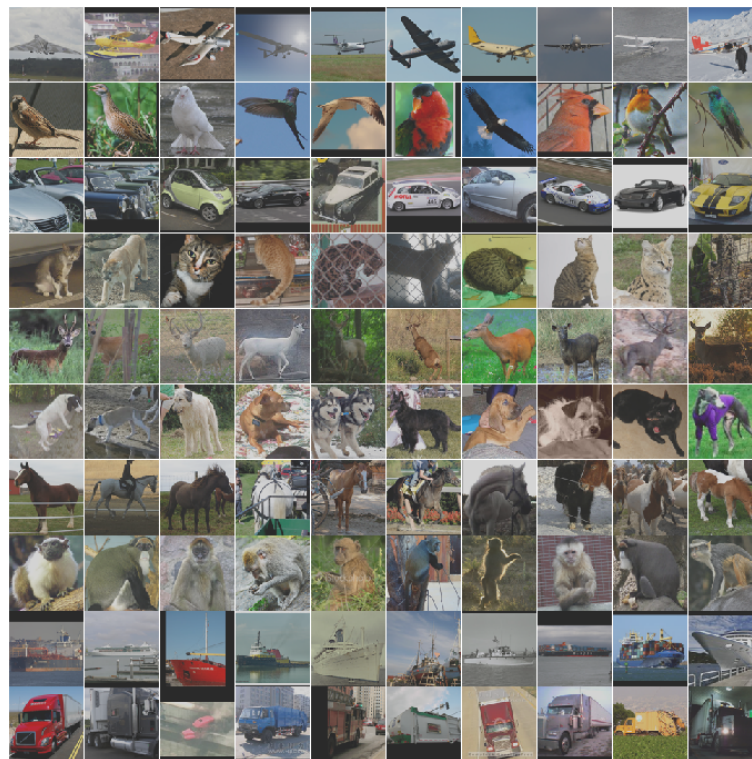# NGCM ML Workshop
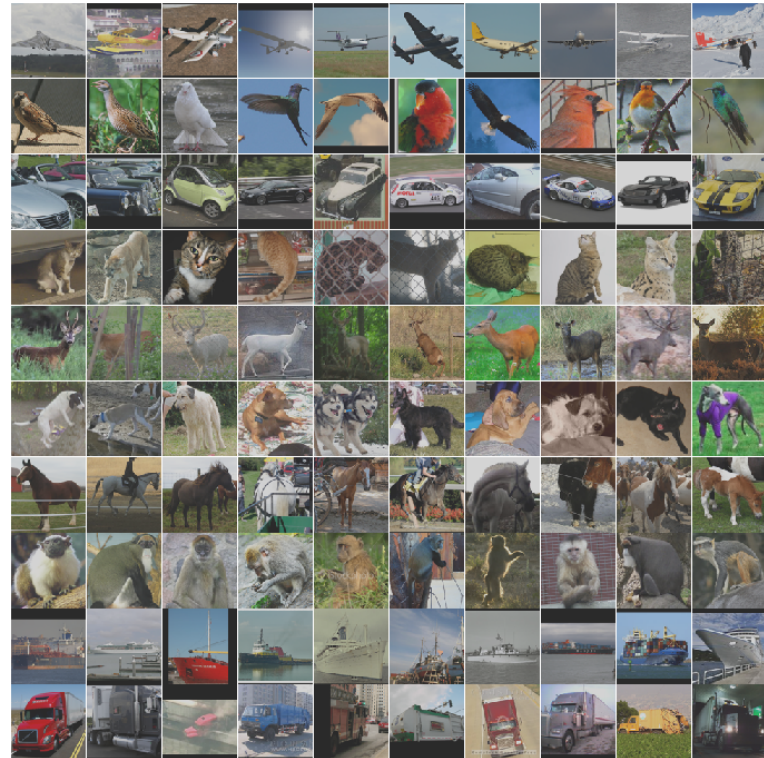
When Machine Learning Works

ImageNet, Alpha Zero

Outline

1. **Image Net**

2. Alpha Zero

ImageNet

- ImageNet was set up to create a databases of images of different objects

- Similar to WordNet, a dictionary/ontology of words

- It was quickly turned into a competition to get a computer to identify 1000 categories of objects

- The competition *ImageNet Large Scale Vision Recognition Competition* is probably why we are here!

