Why is deep learning so cool?

Lamberto Ballan

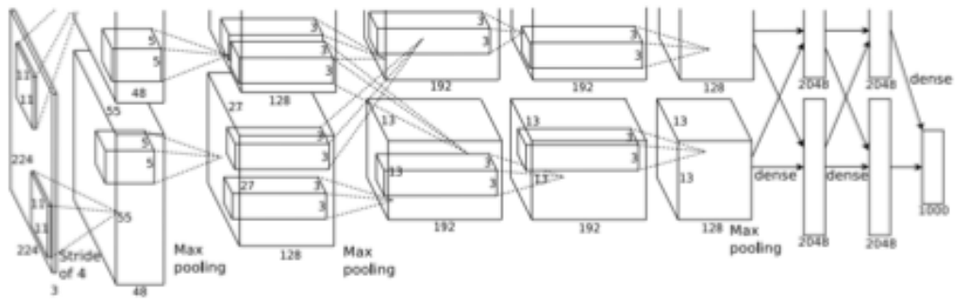
University of Padova, Italy

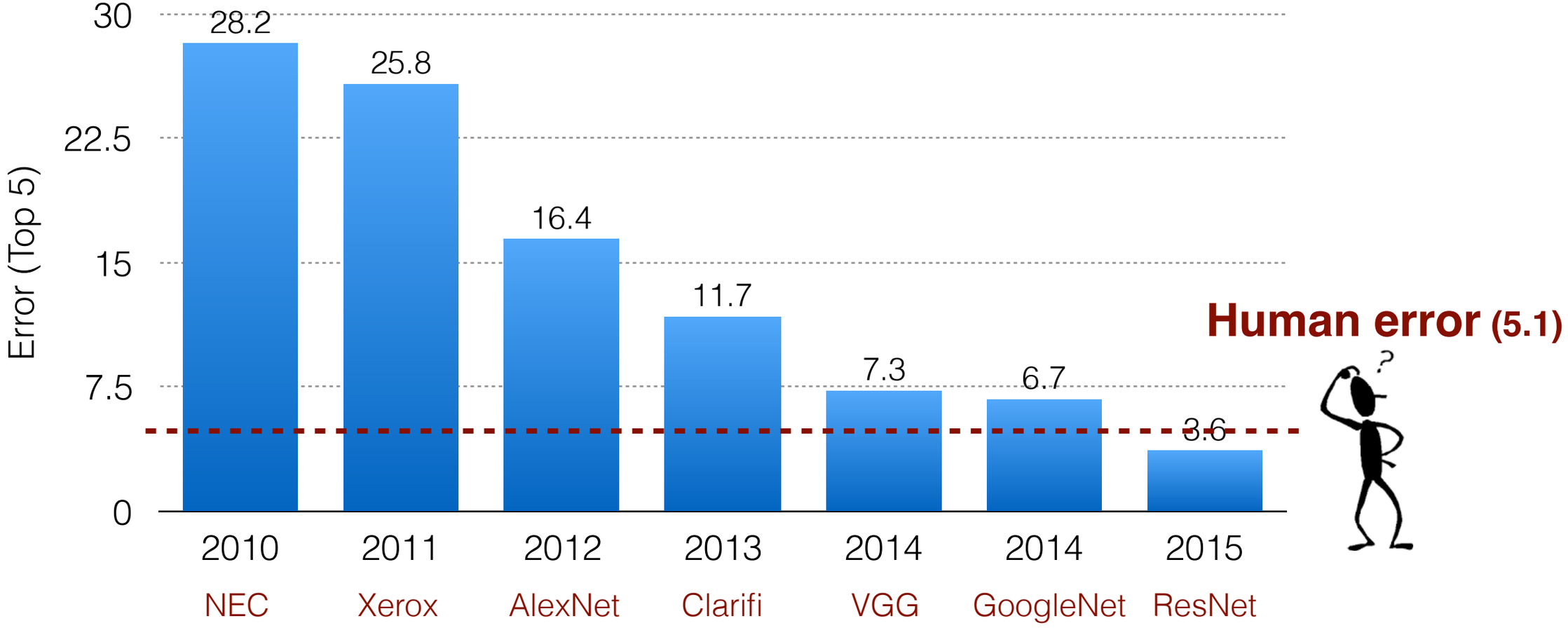
GIRPR-CVPL - Modena, Jan 29, 2018

DIPARTIMENTO MATEMATICA
Department of Mathematics "Tullio Levi-Civita"

