

Deep Learning: Theory and Practice

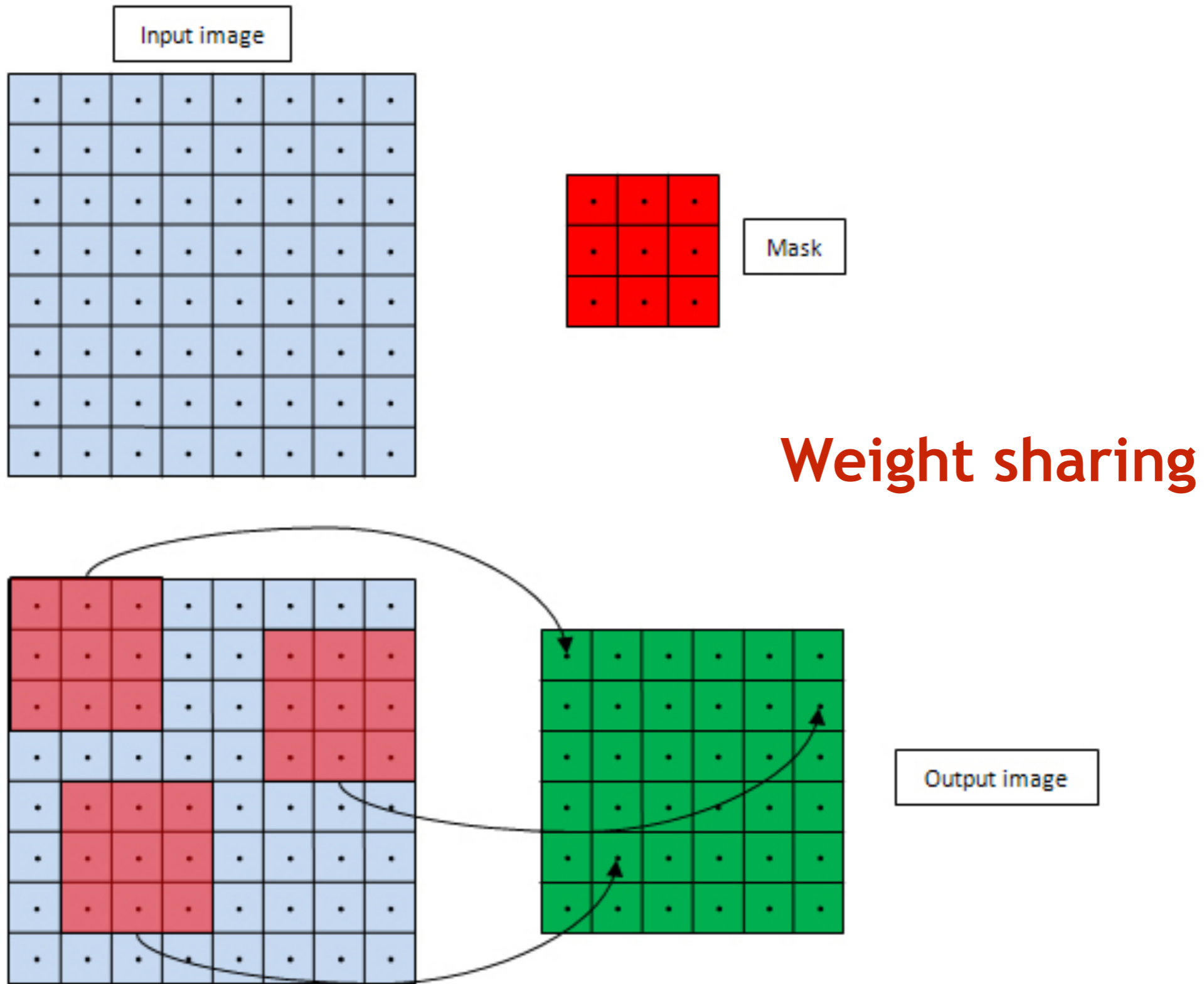
Convolutional Neural Networks

21-03-2019

