Continuación de Redes convolucionales

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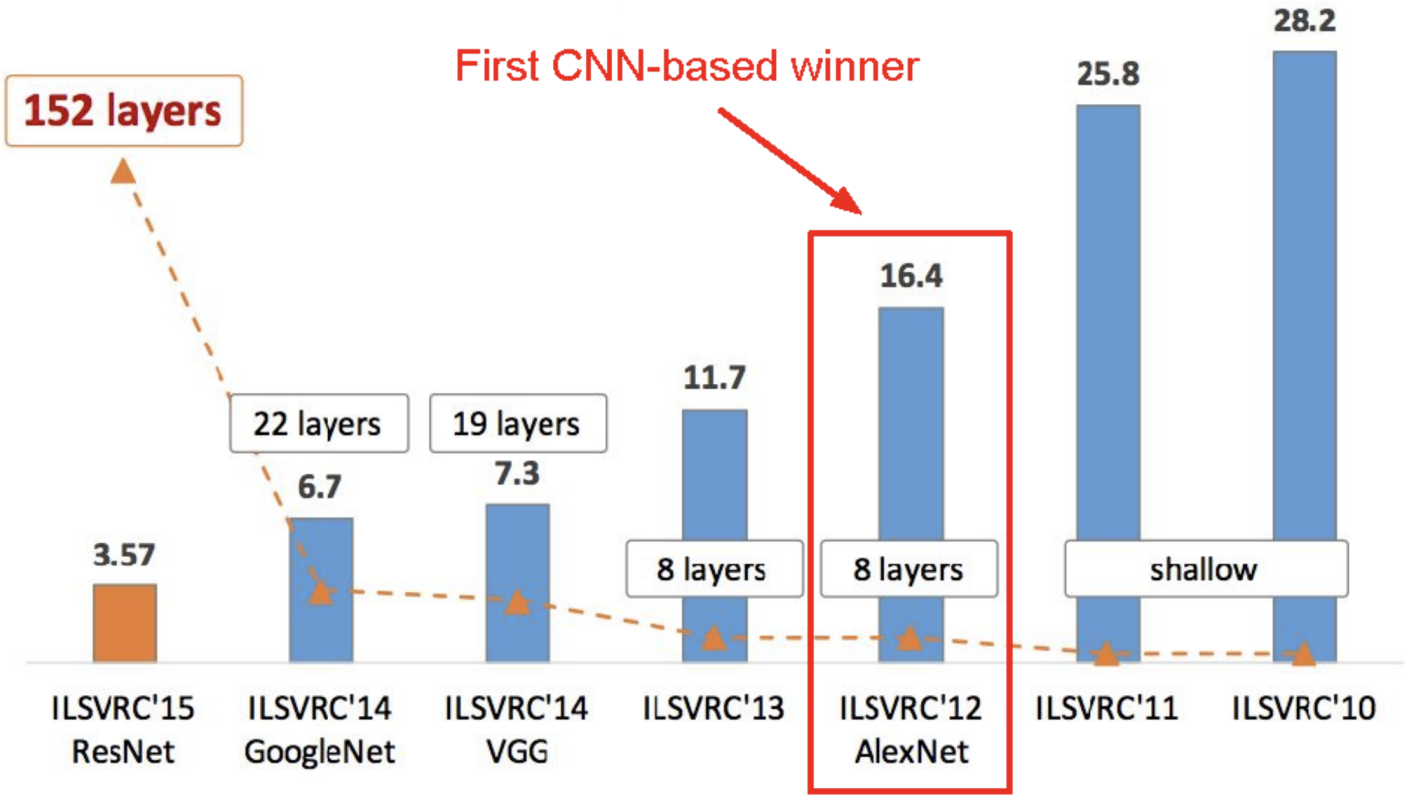
Objetivos

- Conocer Imagenet y las distintas arquitecturas que han ganado.
- Contar parámetros en Alexnet.
- Enteder el concepto de transfer learning.

1000 clases, 1.2 millones de imágenes de entrenamiento, 100.000 imágenes de testeo.

