

中華民國 無店面零售商業同業公會

2018 年



無店面產業論壇

| | 時間 | 分鐘 | 內容 | 講者 |
|---|-------------|----|------------|---------------------------|
| 1 | 13:30~14:00 | 30 | 來賓報到 | |
| 2 | 14:00~14:05 | 5 | 主辦單位致詞 | 無店面公會 王孝慈常務理事 |
| 3 | 14:05~14:10 | 5 | 頒發顧問聘書及大合照 | 王孝慈常務理事 張善政榮譽院長、陳昇瑋執行長 |
| 4 | 14:10~15:00 | 50 | 大數據與新零售 | 東吳大學巨量資料管理學院 張善政榮譽院長 |
| 5 | 15:00~15:50 | 50 | 數位經濟與行動支付 | 金融監督管理委員會 鄭貞茂副主委 |
| 6 | 15:50~16:05 | 15 | 中場休息 | |
| 7 | 16:05~16:55 | 50 | 人工智慧民主化在台灣 | 台灣人工智慧學校 陳昇瑋執行長 |

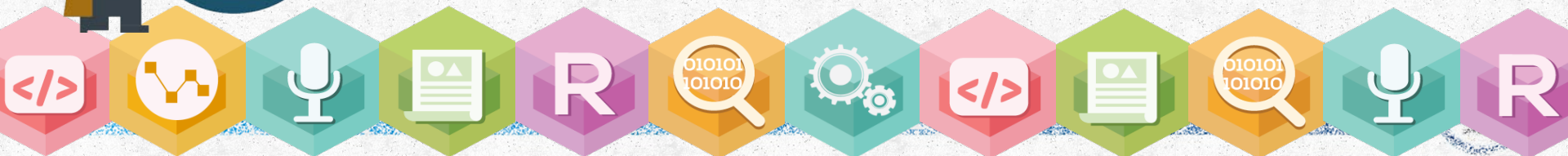
人工智慧民主化在台灣

讓機器學習及人工智慧在台灣深化，帶動產業發展

陳昇瑋

台灣人工智慧學校執行長

中央研究院資訊科學研究所研究員



資料分析這條路

- Since 2002 (my first PhD year) ...
- PhD dissertation: based on a 20-hour game packet trace
- Collaboration & Consulting
 - 製造業
 - 電信業
 - 社群網路 / 遊戲
 - 銀行 / 壽險 / 電子票証
 - 中央 / 地方政府



Change is the only constant

- Heraclitus (535 BC - 475 BC)



(Slide Credit: [Albert Chen](#))

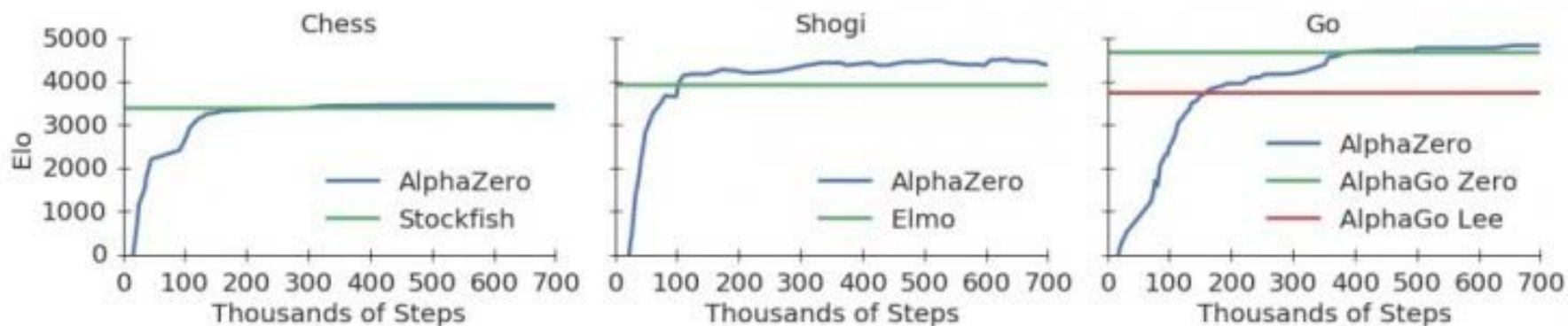


AlphaZero AI

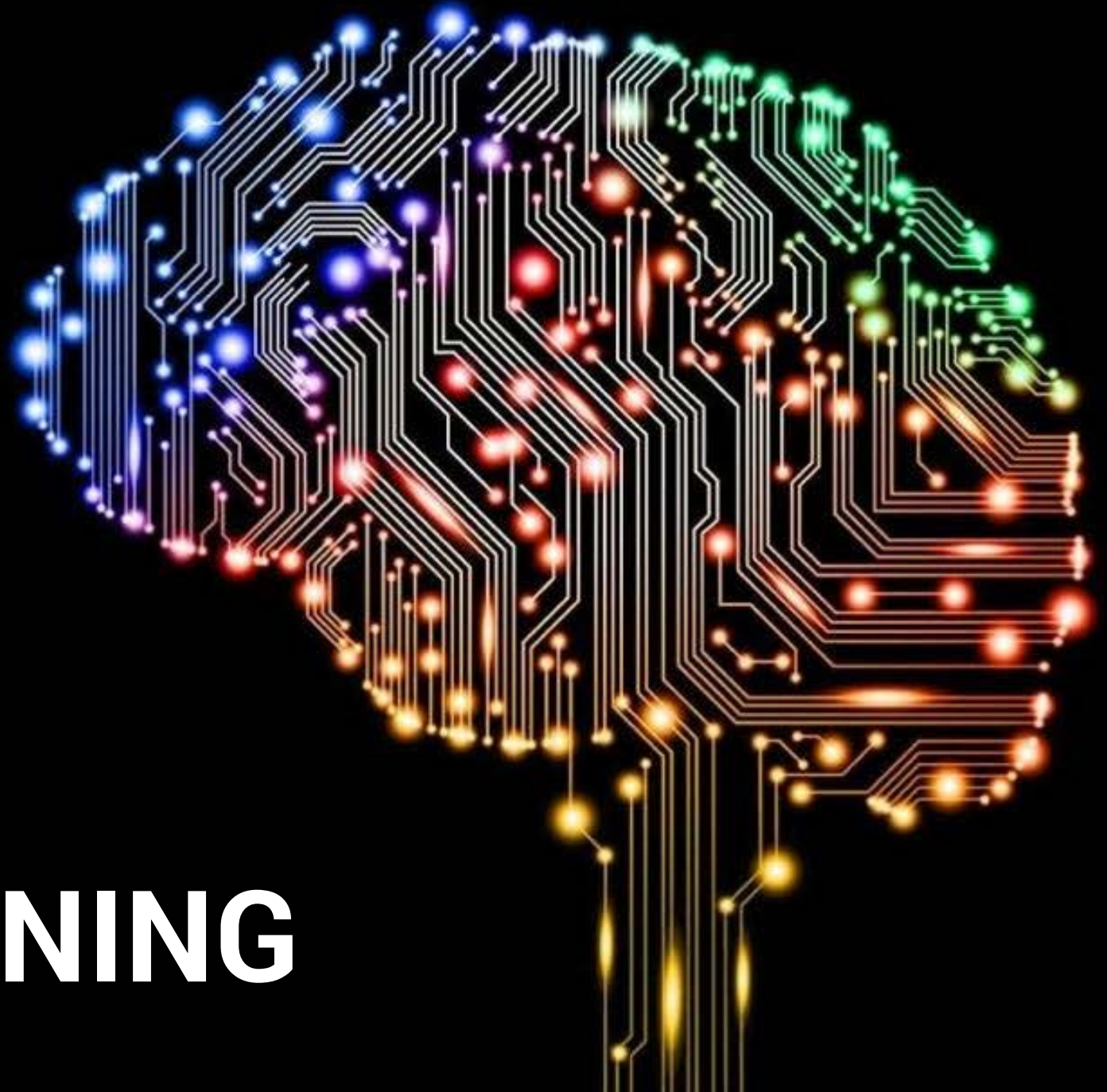
Mastering Chess and Shogi by self play
with reinforcement learning



作者們用同樣的算法設定、網絡架構和超參數（只有剛剛說到的噪聲大小不同），分別訓練了下國際象棋、日本象棋、圍棋的三個 AlphaZero 實例。訓練從隨機初始化的參數開始，步數一共是 70 萬步，mini-batch 大小 4096；5000 個第一代 TPU 用來生成自我對局，64 個第二代 TPU 用來訓練神經網絡（注：第二代 TPU 的存儲器帶寬更高）。

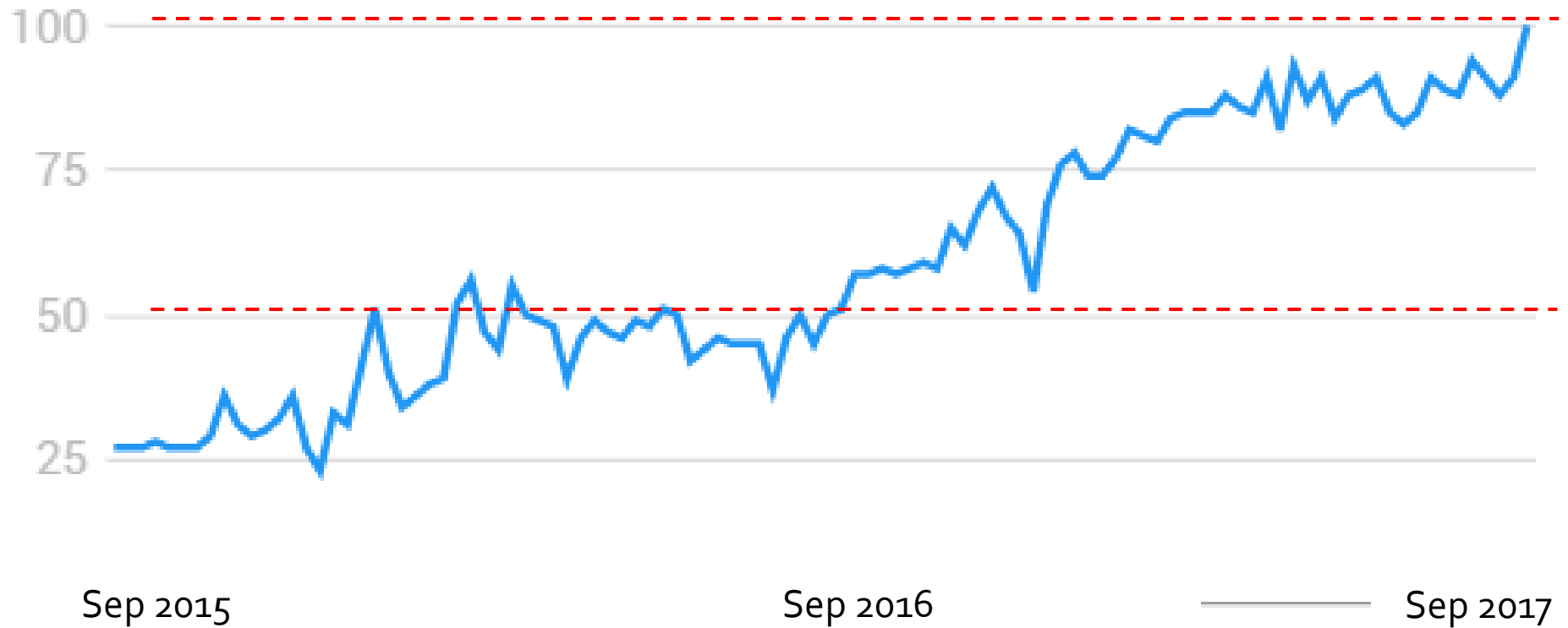


| Game | White | Black | Win | Draw | Loss |
|-------|-----------|-----------|-----|------|------|
| Chess | AlphaZero | Stockfish | 25 | 25 | 0 |
| | Stockfish | AlphaZero | 3 | 47 | 0 |
| Shogi | AlphaZero | Elmo | 43 | 2 | 5 |
| | Elmo | AlphaZero | 47 | 0 | 3 |
| Go | AlphaZero | AG0 3-day | 31 | – | 19 |
| | AG0 3-day | AlphaZero | 29 | – | 21 |



DEEP LEARNING

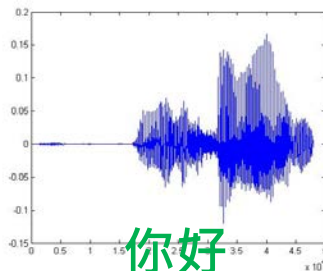
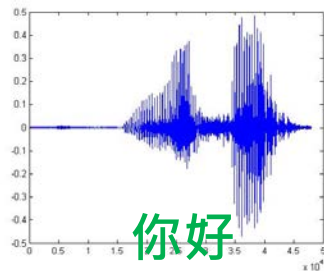
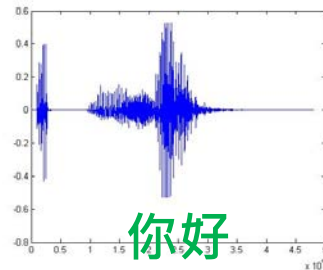
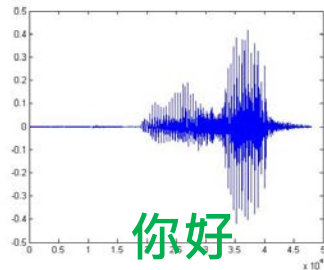
“Deep Learning” search trend



Machine Learning

“

A type of algorithms that gives computers the ability to learn rules from experience, rather than being hard coded.



