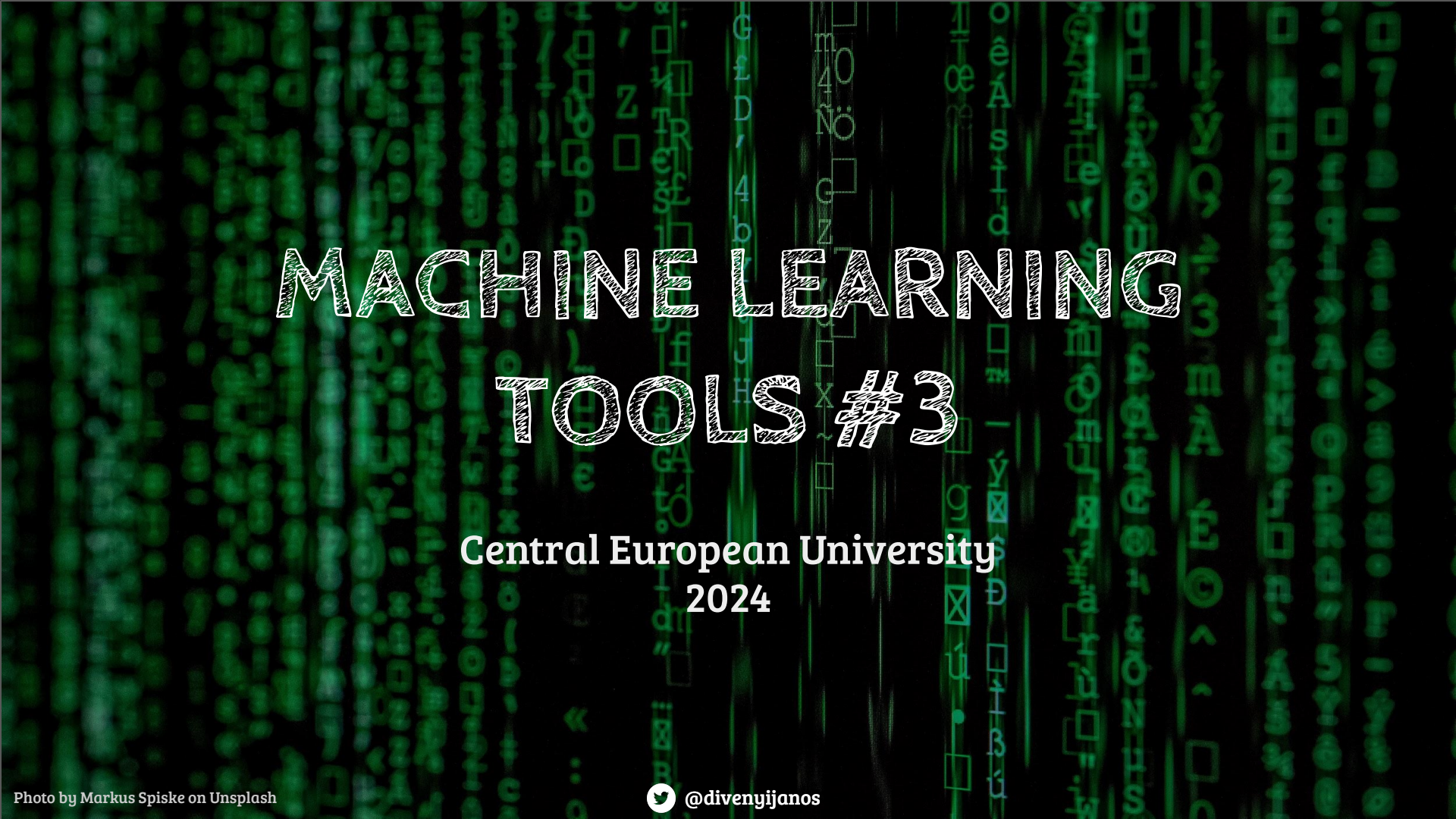

MACHINE LEARNING TOOLS #3

Central European University
2024

Photo by Markus Spiske on Unsplash