https://arxiv.org/pdf/1409.0575

Ganadores de ILSVR



https://cs231n.stanford.edu/slides/2019/cs231n_2019_lecture09.pdf

El año 2012 ganó por primera vez una CNN

ImageNet Classification with Deep Convolutional Neural Networks

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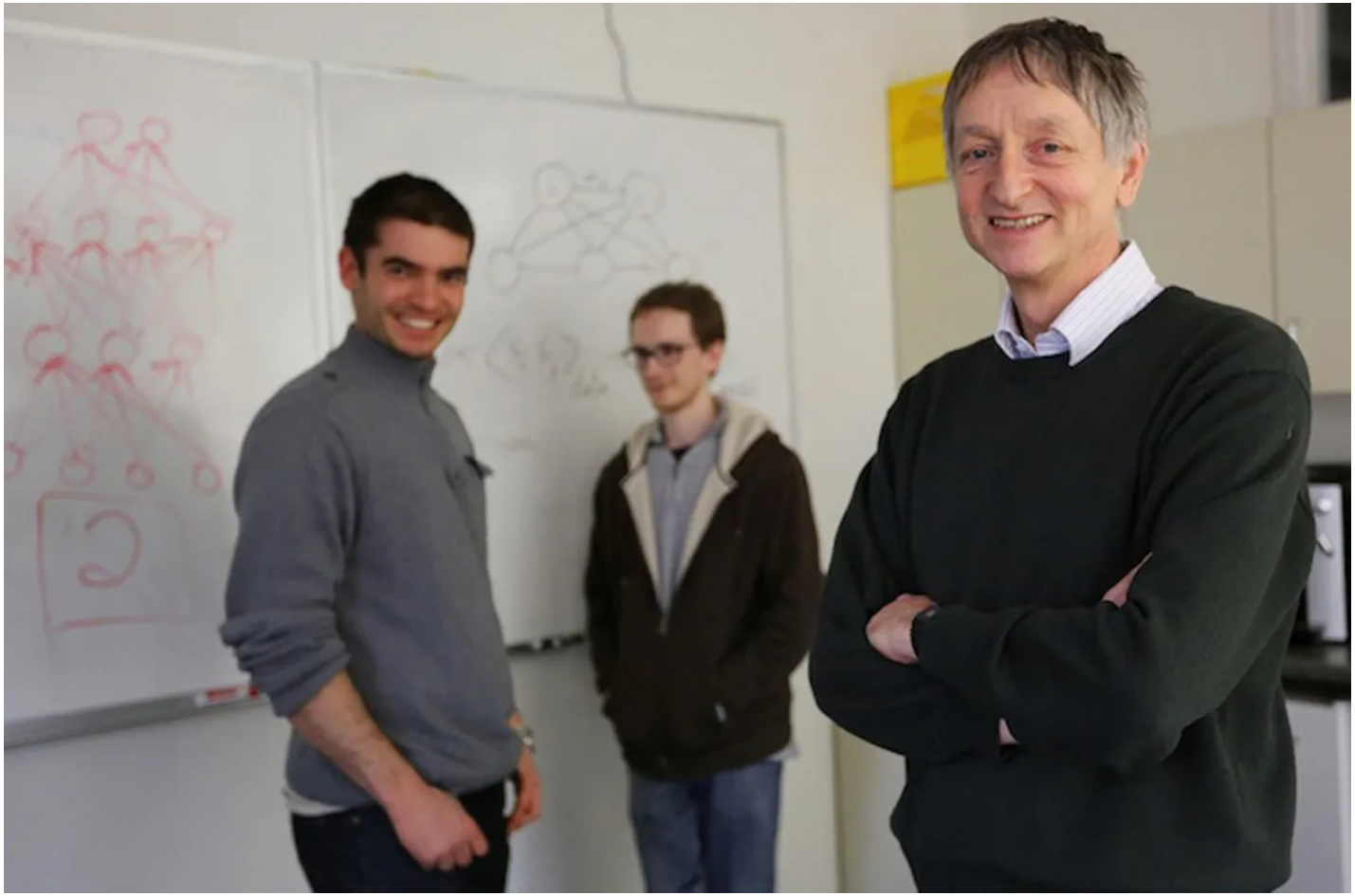
https://proceedings.neurips.cc/paper_files/paper/2012/file/c399862d3b9d6b76c8436e924a68c45b-Paper.pdf