Find the common patterns from the left waveforms

You quickly get lost in the exceptions and special cases.

It seems impossible to write a program for speech recognition

0 0 0 1 1 1 1 1 1 2

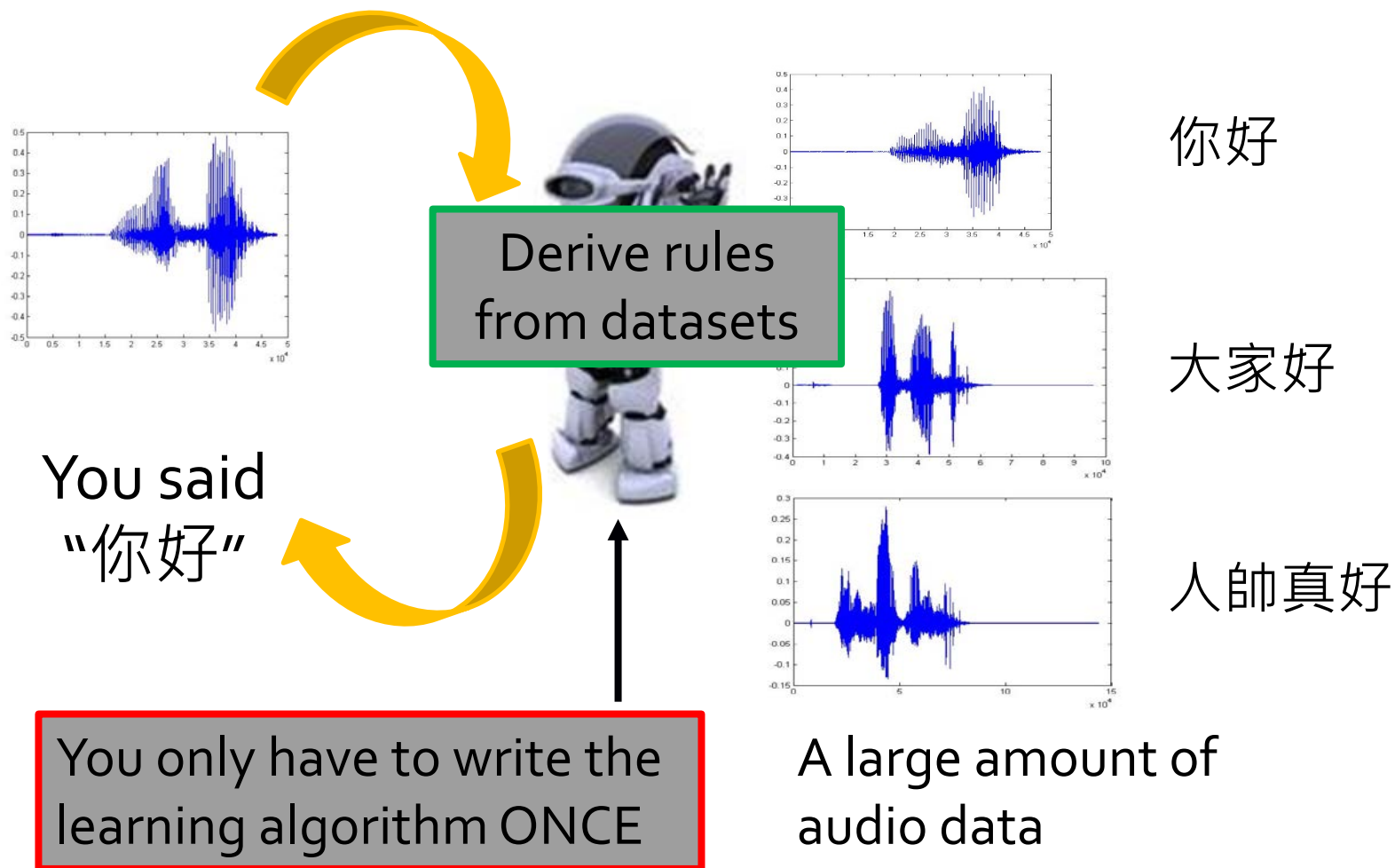
2 2 2 2 2 2 2 3 3 3

3 4 4 4 4 4 5 5 5 5

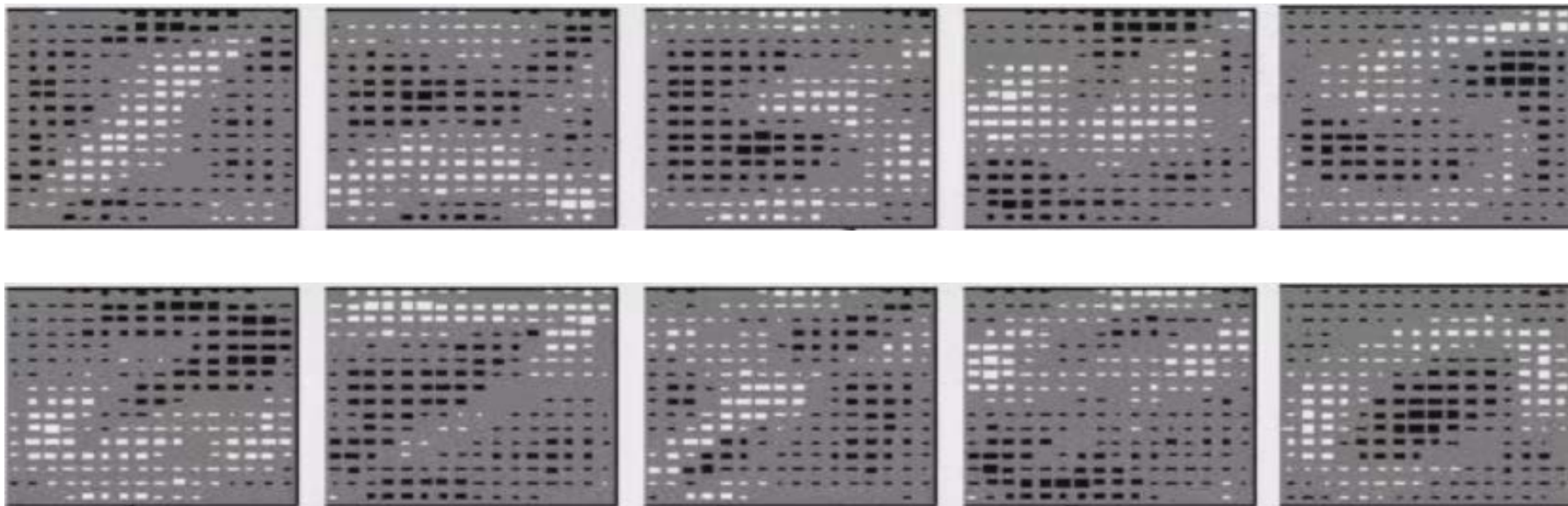
6 6 7 7 7 7 7 8 8 8

8 8 8 8 8 9 9 9 9

Let the machine learn by itself

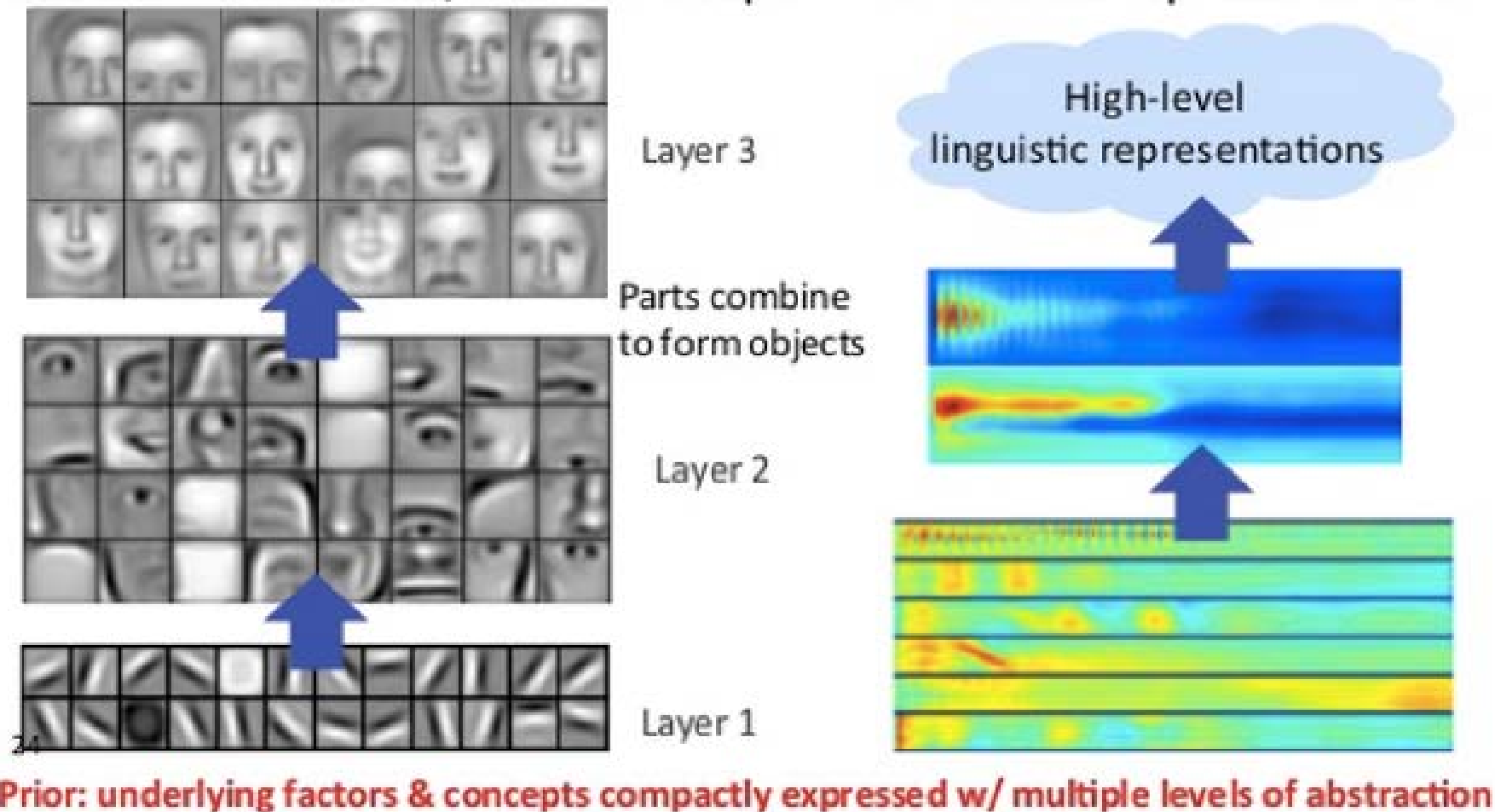


Patterns learned by machine

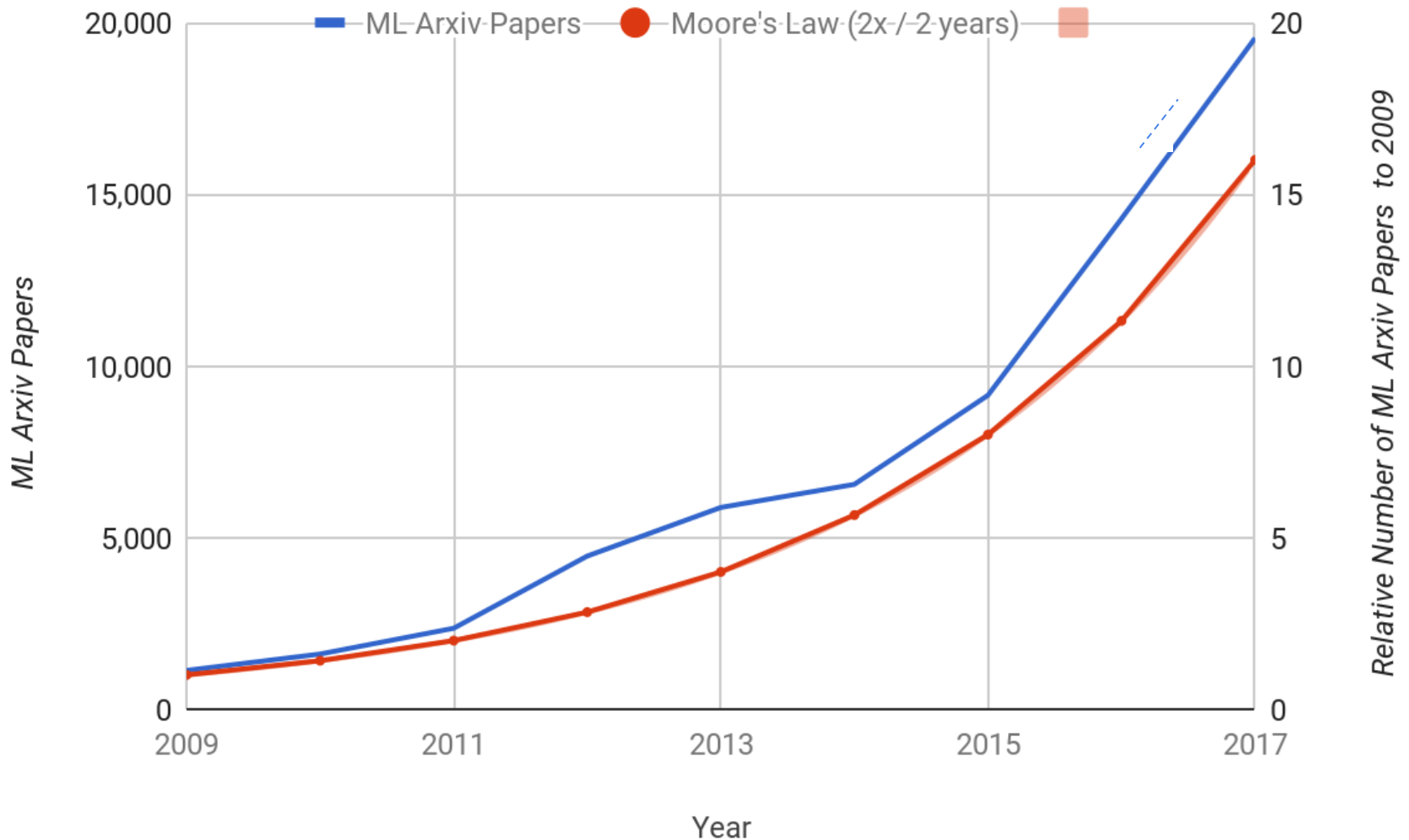


Multi-layer patterns learned from faces

