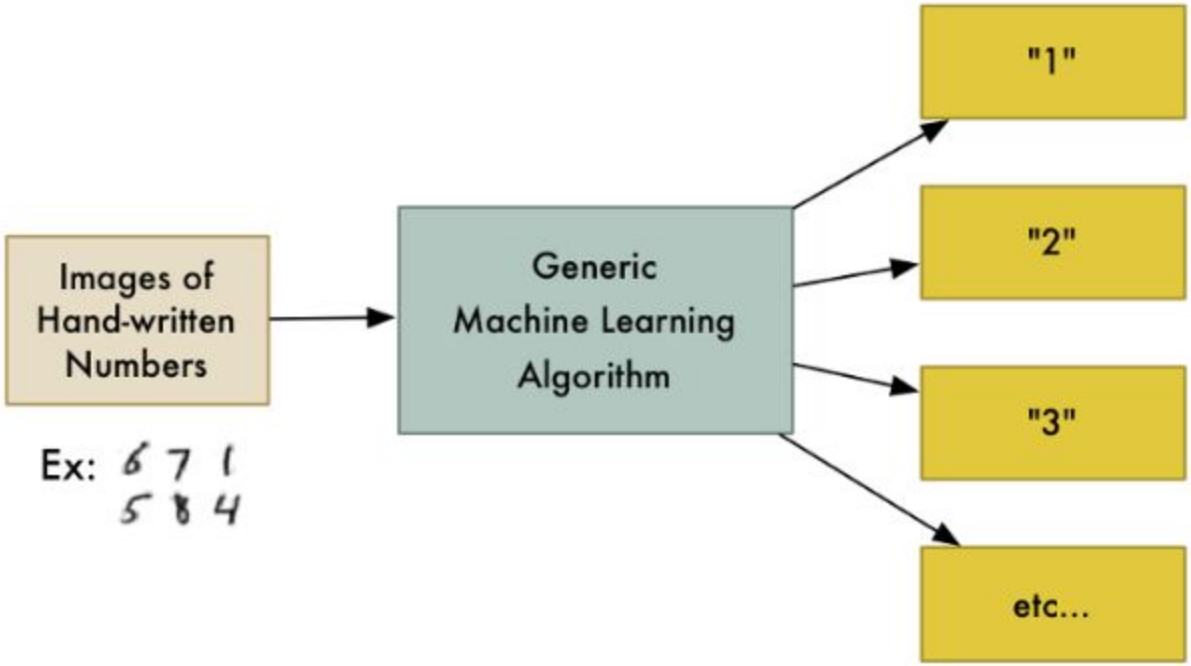
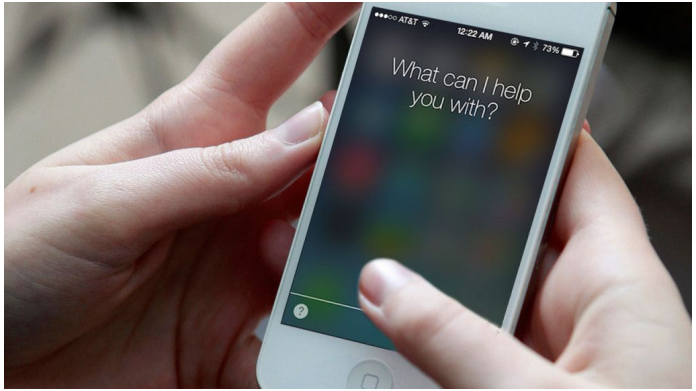
Introduksjon til maskinlæring

Av Bendik Kvamstad fra Epigram.AI

Hva er maskinlæring?

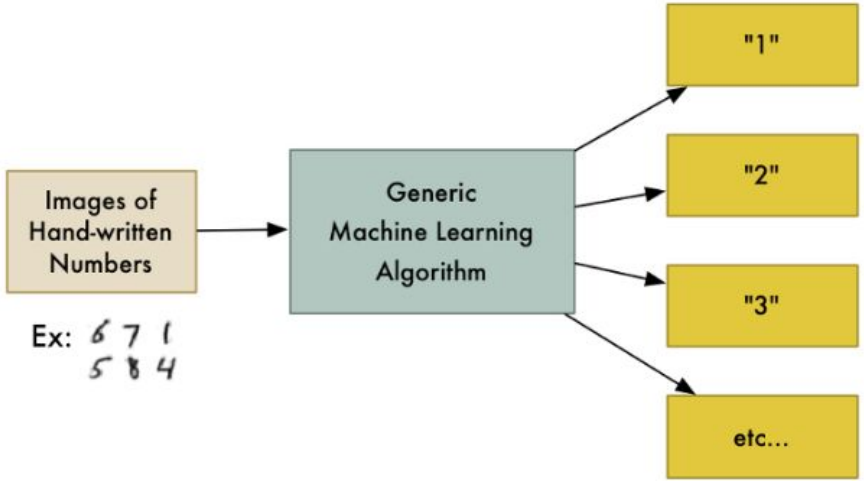

Images of Hand-written Numbers
Ex:
Generic Machine Learning Algorithm
"1"
"2"
"3"
etc...