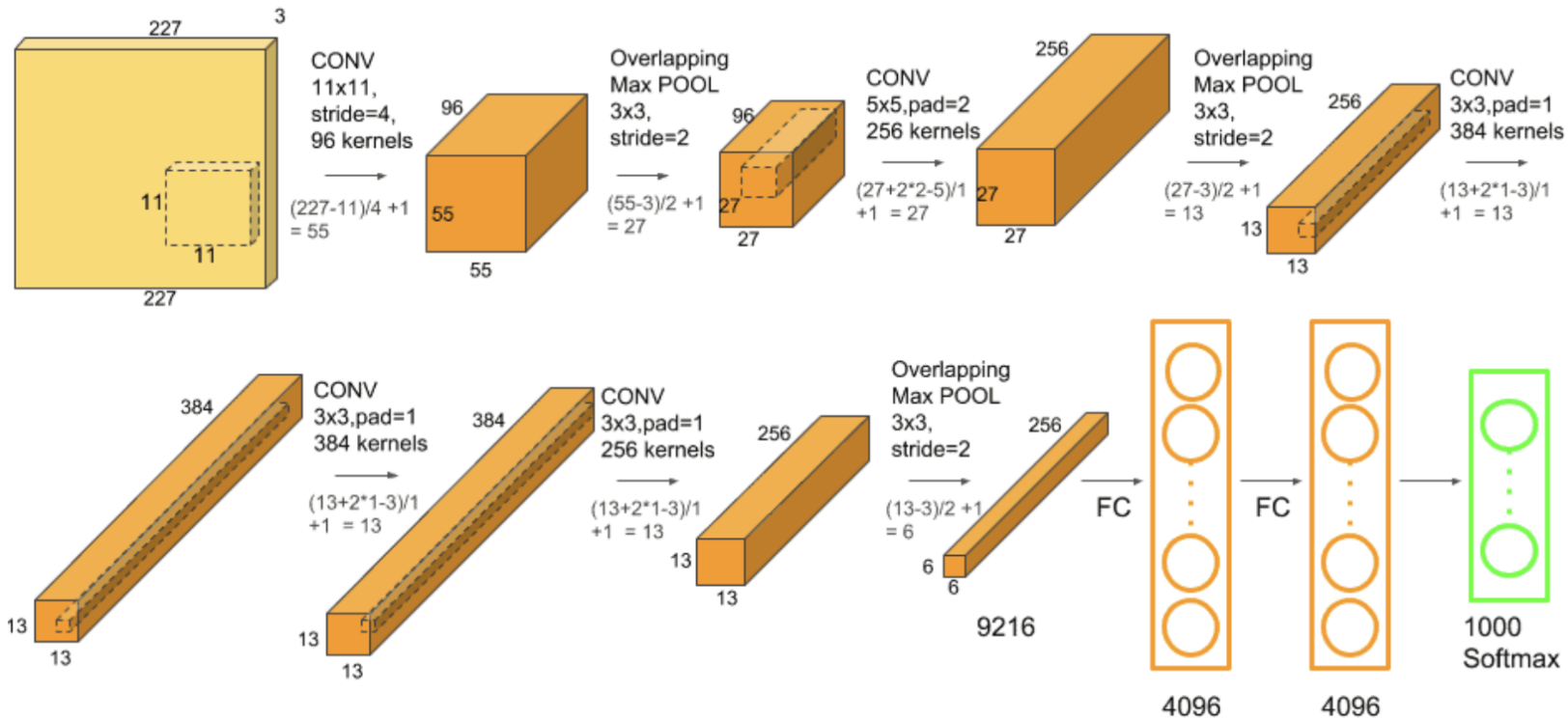
El mundo la llamó Alexnet en honor a Alex



https://mit6874.github.io/assets/sp2021/slides/l03.pdf

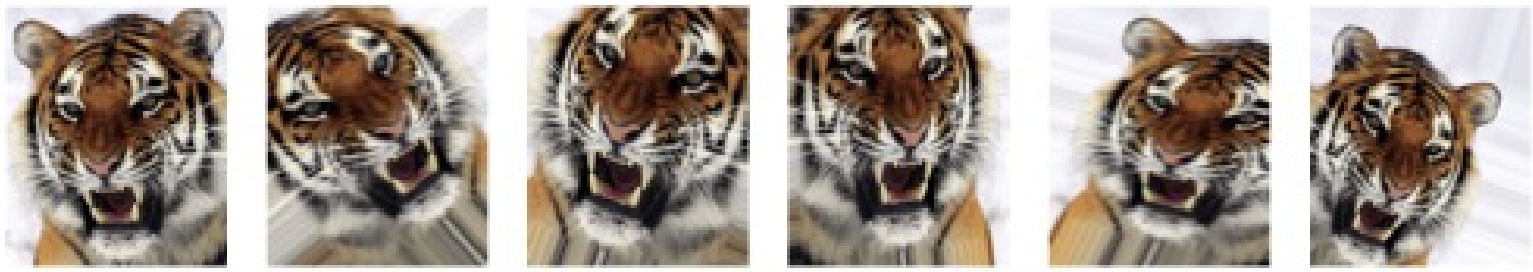
Desafío: contar el número de parámetros en Alexnet

¿Cuántos parámetros tiene esta red?



https://learnopencv.com/number-of-parameters-and-tensor-sizes-in-convolutional-neural-network/

