

CNN (Convolutional Neural Network)

Input Volume (+pad 1) (7x7x3)

 $x[:, :, 0]$

0	0	0	0	0	0	0
0	0	0	1	0	2	0
0	1	0	2	0	1	0

0	1	0	2	2	0	0
0	2	0	0	2	0	0
0	2	1	2	2	0	0
0	0	0	0	0	0	0

 $x[:, :, 1]$

0	0	0	0	0	0	0
0	2	1	2	1	1	0
0	2	1	2	0	1	0

0	0	2	1	0	1	0
0	1	2	2	2	2	0
0	0	1	2	0	1	0
0	0	0	0	0	0	0

 $x[:, :, 2]$

0	0	0	0	0	0	0
0	2	1	1	2	0	0
0	1	0	0	1	0	0

0	0	1	0	0	0	0
0	1	0	2	1	0	0
0	2	2	1	1	1	0
0	0	0	0	0	0	0

Filter W0 (3x3x3)

 $w0[:, :, 0]$

-1	0	1
0	0	1
1	-1	1

 $w0[:, :, 1]$

-1	0	1
1	-1	1
0	1	0

 $w0[:, :, 2]$

-1	1	1
1	1	0
0	-1	0

Bias b0 (1x1x1)

 $b0[:, :, 0]$

1

Filter W1 (3x3x3)

 $w1[:, :, 0]$

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

 $w1[:, :, 1]$

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

 $w1[:, :, 2]$

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

Bias b1 (1x1x1)

 $b1[:, :, 0]$

0

Output Volume (3x3x2)

 $o[:, :, 0]$

2	3	3
3	7	3
8	10	-3

 $o[:, :, 1]$

-8	-8	-3
-3	1	0
-3	-8	-5

toggle movement

ImageSource: freecodecamp.org

The agreement on the European Economic Area was signed in August 1992 .

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1992

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<end>

Images: @JudyAlomar, MIT



Input Volume (+pad 1) (7x7x3)

 $x[:, :, 0]$

0	0	0	0	0	0	0
0	0	0	1	0	2	0
0	1	0	2	0	1	0

0	1	0	2	2	0	0
0	2	0	0	2	0	0
0	2	1	2	2	0	0
0	0	0	0	0	0	0

 $x[:, :, 1]$

0	0	0	0	0	0	0
0	2	1	2	1	1	0
0	2	1	2	0	1	0

0	0	2	1	0	1	0
0	1	2	2	2	2	0
0	0	1	2	0	1	0
0	0	0	0	0	0	0

 $x[:, :, 2]$

0	0	0	0	0	0	0
0	2	1	1	2	0	0
0	1	0	0	1	0	0

0	0	1	0	0	0	0
0	1	0	2	1	0	0
0	2	2	1	1	1	0
0	0	0	0	0	0	0

Filter W0 (3x3x3)

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0	0	1
1	-1	1

 $w0[:, :, 1]$

-1	0	1
1	-1	1
0	1	0

 $w0[:, :, 2]$

-1	1	1
1	1	0
0	-1	0

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0	-1	1

 $w1[:, :, 1]$

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

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

 $x[:, :, 1]$

0	0	0	0	0	0	0
0	2	1	2	1	1	0
0	2	1	2	0	1	0
0	0	2	1	0	1	0
0	1	2	2	2	2	0
0	0	1	2	0	1	0
0	0	0	0	0	0	0

 $x[:, :, 2]$

0	0	0	0	0	0	0
0	2	1	1	2	0	0
0	1	0	0	1	0	0
0	0	1	0	0	0	0
0	1	0	2	1	0	0
0	2	2	1	1	1	0
0	0	0	0	0	0	0

Filter W0 (3x3x3)

 $w0[:, :, 0]$

-1	0	1
0	0	1
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 $w0[:, :, 1]$

-1	0	1
1	-1	1
0	1	0

 $w0[:, :, 2]$

-1	1	1
1	1	0
0	-1	0

Bias b0 (1x1x1)

 $b0[:, :, 0]$

1

Filter W1 (3x3x3)

 $w1[:, :, 0]$

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0	-1	0
0	-1	1

 $w1[:, :, 1]$

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

 $w1[:, :, 2]$

-1	1	-1
0	-1	-1
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Bias b1 (1x1x1)