Used everywhere

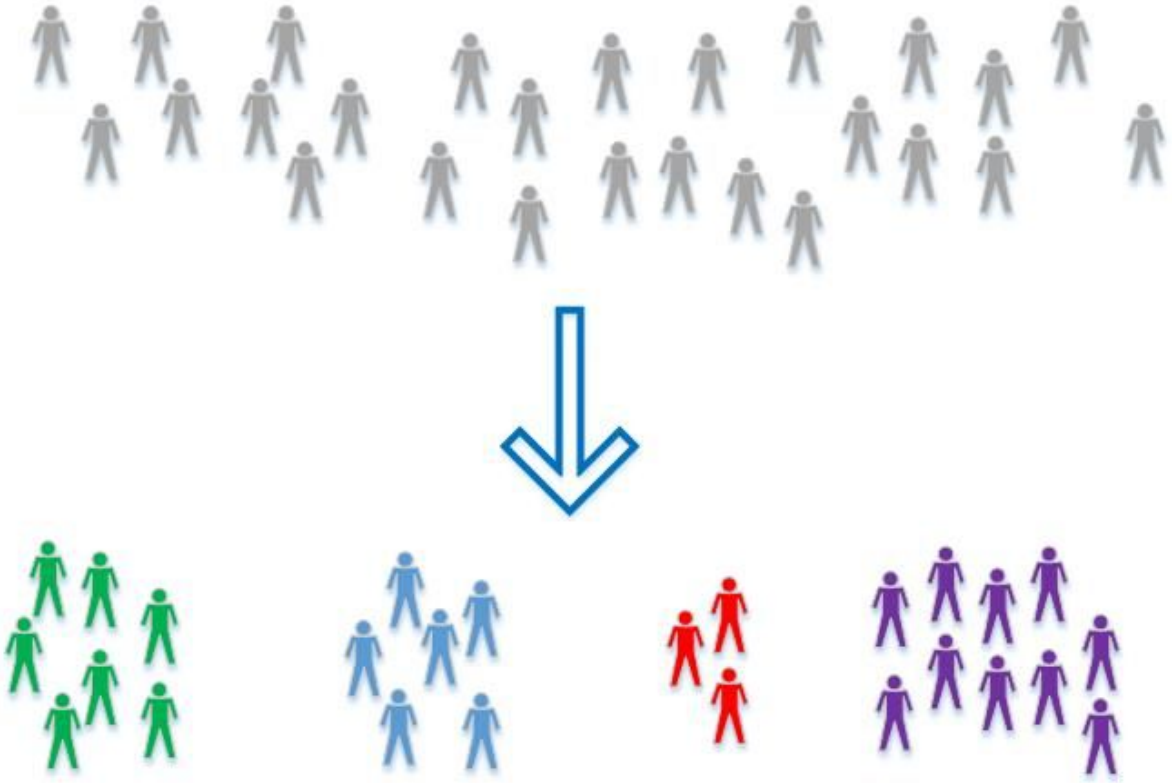


Supervised
vs
Unsupervised

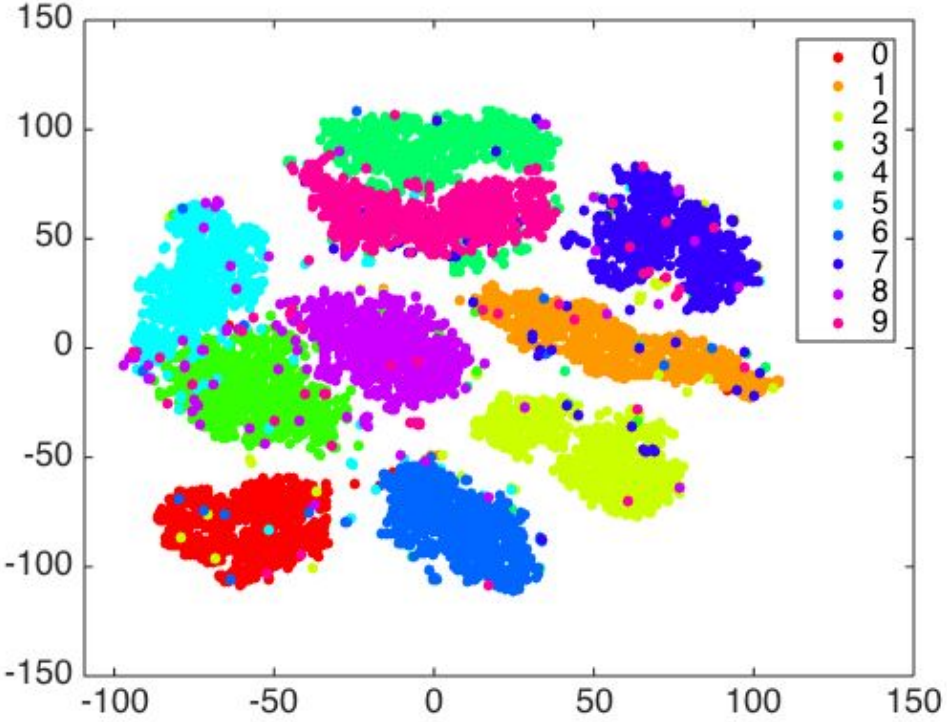
Supervised Learning



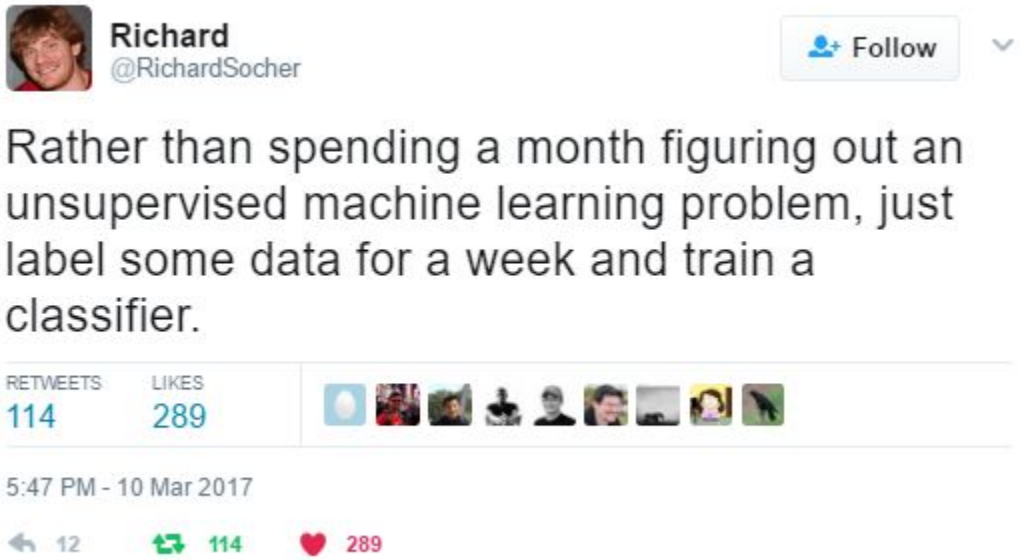
Unsupervised learning



Unsupervised learning



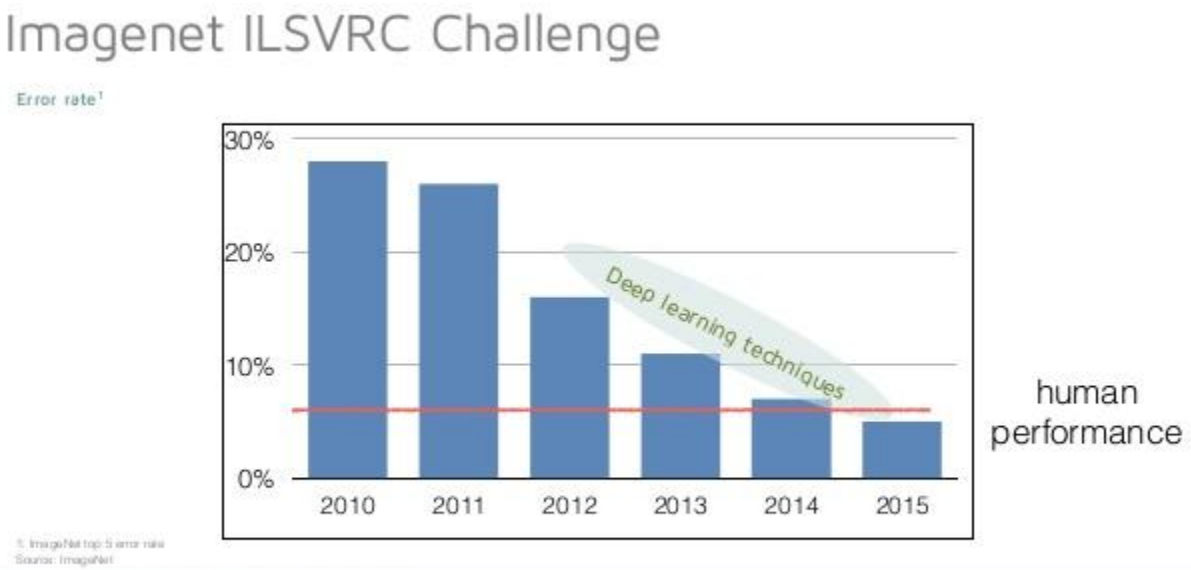
Unsupervised vs Supervised learning



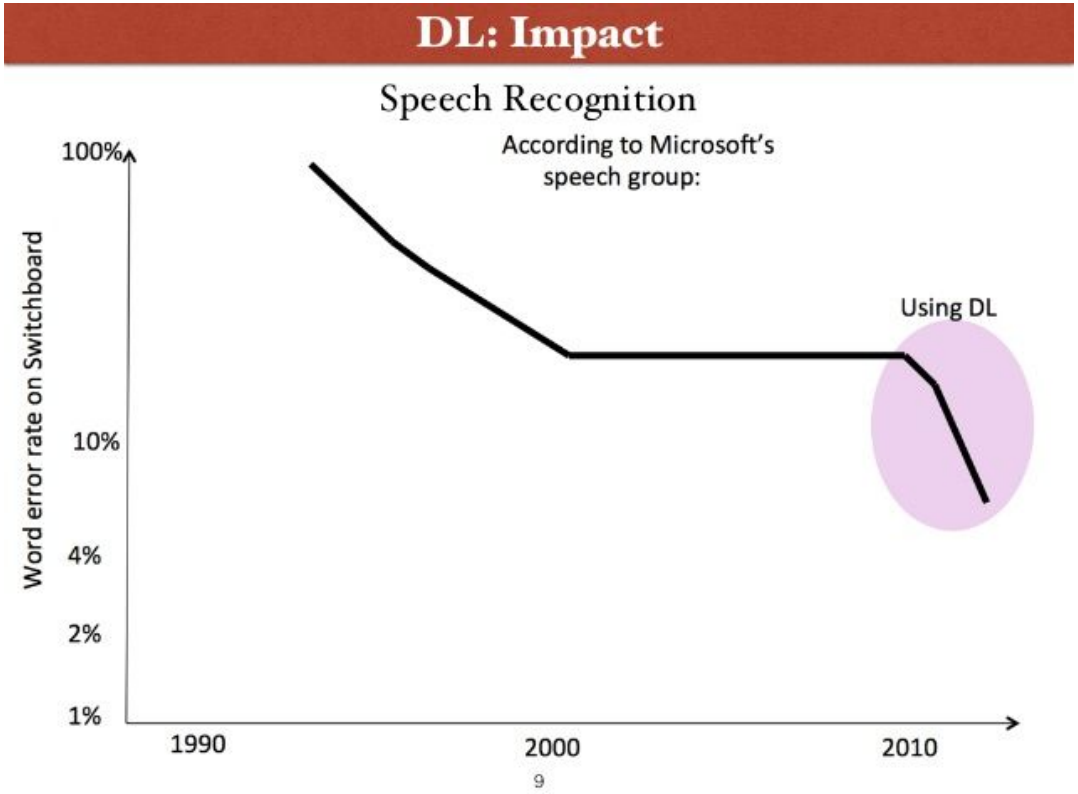
Machine learning - State of the art

Imagenet

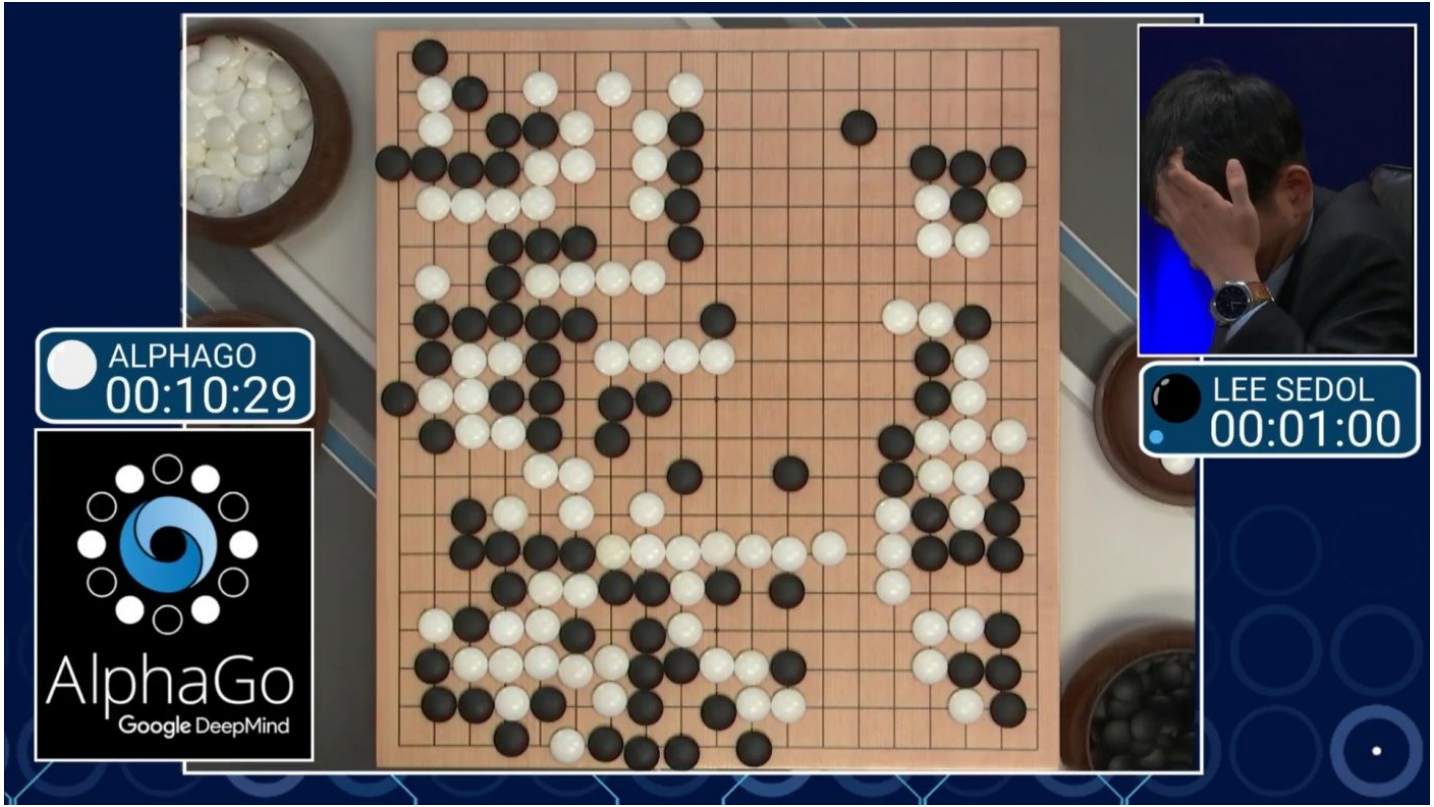
Image recognition



Speech recognition



AlphaGO



Why now? - GPUs

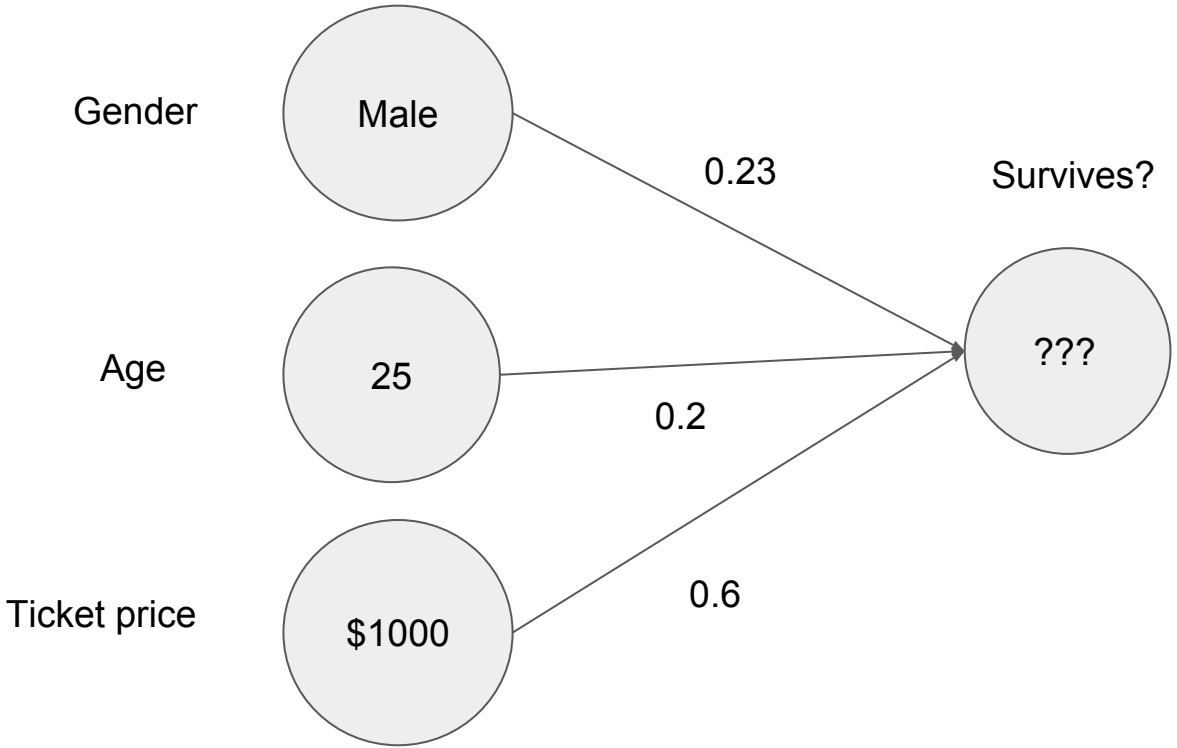
What is deep learning?