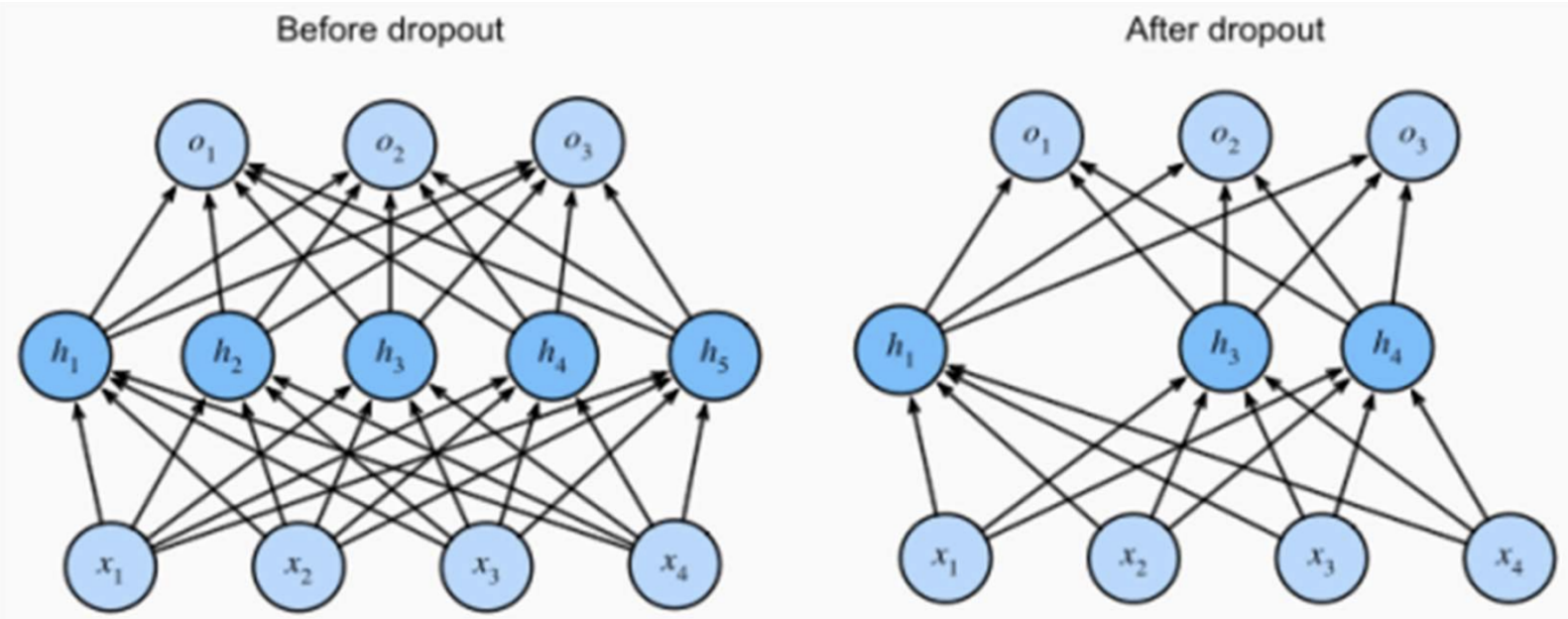
Alexnet hizo mucho *Data augmentation*



https://www.statlearning.com/

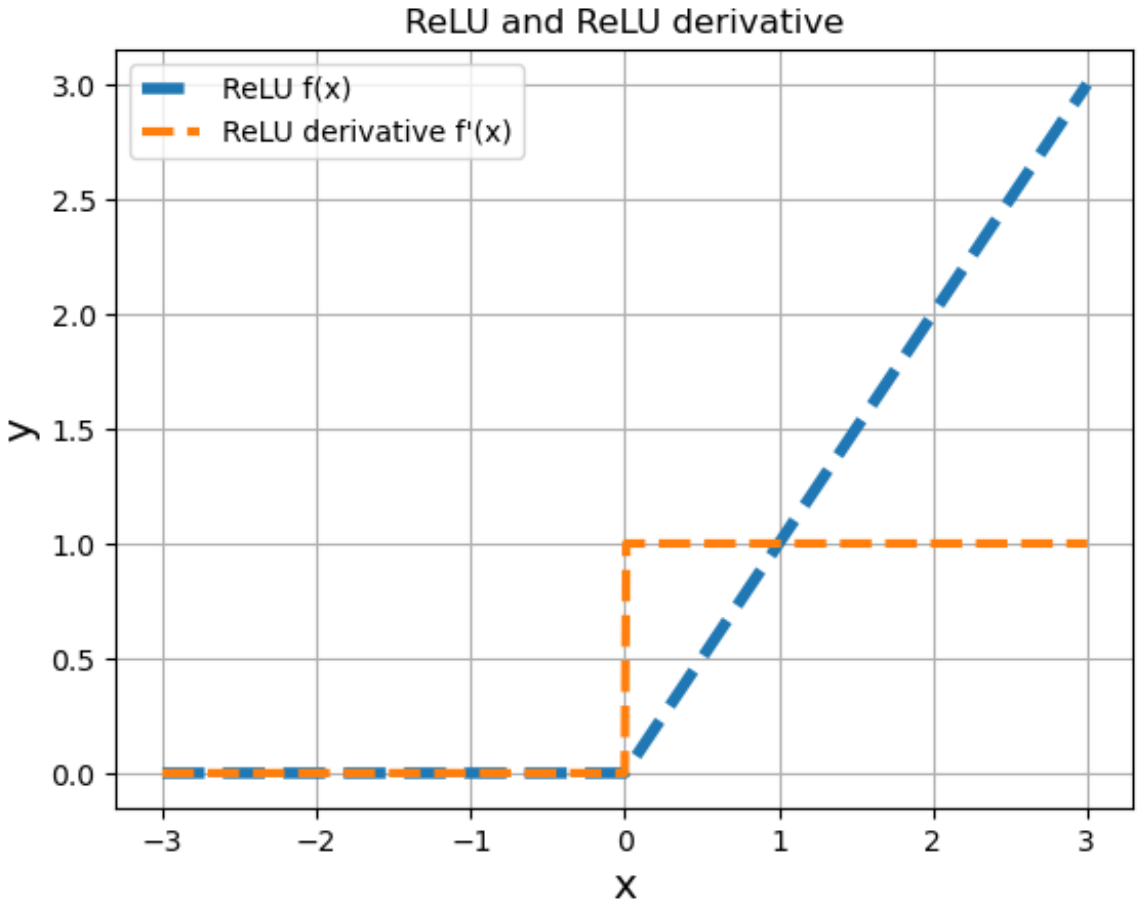
Incluído *crop*

Dropout



https://www.uomustansiriyah.edu.iq/media/lectures/5/5_2024_11_20!08_10_33_PM.pdf

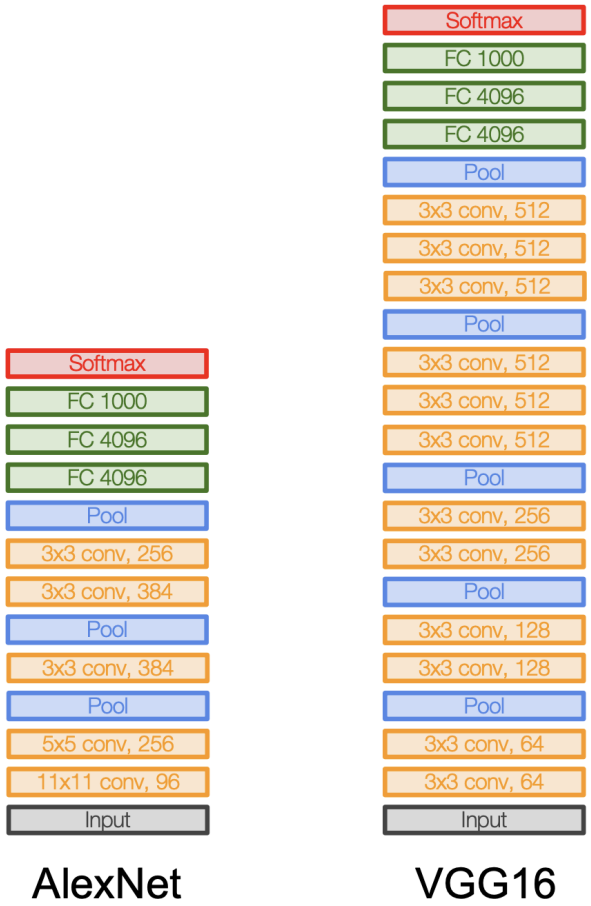
