機器學習

Machine Learning

Machine Learning

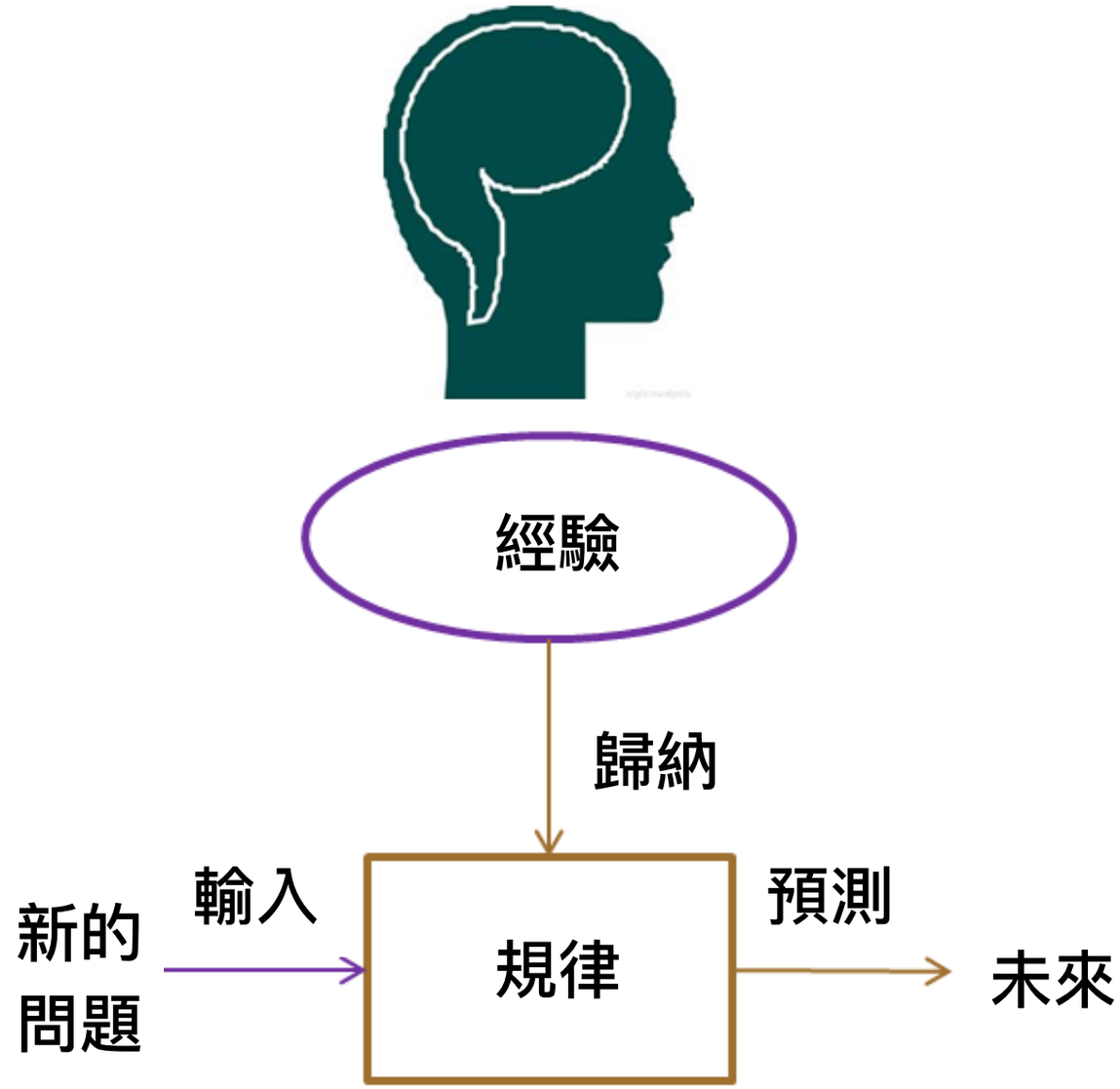
v.s.

Algorithms

Cat or not cat?

Cat or not cat?