Titanic: Machine Learning from Disaster

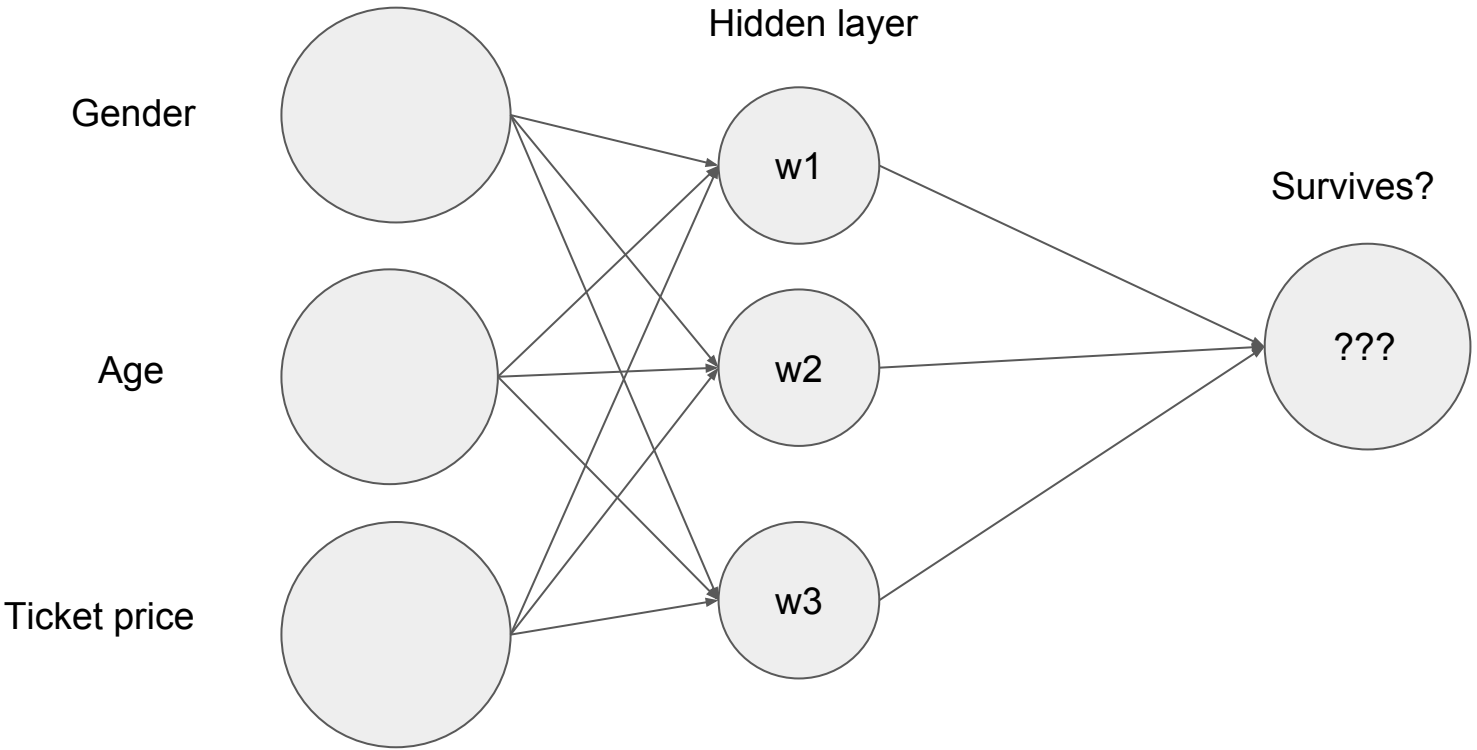
Titanic passenger information

Gender	Age	Ticket price	Survived
Male	55	$1500	Yes
Female	75	$50	No
Male	30	$15	No
Female	25	$12	Yes