Y usó RELU en vez de sigmoid



https://kawahara.ca/derivatives/relu/

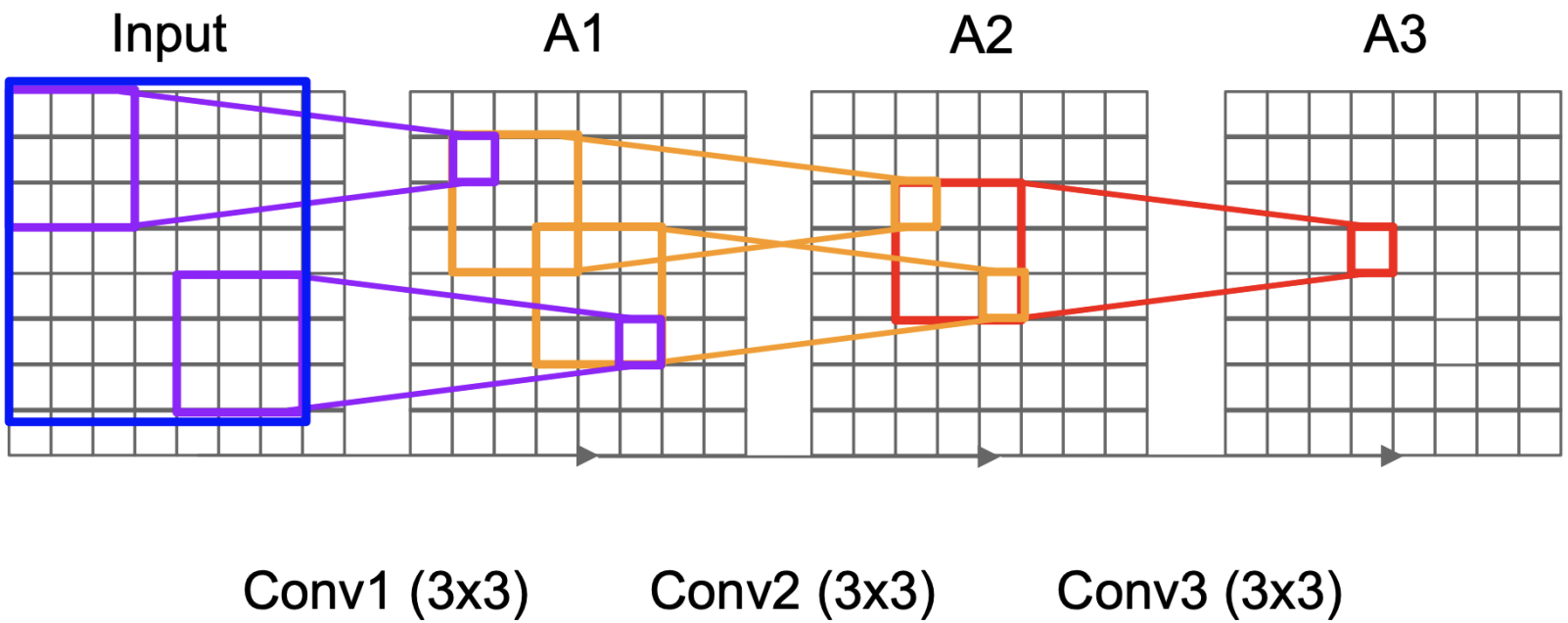
VGG-16

VGG solo usa filtros 3x3 con p=s=1 y pool 2x2 s=2



https://cs231n.stanford.edu/slides/2025/lecture_6.pdf

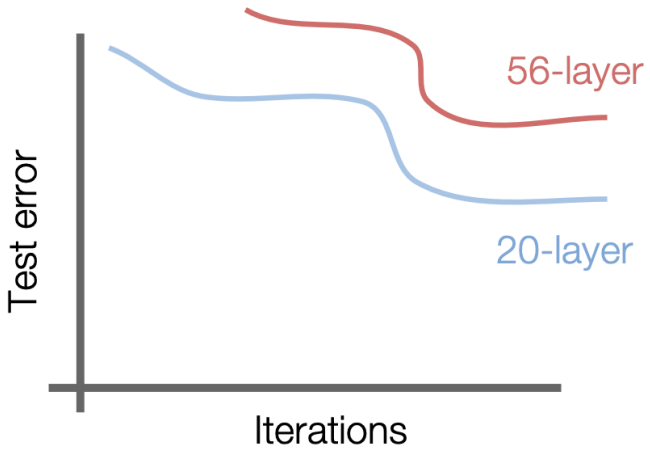