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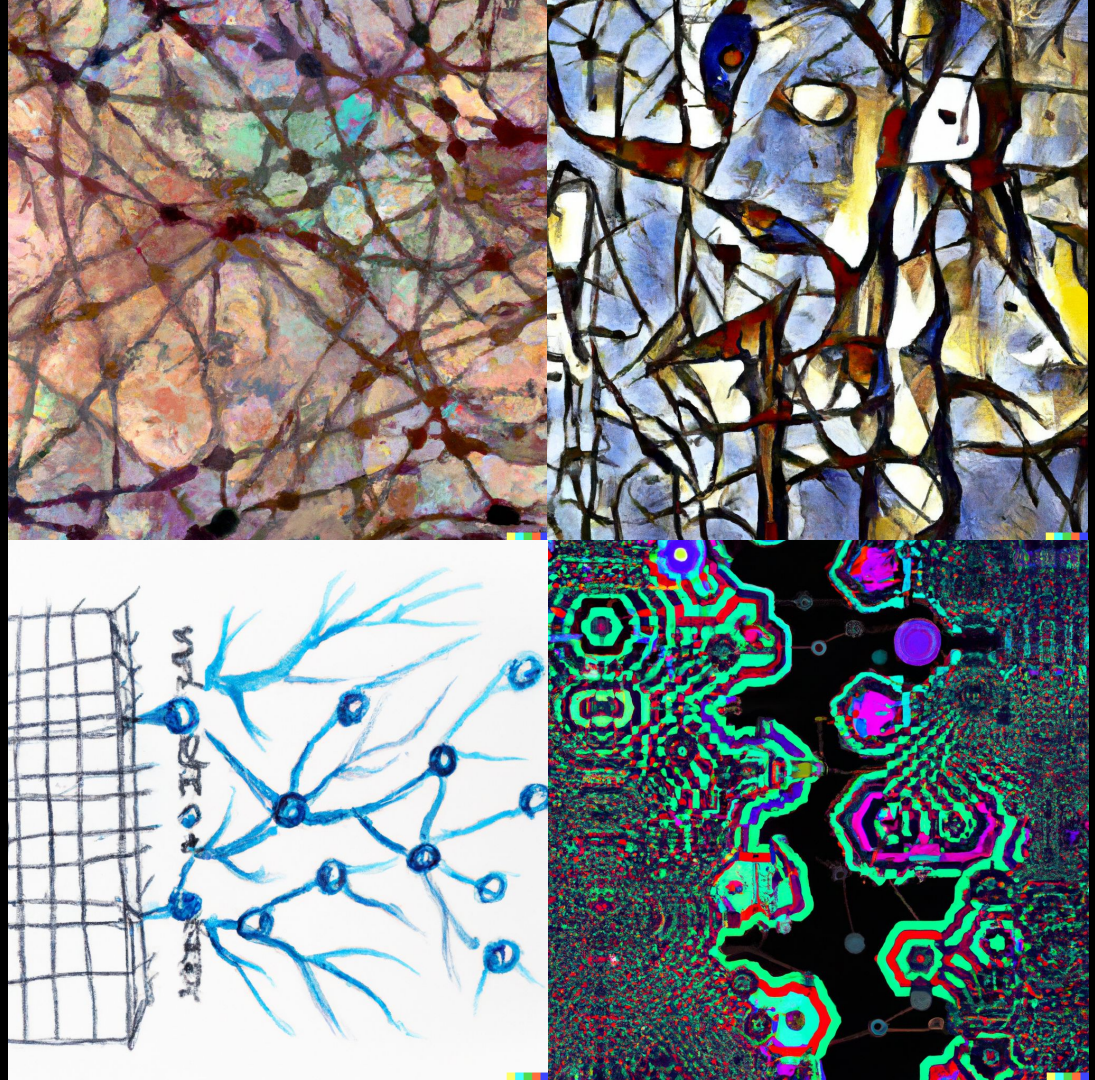
Deep Learning