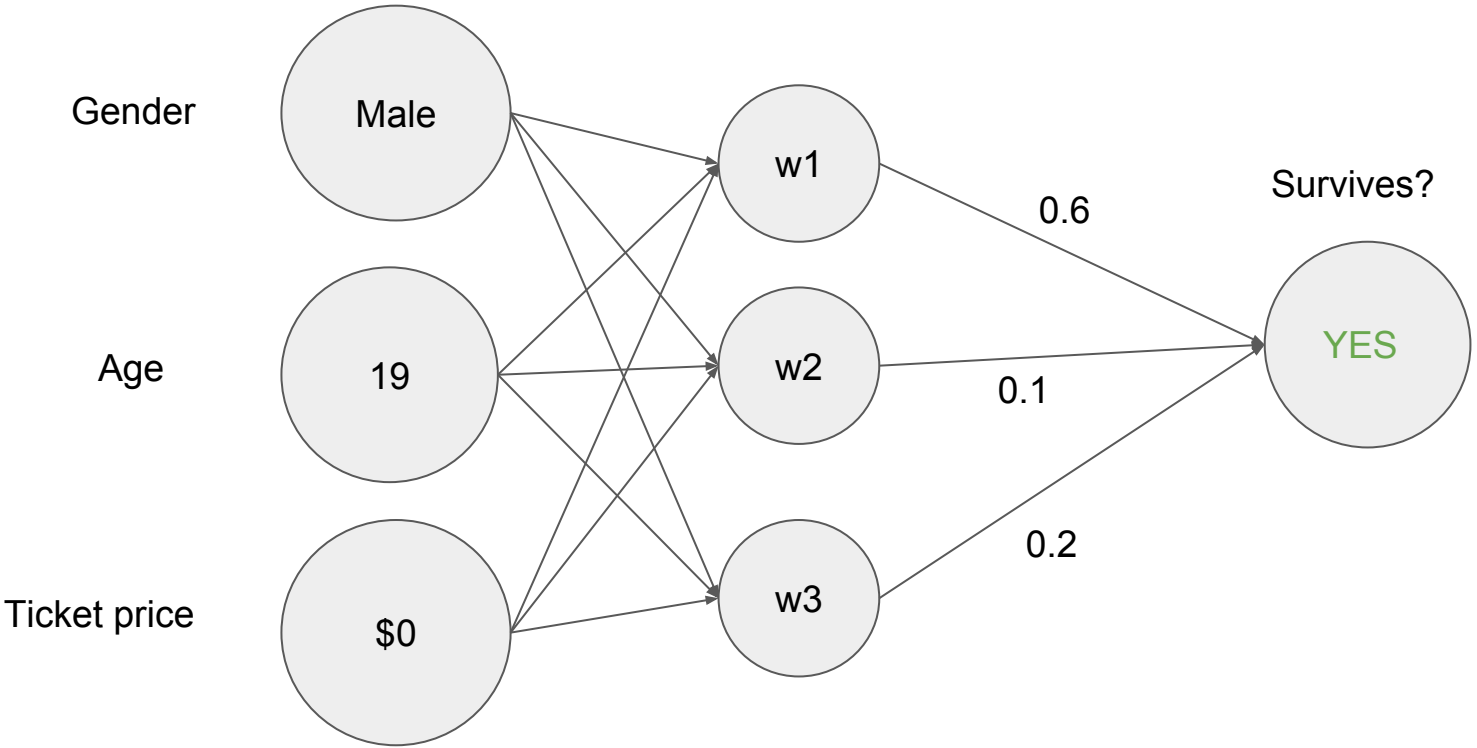
Titanic survival



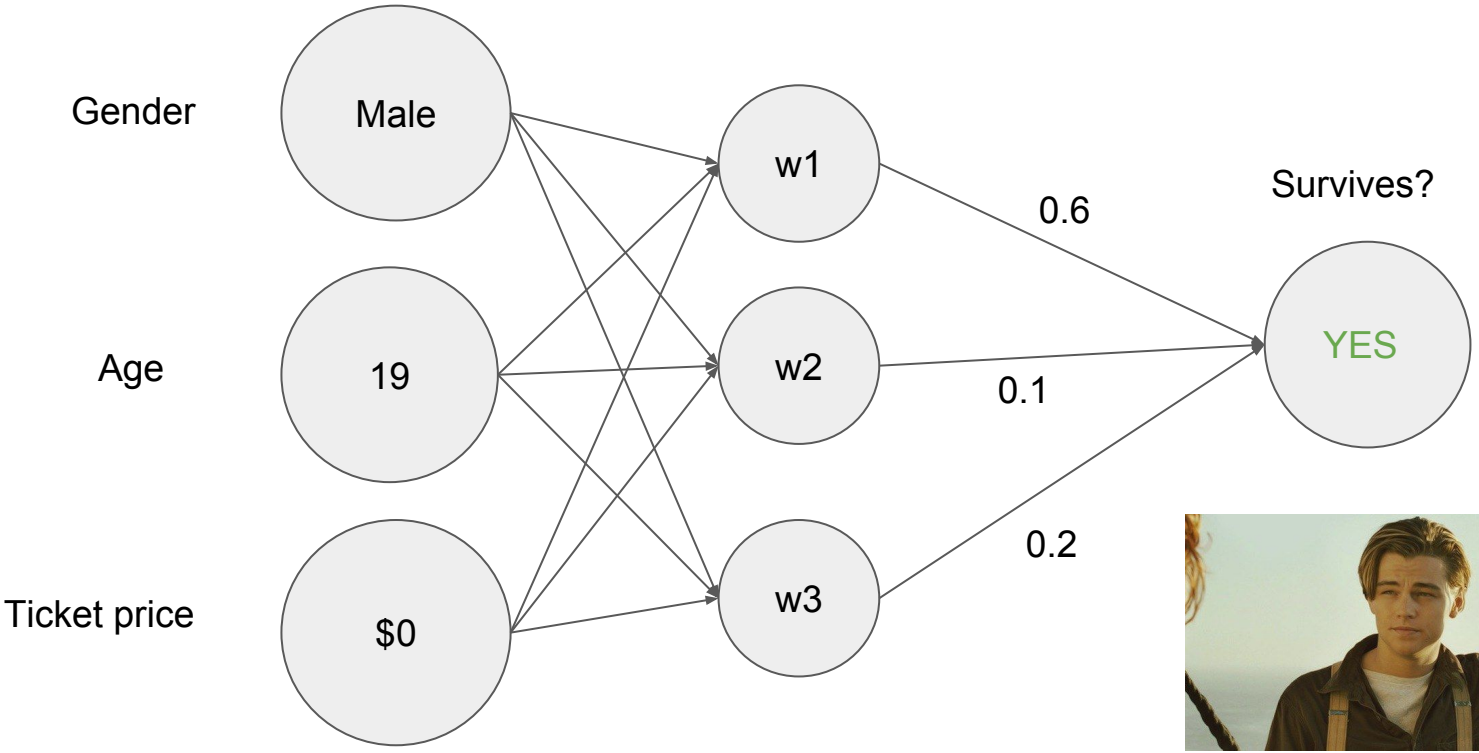
Neural network



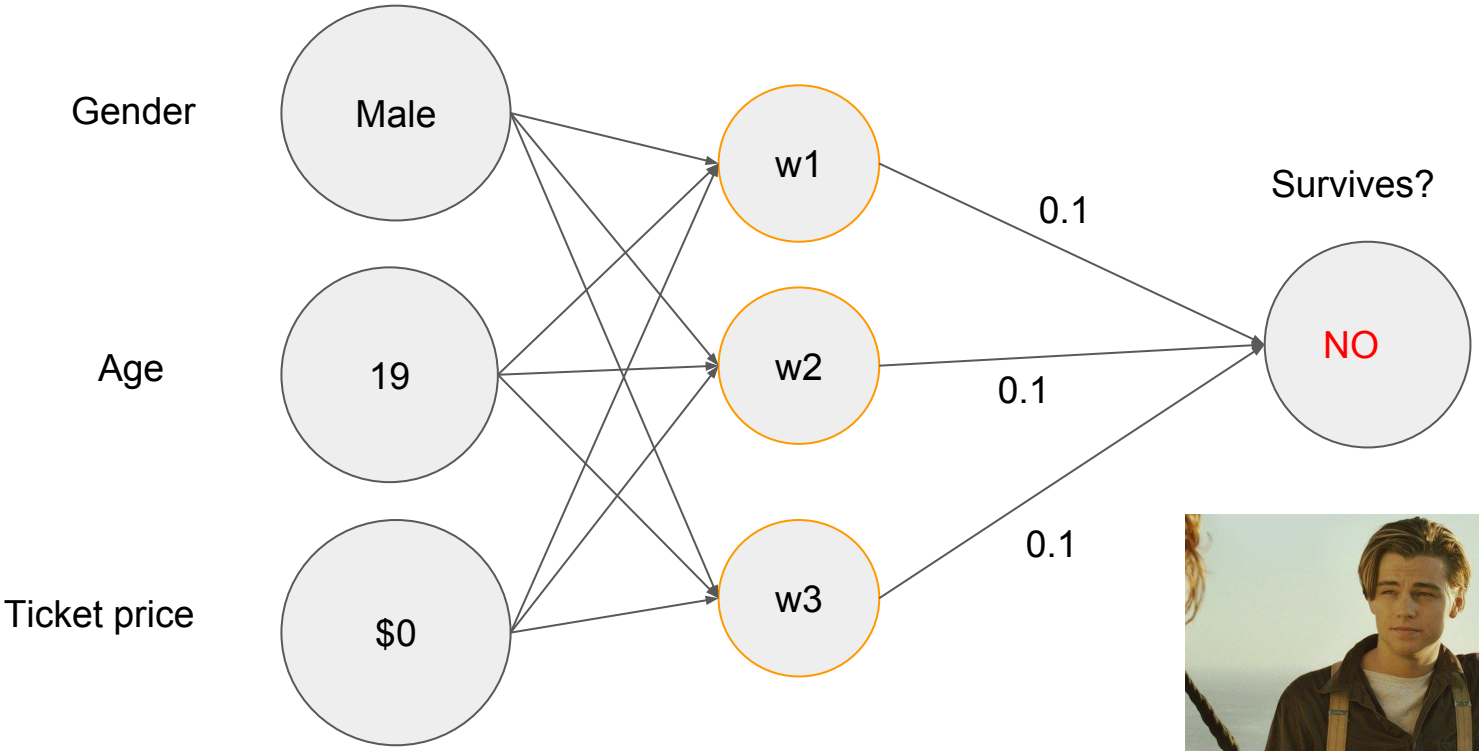
Titanic survival



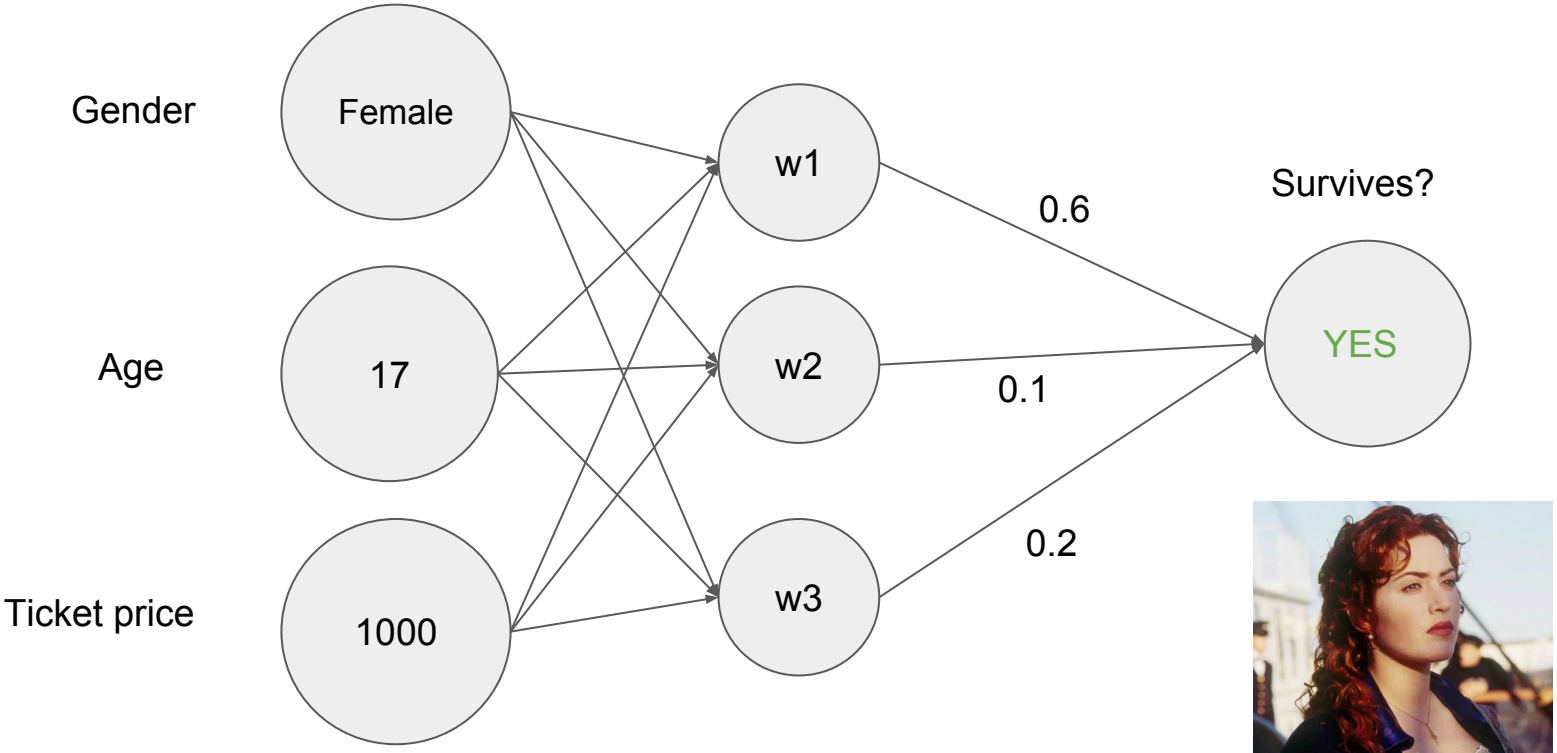
Titanic survival



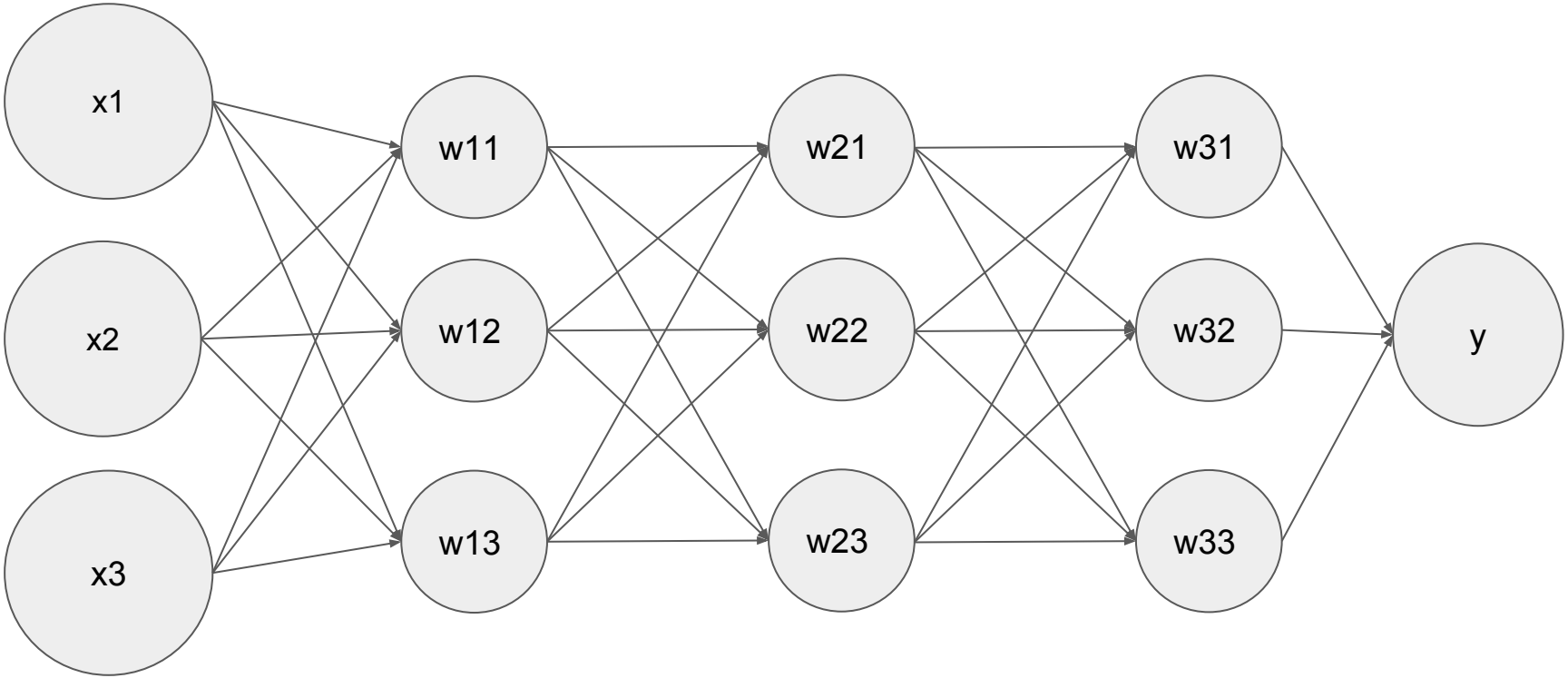
Titanic survival



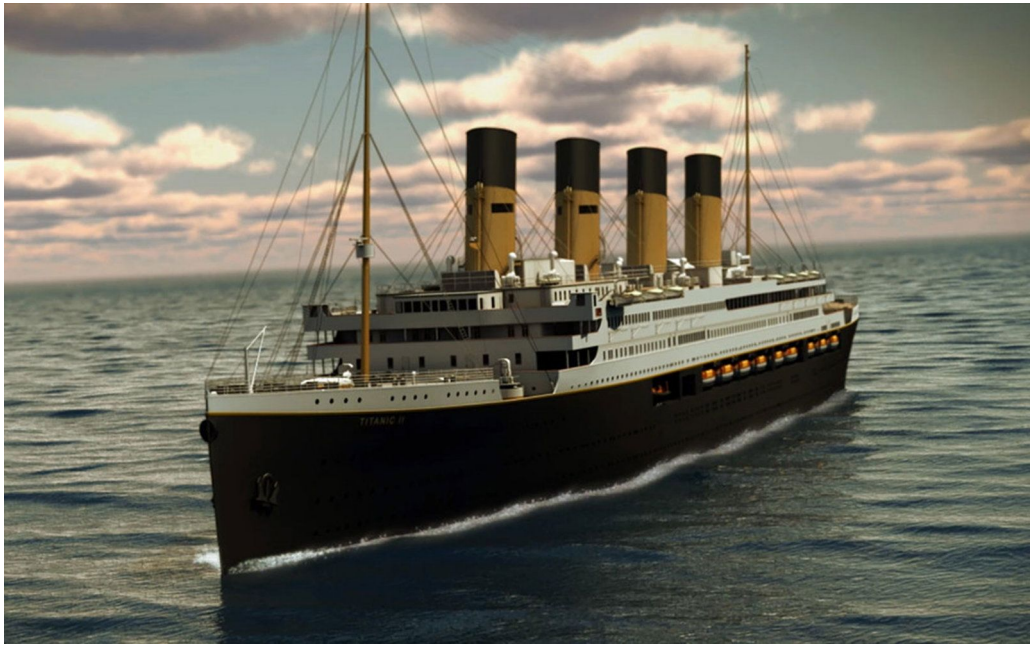
Titanic survival