Visual recognition results

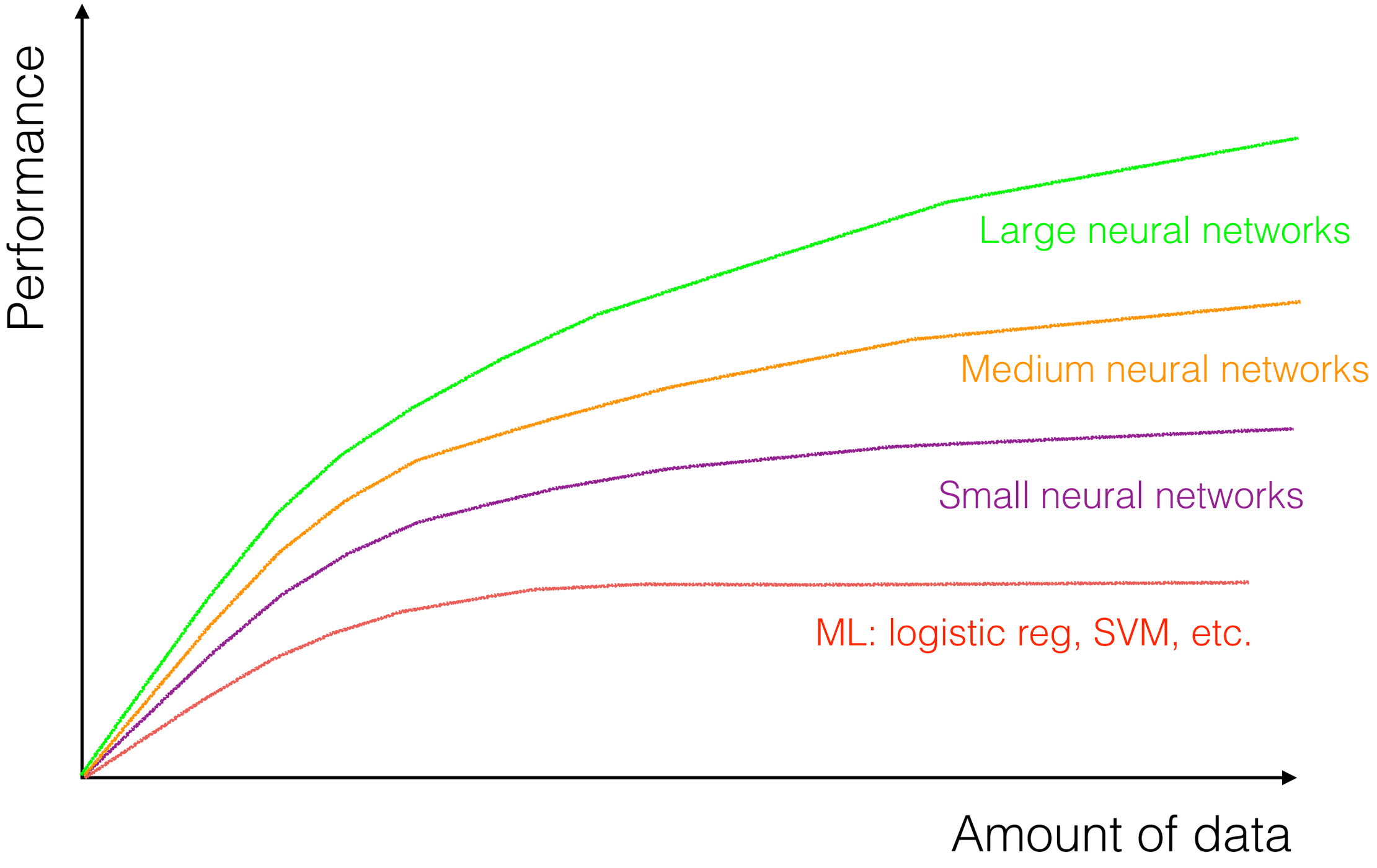
- ImageNet-ILSVRC (classification) over the years