created by Dall-E in March 2023

@divenyijanos
created by Leonardo.AI in March 2024

Classify Handwritten Digits

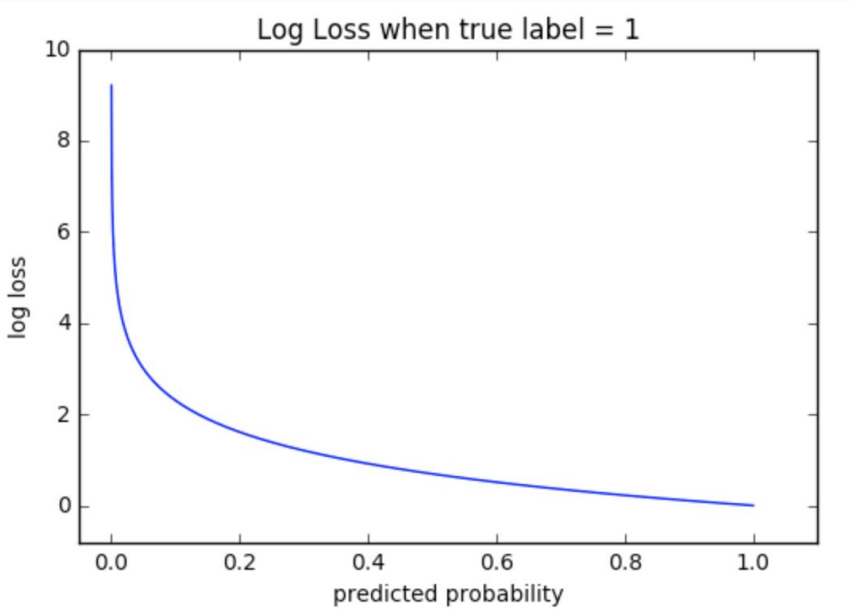
created by Leonardo.AI in March 2024

Log loss - cross entropy

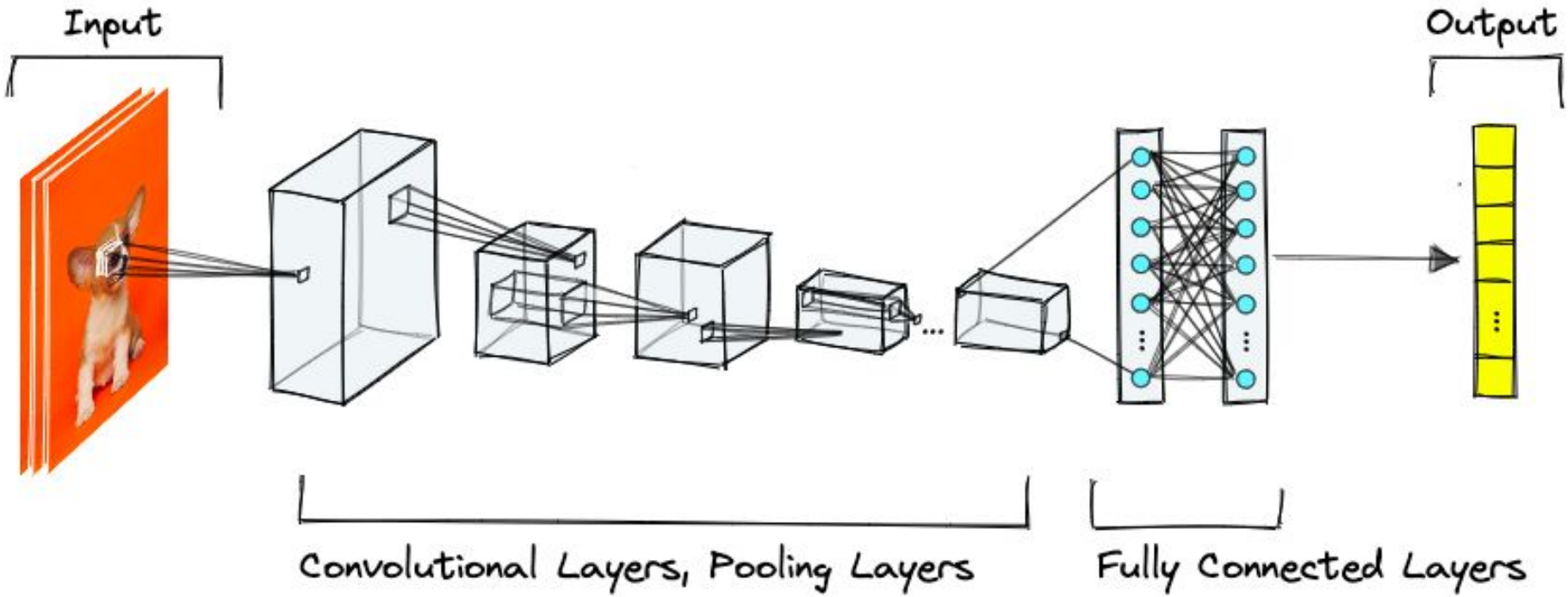
- **Entropy** ~ measure of surprise
  -Σp*log(p)

