Deep Learning - Images

Module 3

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What're you looking forward to the most this upcoming winter break? :)

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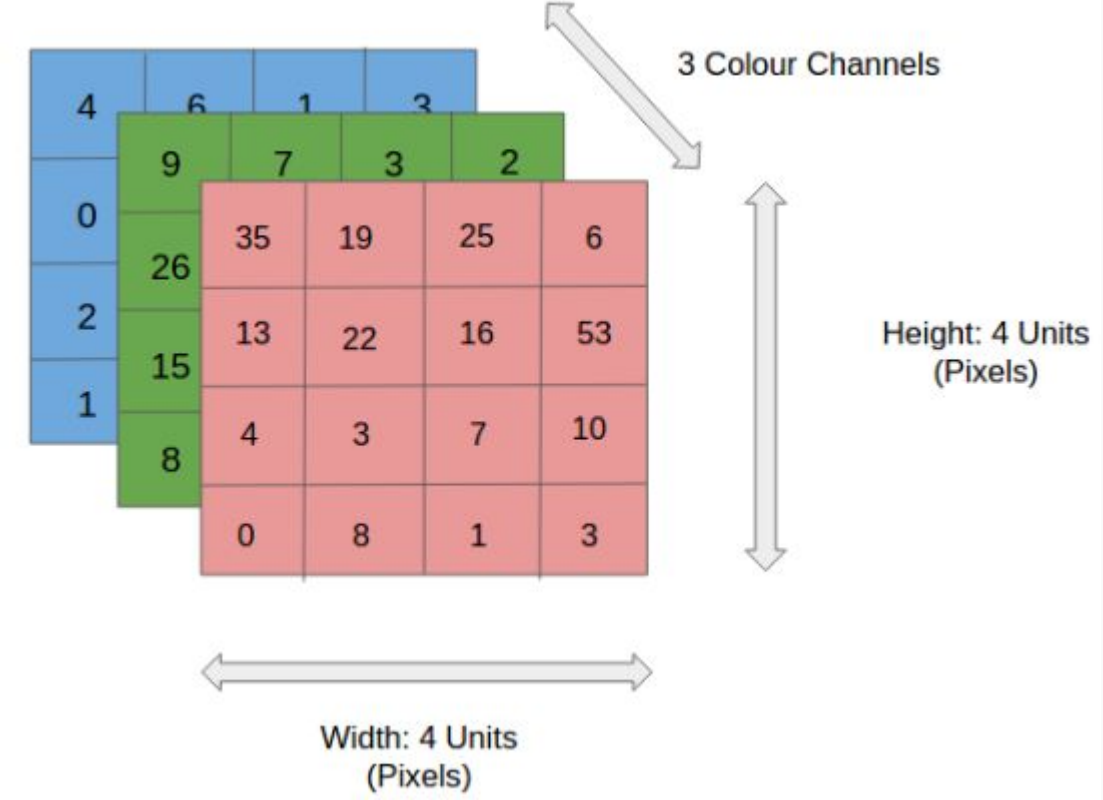
Topics

- Motivation
  - Image as input data
  - Why CNN
- CNN
  - Architecture
  - Training
  - Types
- Transfer Learning

Image as Input Data



https://miro.medium.com/max/1250/1*15yDvGKV47a0nkf5qLKOOQ.png

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Why is CNN preferred for image data?