Filtros pequeños seguidos tienen el efecto de aumentar el campo receptivo sin aumentar el número de parámetros

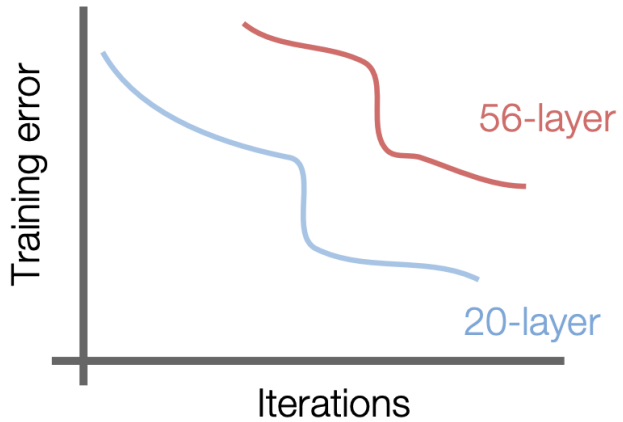


https://cs231n.stanford.edu/slides/2025/lecture_6.pdf

ResNet

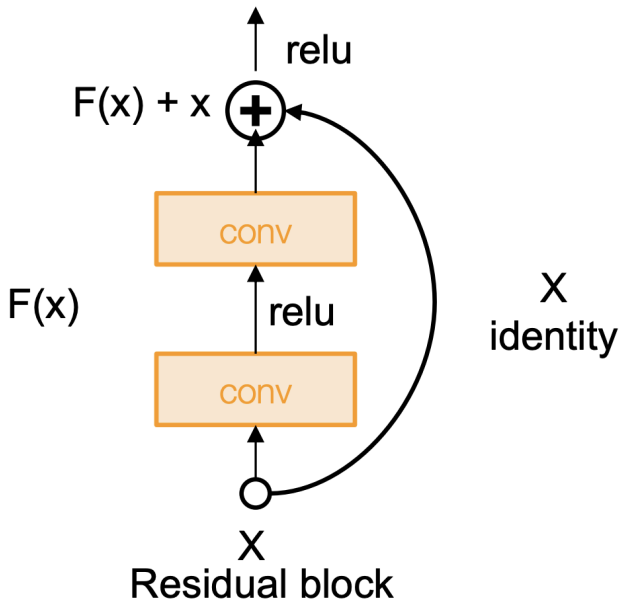
Redes convolucionales muy profundas son dificiles de entrenar