Machine learning

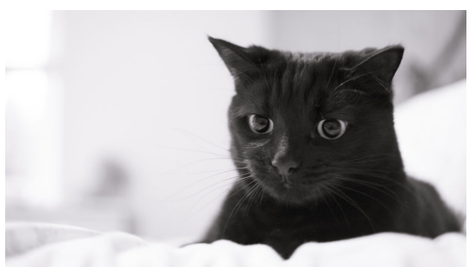


Machine learning

not cat

cat

cat



cat

⋮

Machine learning

歷史數據

訓練

新的數據 → 輸入 → 模型 → 預測 → 未知屬性

經驗

歸納

新的問題 → 輸入 → 規律 → 預測 → 未來

Machine learning

- Tom Mitchell

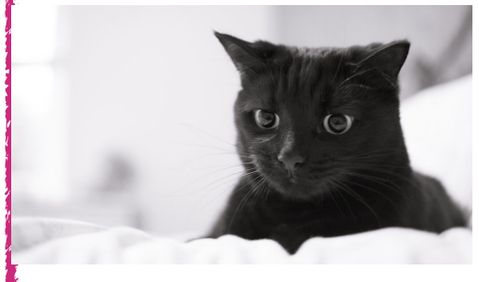
  A program can be said to learn from experience E with respect to some class of tasks T and performance measure P, if its performance at tasks in T, as measured by P, improves with experience E.

Machine learning

not cat

cat

cat



cat

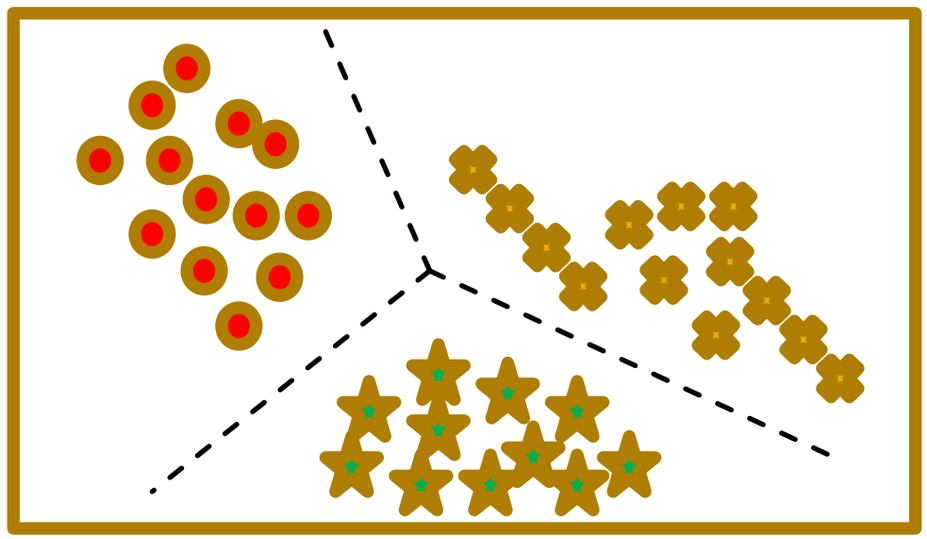
⋮

E

T: Cat or not cat?

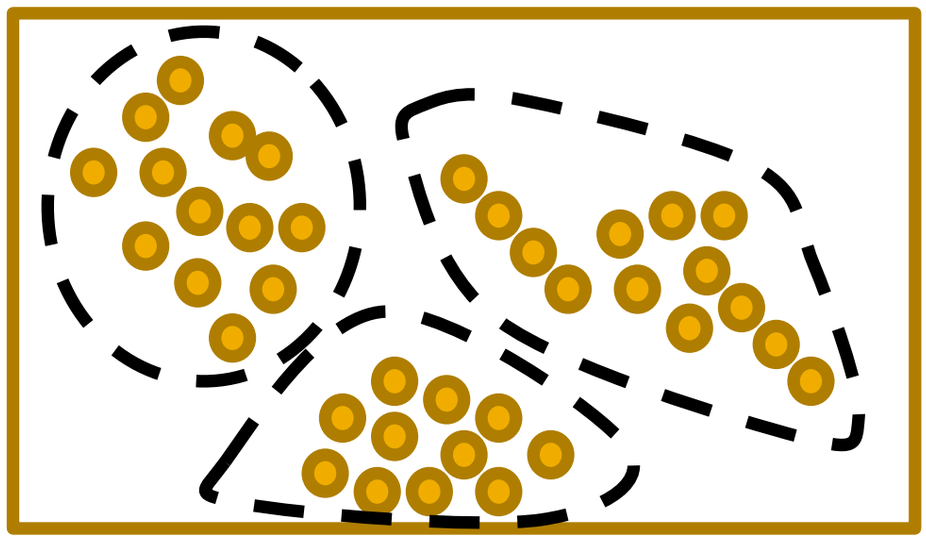
P: The number (or fraction) of objects correctly classified.