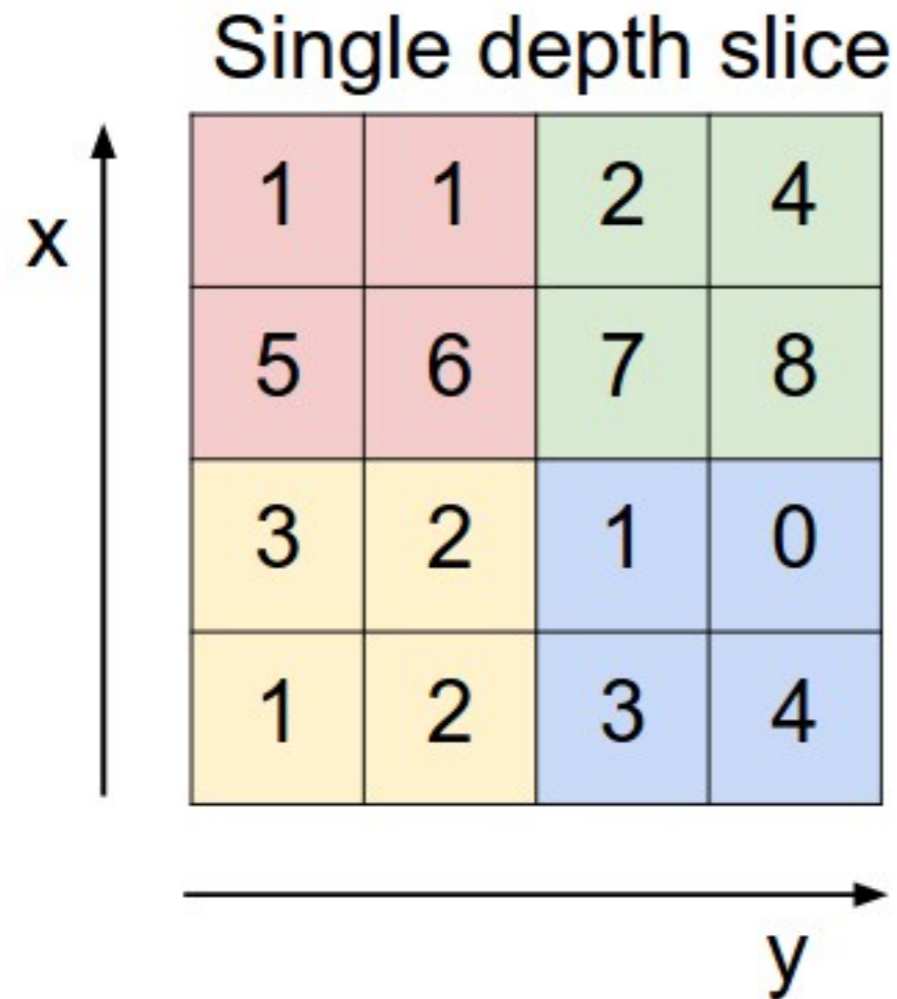
deeplearning.cce2019@gmail.com



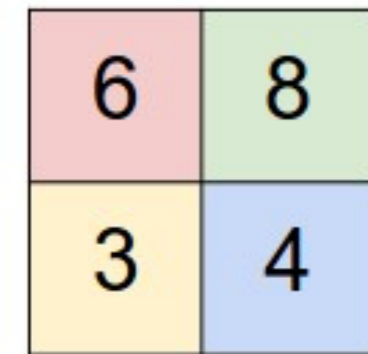
Other Architectures - Convolution Operation