Image classification
Easiest classes

red fox (100)   hen-of-the-woods (100)   ibex (100)   goldfinch (100)   flat-coated retriever (100)

tiger (100)   hamster (100)   porcupine (100)   stingray (100)   Blenheim spaniel (100)
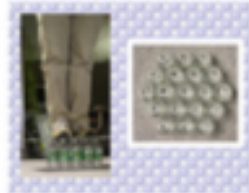
Hardest classes

muzzle (71)   hatchet (68)   water bottle (68)   velvet (68)   loupe (66)
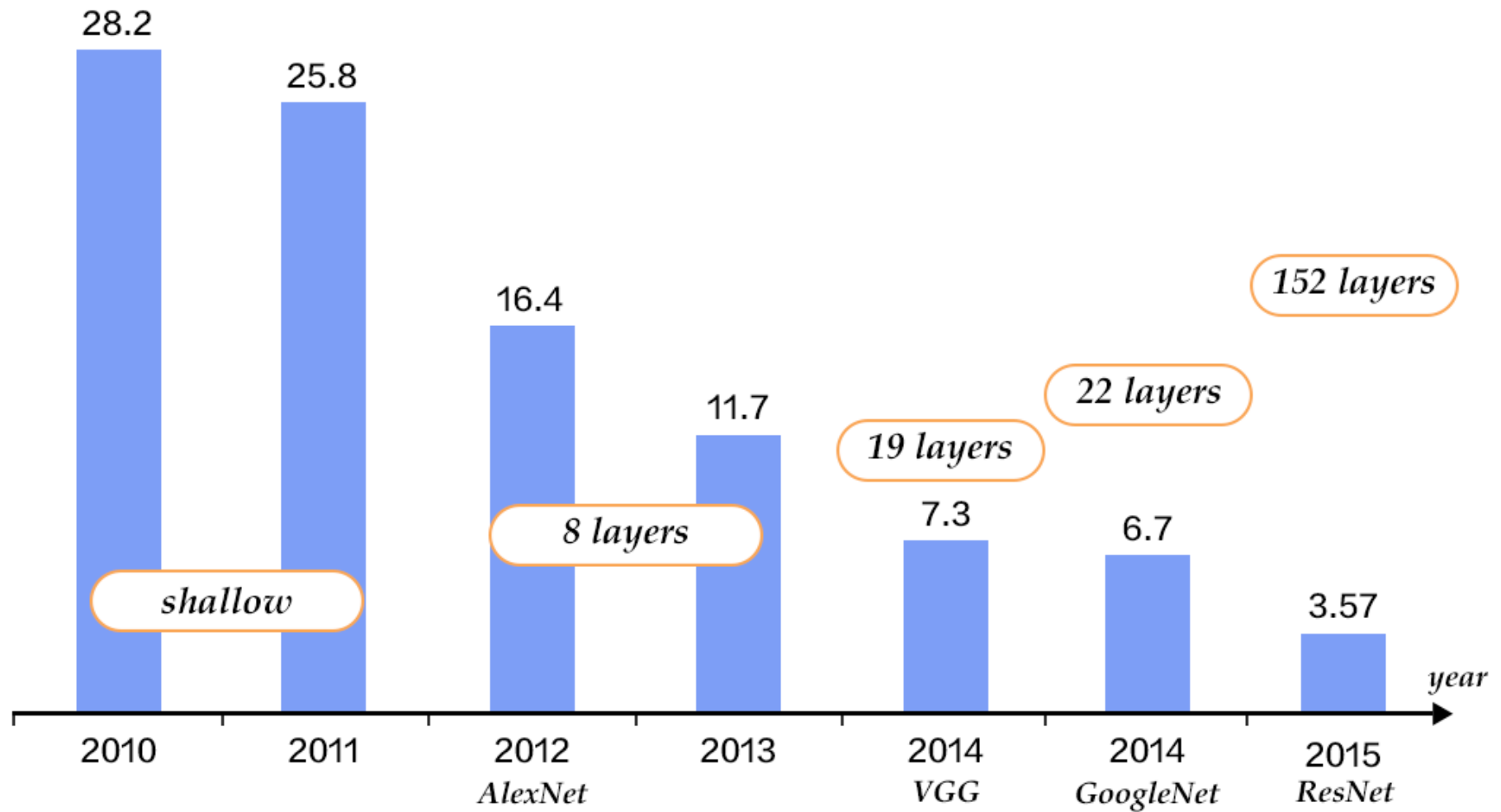
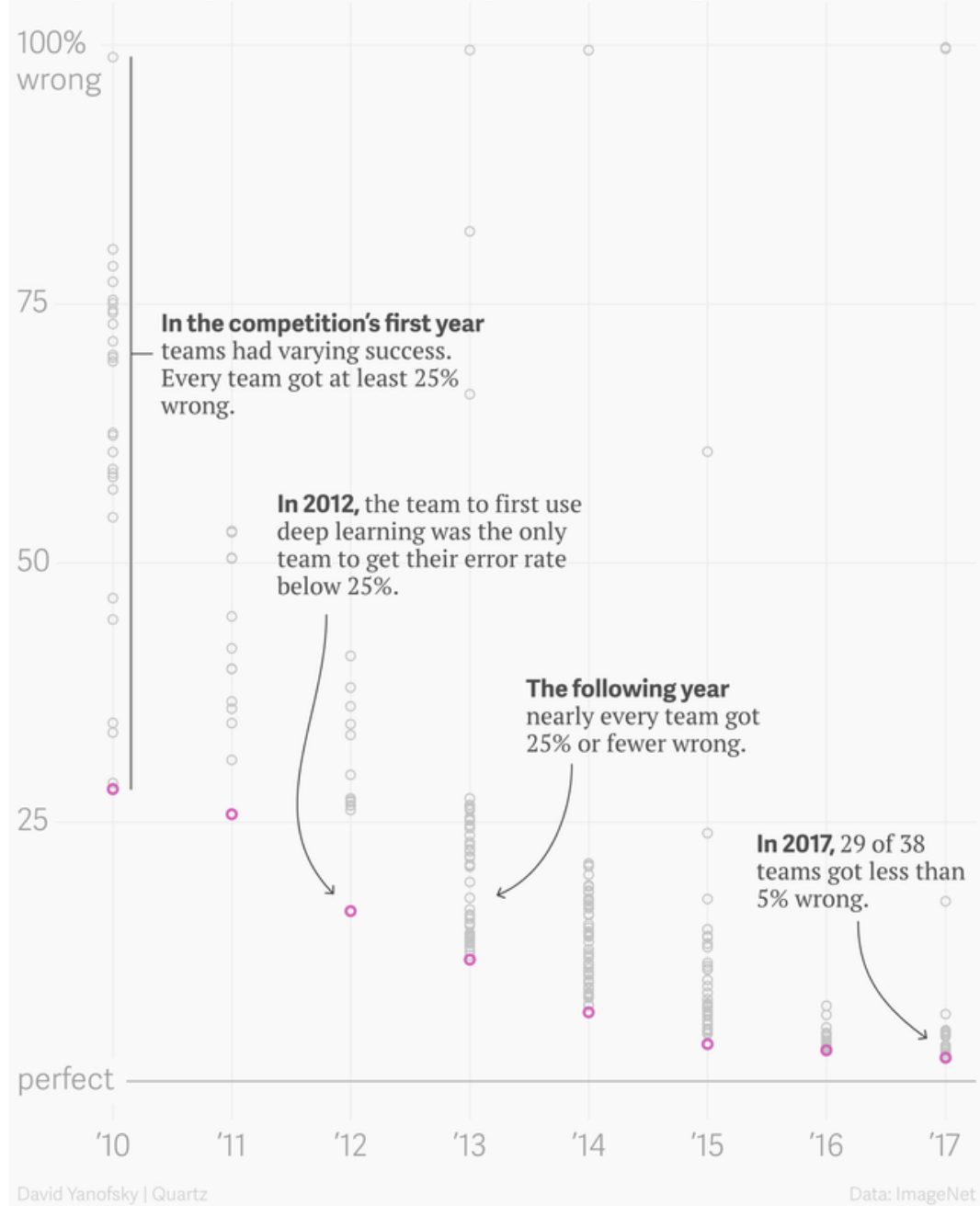hook (66)   spotlight (66)   ladle (65)   restaurant (64)   letter opener (59)

