

君たちはどう働くか
The future of work
or
How will you work

International High School Student Forum
St. Palace Hotel Kurayoshi
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Outline

- The advance in technology has had great impacts on how we work.
- Recent IT, esp. robotics and AI, are expected to have unprecedented impact.
- In this lecture, we will consider such impacts, focusing on “unemployment and distribution of wealth”, “good life”, and “machines’ control over humans”.

The development of robots and AI

According to John McCarthy

- An AI is an artificial system which behaves in such way that if humans behave in the same way, he or she will be considered as “intelligent”.
- Early AI focuses on abilities such as logical reasoning or using language.



John McCarthy,
who coined the term “artificial intelligence”

By "null0" (<https://www.flickr.com/photos/null0/272015955/>)
[CC BY-SA 2.0 (<https://creativecommons.org/licenses/by-sa/2.0>)]
via Wikimedia Commons

What is intelligence?

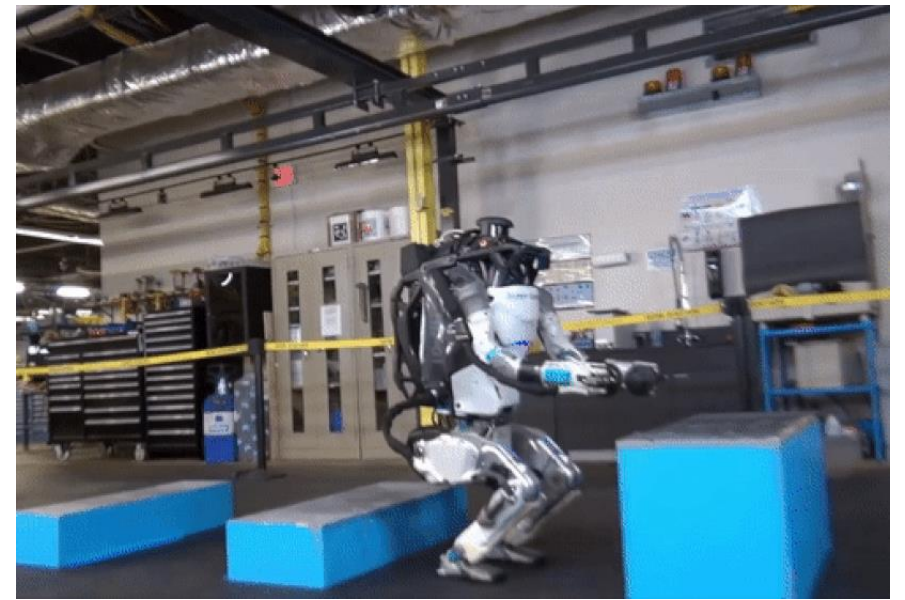
- Reasoning or calculating
- Solving problems or puzzles
- Using language
- Playing games like chess
- Making discoveries
- Creating something

A brief history of AI

- The end of 19c – the 1930s: Symbolic logic, theory of computation.
- Mid 20c: The advent of computers.
- 1956: Dartmouth conference on artificial intelligence.
- 1950s: The first AI boom. The age of “logical AI”.
- 1980s: The second AI boom. The age of “knowledge AI”.
- 2010s: The third AI boom. The age of “big data” and “machine learning”.
 - Combined with IoT, robots, and nanotechnology, its range of application will be further extended.