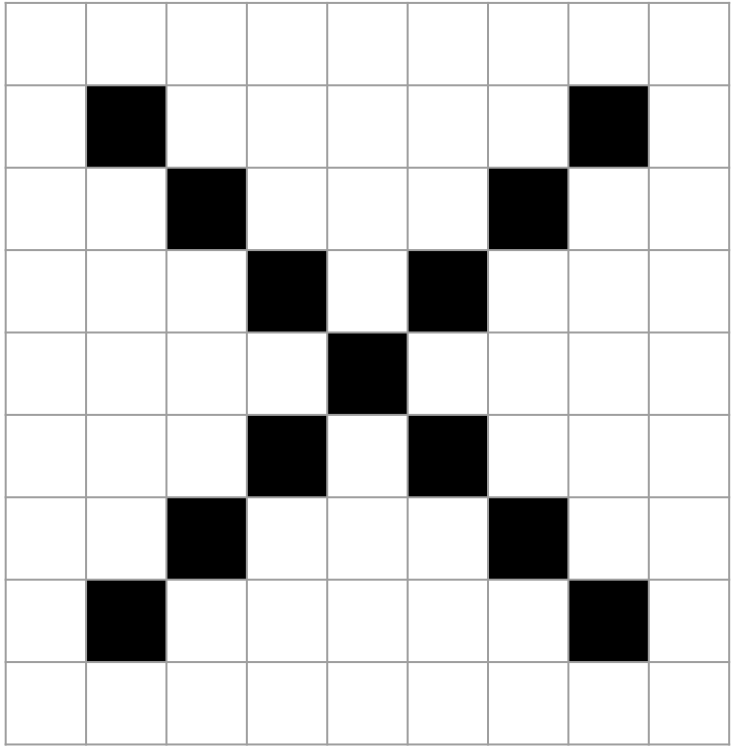


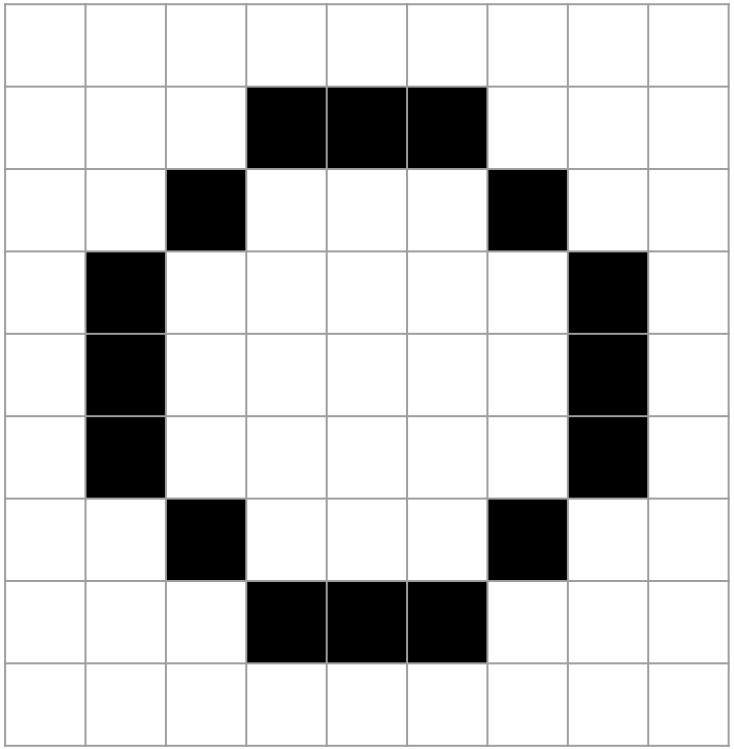
Deep neural network

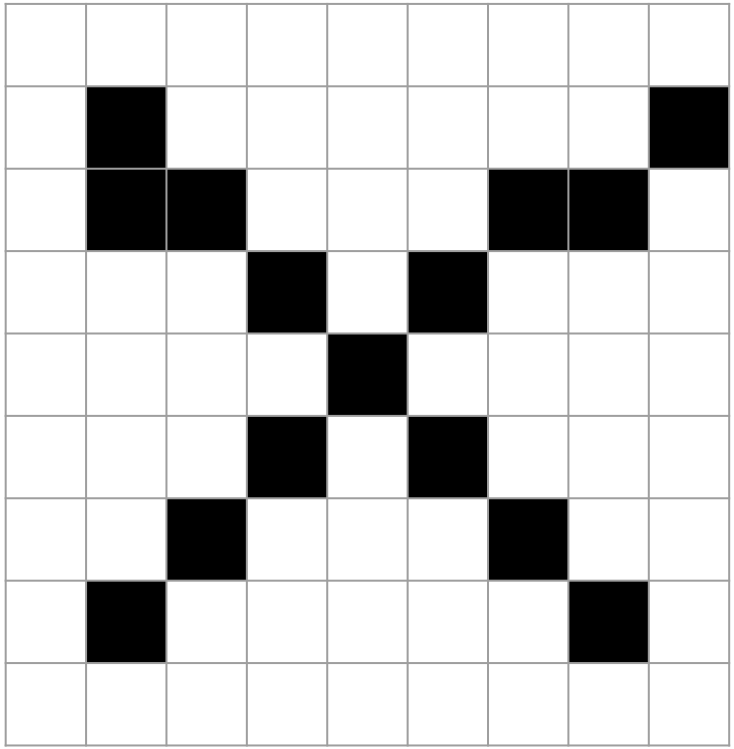


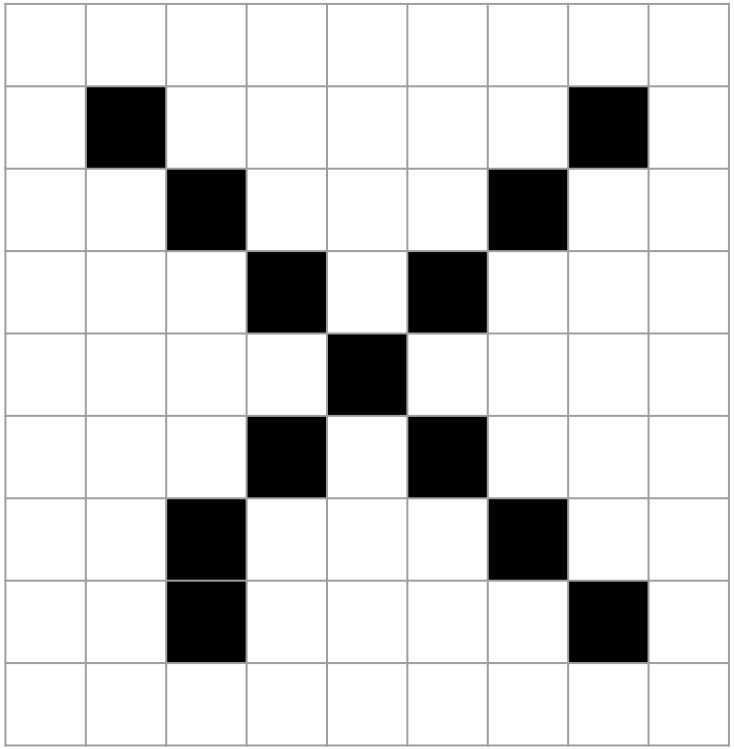
Images?



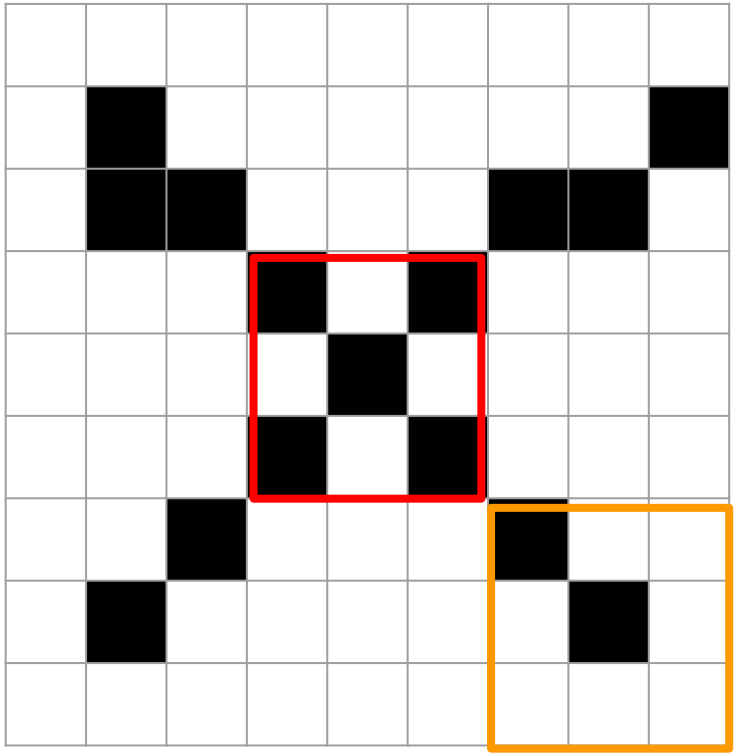


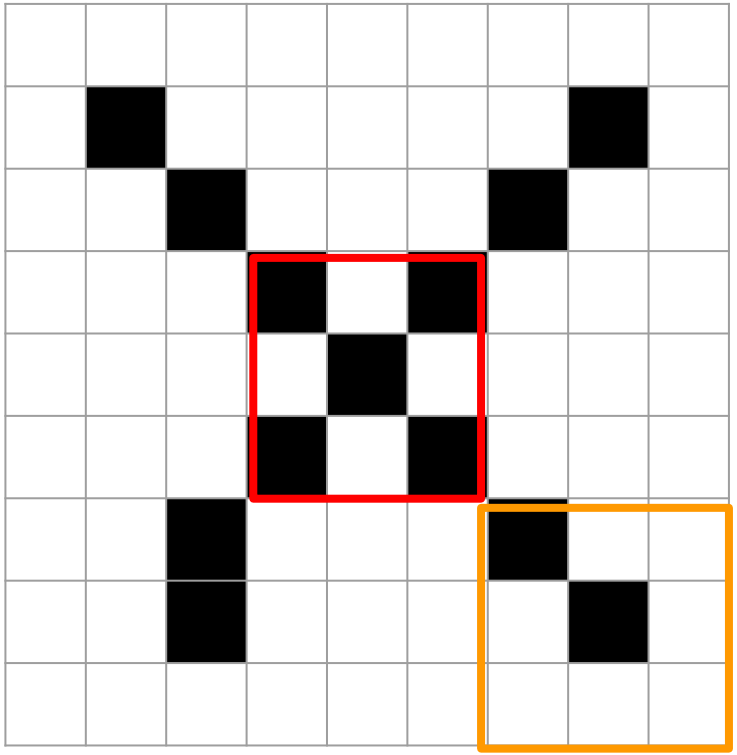


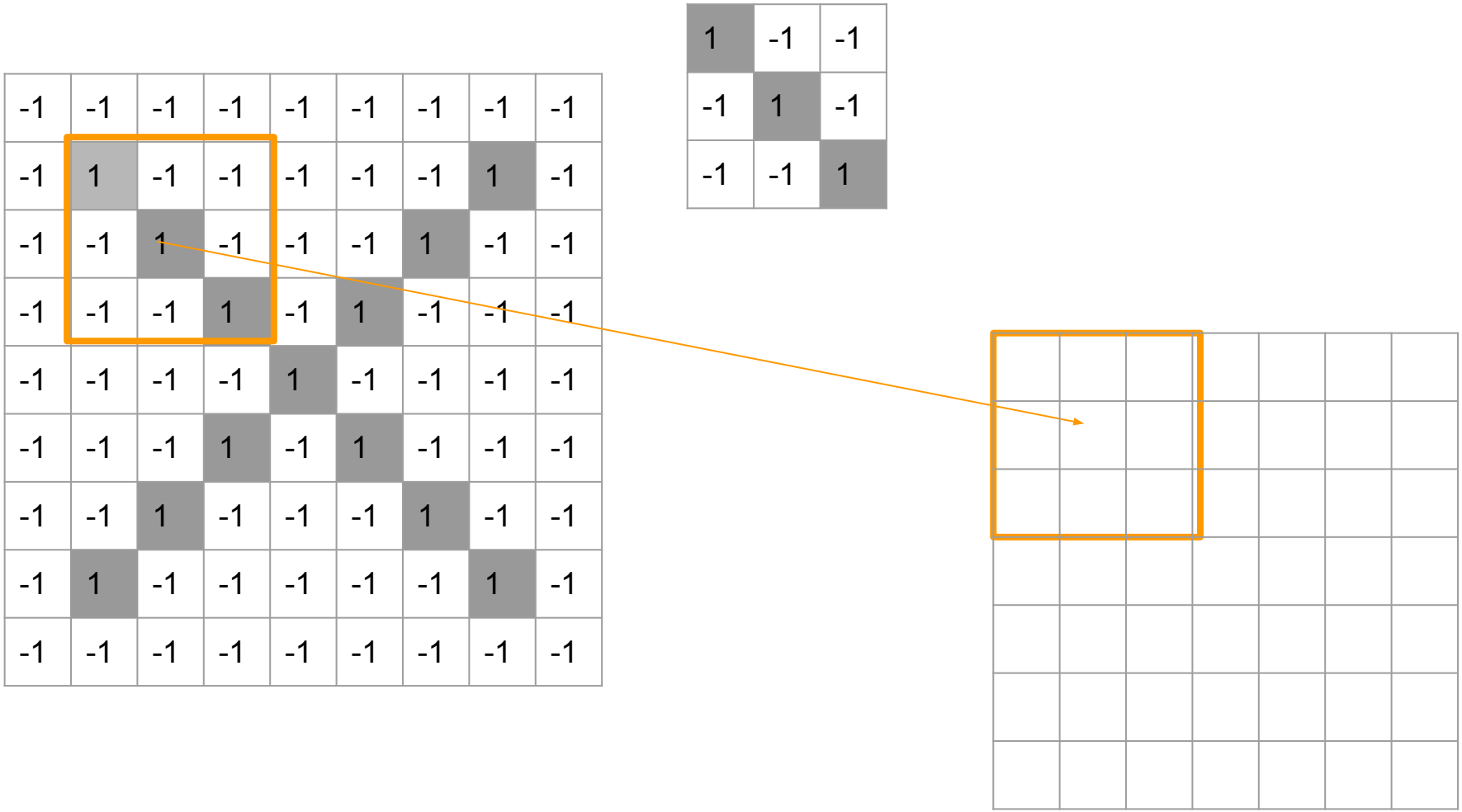




Convolutional neural network (CNN)