- **Cross entropy** ~ how one distribution
  is telling about another one
  -Σp*log(q)

- **Log loss** = Binary cross entropy
  -(y*log(p) + (1-y)*log(1-p))



Convolutional Neural Network (CNN)



Visualization from https://www.pinecone.io/learn/series/image-search/cnn/

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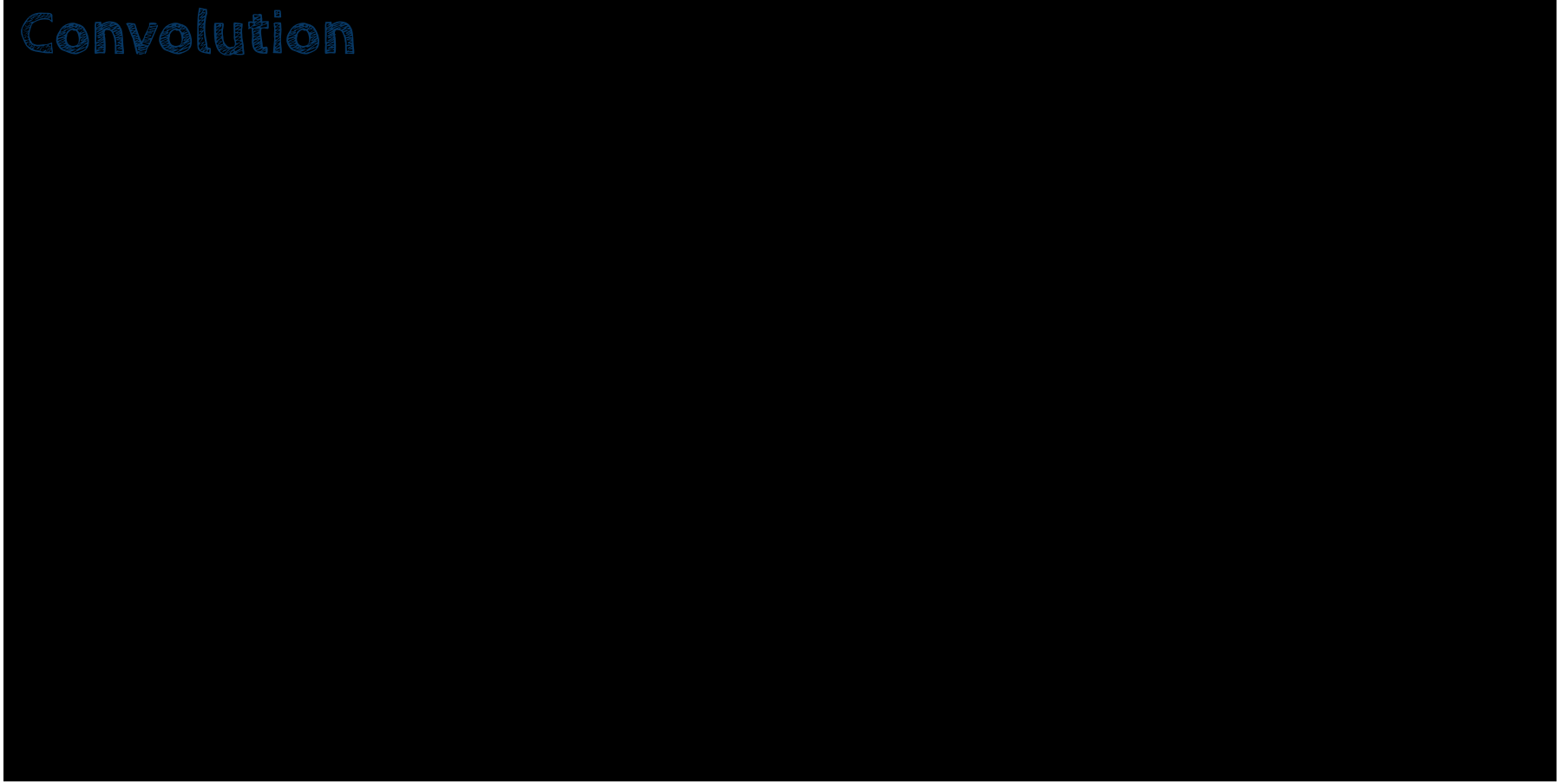
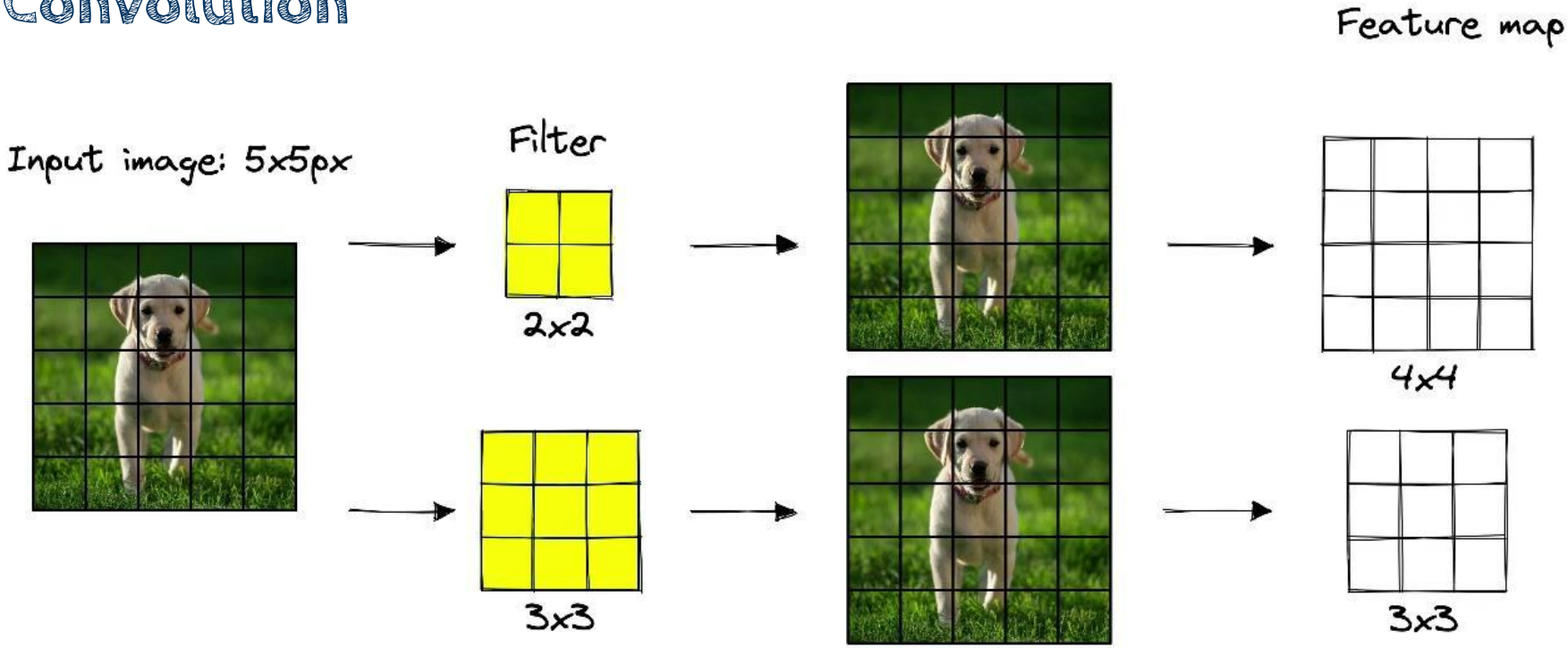
Convolution