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toggle movement

Funktionsprinzipien

CNN (Convolutional Neural Network)

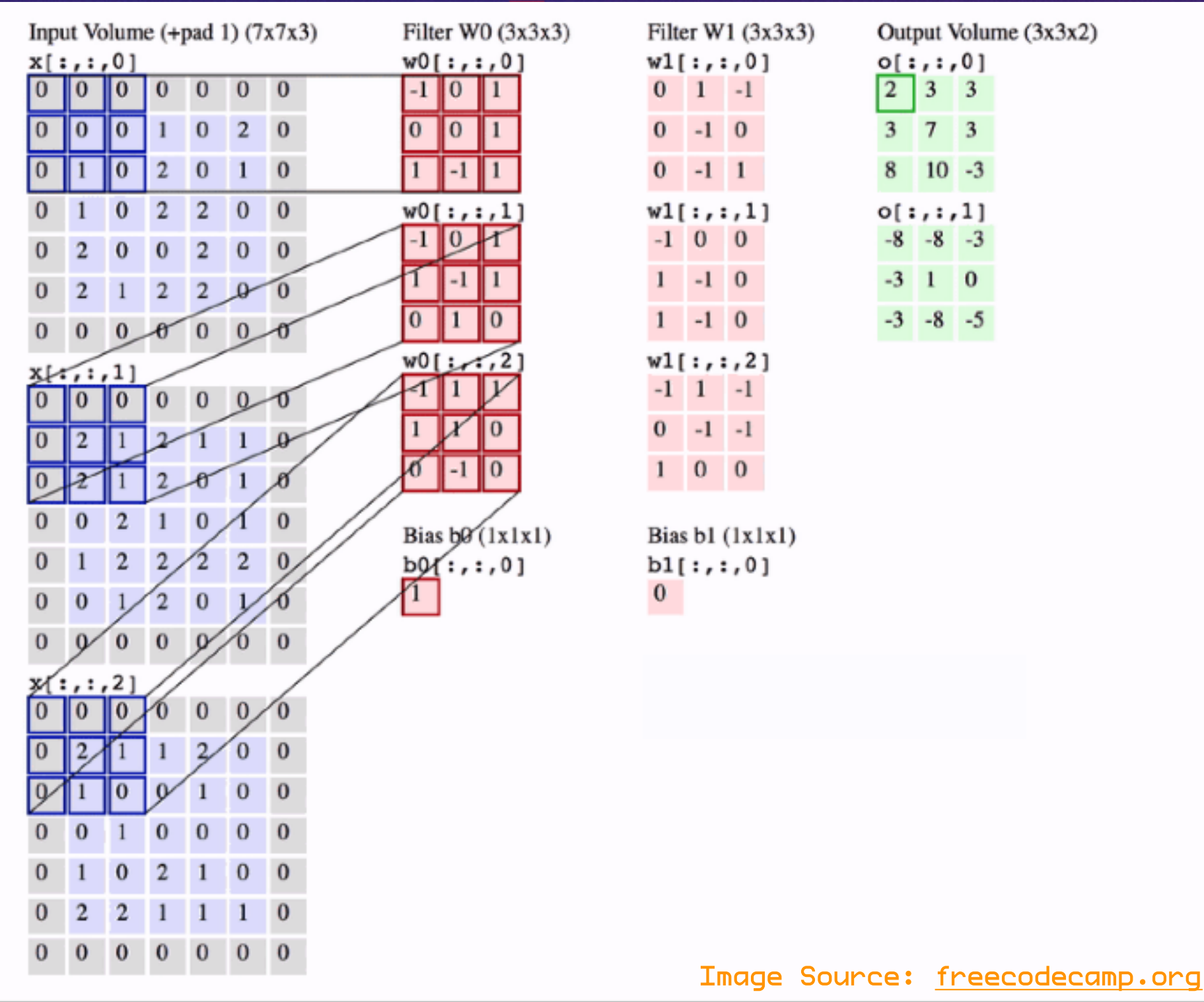


Image Source: [freecodecamp.org](https://www.freecodecamp.org)