Results

ImageNet Large Scale Visual Recognition Challenge results

In the competition's first year teams had varying success. Every team got at least 25% wrong.

In 2012, the team to first use deep learning was the only team to get their error rate below 25%.

The following year nearly every team got 25% or fewer wrong.

In 2017, 29 of 38 teams got less than 5% wrong.

David Yanofsky | Quartz   Data: ImageNet

Outline

1. Image Net

2. **Alpha Zero**
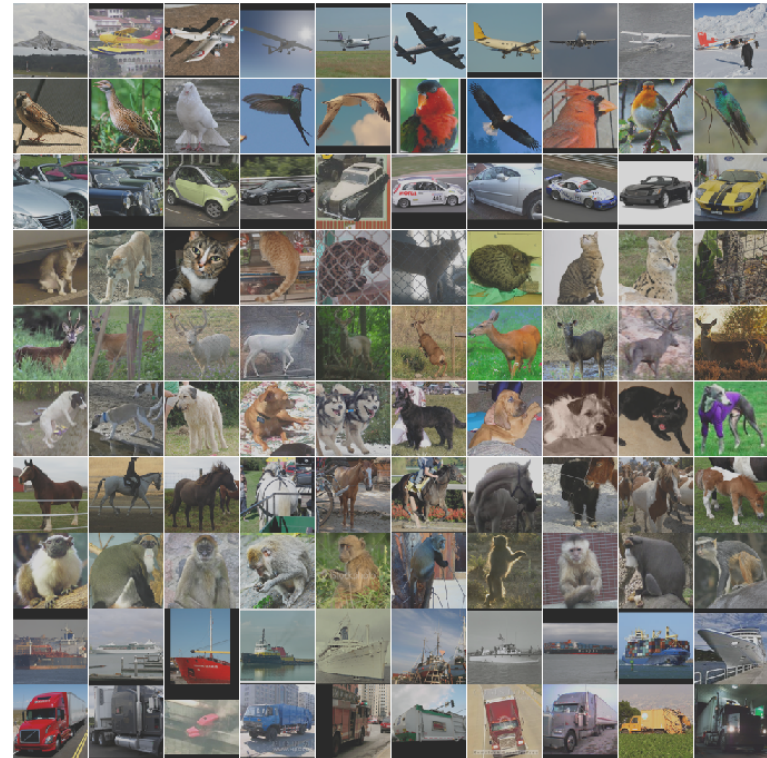
AlphaGo

- The board game Go had been a long running challenge for AI fore years

  ⋆ It has a massively larger search tree than chess
  ⋆ Board evaluation is very hard

- In October 2015 Alpha Go developed by *Deep Mind* beat a professional Go player for the first time

- It beat the world number 1 in 2017

- Used Deep CNN to evaluate board position

Alpha Zero

- In October 2017 *Deep Mind* published AlphaGo-Zero

- A very clever redesign it learnt Go entirely by self-play

- It beat the existing Alpha-Go

- Last month the same team published Alpha-Zero that uses the same algorithm to play Go, Shogi and Chess

- It beats the best computer chess algorithm using 500-1000 less search than conventional chess programs