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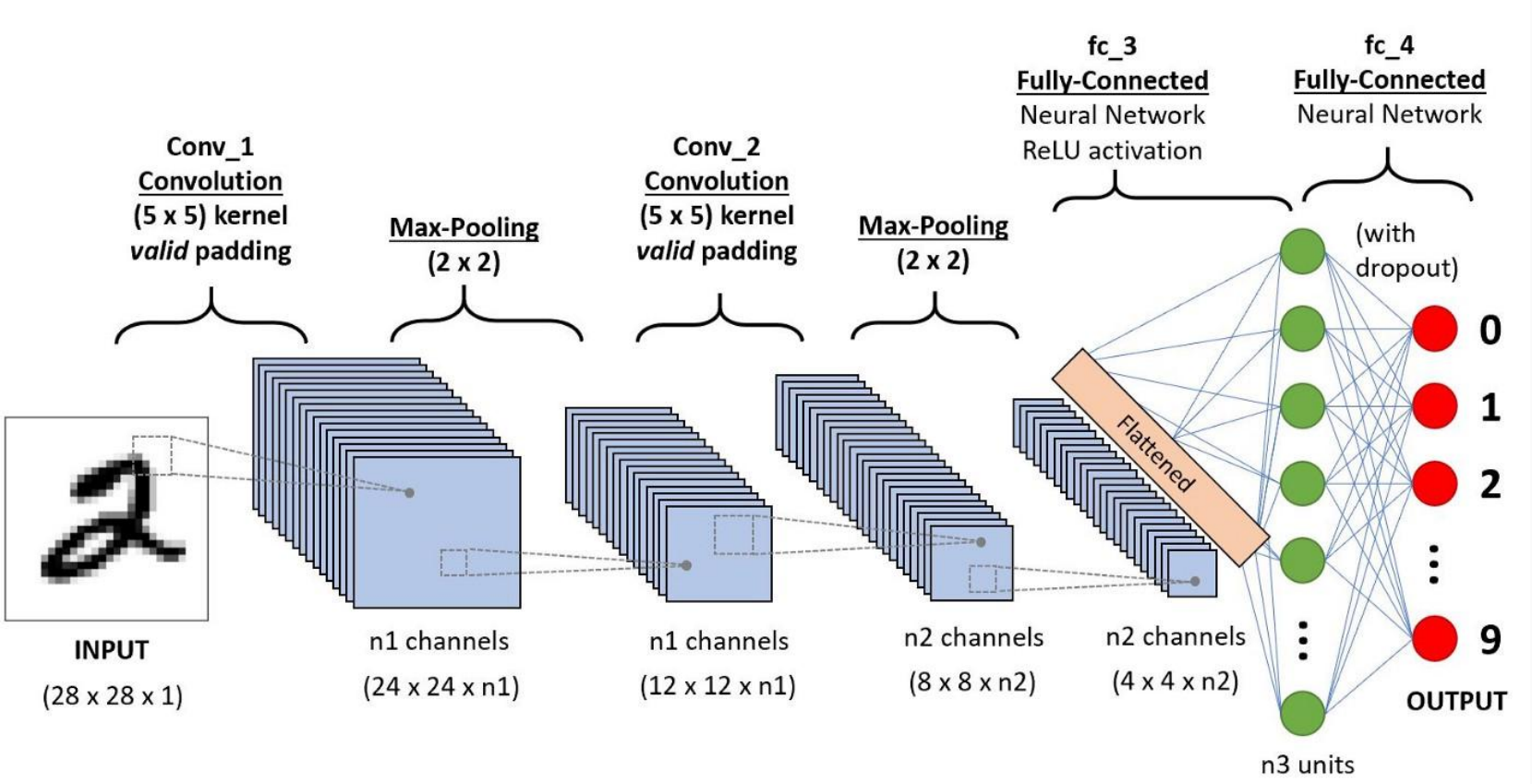
Slido Question

Why is CNN preferred for image data?