Successive model layers learn deeper intermediate representations

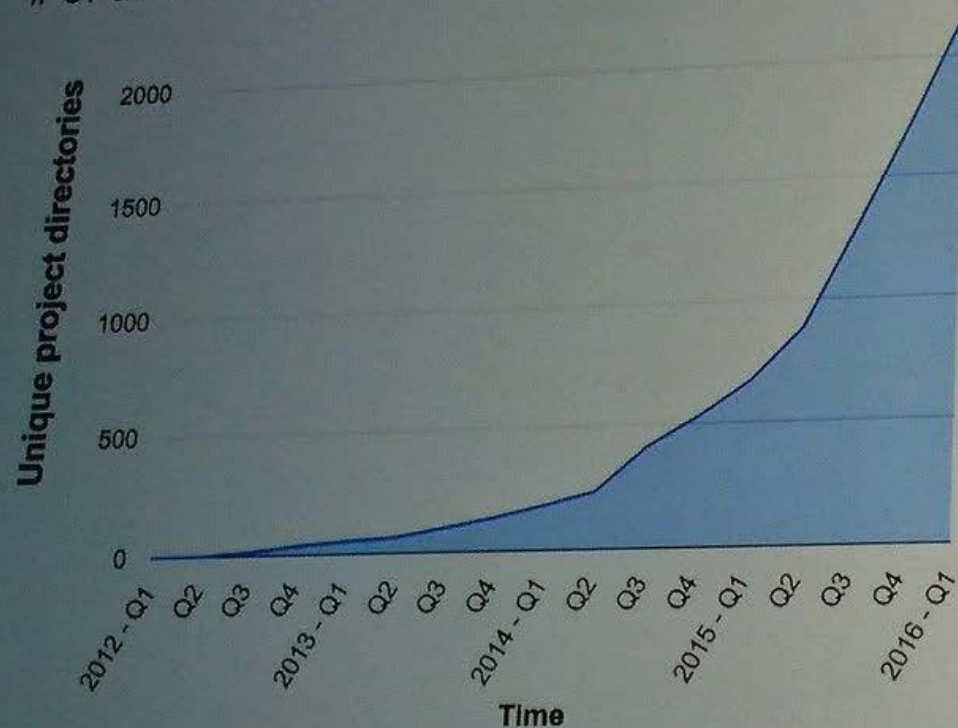


ML Arxiv Papers per Year



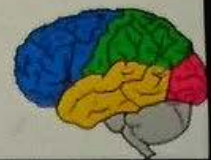
Growing Use of Deep Learning at Google

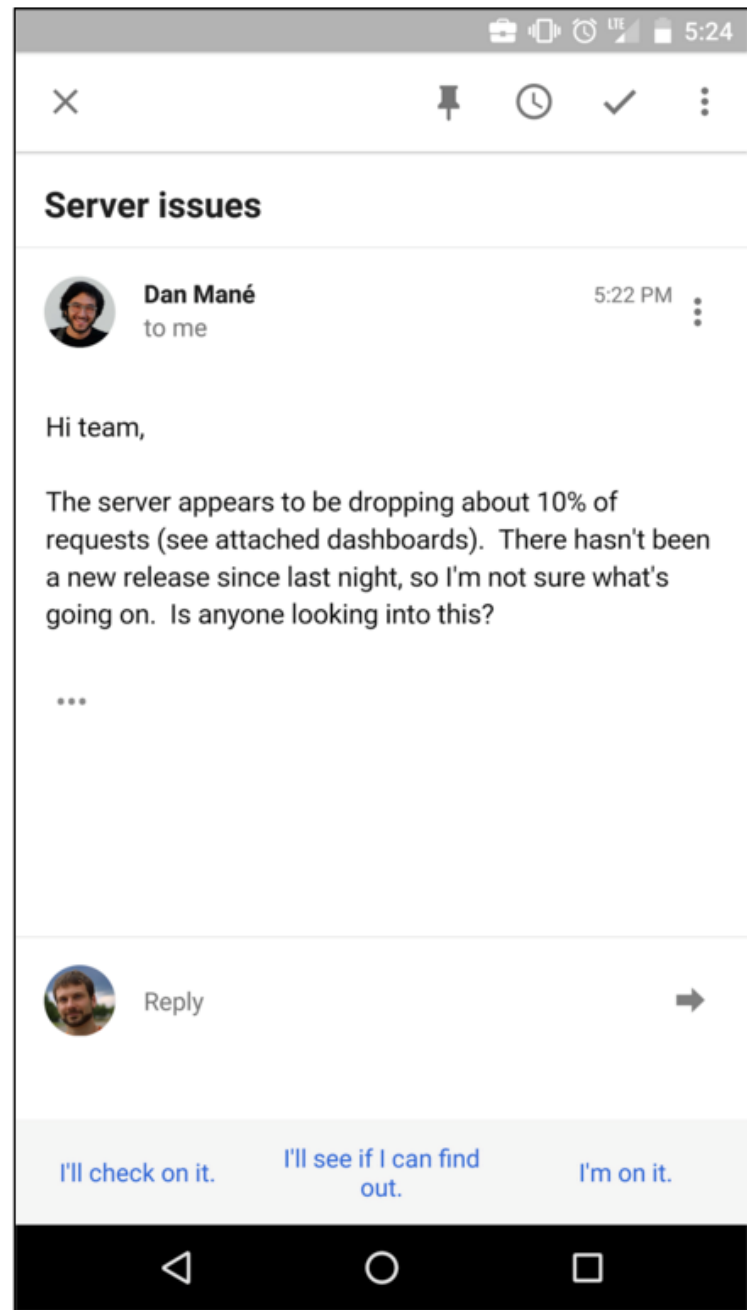
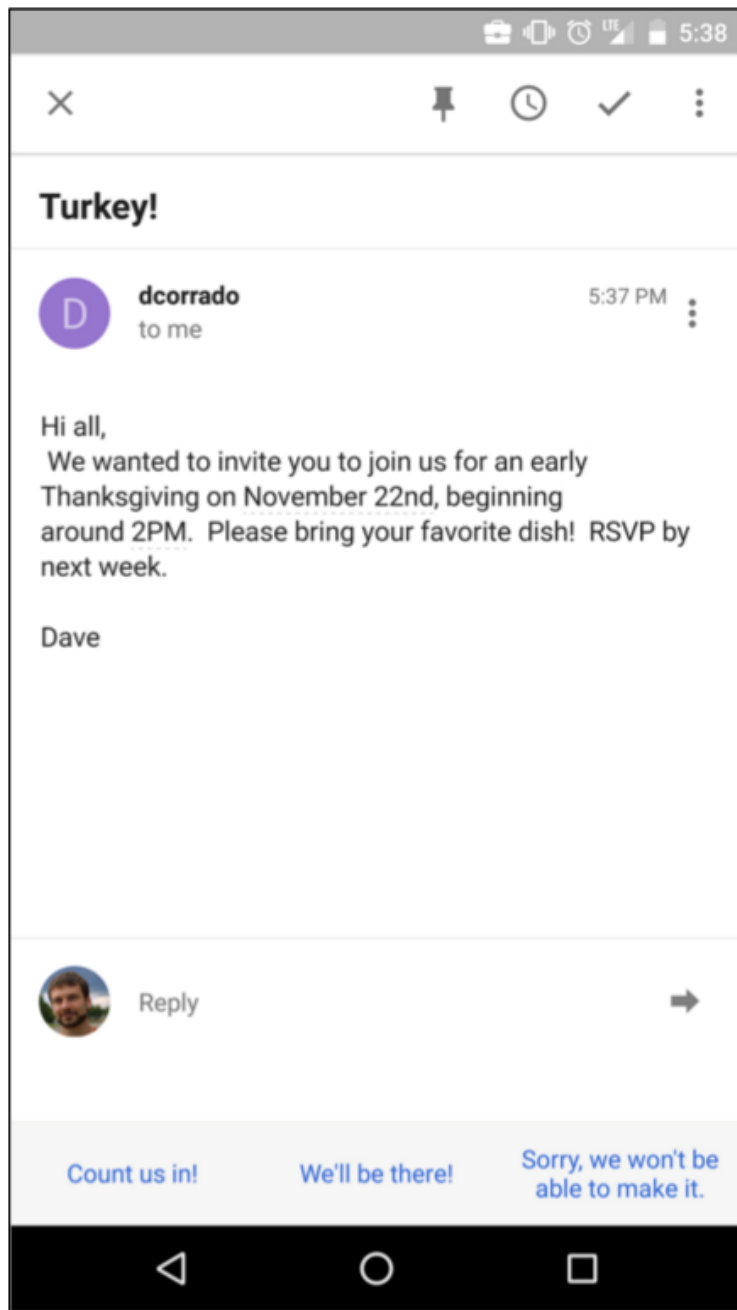
of directories containing model description files



Across many products/areas:

- Android
- Apps
- drug discovery
- Gmail
- Image understanding
- Maps
- Natural language understanding
- Photos
- Robotics research
- Speech
- Translation
- YouTube
- ... many others ...

