \\ +1 & +1 & +1 \end{bmatrix} * A$$

where A is source image

Grayscale Image

Gradient with Prewitt operator

Microsoft

Max Pooling

Generate a max pooling layer from previous convolved layer.

Use a 3 x 3 kernel for the max pooling layer.