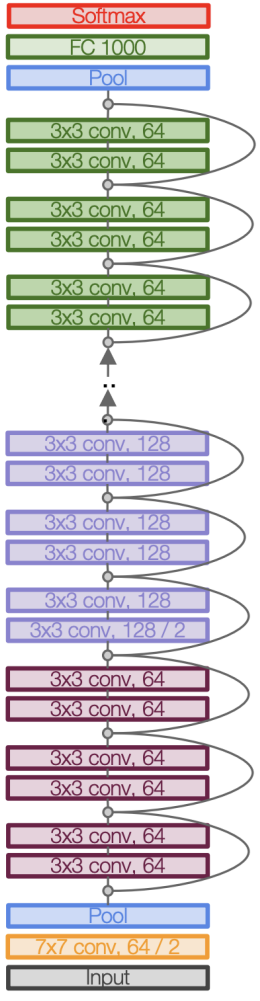




https://cs231n.stanford.edu/slides/2025/lecture_6.pdf

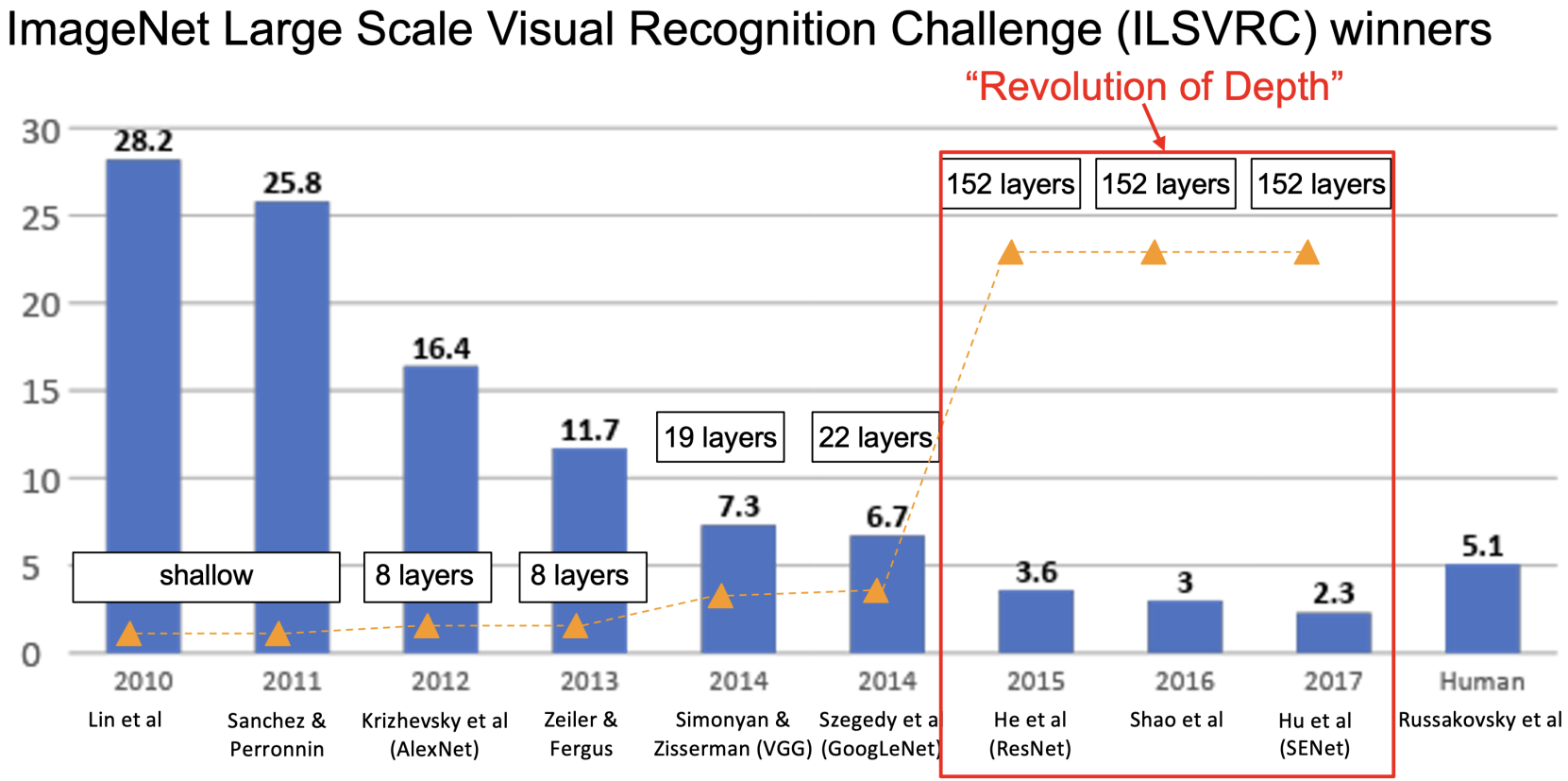
Resnet





https://cs231n.stanford.edu/slides/2025/lecture_6.pdf

Resnet-152 bajó el error a 3,57 %



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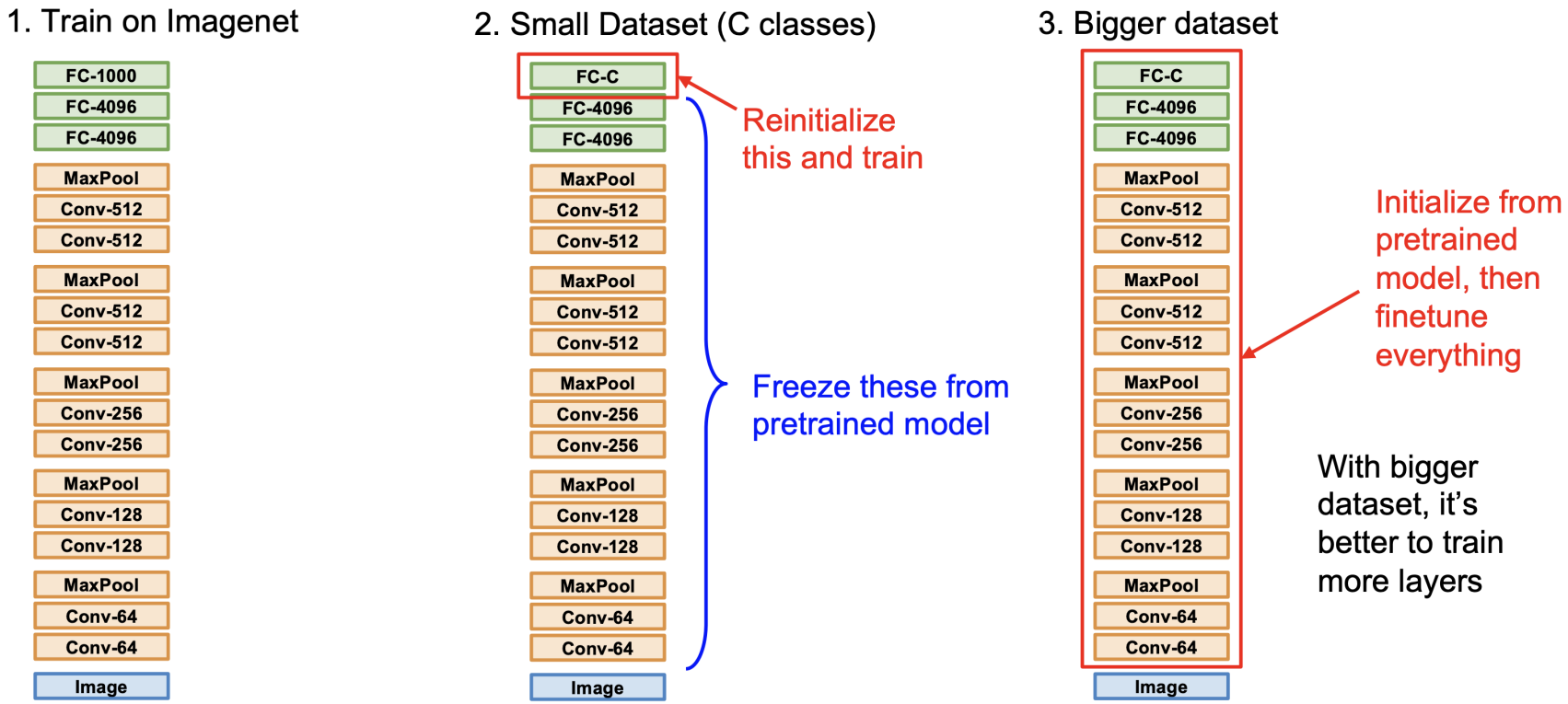
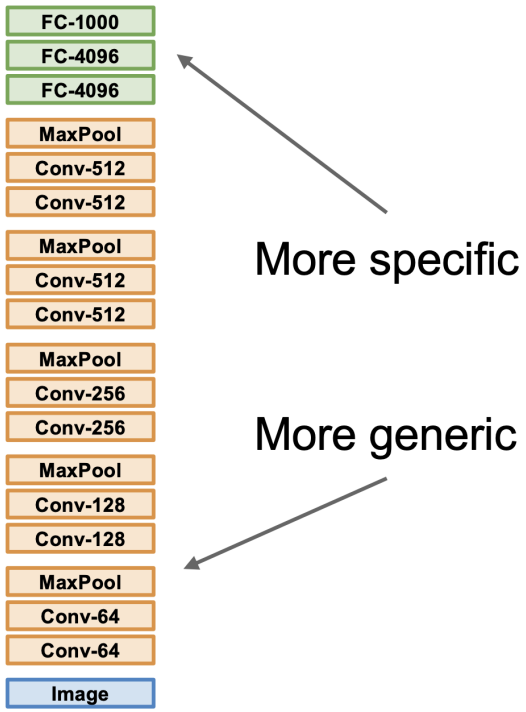
Transfer learning

Congelar capas



https://cs231n.stanford.edu/slides/2025/lecture_6.pdf

Depende de la cantidad de datos que se tiene



	very similar dataset	**very different dataset**
very little data	Use Linear Classifier on final layer	Try another model or collect more data ☹
quite a lot of data	Finetune all model layers	Either finetune all model layers or train from scratch!

https://cs231n.stanford.edu/slides/2025/lecture_6.pdf