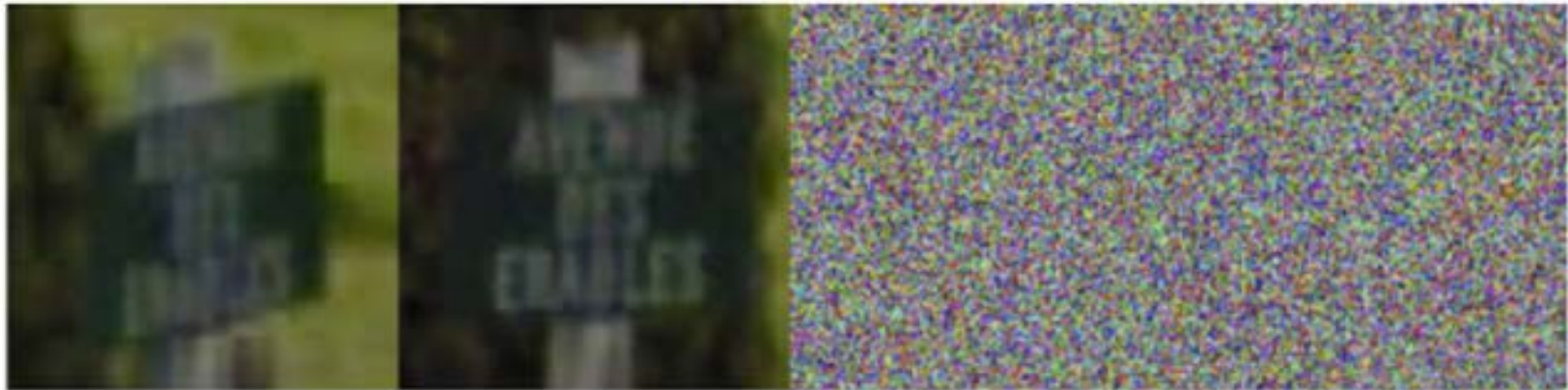




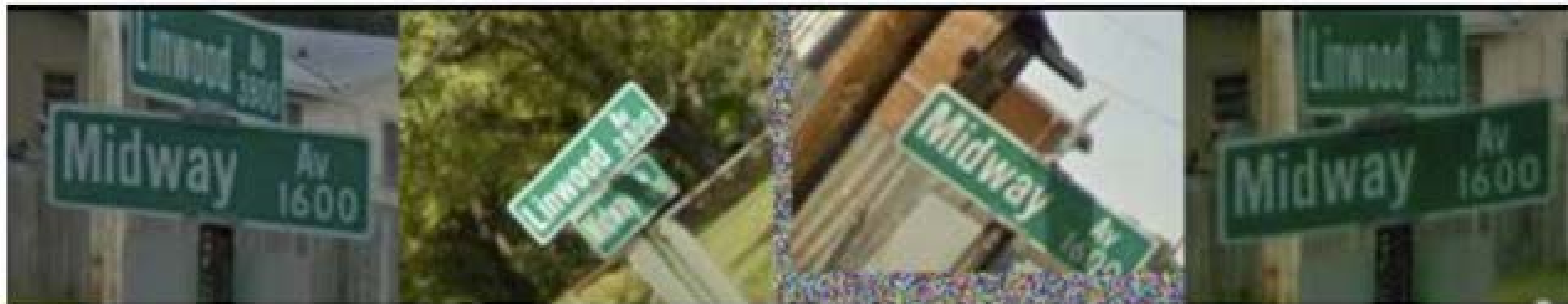




Route de la Ruaz



Avenue des Erables



Midway Avenue



Describes without errors

Describes with minor errors

Somewhat related to the image



A person riding a motorcycle on a dirt road.



Two dogs play in the grass.



A skateboarder does a trick on a ramp.



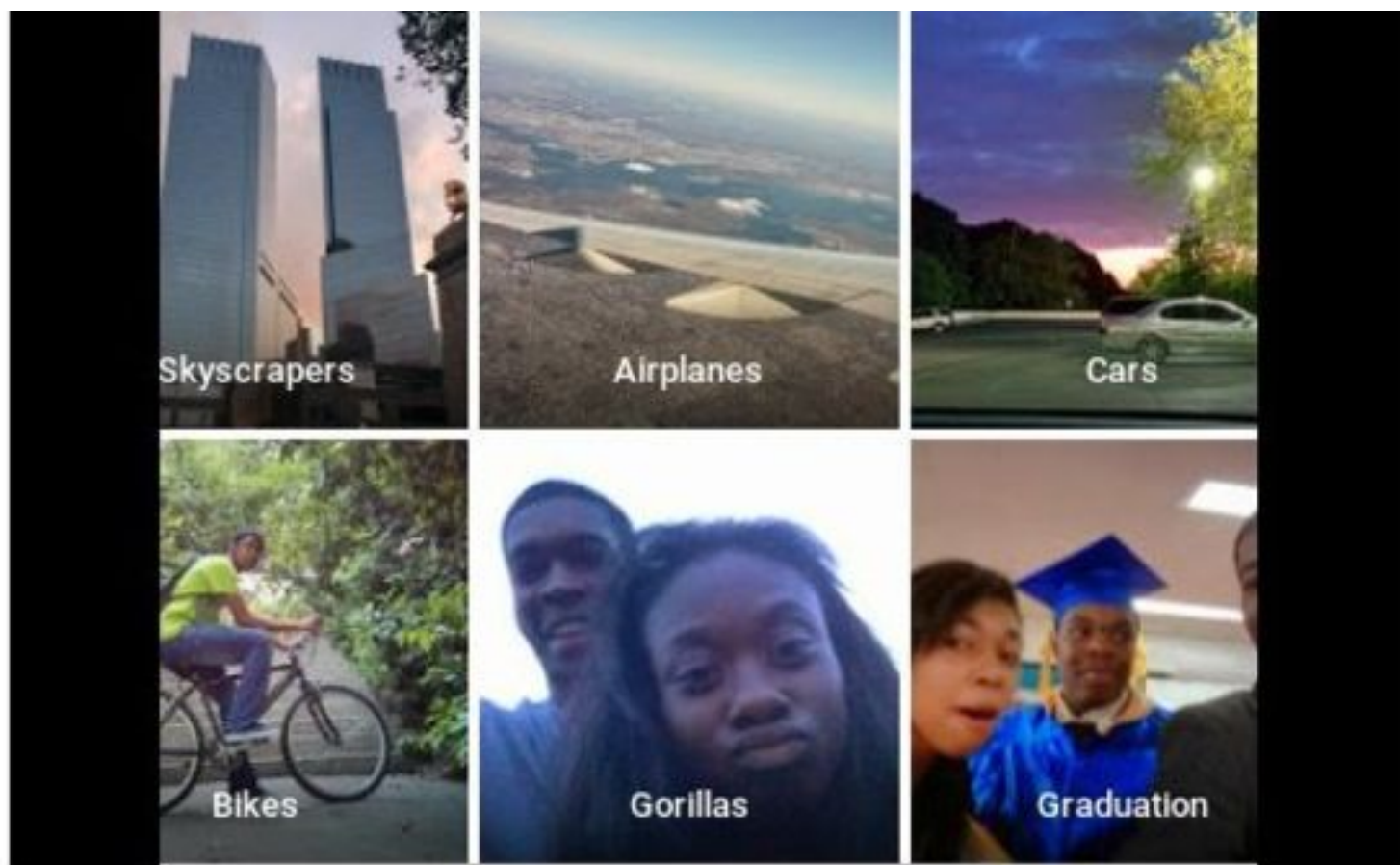
A group of young people playing a game of frisbee.



Two hockey players are fighting over the puck.



A little girl in a pink hat is blowing bubbles.



diri noir avec banan @jackyalcine · Jun 29

Google Photos, y'all [REDACTED] My friend's not a gorilla.