- CNN is able to capture the spatial and temporal dependencies
- Less parameters

CNN Architecture



https://miro.medium.com/max/1400/1*uAeANQIOQPqWZnnuH-VEyw.jpeg

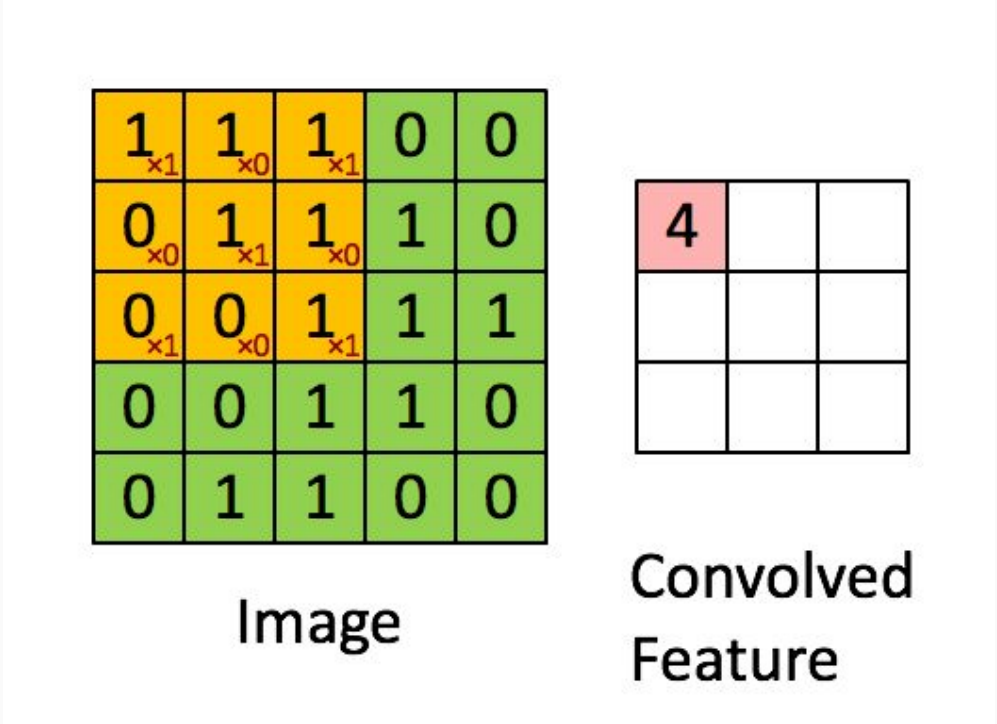
Convolution

Convolution
- Matrix multiplication between kernel and covered area of image
- Extract features for easier processing

Kernel/Filter
- Used in convolution operation
- Same dimension as channel size

Stride
- Step size of each shift

Padding
- Control output dimension



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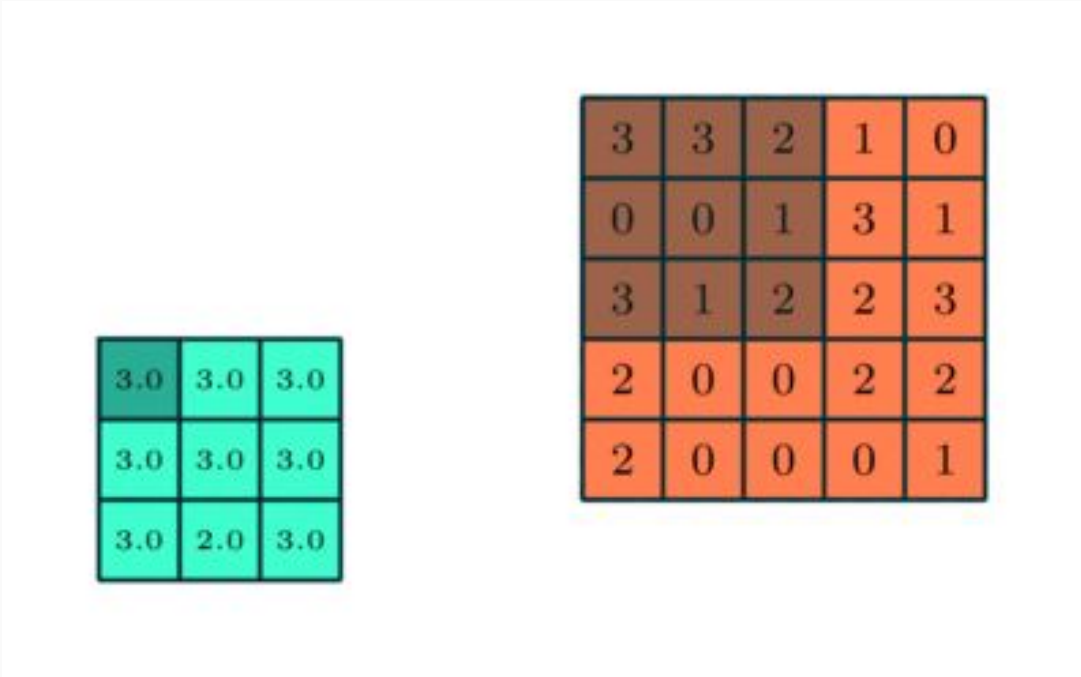
Pooling