Lamberto Ballan: ***"Why is deep learning so cool?"***

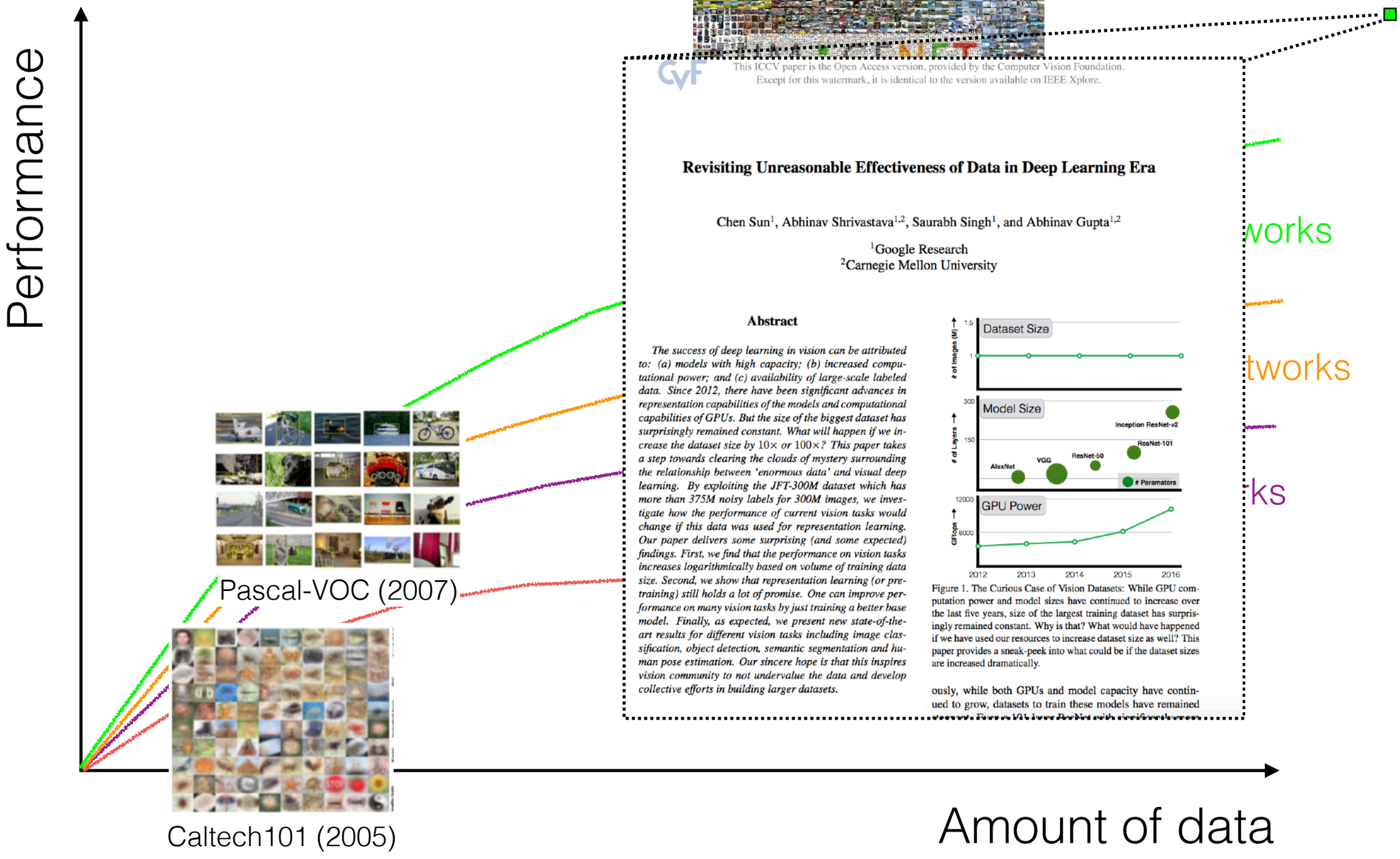
Scale drive deep learning progress



Adapted from slide by Andrew Ng

Lamberto Ballan: ***"Why is deep learning so cool?"***

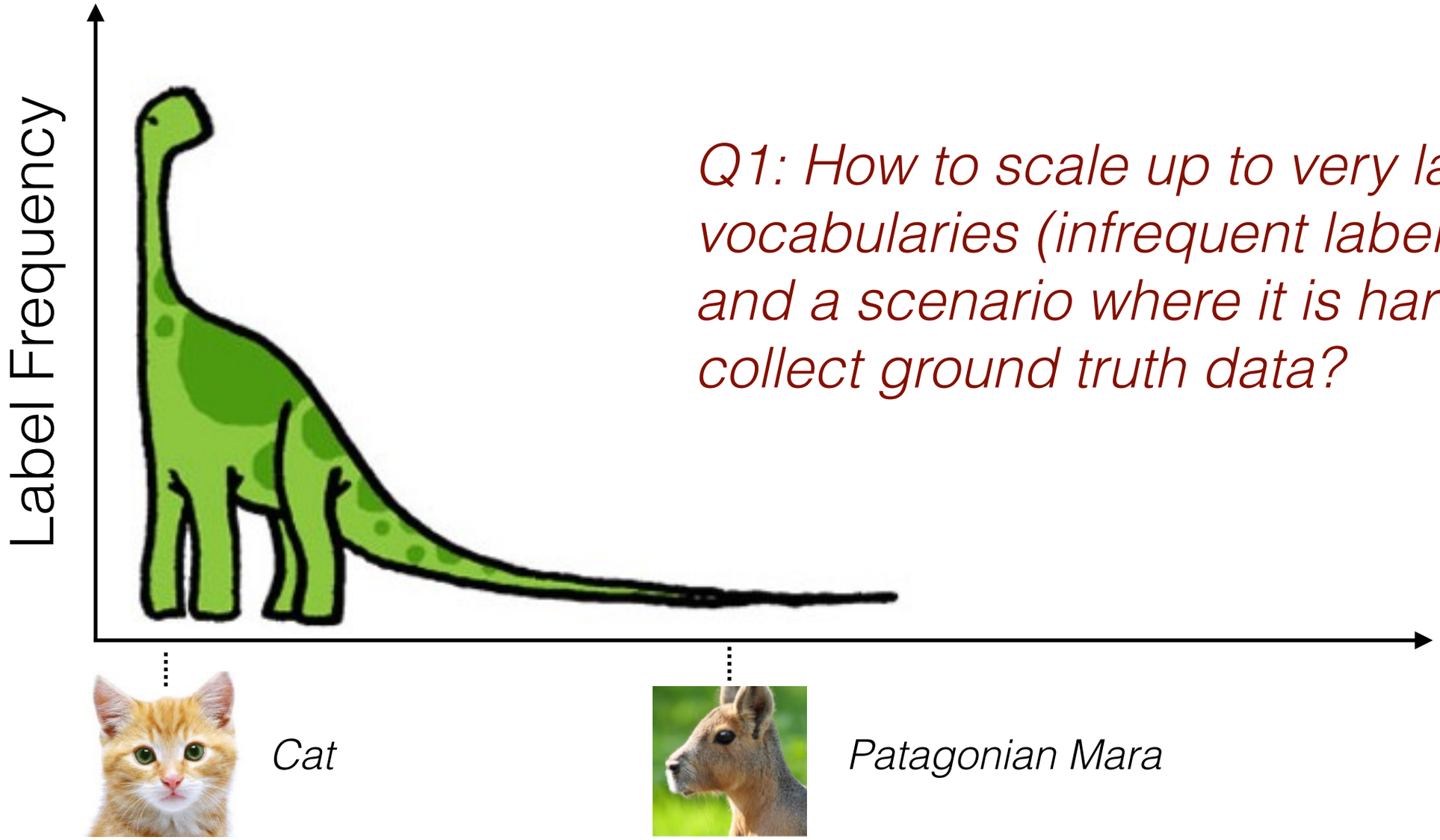