Supervised v.s. UnSupervised Learning



Supervised

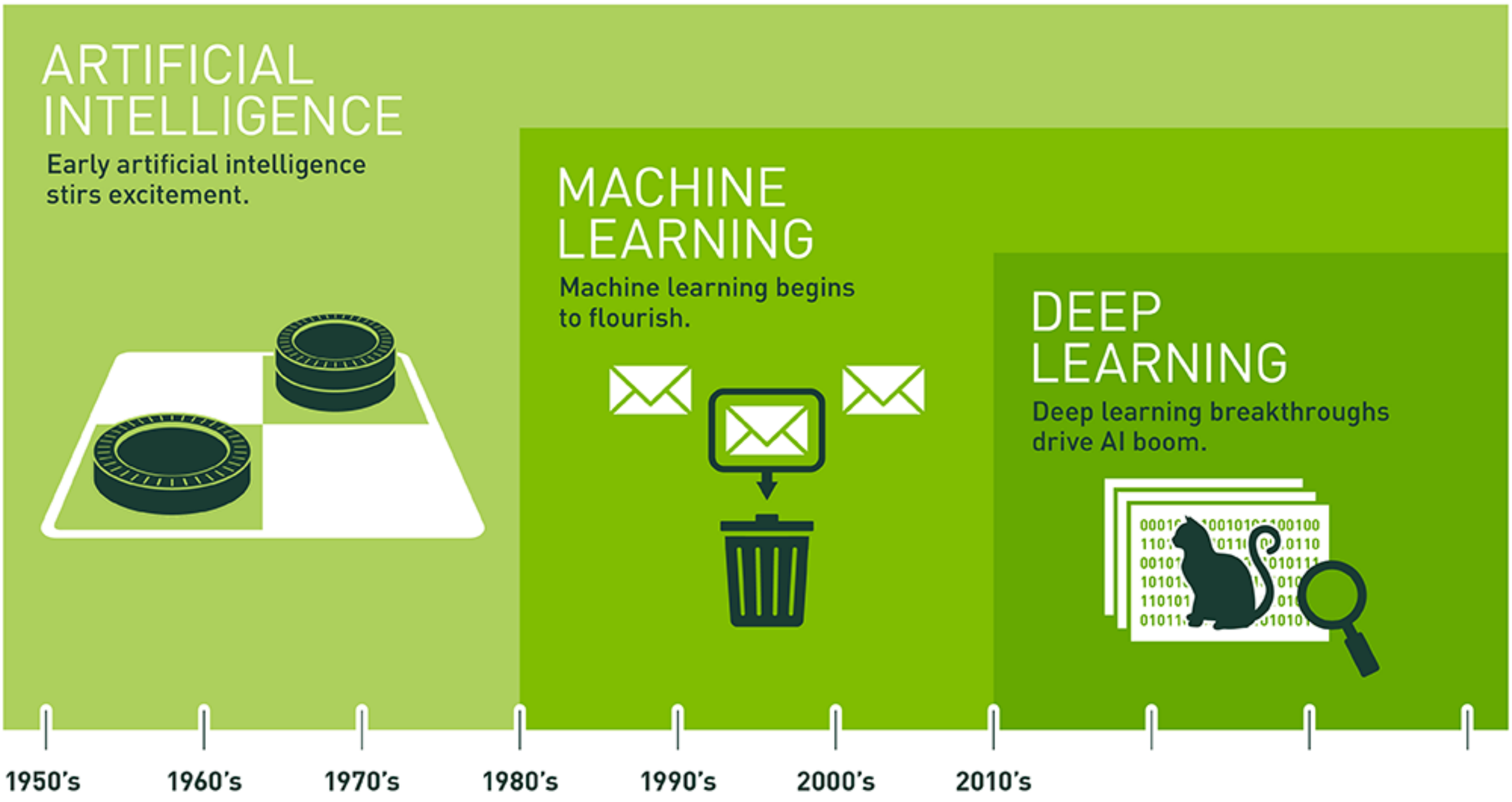
(prediction)