813



394



TWITTER

Deep learning can be highly flexible

- Speech Recognition

$$f * \left(\text{audio waveform} \right) = \text{"Morning"}$$

- Handwritten Recognition

$$f * \left(\text{handwritten digit 2} \right) = \text{"2"}$$

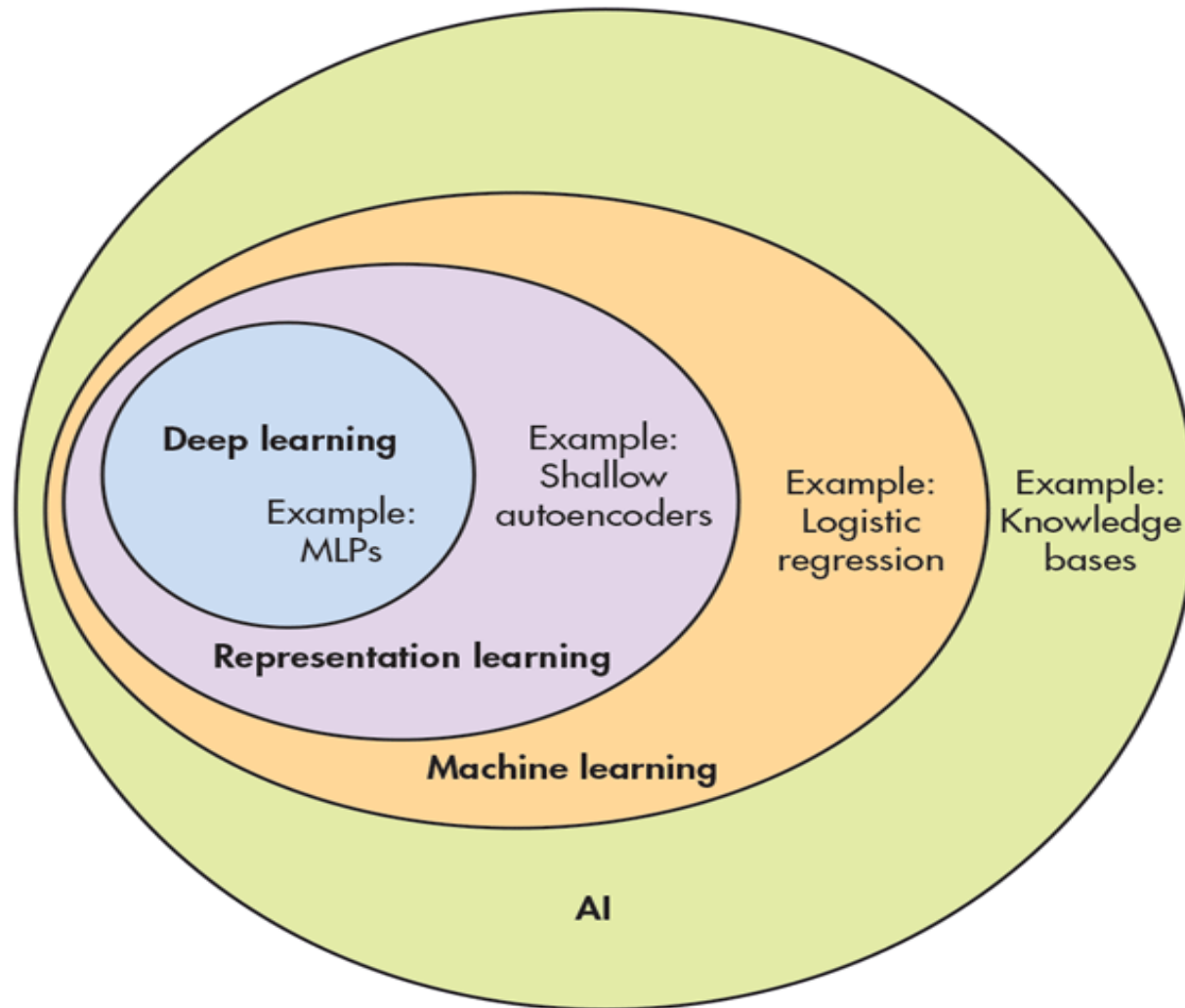
- Playing Go

$$f * \left(\text{Go board state} \right) = \text{"5-5" (step)}$$

- Dialogue System

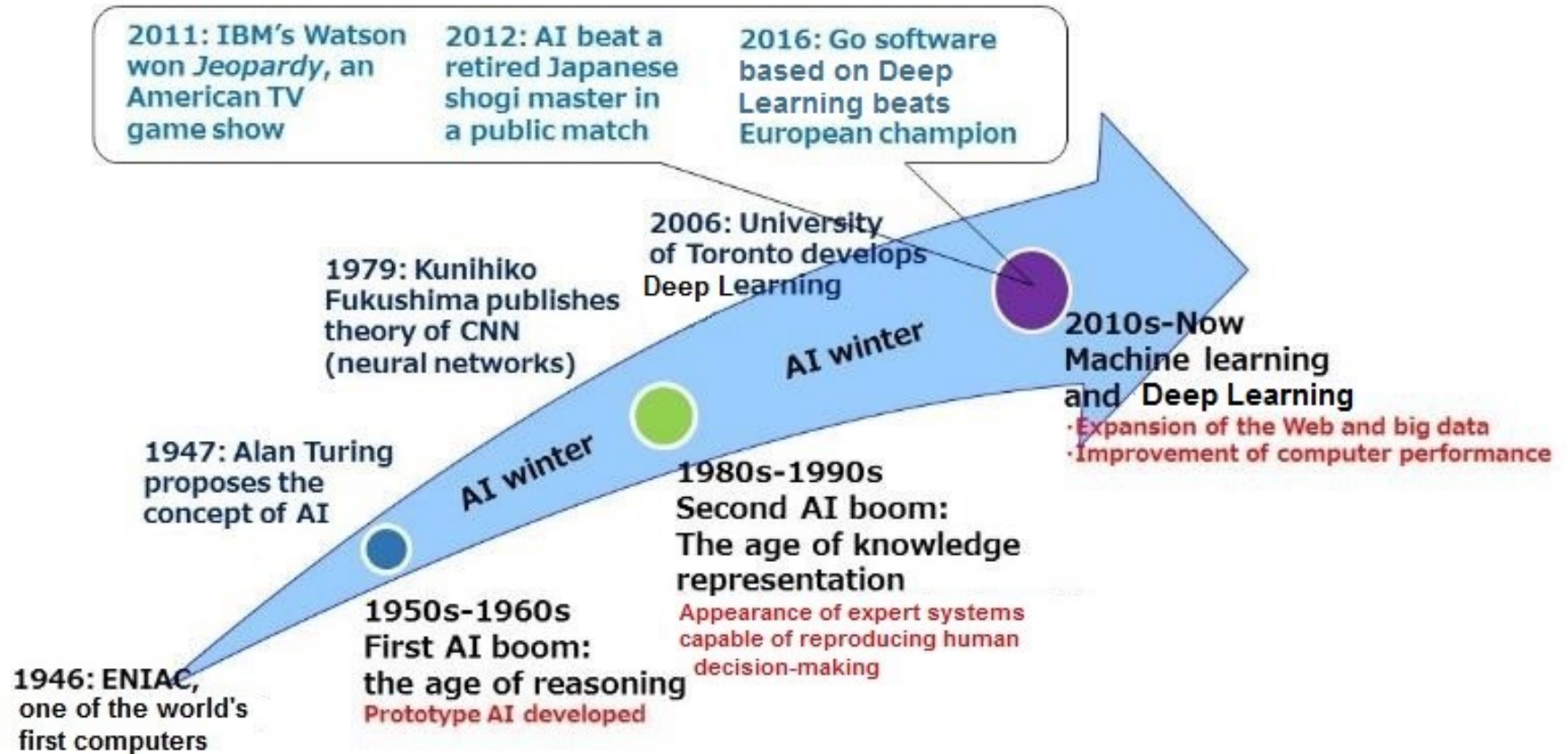
$$f * \left(\begin{array}{c} \text{"Hi"} \\ \text{(what the user said)} \end{array} \right) = \begin{array}{c} \text{"Hello"} \\ \text{(system response)} \end{array}$$

Deep Learning is a subset of Representation Learning



AI Winter (1970-1980, 1990-2000)

AI Research and Development Timeline



https://www.mynewsdesk.com/toshiba-global/blog_posts/bringing-the-new-ai-era-to-life-the-researchers-creating-toshibas-technologies-55589

Ups and downs of Deep Learning

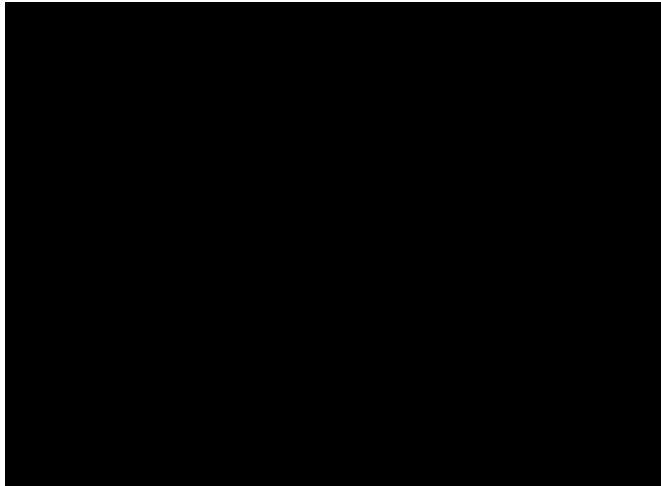
- 1958: Perceptron (linear model)
- 1969: Perceptron has limitation
- 1980s: Multi-layer perceptron
 - Do not have significant difference from DNN today
- 1986: Backpropagation
 - Usually more than 3 hidden layers is not helpful
- 1989: 1 hidden layer is “good enough”, why deep?
- 2006: RBM initialization
- 2009: GPU
- 2011: Start to be popular in speech recognition
- 2012: win ILSVRC image competition
- 2015.2: Image recognition surpassing human-level performance
- 2016.3: Alpha GO beats Lee Sedol
- 2016.10: Speech recognition system as good as humans

What was actually wrong with backprop in 1986?

- We all drew the wrong conclusions about why it failed. The real reasons were:
 - Our labeled **datasets** were thousands of times too small.
 - Our **computers** were millions of times too slow.
 - We initialized the weights in a stupid way.
 - We used the wrong type of non-linearity.

(Credit: Geoff Hinton, [What Was Actually Wrong With Backpropagation in 1986?](#))

人工智慧近年突破的主因之一：運算能力



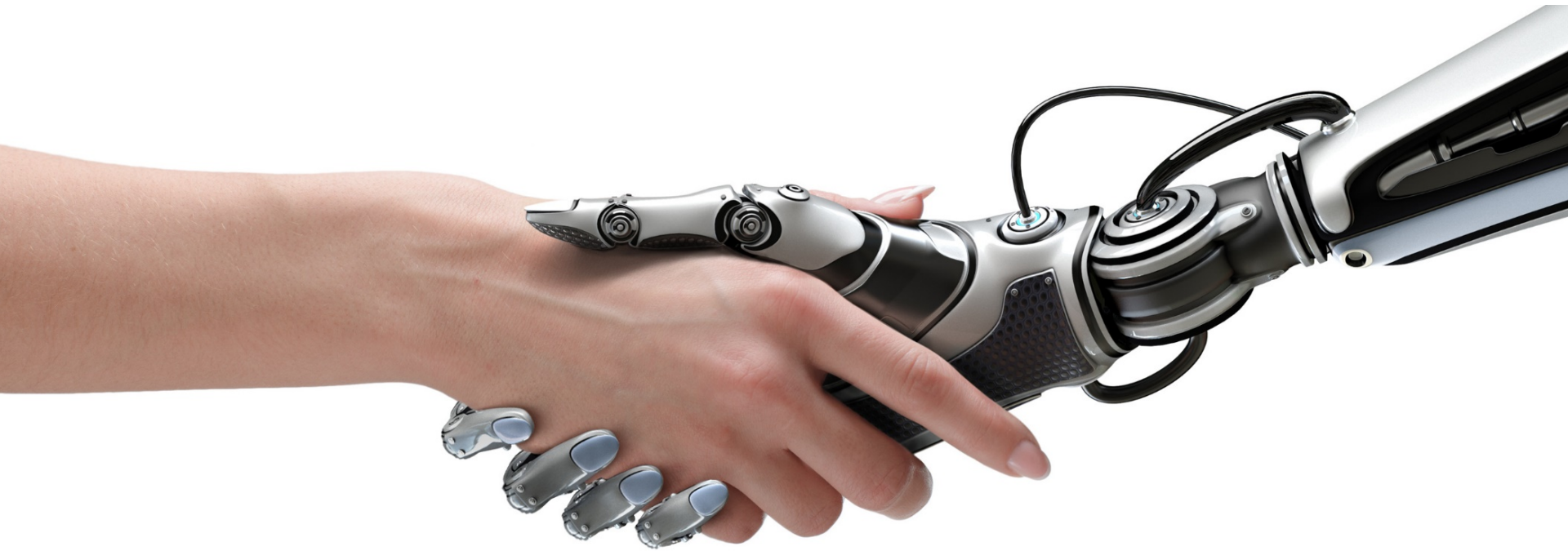
手寫數字辨識 in 1993

影像物件辨識 2016

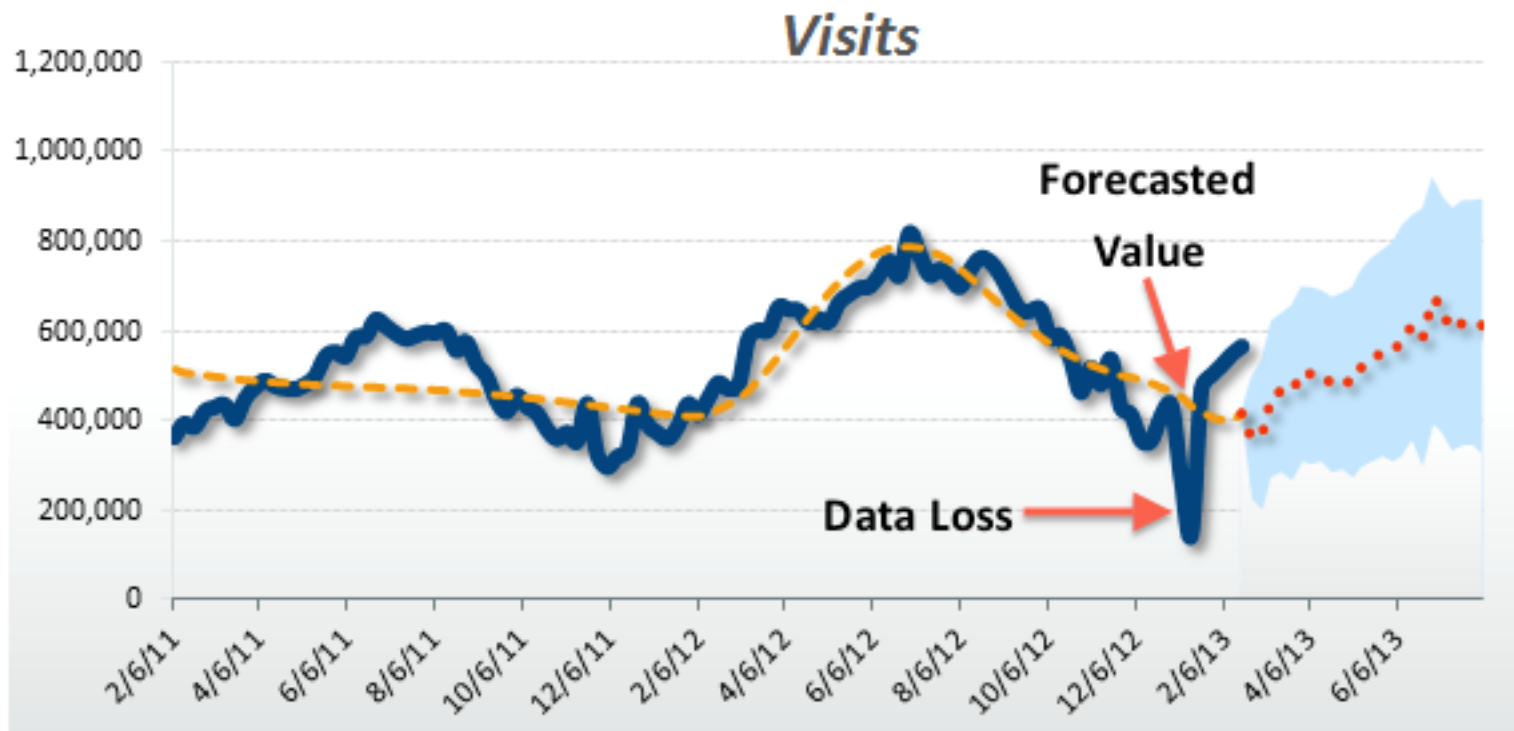


<https://pjreddie.com/darknet/yolo/>

BEYOND SUPERVISED ORDINARY PREDICTION



Time series forecasting





track cycling
cycling
track cycling
road bicycle racing
marathon
ultramarathon



ultramarathon
ultramarathon
half marathon
running
marathon
inline speed skating



heptathlon
heptathlon
decathlon
hurdles
pentathlon
sprint (running)