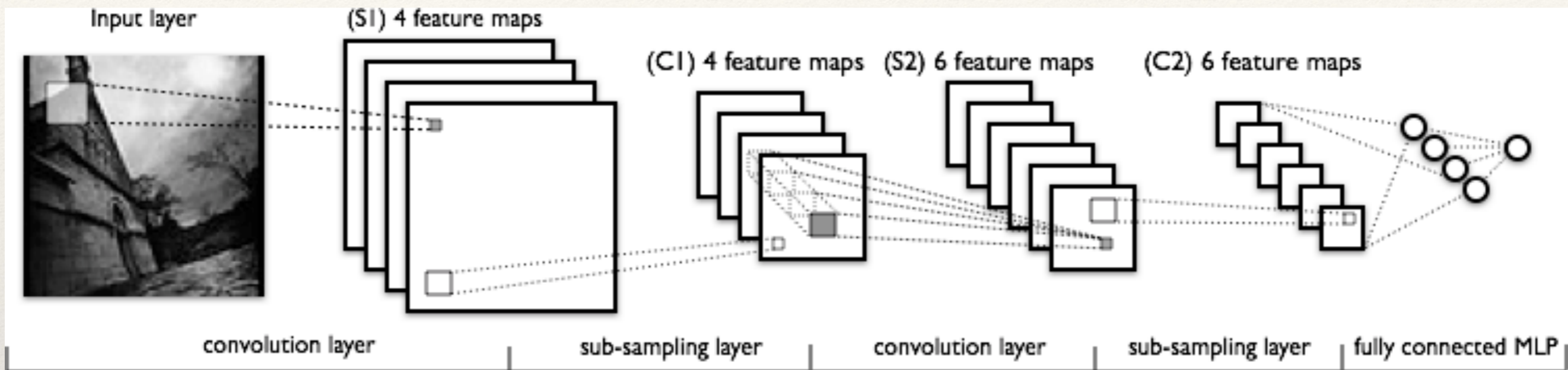
Max Pooling Operation



max pool with 2x2 filters
and stride 2

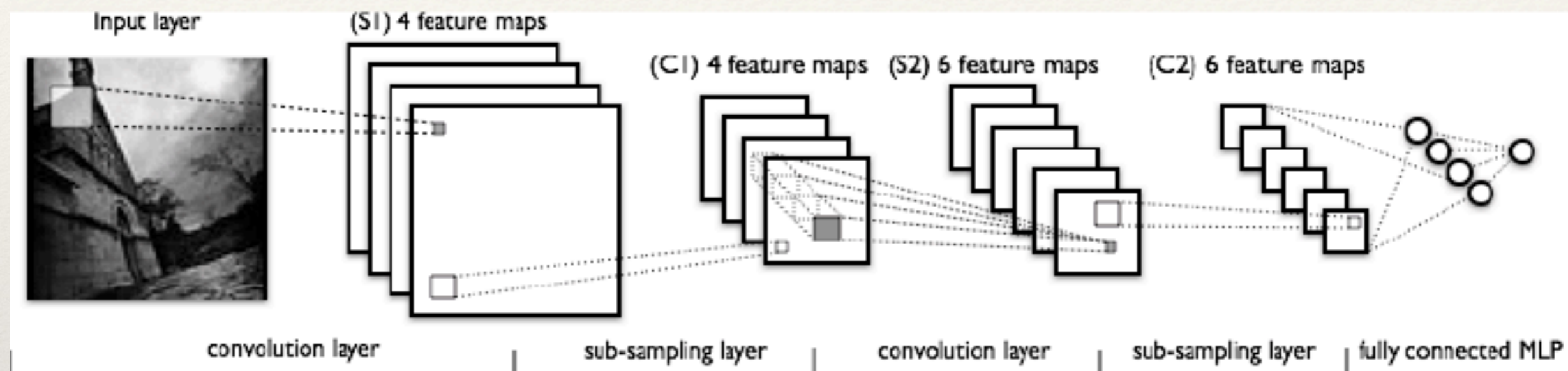