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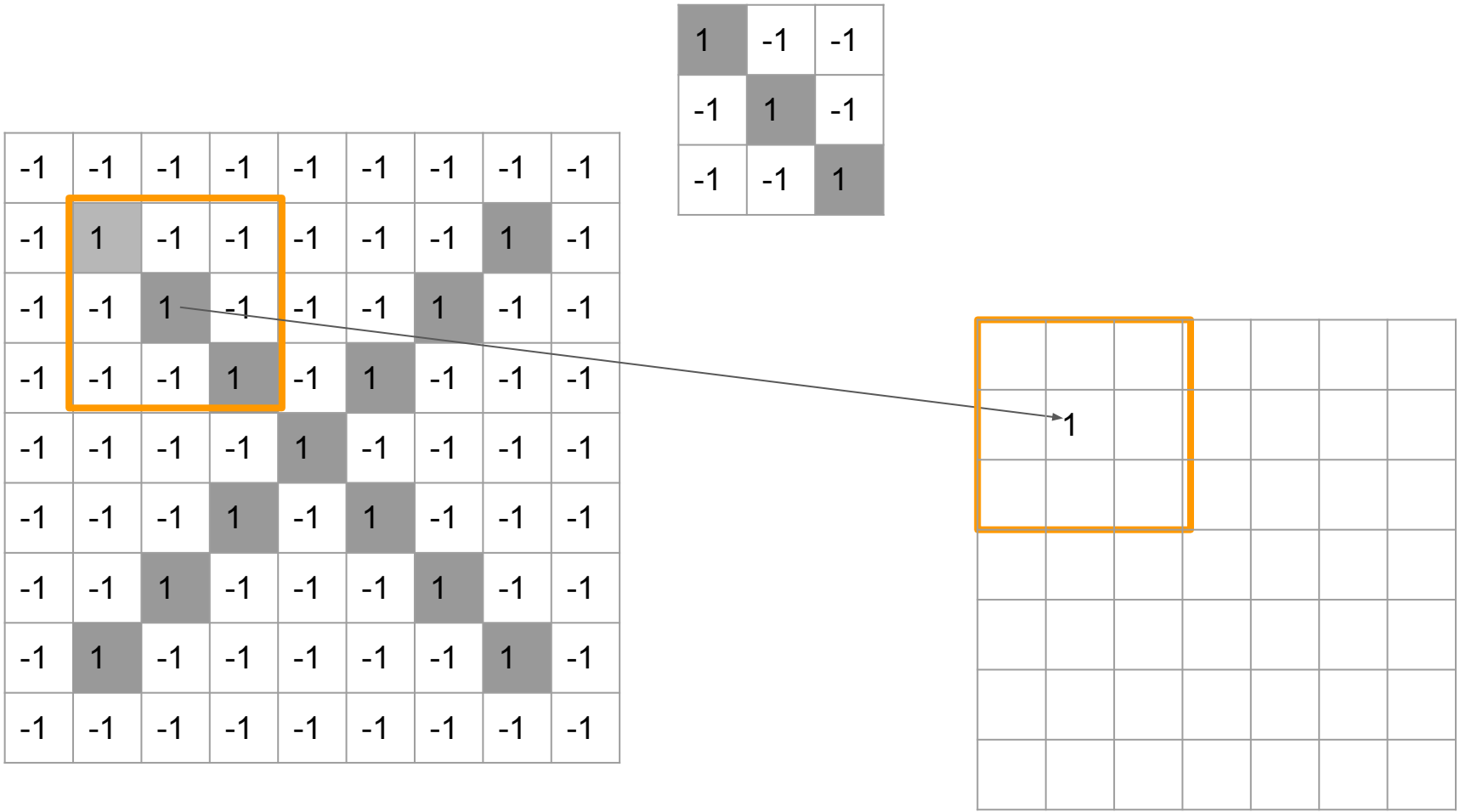
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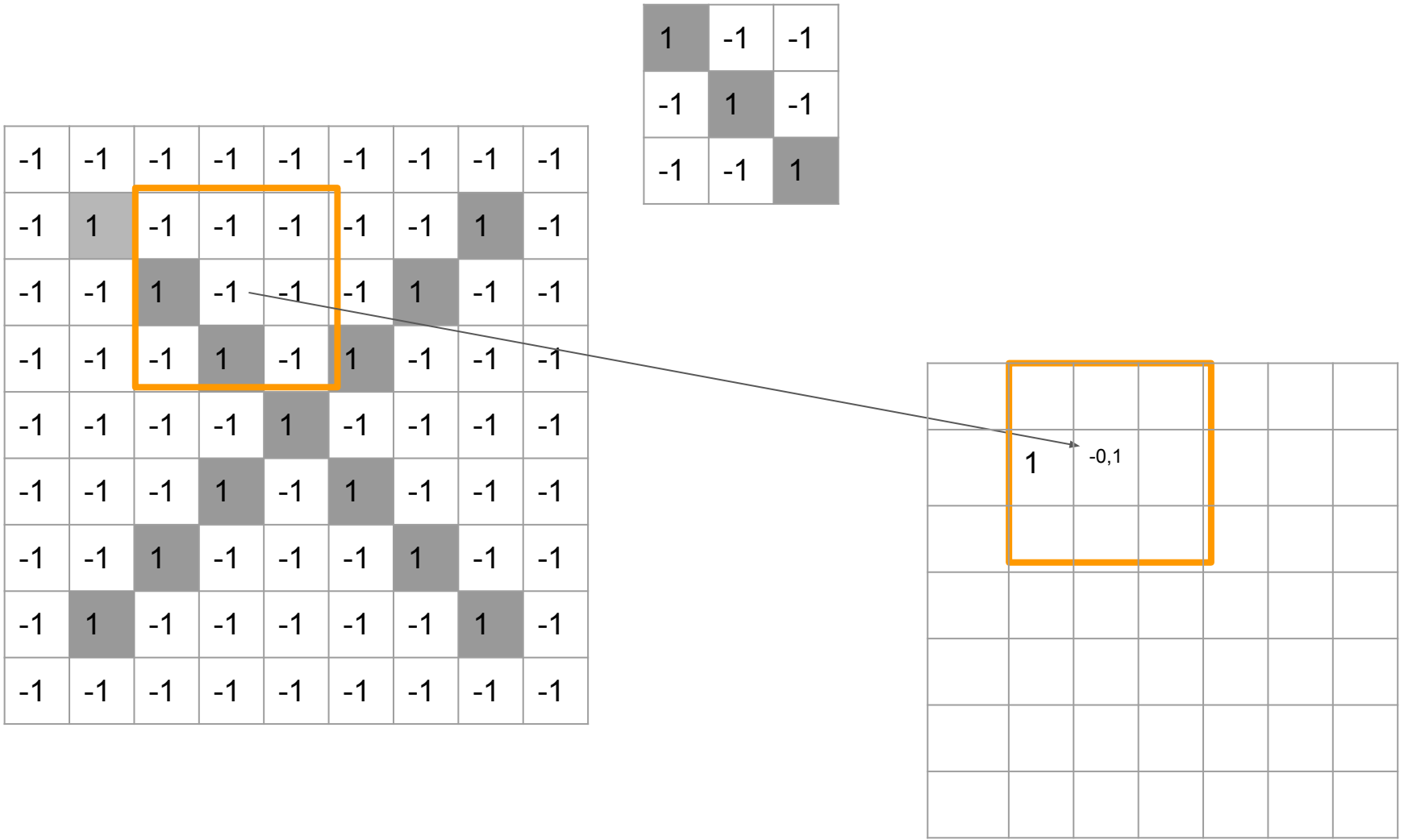
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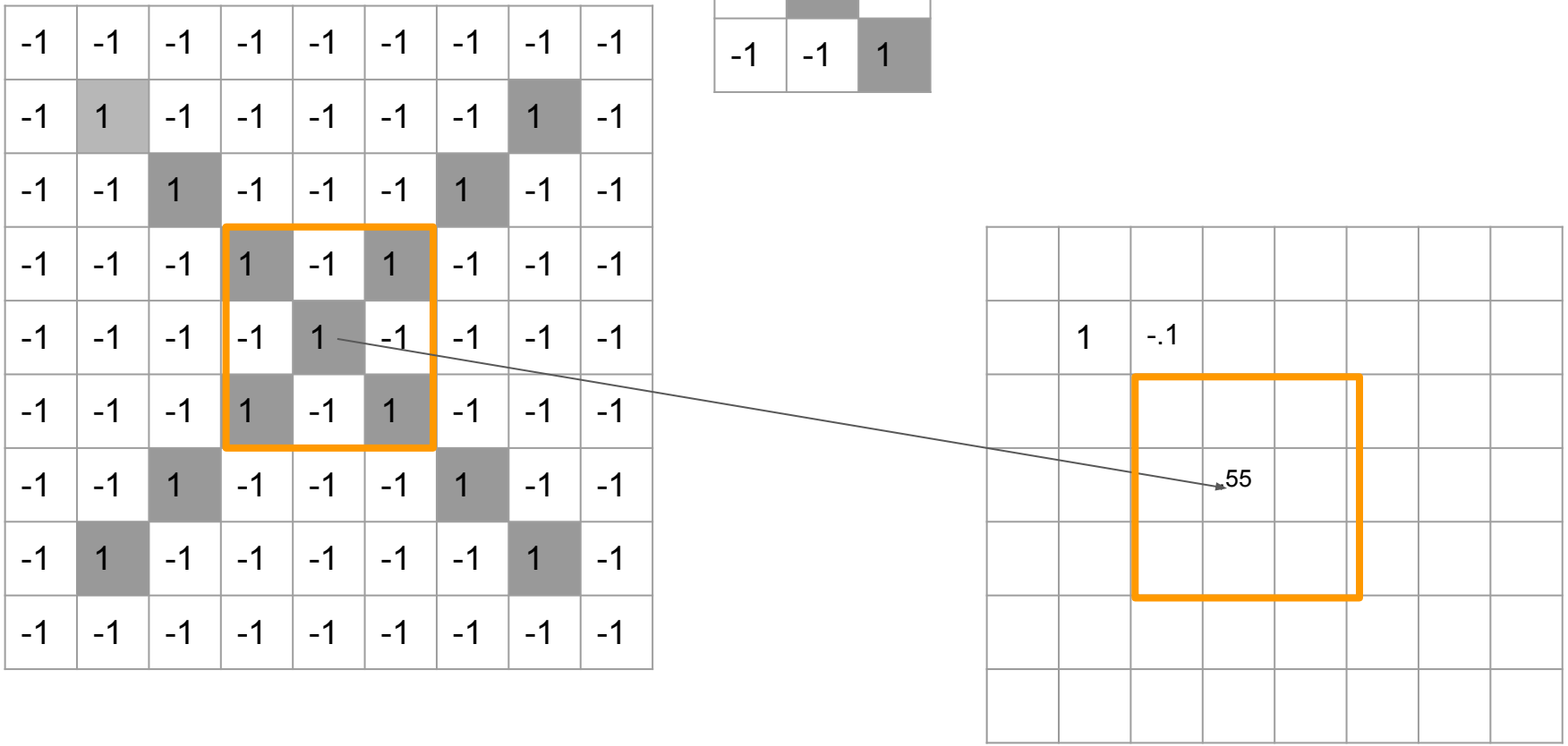
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-1 1 -1 -1 -1 -1 -1 1 -1
-1 -1 -1 -1 -1 -1 -1 -1 -1
1 -.1
55

1	-1	-1
-1	1	-1
-1	-1	1

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-.1	1	-.1	.3	-.1	.1	-.1
.1	-.1	1	-.3	.1	-.1	.5
.3	.3	-.3	.5	-.3	.3	.3
.5	-.1	.1	-.3	1	-.1	.1
-.1	.1	-.1	-.3	-.1	1	.1
.3	-.1	.5	.3	.1	-.1	.7

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1	-1	-1

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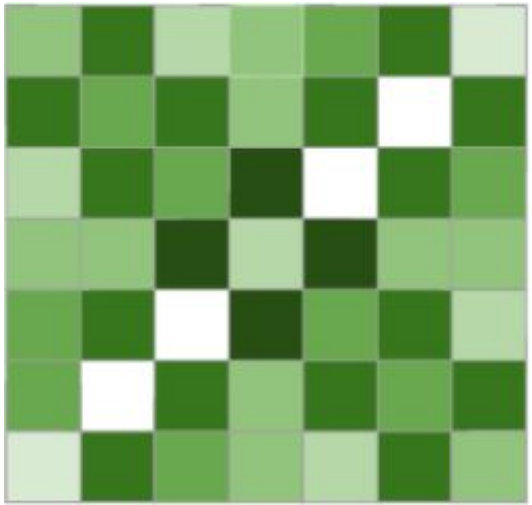