bikejoring
mushing
bikejoring
harness racing
skijoring
carting



demolition derby
demolition derby
monster truck
mud bogging
motocross
grand prix motorcycle racing



telemark skiing
snowboarding
telemark skiing
nordic skiing
ski touring
skijoring

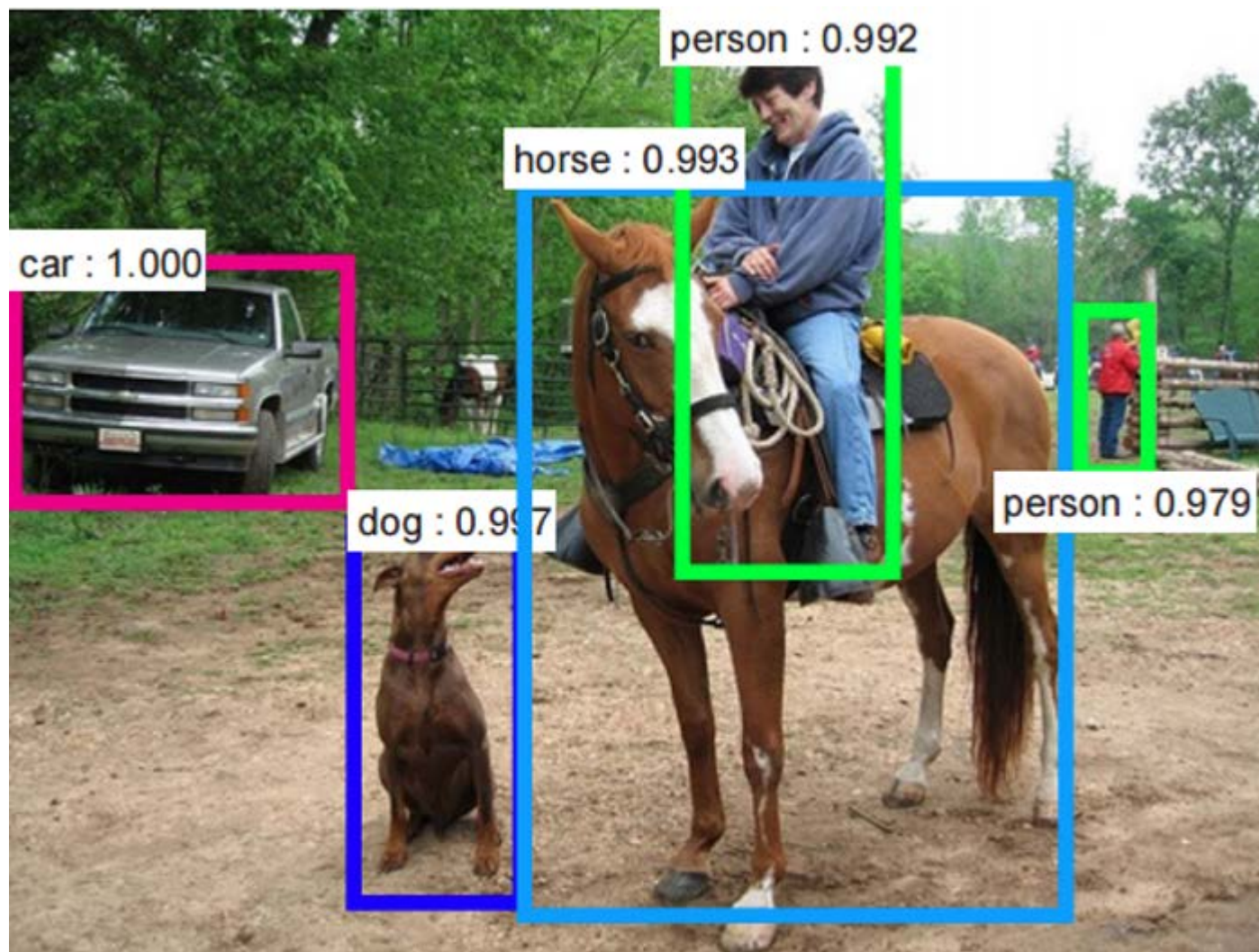


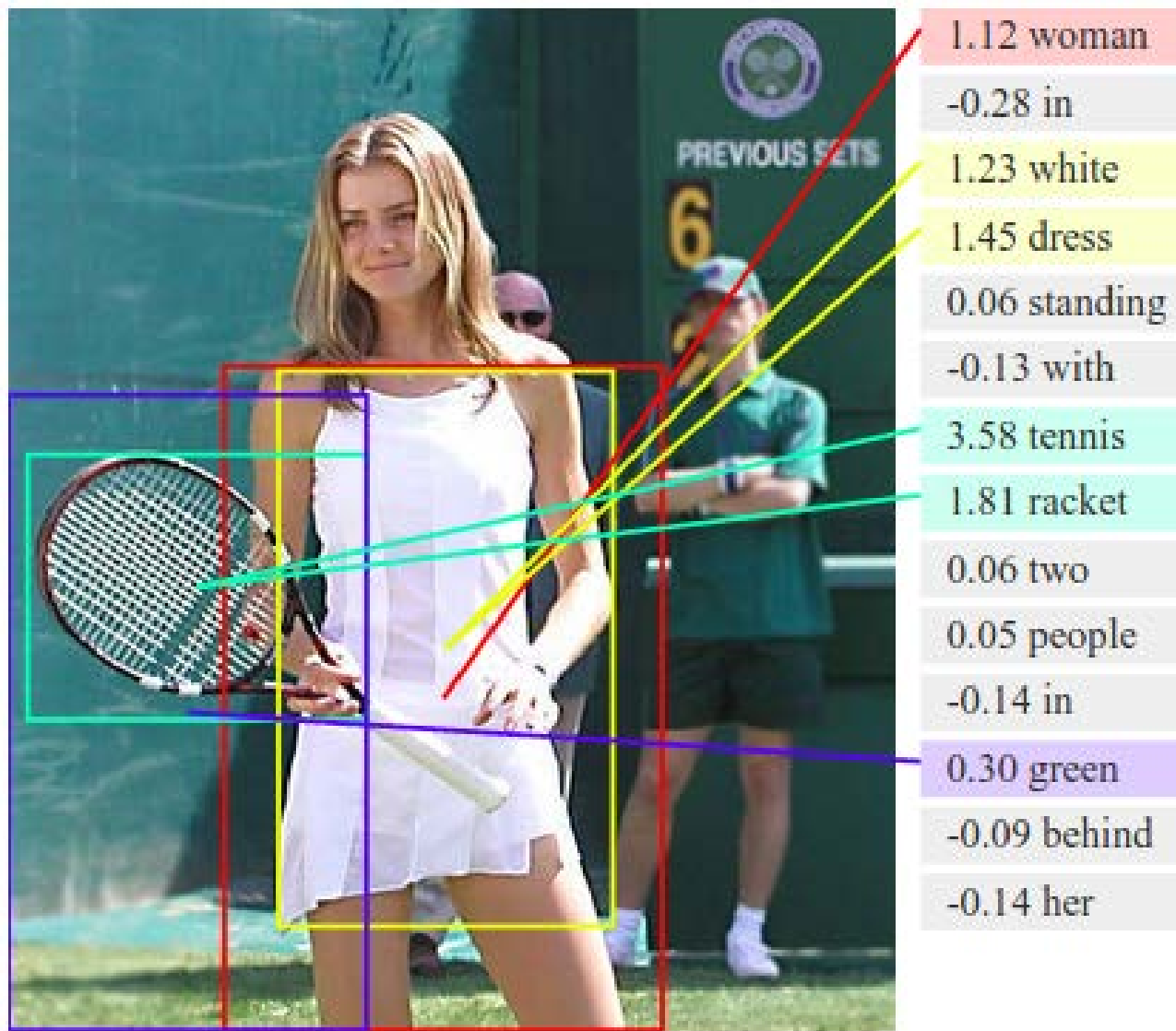
whitewater kayaking
whitewater kayaking
rafting
kayaking
canoeing
adventure racing



arena football
indoor american football
arena football
canadian football
american football
women's lacrosse