Scale drive deep learning progress



Lamberto Ballan: ***"Why is deep learning so cool?"***

This is super cool but…

- **The long tail**: a small number of objects / entities appear very often while most others appear rarely



Q1: How to scale up to very large vocabularies (infrequent labels) and a scenario where it is hard to collect ground truth data?

How children learn to see

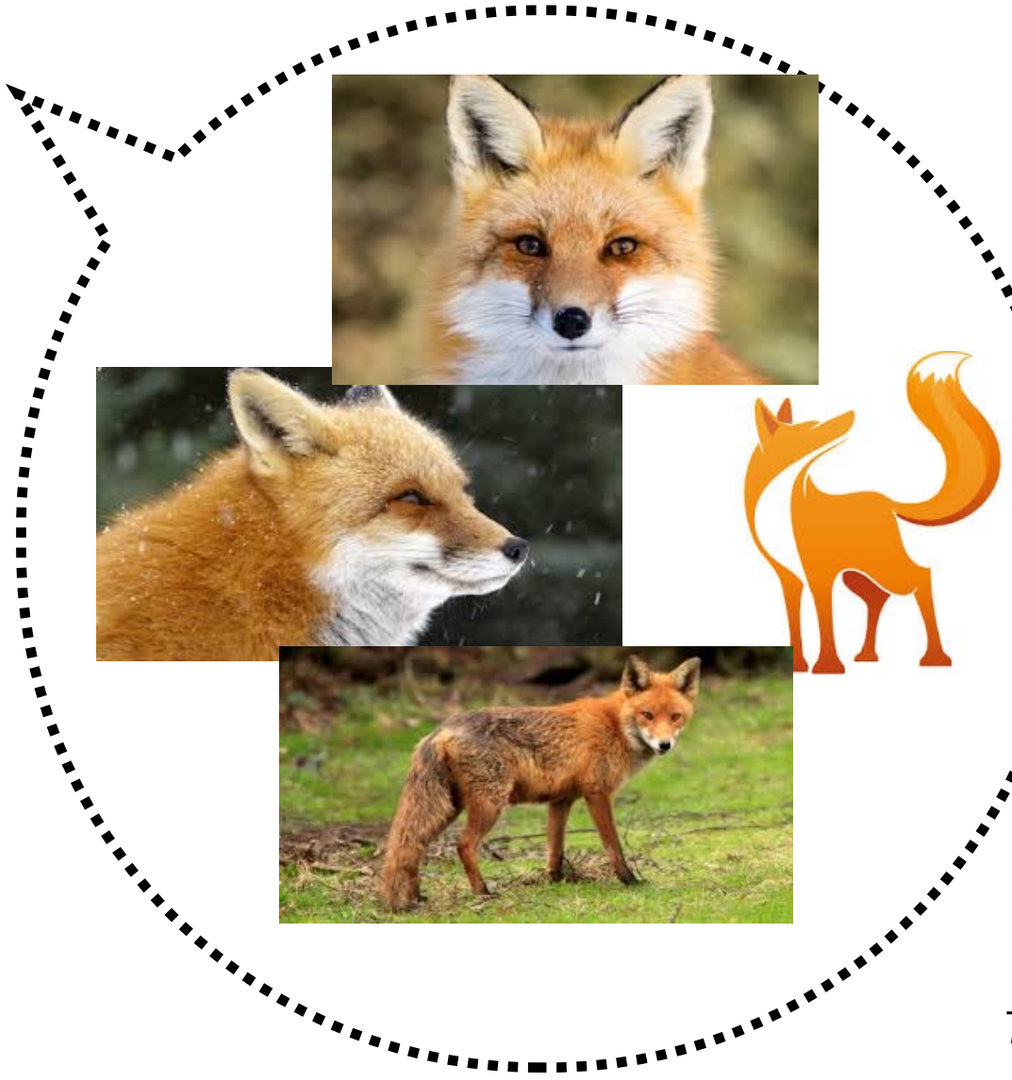
by observing lots (tons) of data

Fox

(Linda loves foxes)