Unsupervised

(pattern)

ML, AI, and DL



Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

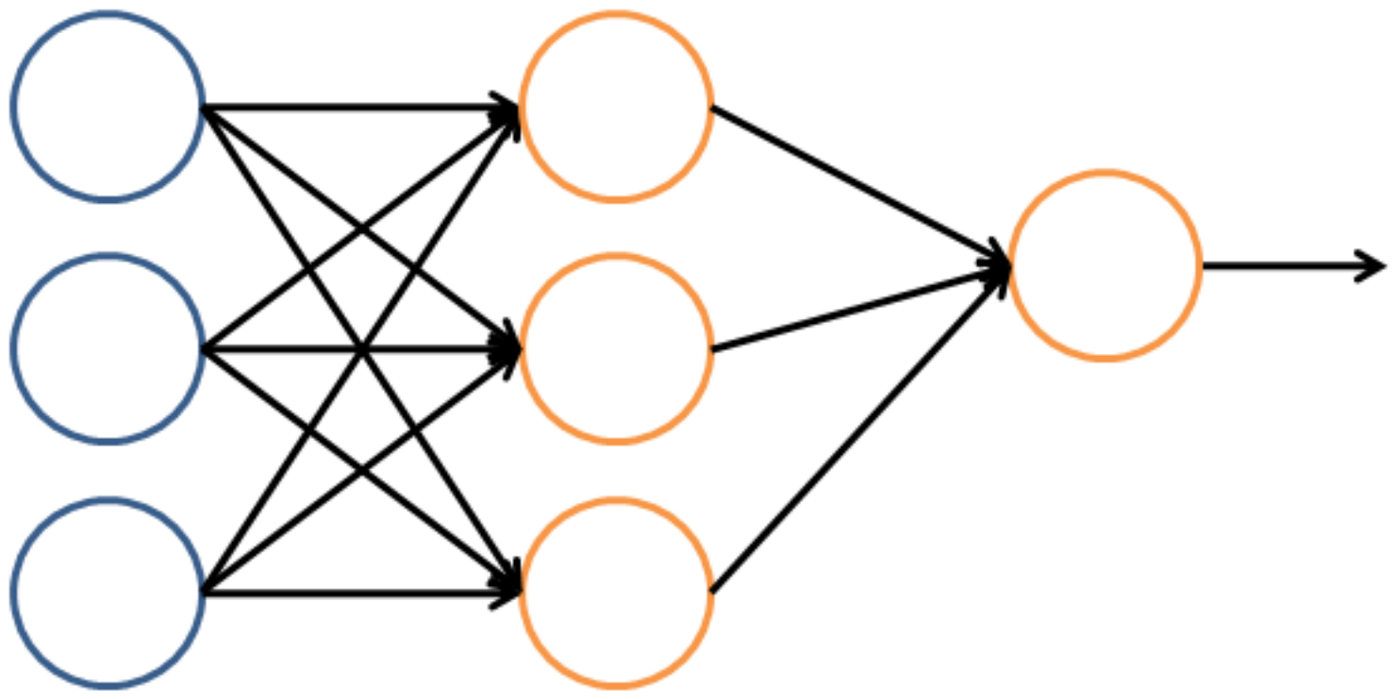
Source: https://blogs.nvidia.com.tw/2016/07/whats-difference-artificial-intelligence-machine-learning-deep-learning-ai/

Artificial intelligence (AI)

"Intelligent Agents" refers to the ability of the computer to simulate/model human thinking processes to imitate human ability or behavior

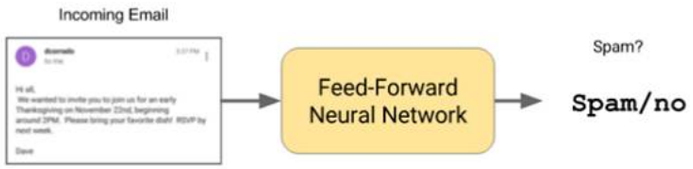
Deep Learning (DL)

learning data representations with use a cascade of multiple layers of nonlinear processing unit