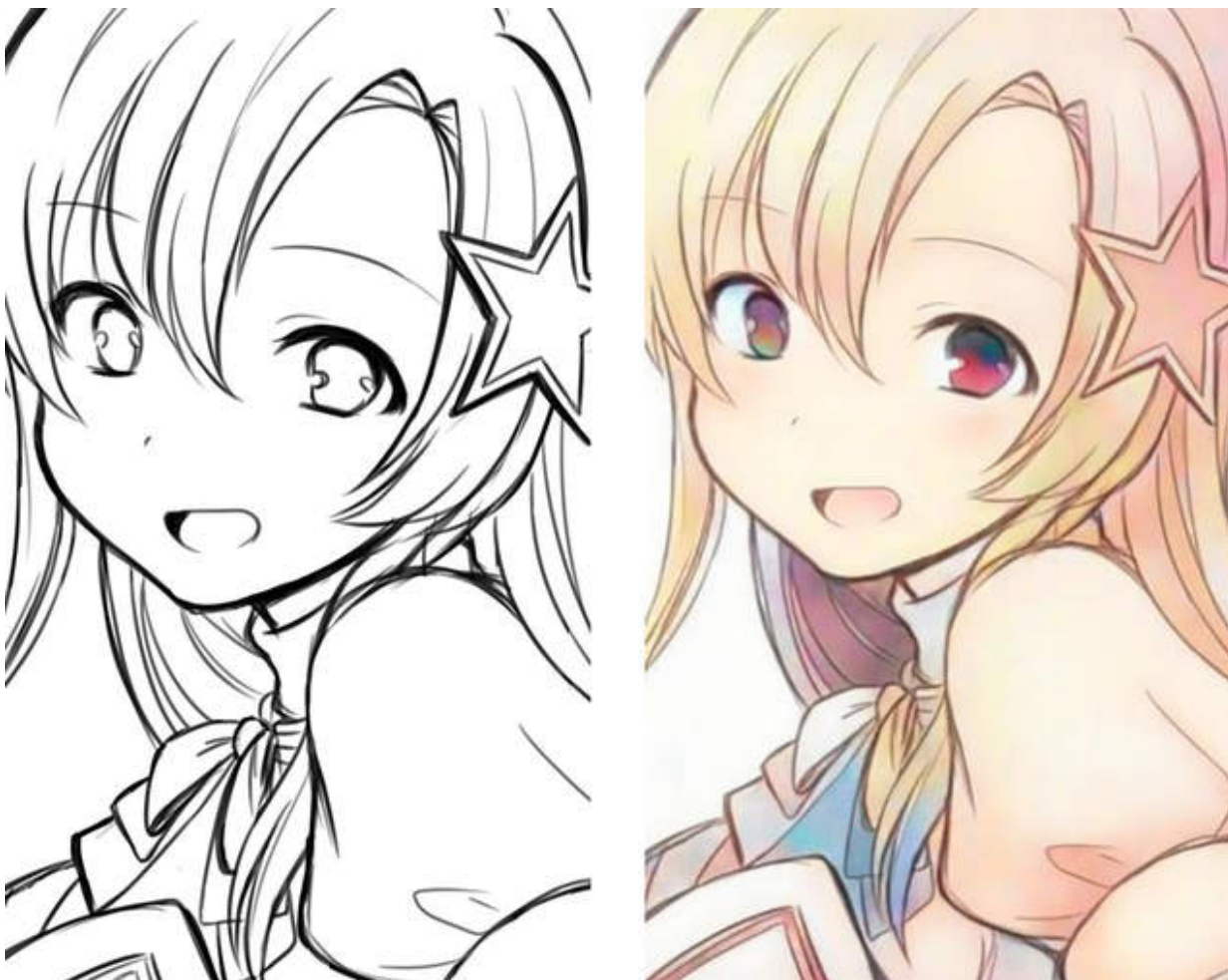
STRUCTURED LEARNING







Auto Coloring



https://paintschainer.preferred.tech/index_zh.html

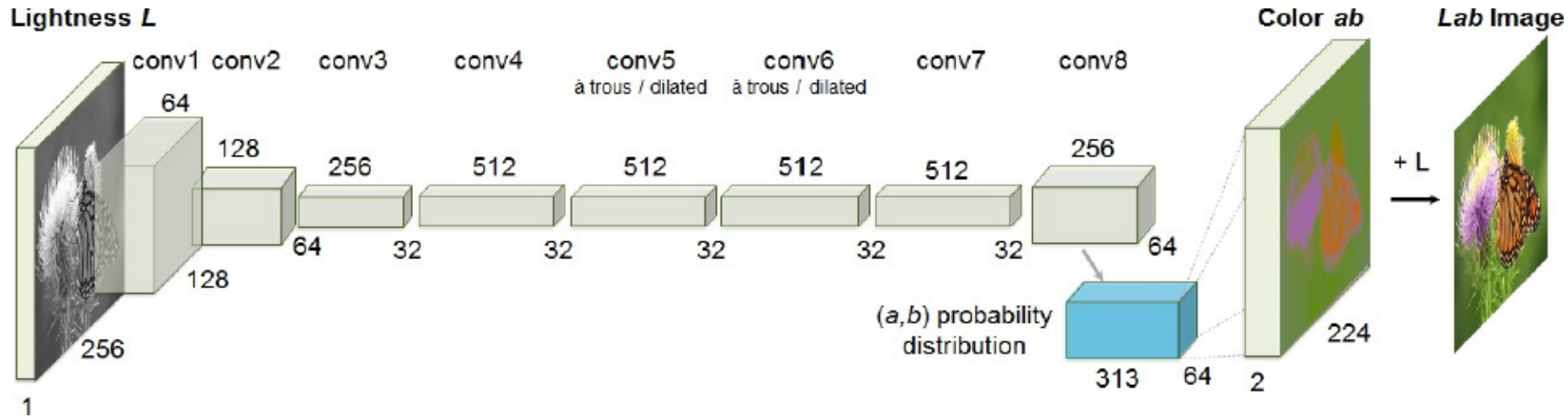
<https://zhuanlan.zhihu.com/p/24712438>

Colorful Image Colorization

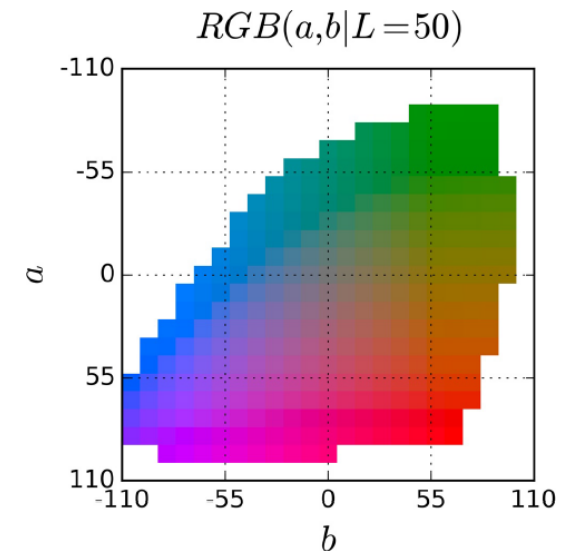


Zhang, Richard, Phillip Isola, and Alexei A. Efros. "Colorful image colorization." *European Conference on Computer Vision*. Springer International Publishing, 2016.

Colorful Image Colorization

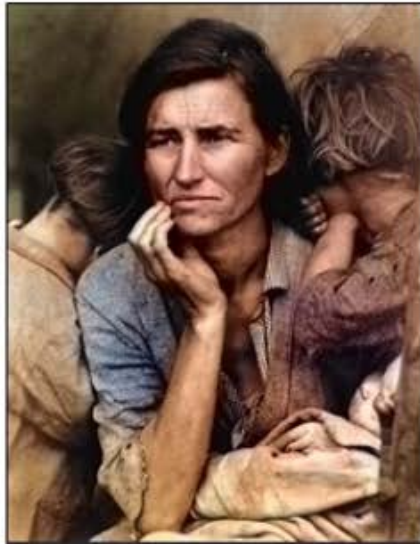


- A 313-class classification problem
- Input: $224 \times 224 \times 1$ (L)
- Model output: $64 \times 64 \times 313$
- Pixel values: annealed mean of 313 colors



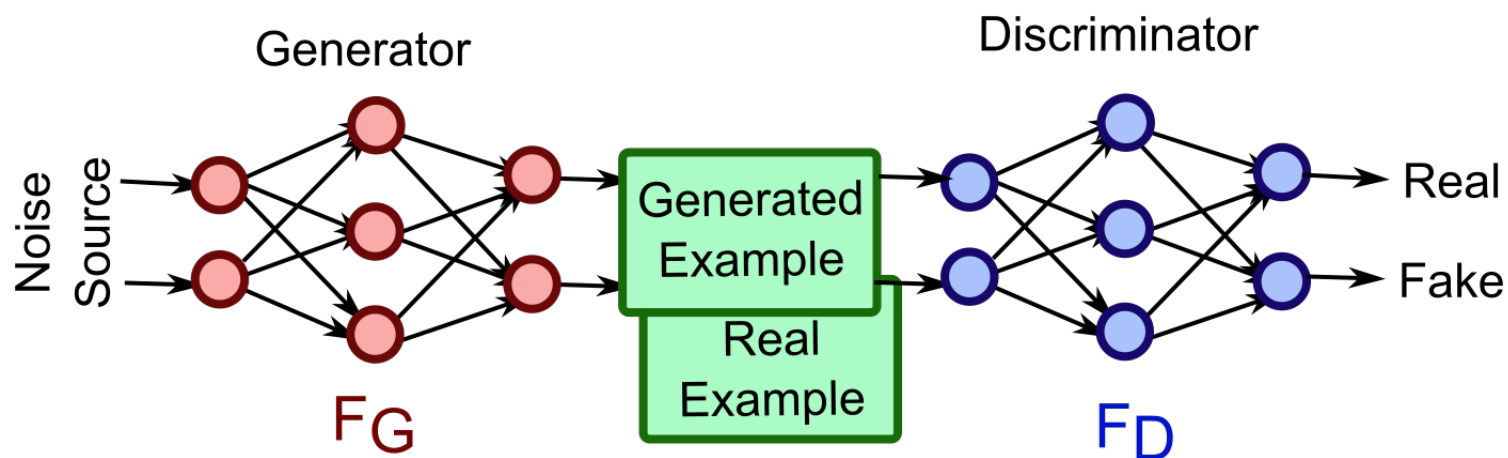
<http://richzhang.github.io/colorization/>

Colorizing Legacy Photos



GENERATIVE MODELS

Generative Adversarial Networks

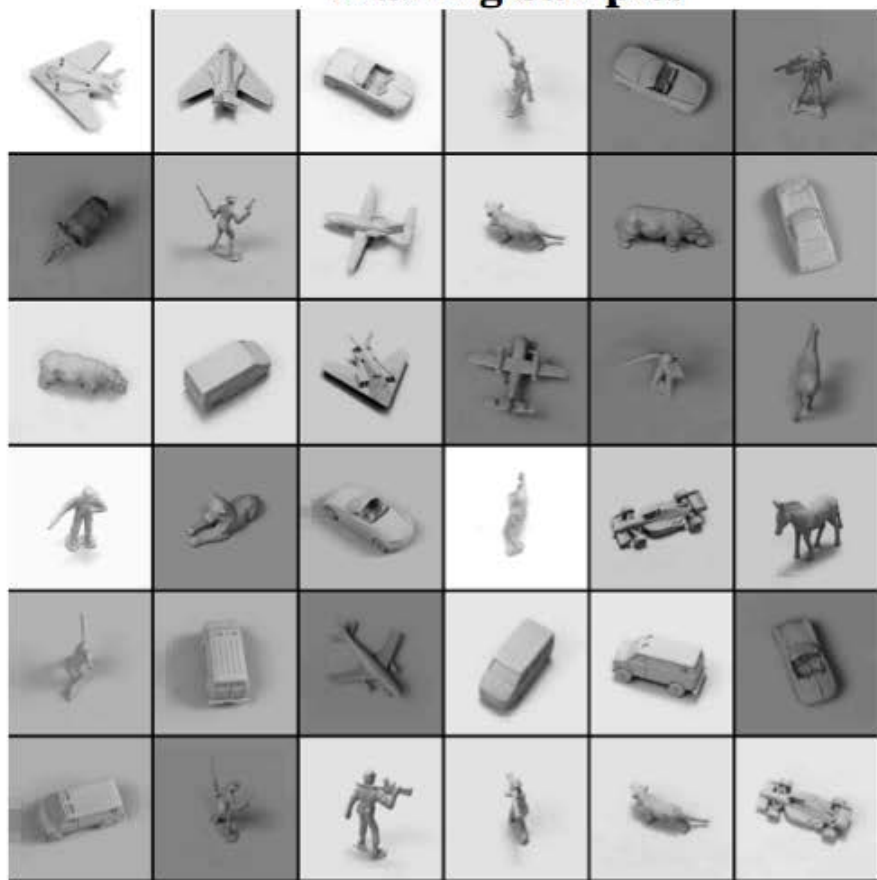


"Generative Adversarial Networks is the **most interesting idea in the last ten years** in machine learning."

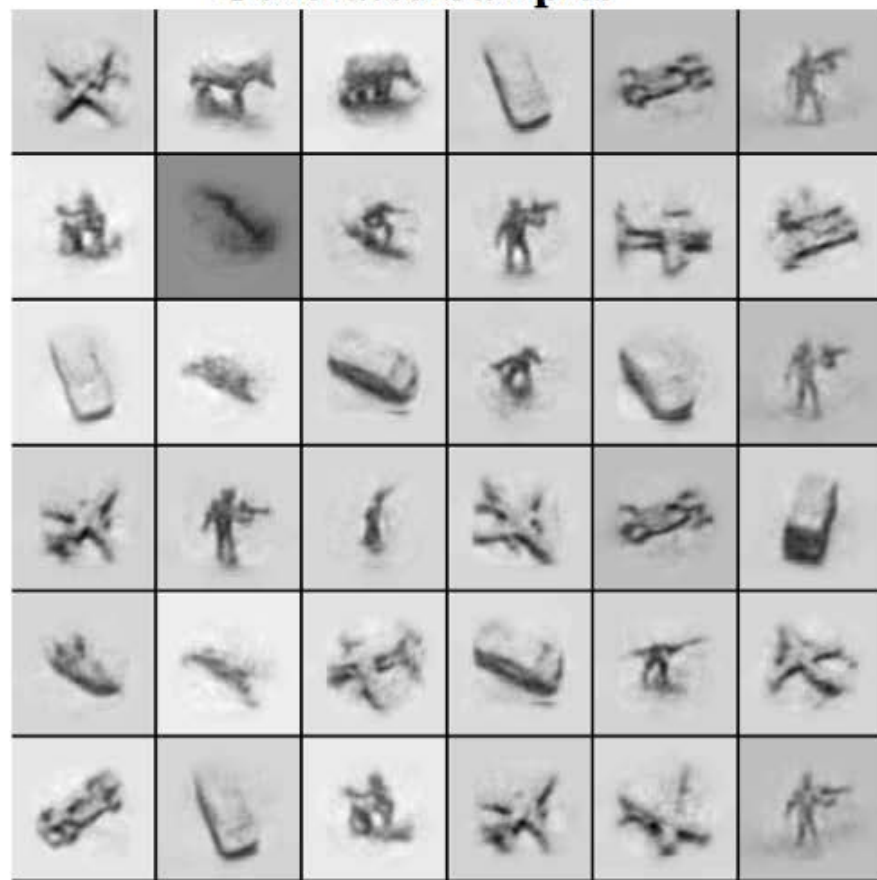
Yann LeCun, Director, Facebook AI

Truth vs. Generated Samples

Training Samples

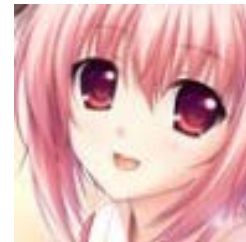
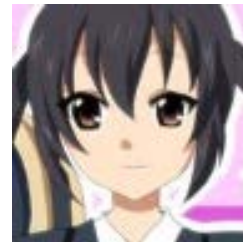
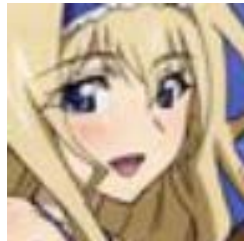


