

Soft Introduction

Machine Learning for Finance (FIN 570)

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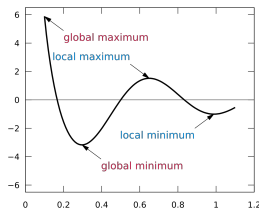
Peking University HSBC Business School, Shenzhen, China

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AlphaGo vs Humans



- AlphaGo made us to rethink about DìngShì or joseki (定式) in Go.
- In Go, DìngShì is the **optimal** (and balanced between black and white) sequences of moves studied by human being for hundreds years.
- AlphaGo surprised Go experts by showing moves not following DìngShì.
- DìngShì we know is not be the globally optimal strategy!



ML/AI: Rise of the machines?

Probably not like this!



Data vs Knowledge

Data

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, ...

Data vs Knowledge

Data

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, ...

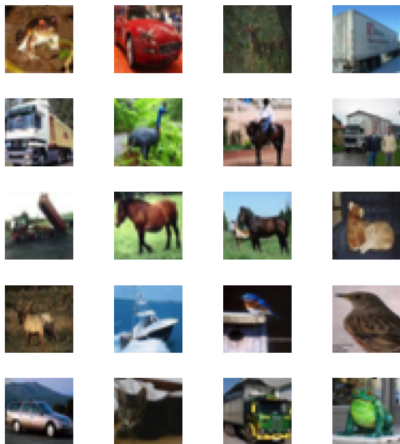
Knowledge

Fibonacci sequence:

$$A_k = A_{k-1} + A_{k-2}, \quad A_0 = 0, \quad A_1 = 1$$

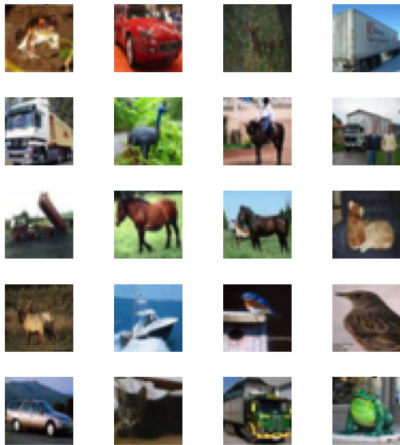
Data vs Knowledge

Data

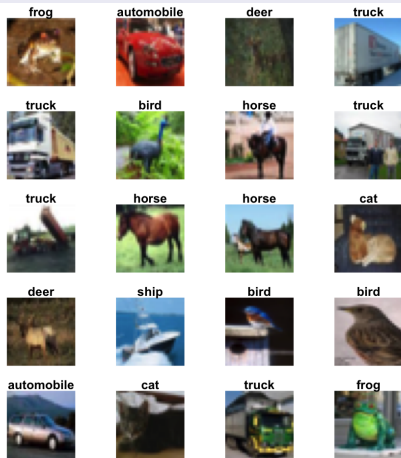


Data vs Knowledge

Data



Knowledge



Data vs Knowledge

Data

$$(x_1, y_1), (x_2, y_2), \dots, (x_n, y_n)$$

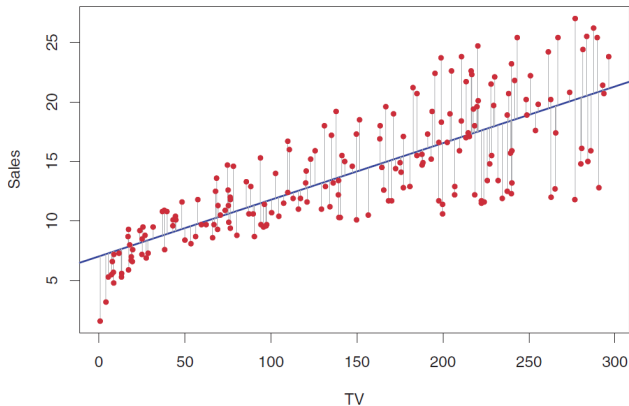
Data vs Knowledge

Data

$$(x_1, y_1), (x_2, y_2), \dots, (x_n, y_n)$$

Knowledge

$$\hat{y} = ax + b$$



What and why now?

What is ML?

- Prediction based on data (data into knowledge)
- An extended version of linear/logistic regression
- Recognition of patterns

What and why now?

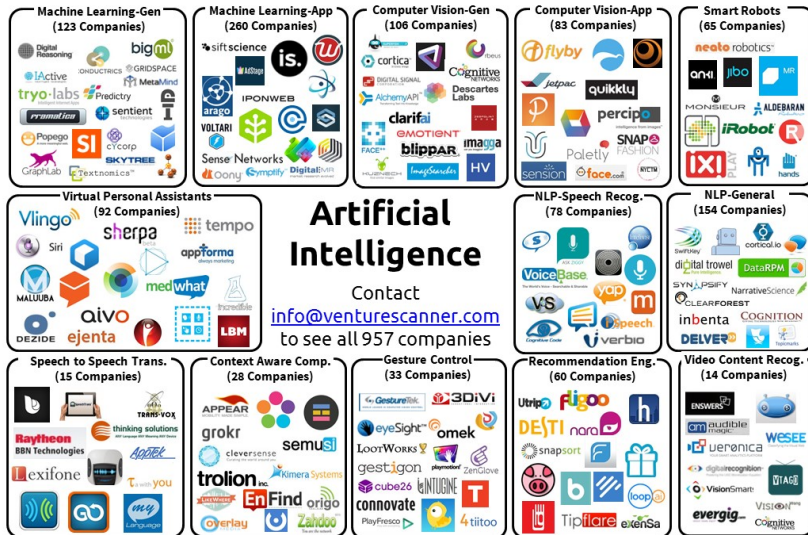
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Why now?

- Abundant Data (Big Data)
- Faster computer (Graphics Processing Unit: GPU)
- Advances in research: Geoffrey Hinton (Google), Yann LeCun (Facebook).

Applications of ML



ML for Finance?

Andrew Ng's article in HBR

If a typical person can do a mental task with less than one second of thought, we can probably automate it using AI either now or in the near future. (Nov 2016, HBR)

ML in Finance (ideals)

- Asset management, investment, stock picking/timing?
- Trading algorithm (alpha strategy) for hedge fund?
- Earnings prediction: e.g., [Prediction Valley](#)
- Predicting next financial crisis?

ML in Finance (reality)

- Cost cut / labor reduction: Chat-bot (trading and sales), accounting/tax, analyst report, legal work
- Data analytics: e.g., [Kensho](#)