<https://www.volvocars.com/jp/about/our-innovation/intellisafe-autopilot>



<https://www.bostondynamics.com/atlas>



<https://www.bostondynamics.com/spot-mini>



<https://www.youtube.com/watch?v=P18EdAKuC1U>

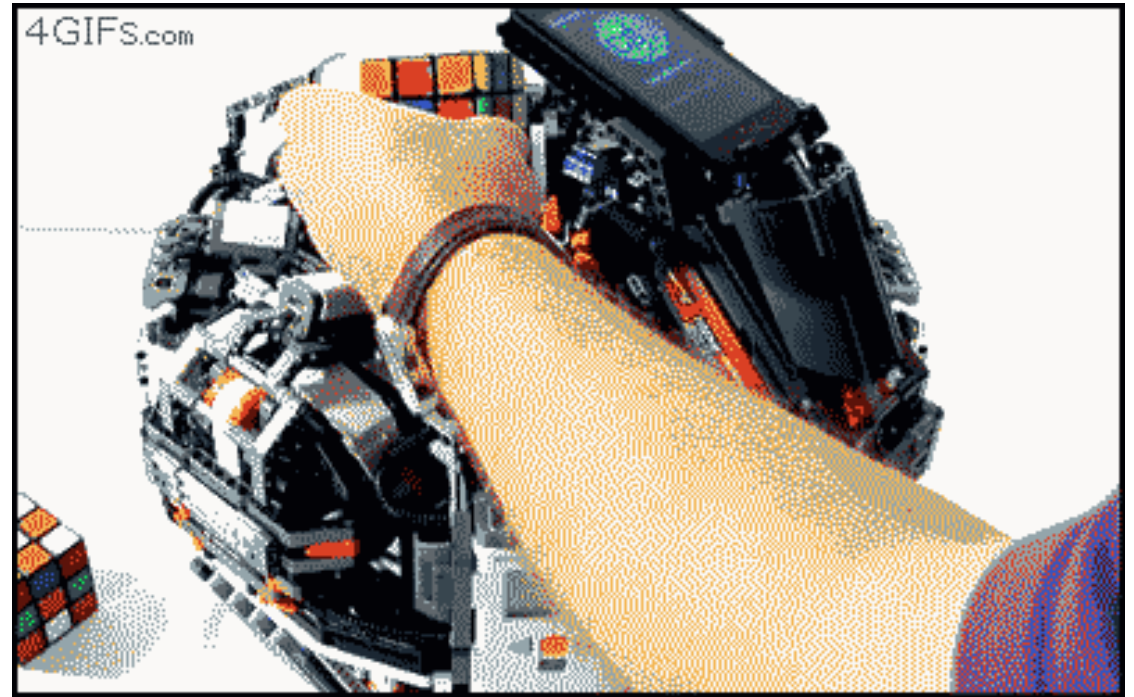
Rubic cube genius

<https://imgur.com/gallery/O6mEPaK>



Rubic cube robot

<https://www.youtube.com/watch?v=vKQvAWNPe4U>



Mastering Chess and Shogi by Self-Play with a General Reinforcement Learning Algorithm

David Silver,^{1*} Thomas Hubert,^{1*} Julian Schrittwieser,^{1*}
Ioannis Antonoglou,¹ Matthew Lai,¹ Arthur Guez,¹ Marc Lanctot,¹
Laurent Sifre,¹ Dharmashan Kumaran,¹ Thore Graepel,¹
Timothy Lillicrap,¹ Karen Simonyan,¹ Demis Hassa

¹DeepMind, 6 Pancras Square, London N1C 4AG.

*These authors contributed equally to this work.

With no prior knowledge, the program reached the champion level within 24 hours.

Abstract

The game of chess is the most widely-studied domain in the history of artificial intelligence. The strongest programs are based on a combination of sophisticated search techniques, domain-specific adaptations, and handcrafted evaluation functions that have been refined by human experts over several decades. In contrast, the *AlphaGo Zero* program recently achieved superhuman performance in the game of Go, by *tabula rasa* reinforcement learning from games of self-play. In this paper, we generalise this approach into a single *AlphaZero* algorithm that can achieve, *tabula rasa*, superhuman performance in many challenging domains. Starting from random play, and given no domain knowledge except the game rules, *AlphaZero* achieved within 24 hours a superhuman level of play in the games of chess and shogi (Japanese chess) as well as Go, and convincingly defeated a world-champion program in each case.