Applications

Gmail Spam

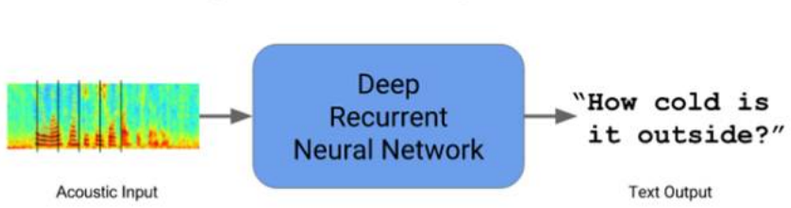


Gmail now intercepts 99.9% of all Spam

Google Gmail Blog - July 2015

Research at Google

Speech Recognition

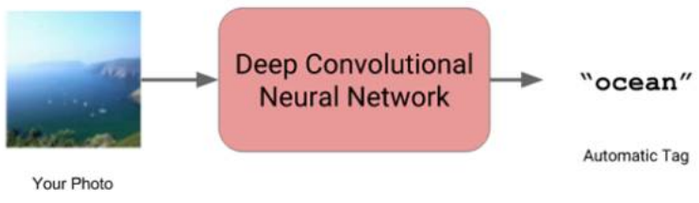


Reduced transcription errors by more than 20%

Google Research Blog - August 2012, August 2015

Research at Google

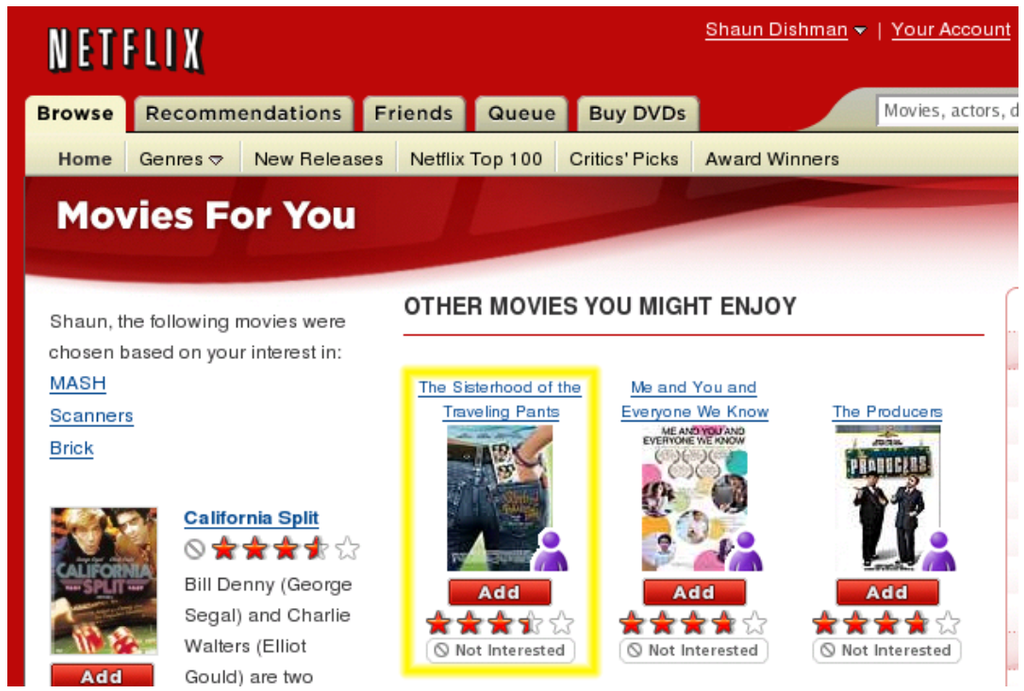
Google Photos Search

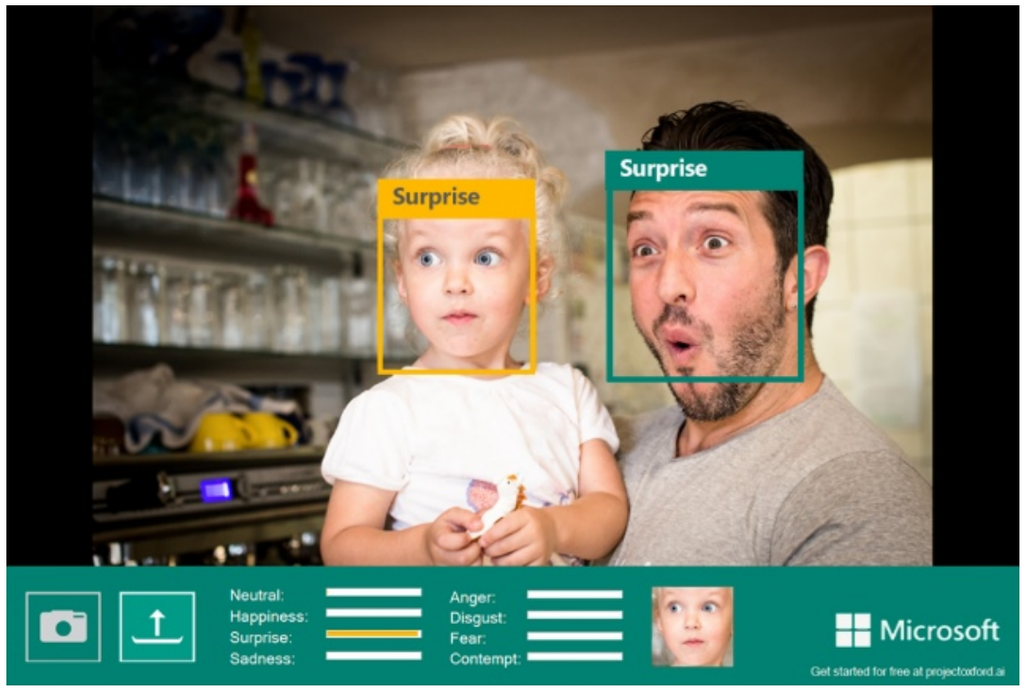


Search personal photos without tags.