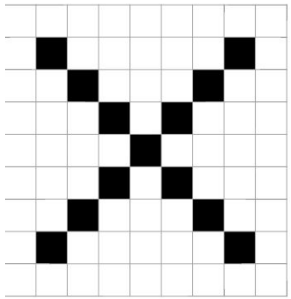
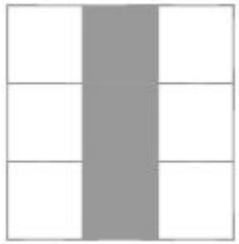
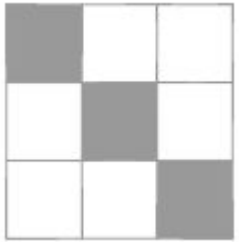
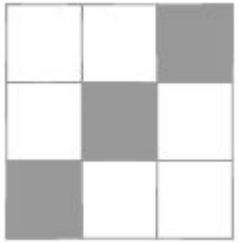
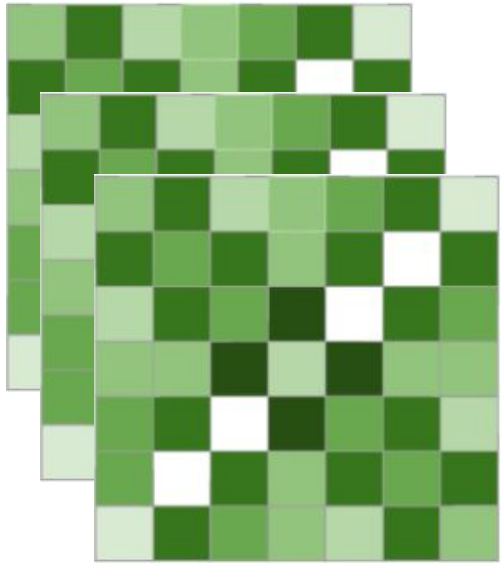
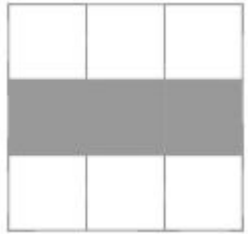
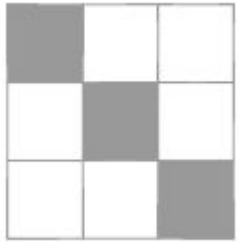
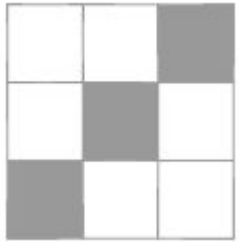
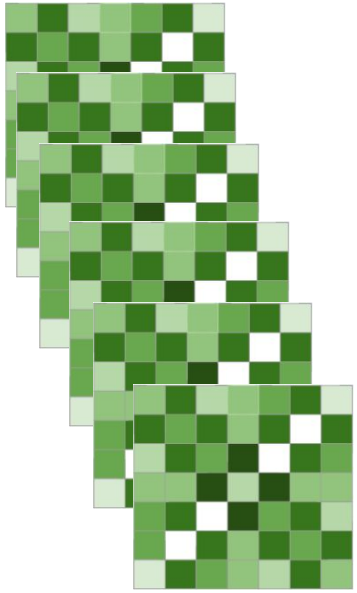

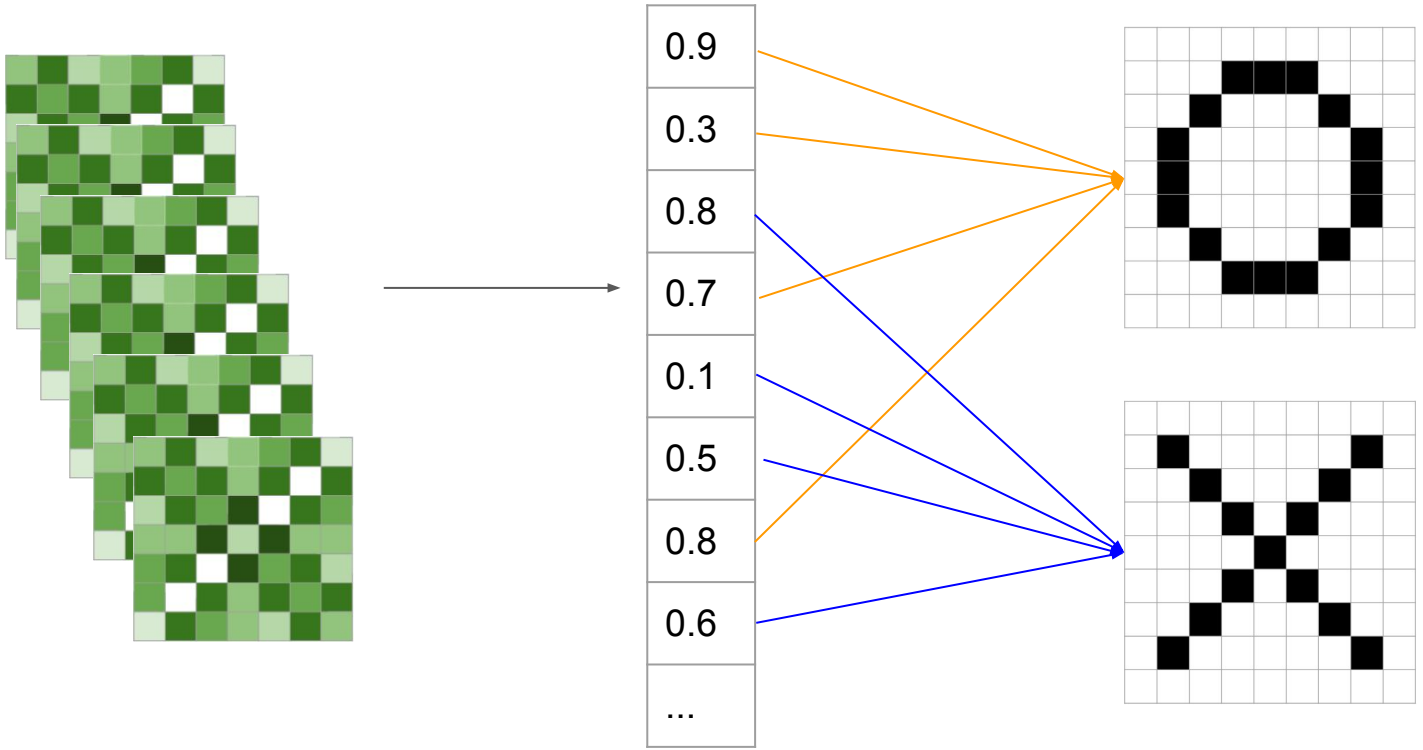
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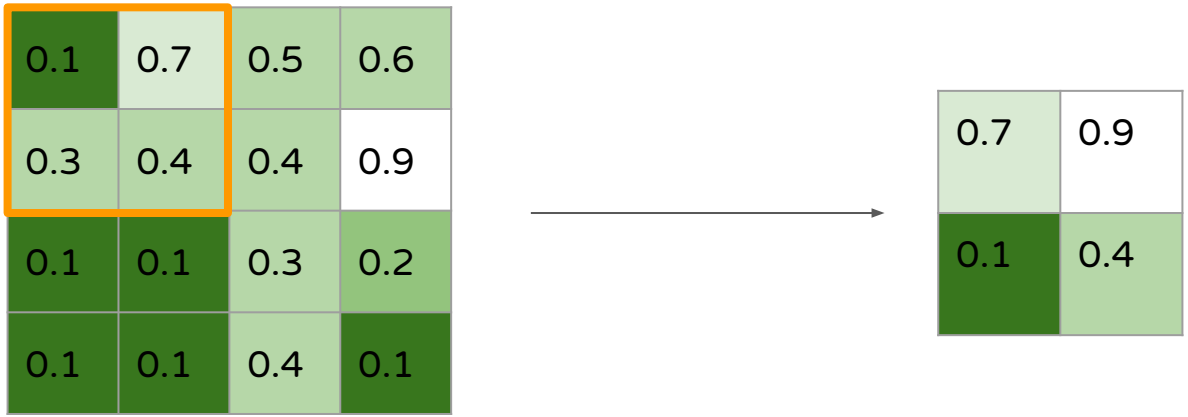
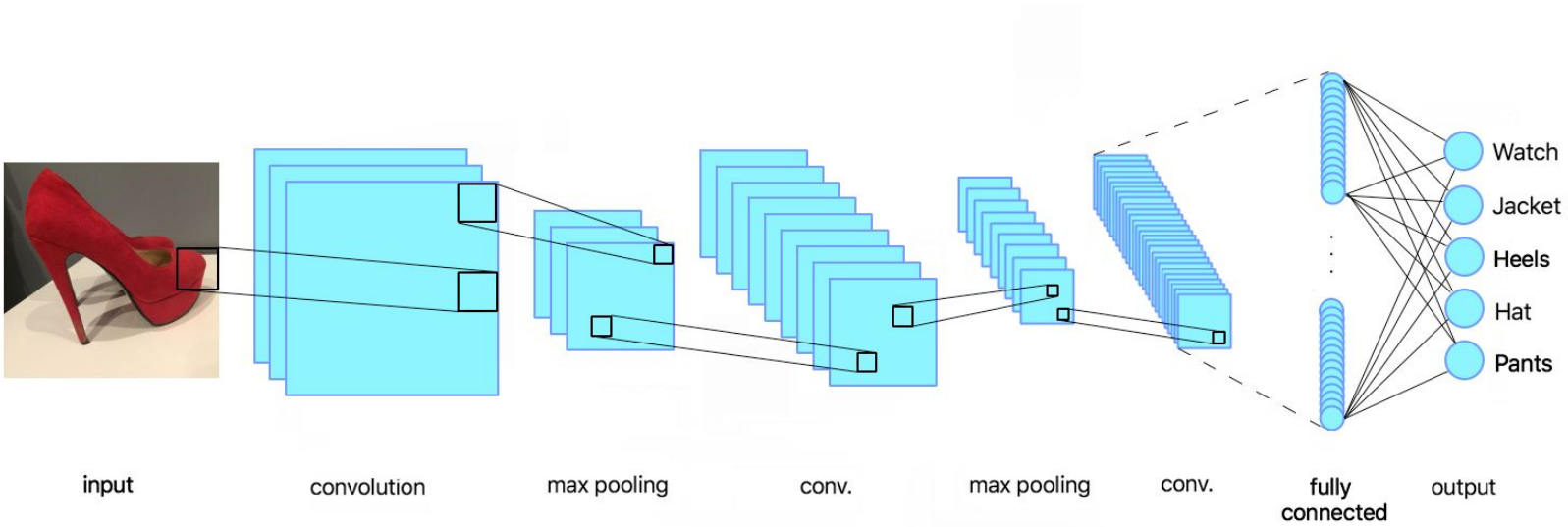
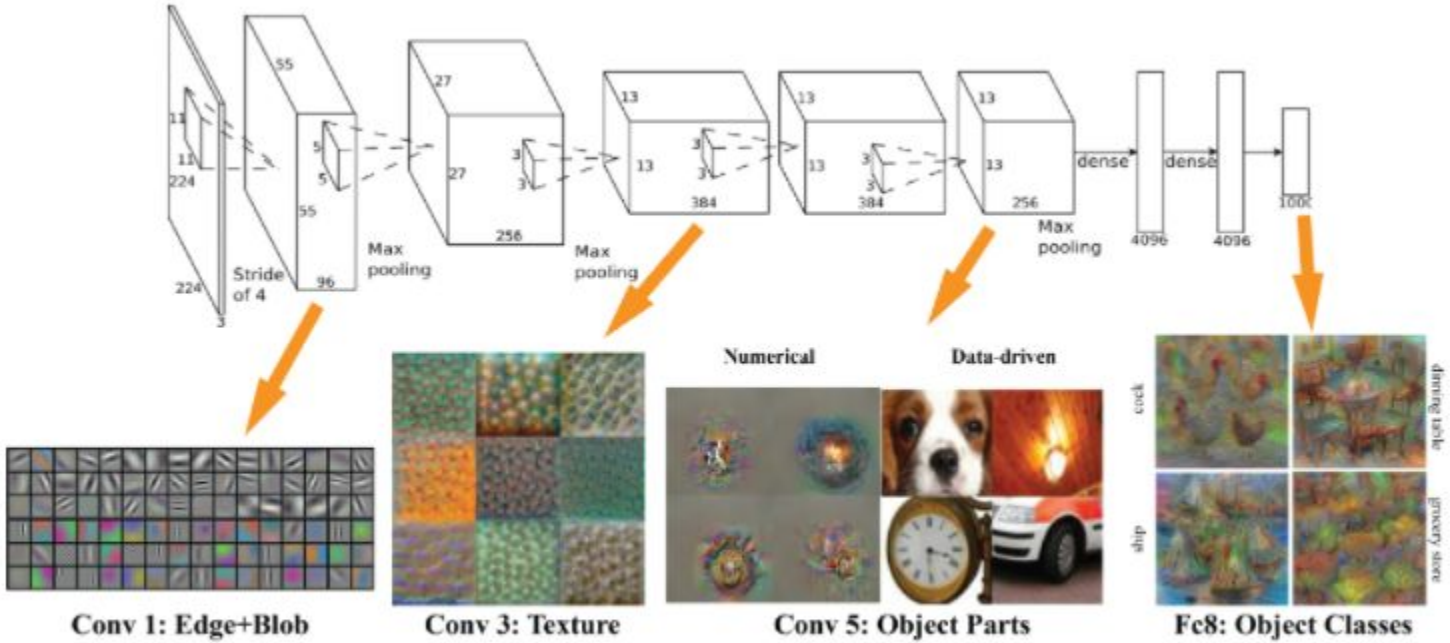
0.3
0.8
0.7
0.1
0.5
0.8
0.6
...