Generated Samples



https://metacademy.org/roadmaps/rgrosse/deep_learning

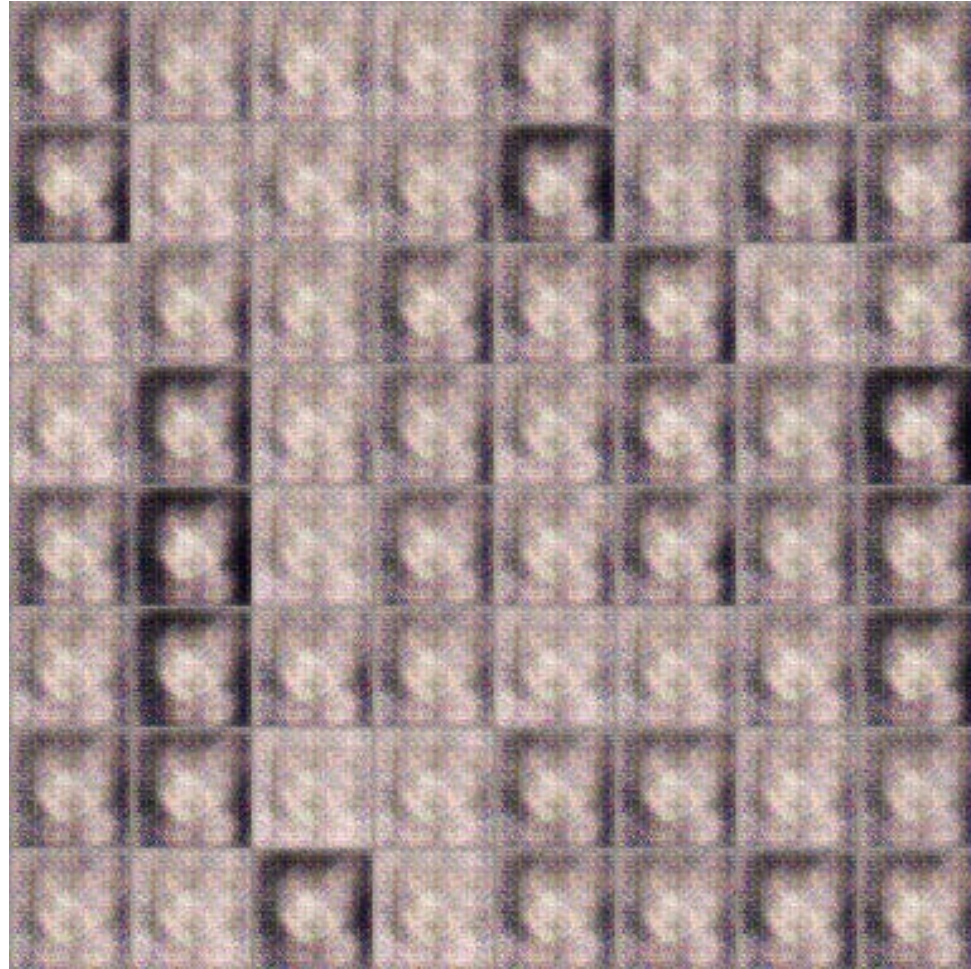
Anime Girl Face Generation



Source of images: <https://zhuanlan.zhihu.com/p/24767059>

DCGAN: <https://github.com/carpedm20/DCGAN-tensorflow>

Anime Girl Face Generation



100 rounds

Anime Girl Face Generation



1000 rounds

Anime Girl Face Generation



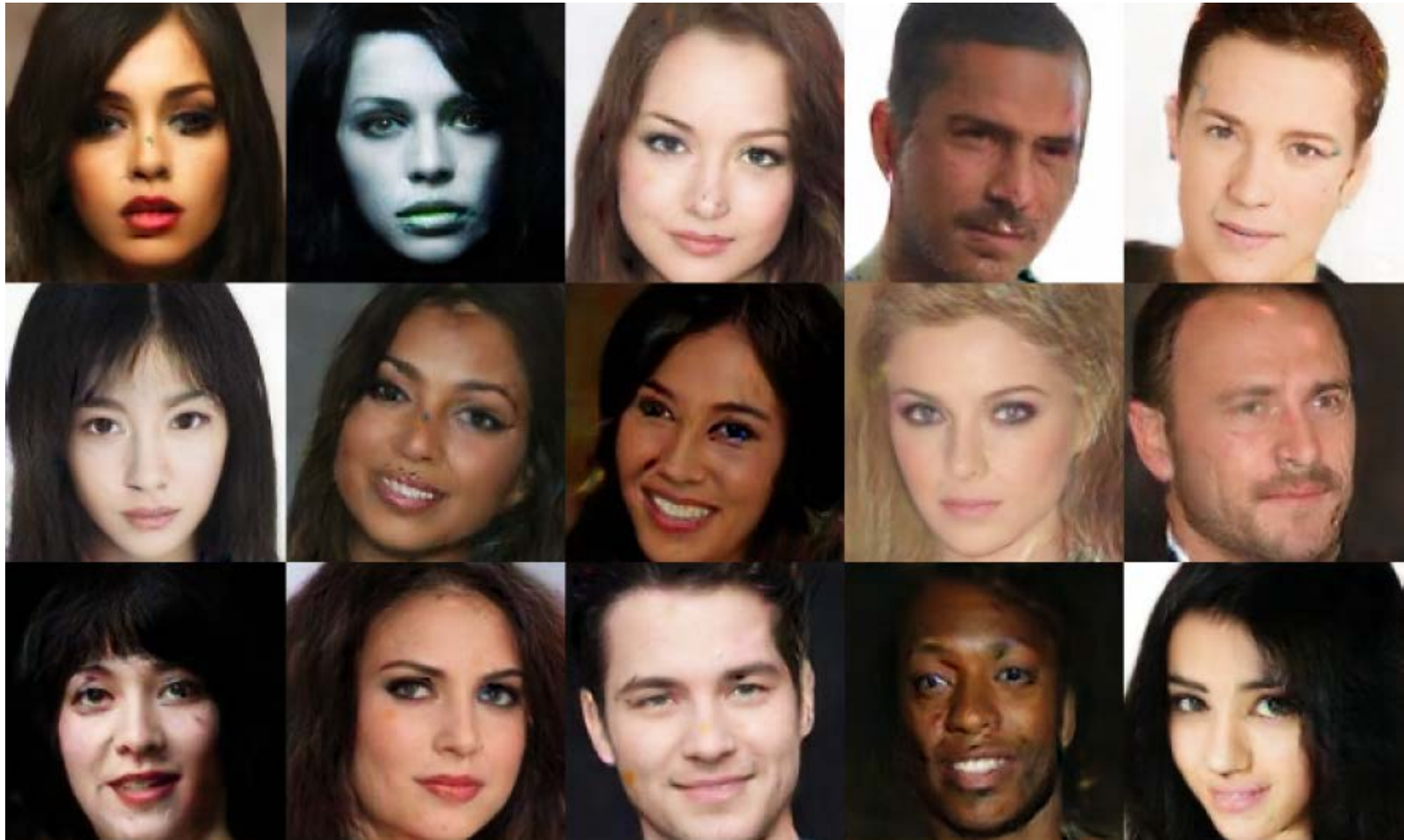
5000 rounds

Anime Girl Face Generation



50,000 rounds

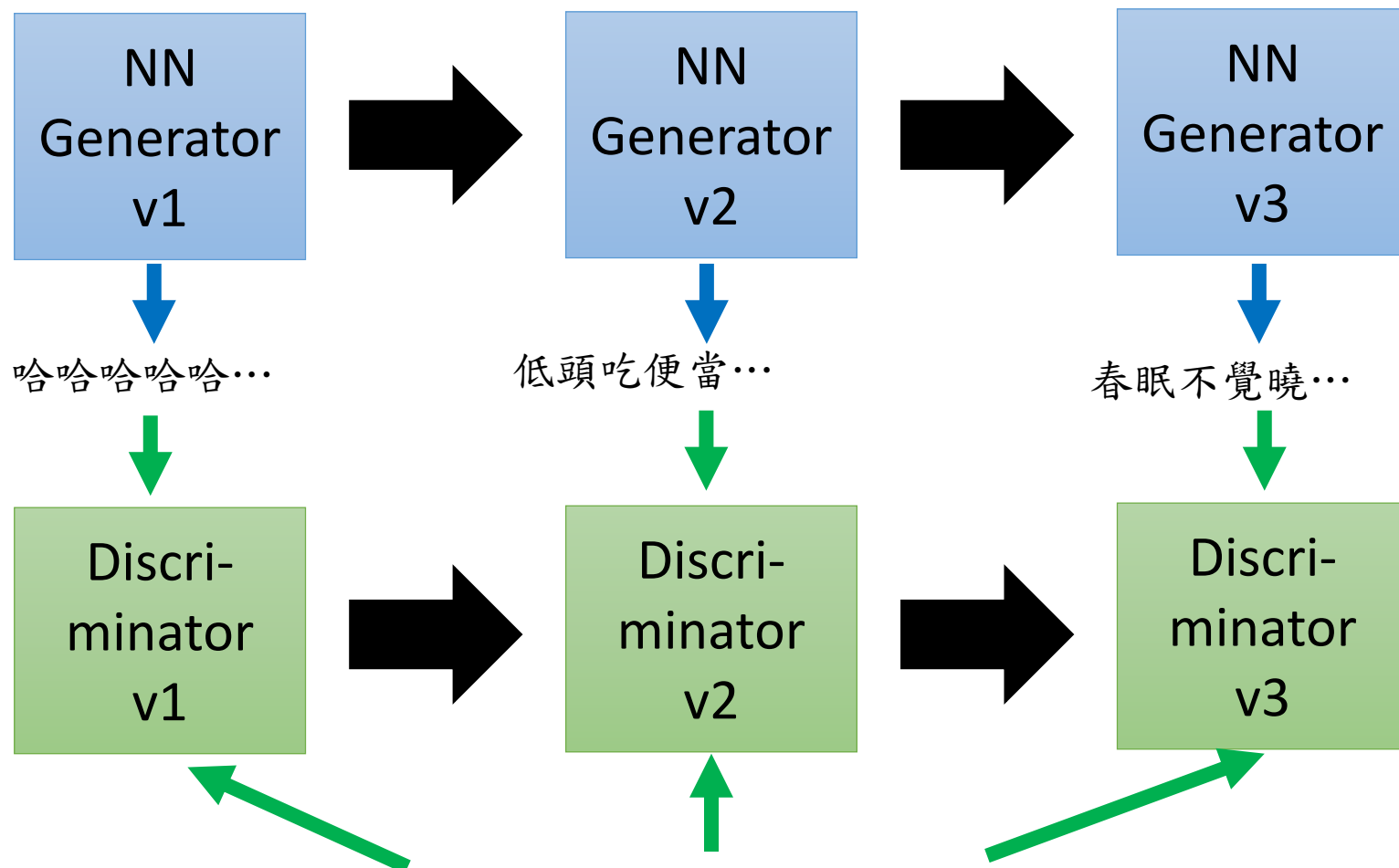
BEGAN (Boundary Equilibrium GAN)



<https://github.com/carpedm20/BEGAN-tensorflow>

Berthelot, David, Tom Schumm, and Luke Metz. "Began: Boundary equilibrium generative adversarial networks." *arXiv preprint arXiv:1703.10717*(2017).

WGAN – Poem Generation



Real poems: 床前明月光，疑似地上霜，舉頭望明月，低頭思故鄉。

加入 無店面公會

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www.cnra.org.tw

※FB粉絲團：

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