Convolutional Neural Networks



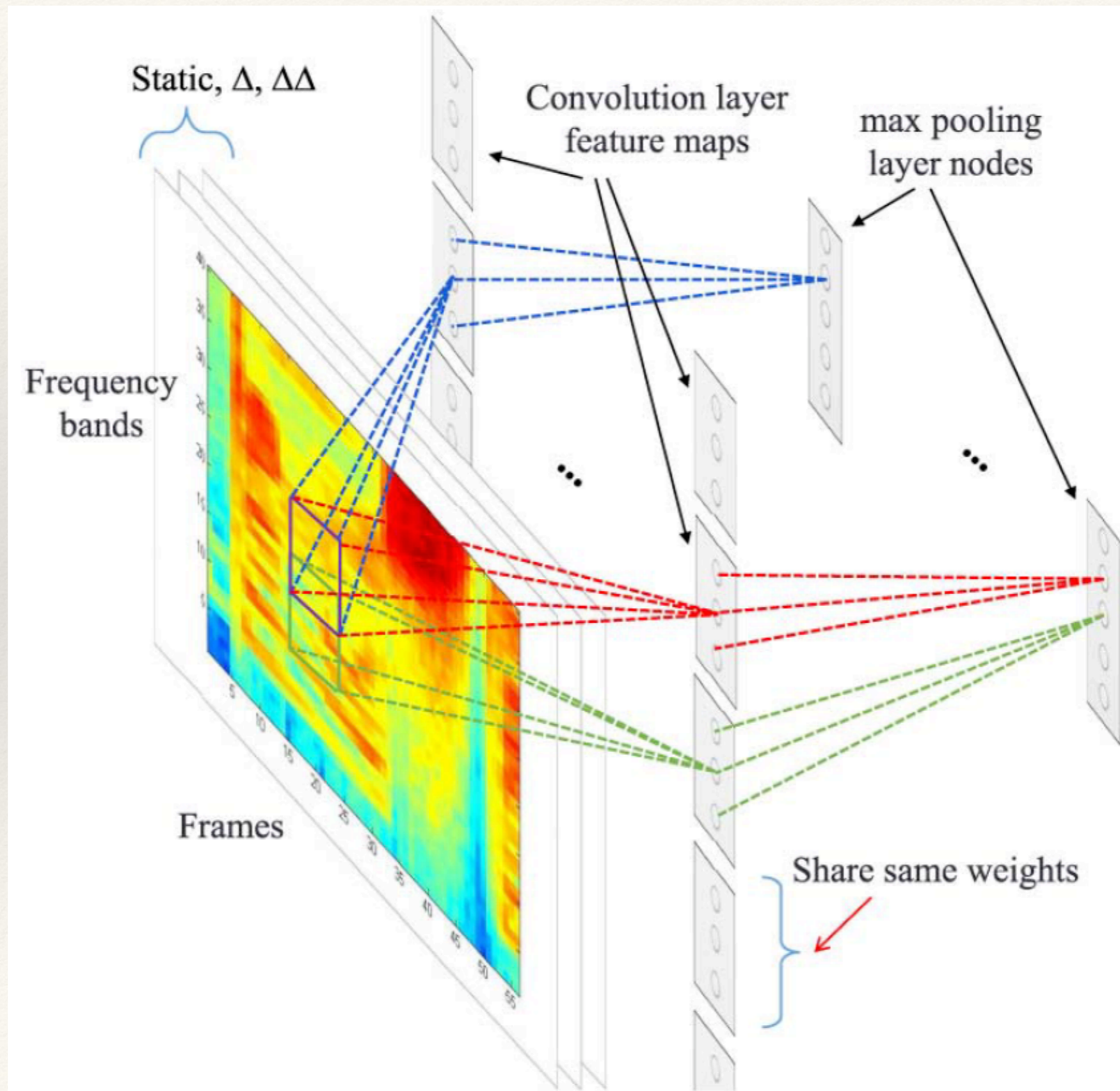
- Multiple levels of filtering and subsampling operations.
- Feature maps are generated at every layer.