Google Research Blog - June 2013

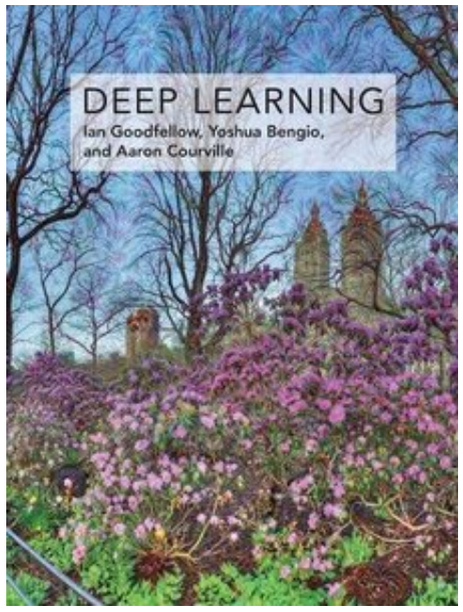
Research at Google



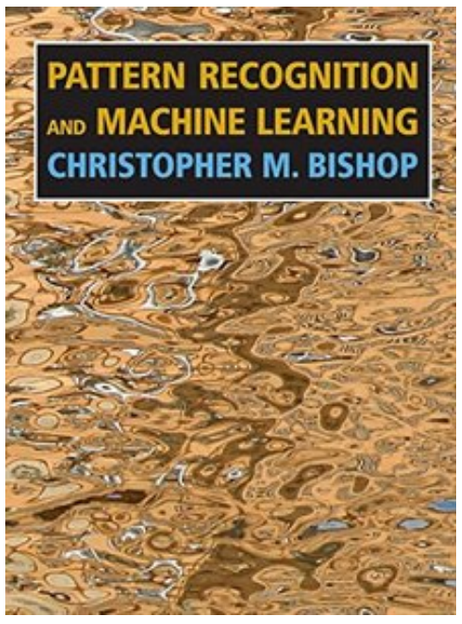


Course information

- Online Resources
  - Coursera
  - Deep Learning
    Ian Goodfellow, Yoshua Bengio, Aaron Courville



  - Pattern Recognition and Machine Learning
    Christopher M. Bishop



  - Introduction to Machine Learning
    E. Alpaydin
  - ……

Course information

- Grading Policy
  - 作業　　40 %
  - 期中考　　30 %
  - 期末報告　　30%
- 上課前請安裝好 python 3.X

Q&A