How children learn to see

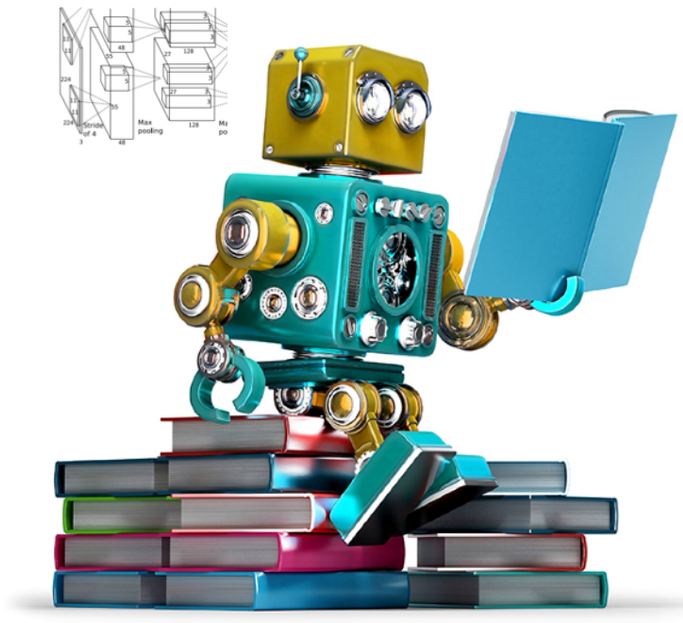
by observing lots (tons) of data



Lamberto Ballan: ***"Why is deep learning so cool?"***

Again, CNNs are cool but…

- Even two year old kids are good at abstraction, and are able to generalize and transfer their knowledge

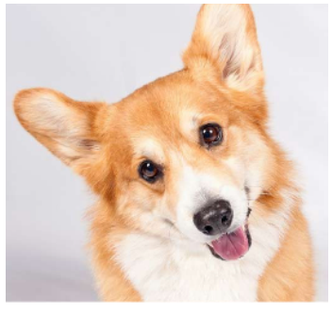


Q2: Our algorithms are very good at memorising categories, but are we really going toward full image understanding?

Cat

Dog

Cardigan Welsh Corgi



Pembroke Welsh Corgi

Breakthroughs in object recognition

… and fine-grained image recognition

Sharing knowledge

- One example (*i.e.* an attempt to address Q1) in the context of social media such as Flickr images

flickr

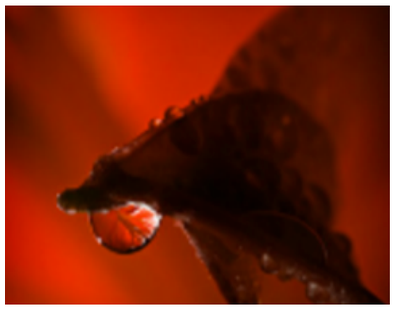
Tags:

flower
petal
closeup
water

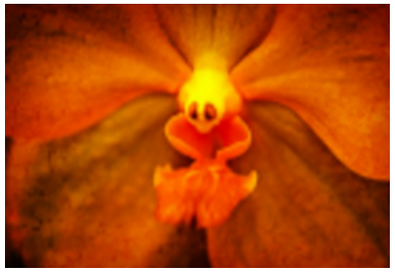
GPS
groups
…

Sharing knowledge

- One example (*i.e.* an attempt to address Q1) in the context of social media such as Flickr images






Sharing knowledge

- One example (*i.e.* an attempt to address Q1) in the context of social media such as Flickr images