Purpose

- Reduce spatial size
- Extract dominant features
- Decrease computational power

Types

- Max
- Average



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Fully Connected

- Flattened & converted data now suitable for MLP
- Train to distinguish features
- Softmax classification

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Motivation for Transfer Learning

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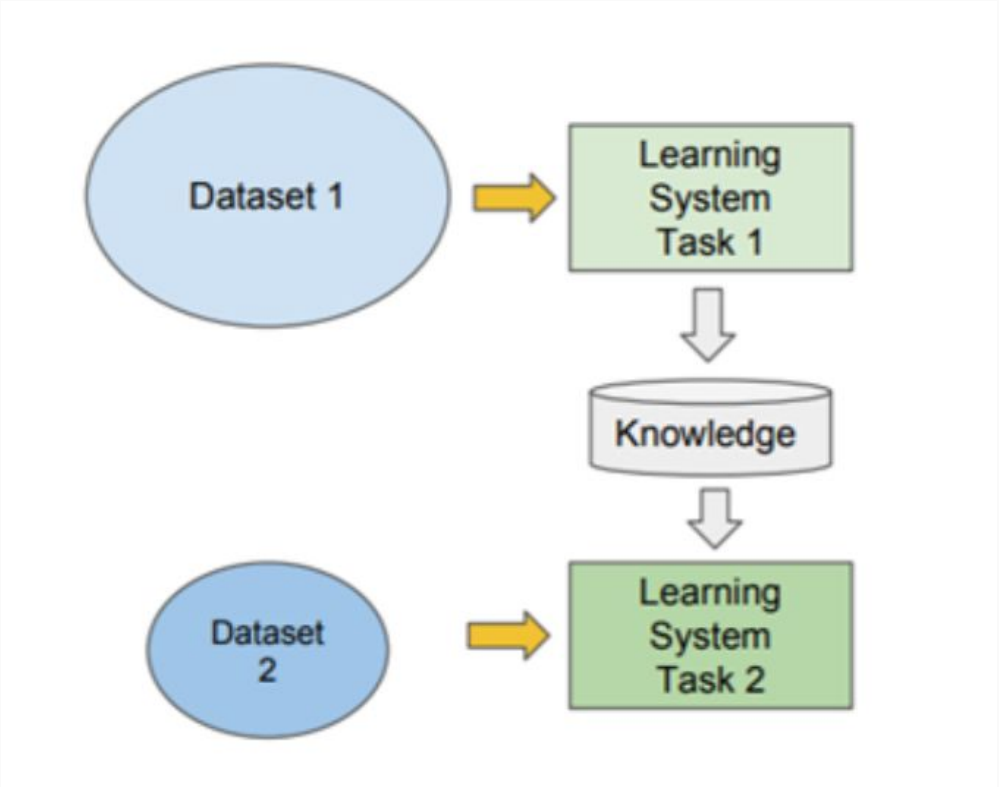
Transfer Learning

Pre-trained models: feature extractor

Fine-tuning: Re-train certain weights



https://towardsdatascience.com/a-comprehensive-hands-on-guide-to-transfer-learning-with-real-world-applications-in-deep-learning-212bf3b2f27a

Thank You! :)