Max pooling



Deep learning cnn model

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11
224
224
3
55
55
5
5
96
Stride
of 4
27
27
256
Max
pooling
3
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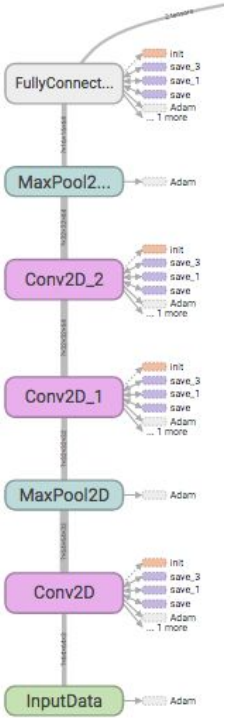
13
13
384
Max
pooling
384
256
Max
pooling
dense
4096
dense
4096
1000
Numerical
Data-driven
cock
ship
drum
grocery store
Conv 1: Edge+Blob
Conv 3: Texture
Conv 5: Object Parts
Fc8: Object Classes

Cats vs Dogs

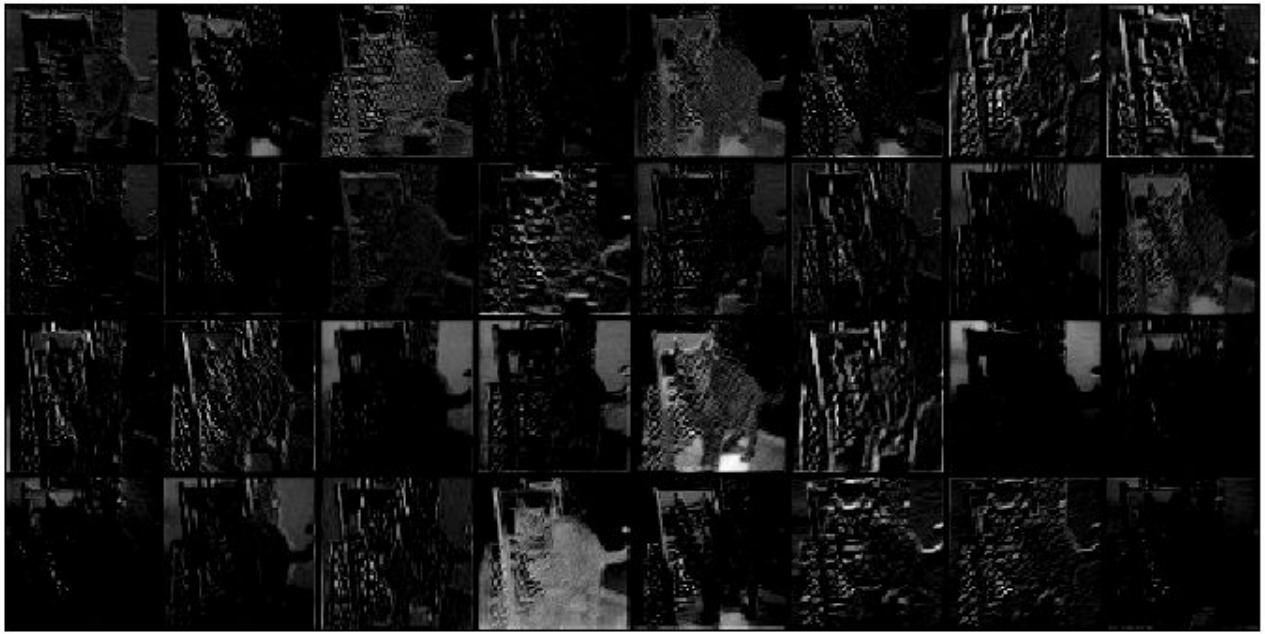

02/05/2006


RED
MALE
5

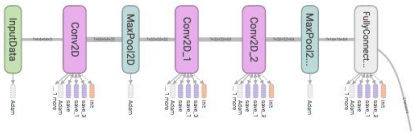
Cats vs Dogs - Model



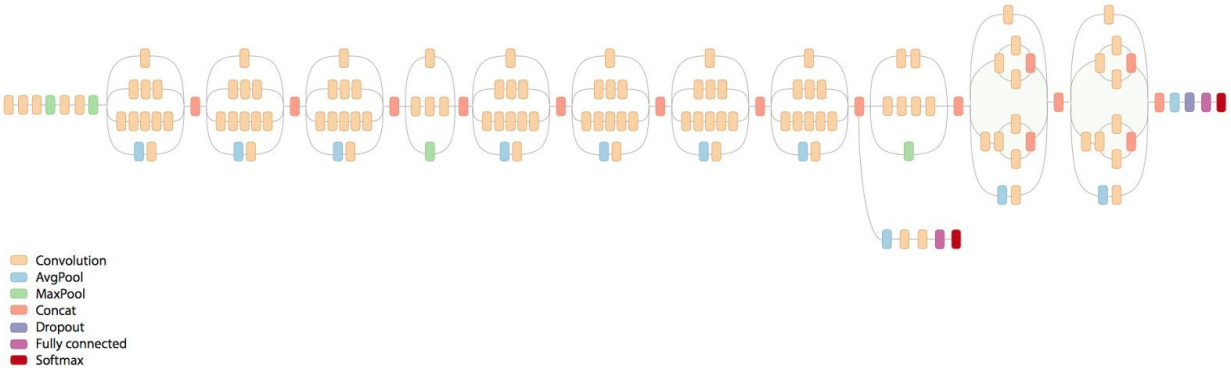
Tensorflow demo



Our model

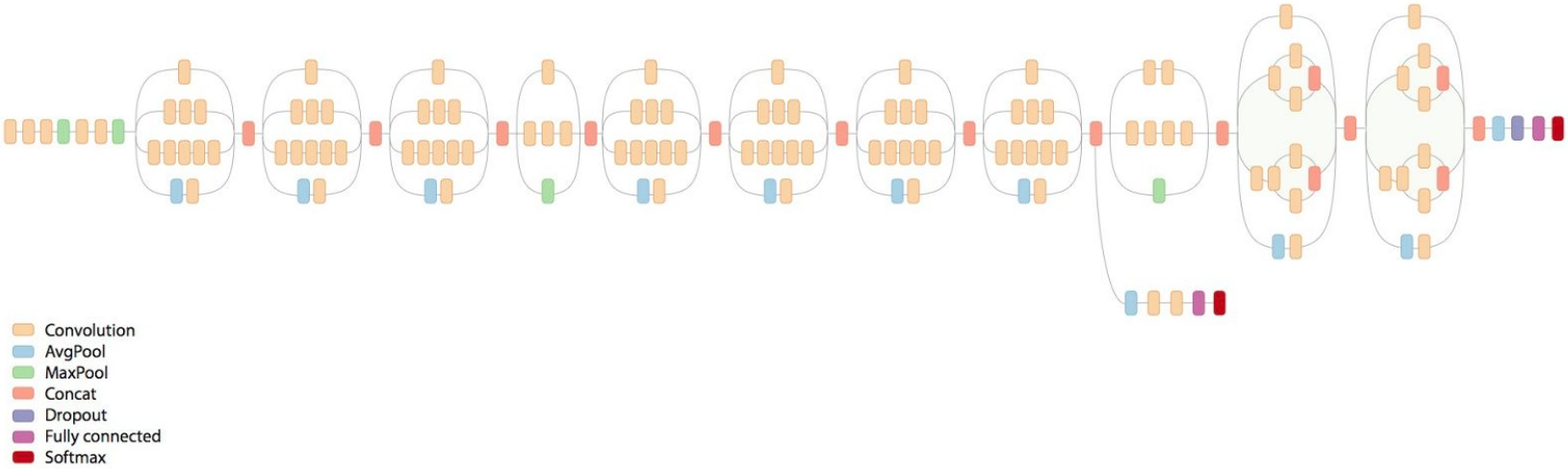


State-of-the-art



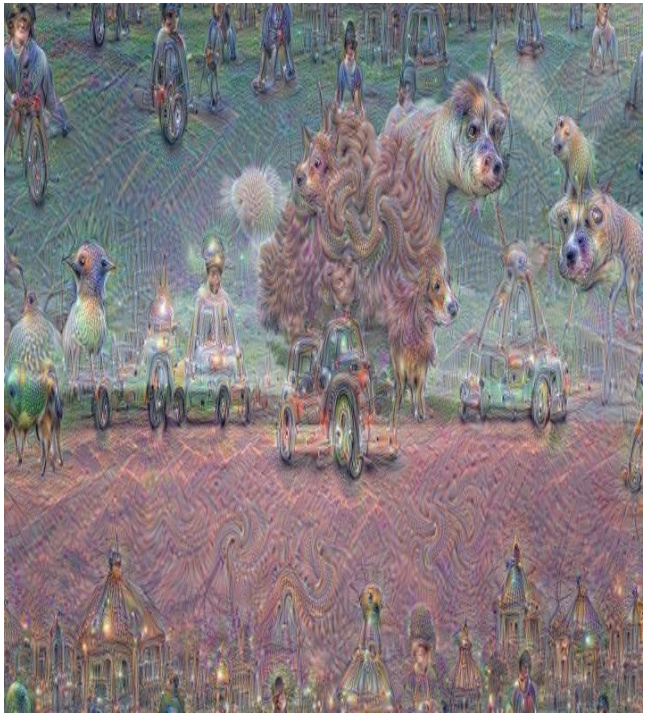
Transfer learning

Inception V3



JPEG

Inception Features
(abstract illustration)

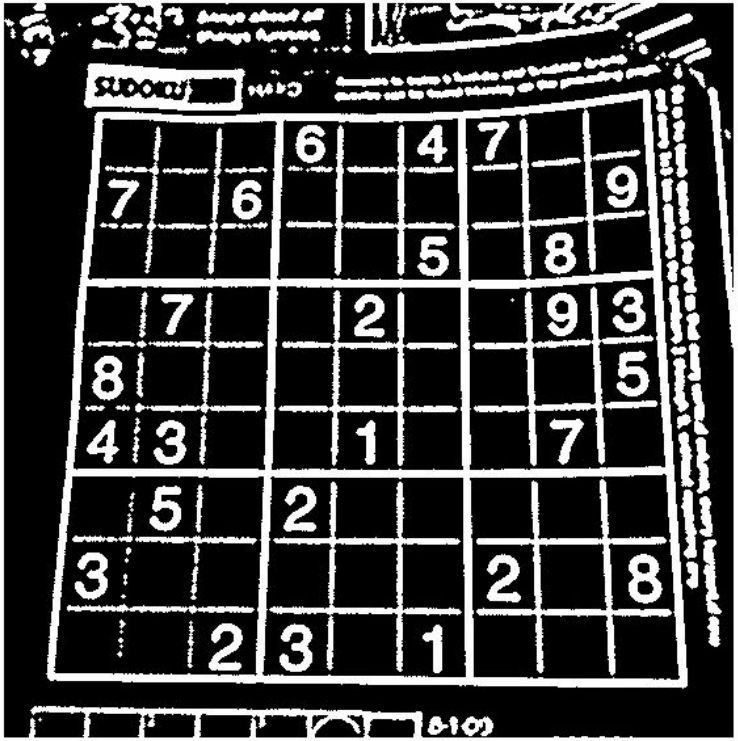


Inception demo

Tips og Triks

OpenCV

An image with a sudoku puzzle



Learning resources

- Machine Learning is Fun! (https://medium.com/@ageitgey/machine-learning-is-fun-80ea3ec3c471#.s71r3kpe5)
- Andrew Ng - Machine learning (https://www.coursera.org/learn/machine-learning)
- Tensorflow.com
- Kaggle.com (Titanic example)
- https://gym.openai.com/

Spørsmål?

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