美少女キャラクターを人工知能が自動生成してくれる「MakeGirls.moe」



Painting

<https://gigazine.net/news/20170814-make-girls-moe/>

グーグルの芸術家AI、バッハ調の音楽を自動で作曲

Composition

高橋 秀和=ITpro

2

ツイート 保存する





きまぐれ人工知能プロジェクト
作家ですのよ

成果 | メンバー | 報道

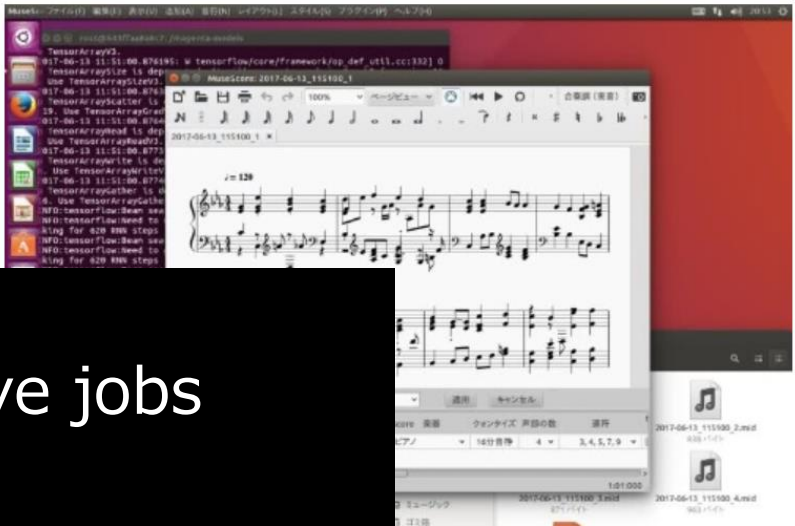
Story writing

作家ですのよ

エッセイなどに書かれたアイデア発想を参考にして、人工知能におもしろいショートショートを創作させることを目指すプロジェクトです。

公立はこだて未来大学の松原仁教授を中心にしたプロジェクトチームで、2012年9月にスタート。2017年頃の「新作発表」が目標です。

AI and creative jobs



https://www.fun.ac.jp/~kimagure_ai/

<https://tech.nikkeibp.co.jp/it/atcl/column/17/060700229/061300004/>

SELF : 人工知能(AI)があなたの生活を完全サポート

[View More by This Developer](#)

By SELF Inc.

Open iTunes to buy and download apps.



[View in iTunes](#)

Description

人工知能（AI）が、毎日のメンタルや健康の分析を行い、あなたに応えます。

■美少女型AI「古瀬あい」も登場！ ※Ver.2.2.0より

[SELF : 人工知能\(AI\)があなたの生活を完全サポート Support](#)

[...More](#)

What's New in Version 2.2.3

・不具合修正

Free

Category: [Entertainment](#)

Updated: Jun 05, 2017

Version: 2.2.3

Size: 149 MB

Language: English

Seller: SELF inc.

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[Rated 12+](#) for the following:

Infrequent/Mild Alcohol, Tobacco, or Drug Use or References

Infrequent/Mild Horror/Fear Themes

Infrequent/Mild

Mature/Suggestive Themes

Infrequent/Mild Profanity or Crude Humor

Compatibility: Requires iOS 8.0 or later. Compatible with iPhone, iPad, and iPod touch.

Customer Ratings

Current Version:

iPhone Screenshots



Even communication

- The normal version is free.
- However, you need to pay about \$150 per week in order to keep the “beautiful girl” version to remember you.

ジャンル別一覧 > ユリイカ > ユリイカ2018年7月号 特集=バーチャルYouTuber

ユリイカ2018年7月号 特集=バーチャル YouTuber



I wrote an article in which I argued that people will increasingly prefer virtual agents to humans as a conversation partner, because people are eager to have communication but find themselves awkward in conversation with humans.

■ 新しい遊びのつくり方 / みゆみゆ

ごく主観的な話 / じーえふ

くまーめいど、バーチャルをやる / 窓ハルカ

二一世紀の可愛い機械のトルコ人たち / 久木田水生

虚構世界のキャラクターの人権とVTuberの人権にかんする覚書 / 藤田祥平

ヴァーチャルなキャラクターの操演と動物性についての試論 / 猪口智広

Unemployment and distribution of wealth

Will humans go the way of horses?