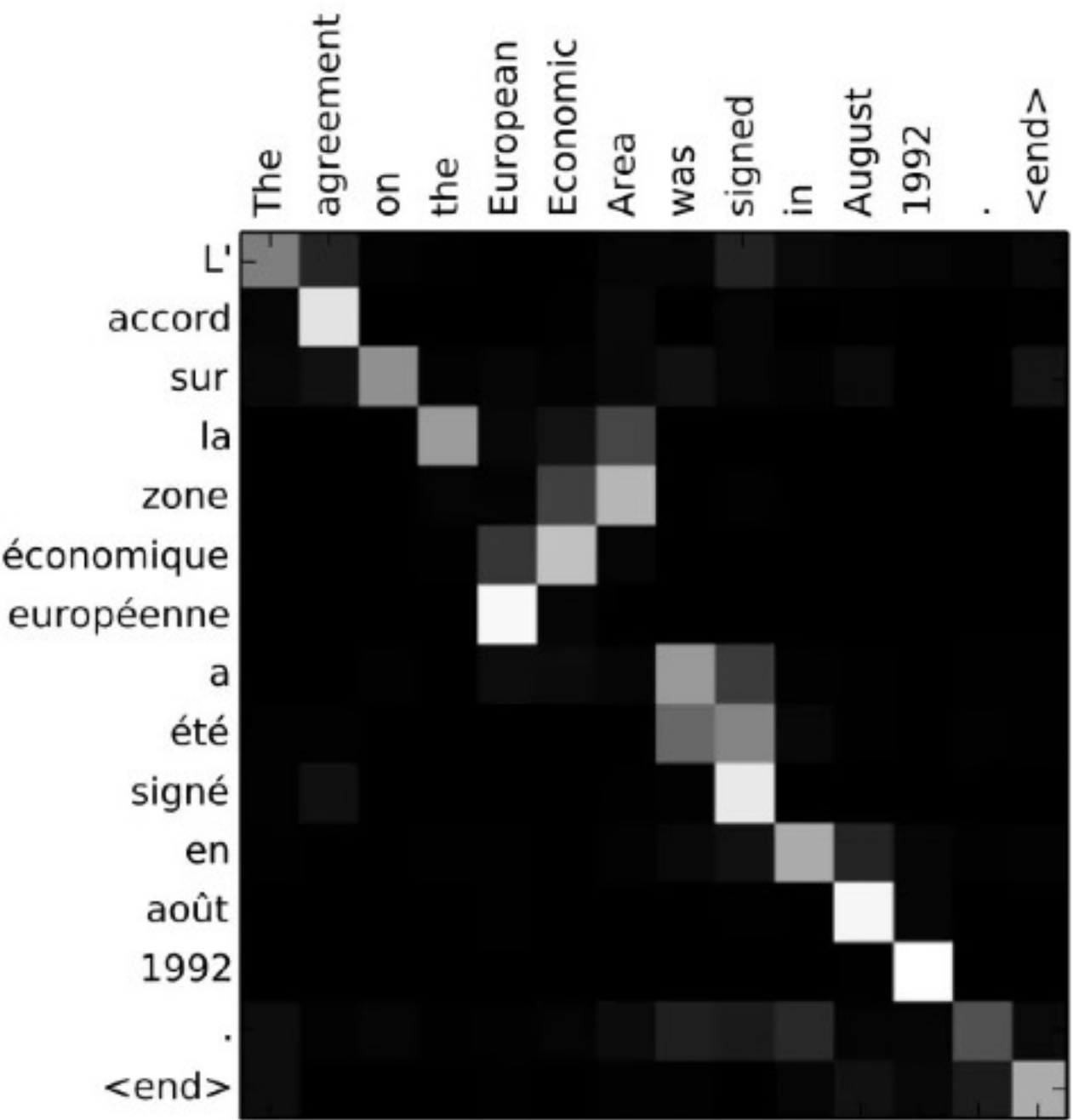


Image Source: @JayAlammar, MIT

Interaktionsprinzipien

- ✦ Text-2-Image / Text-2-Text / Text-2-Data
- ✦ Image-2-Image / Image-2-Text
- ✦ Language-2-Text / Language-2-Image
- ✦ Data-2-Text / Data-2-Data
- ✦ Vision-2-Text / Vision-2-Data