Convolutional Neural Networks



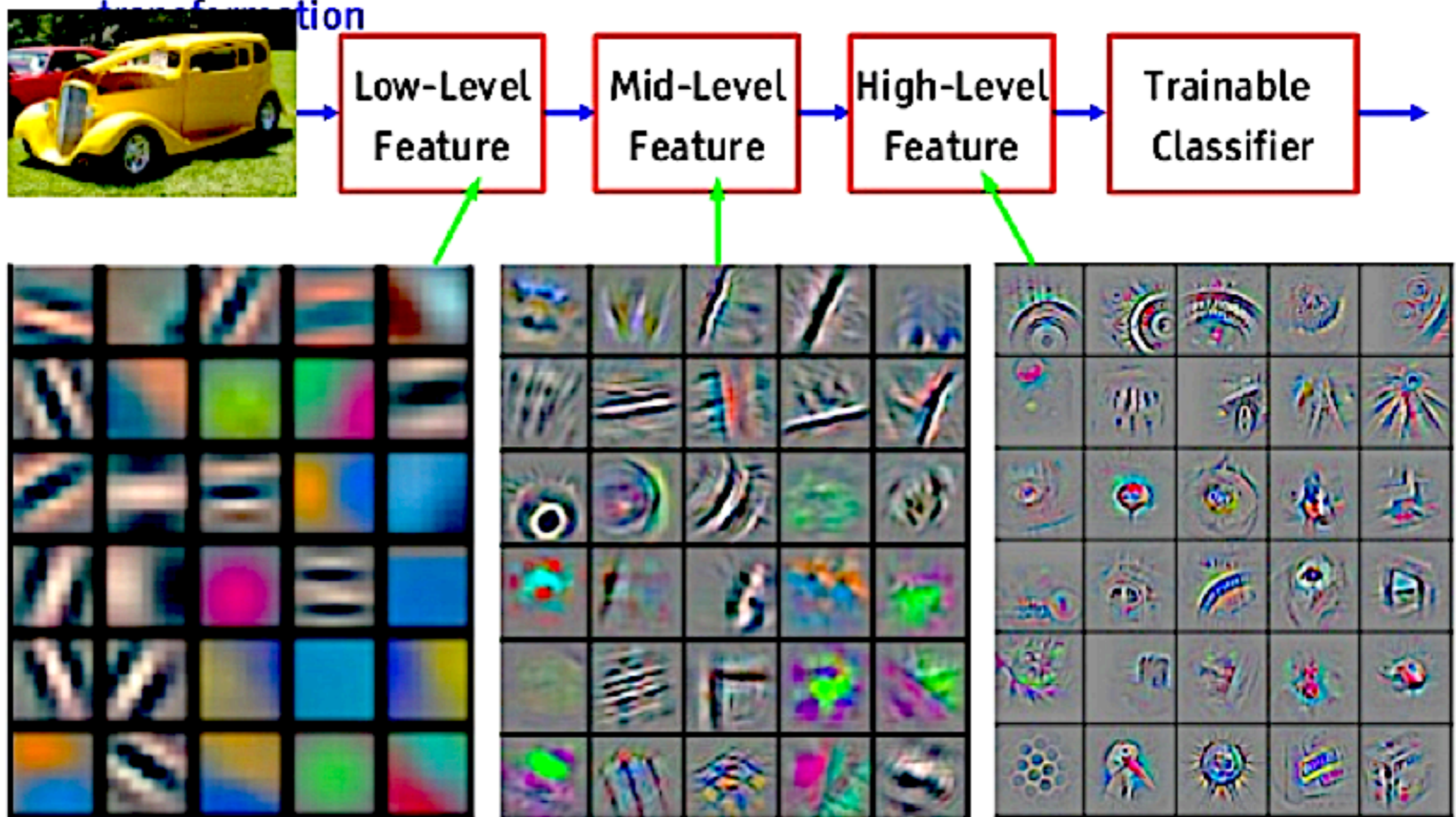
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CNNs for Speech and Audio



Representation Learning in CNNs

It's **deep** if it has more than one stage of non-linear feature transformation



Feature visualization of convolutional net trained on ImageNet from [Zeiler & Fergus 2013]