- Brynjolfsson, E and McAfee, A. "Will humans go the way of horses?: Labor in the second machine age," *Foreign Affairs*, **94**(4), pp.8-14.
- Through the industrial revolution, horses lost their value as labour force, and as a result their population decreased drastically.
- There is no guarantee that the same thing will happen to humans.
- Humans are different from horses in that **they can choose their future.**
- We should seriously address the question of **what kind of society we will construct "around the labor-light economy."**

AI will create as many jobs as it displaces by boosting economic growth

Jul 17, 2018

- Although the overall effect on UK jobs is estimated to be broadly neutral there will be “winners” and “losers” by industry sector
- Health (+22%), professional, scientific and technical services (+16%) and education (+6%) will see the largest net increase in jobs in the long run
- Manufacturing (-25%), transport and storage (-22%) and public administration (-18%) are estimated to see the largest net long-term decrease in jobs due to AI

Artificial Intelligence (AI) and related technologies are projected to create as many jobs as they displace in the UK over the next 20 years, according to new analysis by PwC. In absolute terms, around 7 million existing jobs could be displaced, but around 7.2 million could be created, giving the UK a small net jobs boost of around 0.2 million.

- Some jobs will be replaced by AI, but AI-boosted economy will increase employment.
- As a result, the unemployment rate will be almost the same.
- However, the distribution of jobs will be changed a lot.
- The employment in manufacturing etc. will see a large decrease, while that in health, education and R & D will see a large increase.

<https://www.pwc.co.uk/press-room/press-releases/AI-will-create-as-many-jobs-as-it-displaces-by-boosting-economic-growth.html>



New college recruits gather for an orientation session at Sumitomo Mitsui Banking's Tokyo headquarters in 2016. (Photo by Yuichiro Takagi)

COVER STORY

Shrinking to survive: Japan's banks face a quiet crisis

There are signs this is beginning to change, however. The country's three biggest banks have announced plans to close branches, eliminate thousands of positions and introduce more automation -- radical steps in an industry where employees expect to have jobs for life. But critics warn they are still not moving quickly enough to prepare for the next wave of digital disruption heading their way. One senior executive says Japan's banks are experiencing a "quiet crisis."

- Japan's megabanks are closing their retail branches because more and more of their customers are moving to online.

<https://asia.nikkei.com/Spotlight/Cover-Story/Shrinking-to-survive-Japan-s-banks-face-a-quiet-crisis>

Negative income tax!

Basic income!

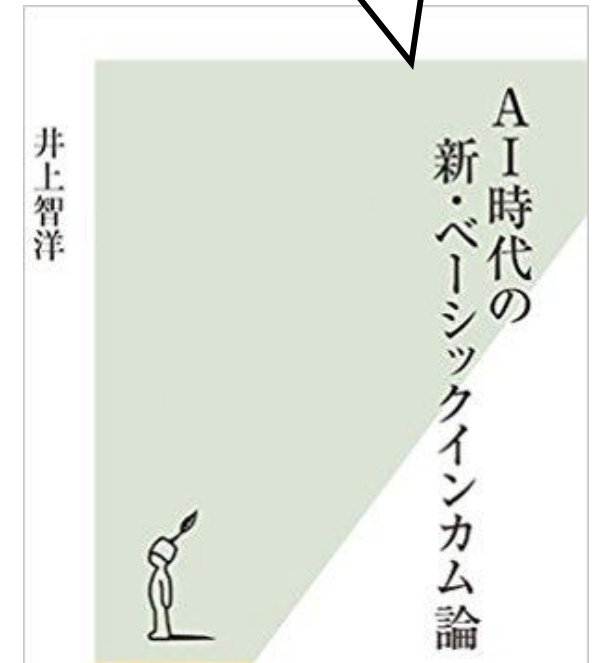
Let everyone own stocks!