Visualization from https://www.pinecone.io/learn/series/image-search/cnn/

Convolution



Visualization from https://www.pinecone.io/learn/series/image-search/cnn/

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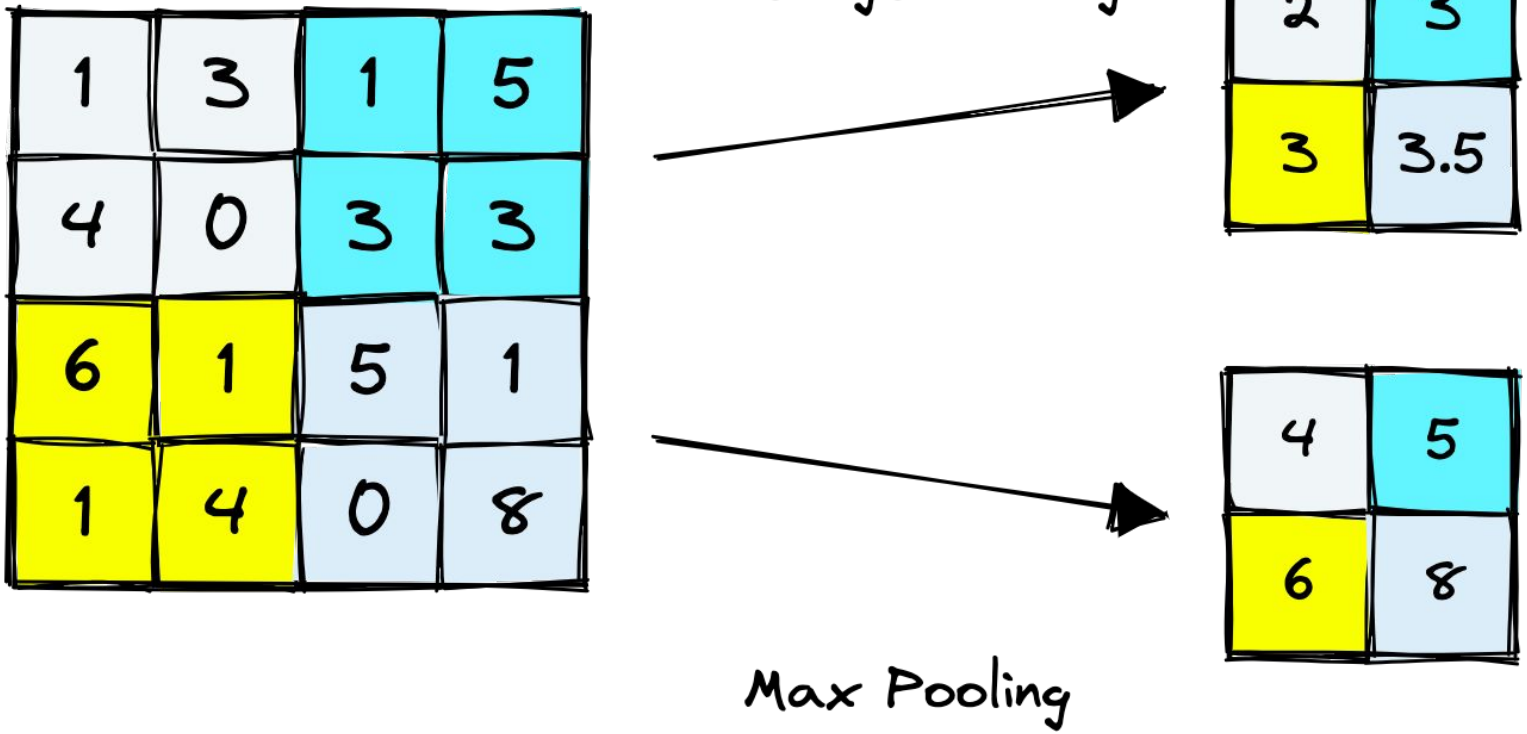
Pooling



Visualization from https://www.pinecone.io/learn/series/image-search/cnn/

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Recommended Materials

Video:

- Grant Sanderson (3Blue1Brown): Neural Networks (4 videos)
- Josh Starmer (StatQuest): Neural Networks / Deep learning (up to the 14th video)
- Mandy ? (deeplizard): Convolutional Neural Networks (CNNs) explained

Text:

- Christopher Olah: Visual Information Theory
- NNDL Chapters 1-3
- ISLR 10.1-3&7: Single Layer Neural Networks, Multilayer Neural Networks, Convolutional Neural Networks, Fitting a Neural Network