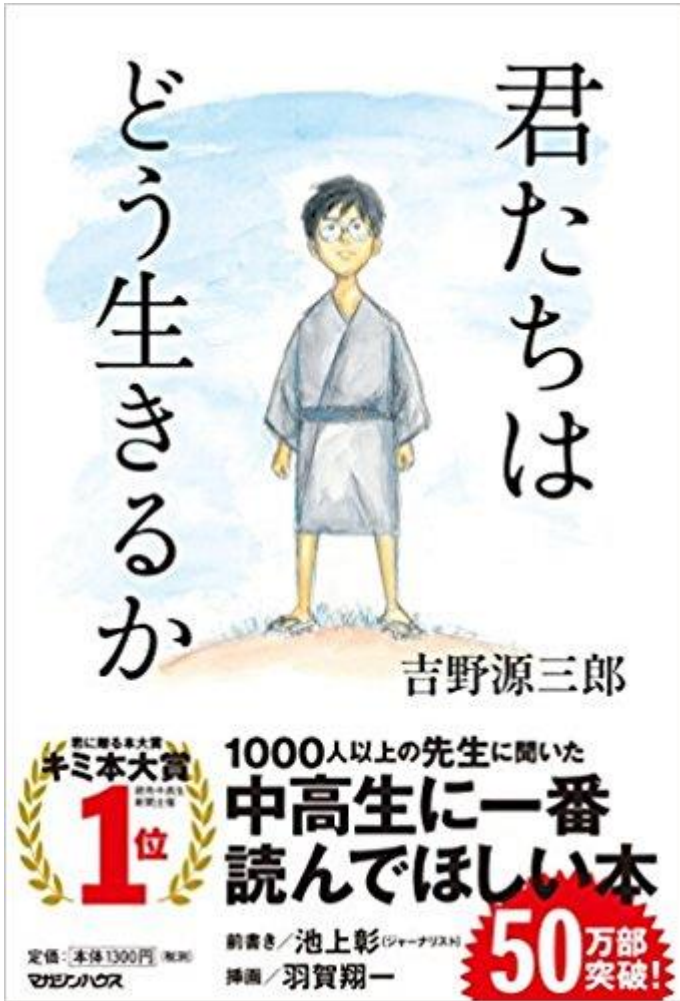
Work is not only for money



If one can live without working, that is blessing



Good life



- “But if one asks which is more respectable or more precious, those who produce more than they consume and contribute to the society, or those who do not produce but only consume, the answer is obvious.”
- しかし自分が消費するものよりも、もっと多くのものを生産して世の中に送り出している人と、何も生産しないでただ消費ばかりしている人間と、どっちが立派な人間か、どっちが大切な人間か、——こう尋ねてみたら、それは問題にならないじゃあないか。（pp. 149-150）

Genzaburo Yoshino, *How will you live*



The future depicted in the film *WALL-E*

画像は <http://everything sneakers.com/running-shoes-for-men-balance-is-new> より転載

A traditional model of “good life”

- Contributing to the community using knowledge and skills one has acquired through education and training.
- However, is this possible in the future?
- We may need to change such traditional values.

Technology and the value of humans

- If one's value is associated with "ability", "performance" or "productivity", the development in technology will relatively deflate human value.
- When machines have "intelligence" or "mind", where should we seek values of humans?
- It will be even more essential that all humans have the equal value by merely existing or living, which is the fundamental principle of humanism.

Machines' control over
humans

Prediction of consumers behaviours

- Prediction of the number of the visitors based on past data.
- Reduction of waste.
- Efficient deployment of personnel
 - Efficient for owners
 - More burden for employee?



明日の来客予想はAIに聞け——創業100年の老舗店「あびや」のデータ活用

記事内容の要約

- 老舗食堂のデジタル化とデータ活用による経営変革を支援
- 食券をデジタル化し、来店予約や在庫管理で実現
- 自社のベストプラクティスをもとに、勘と経験に頼りがちな業界全体の体質改善を目指す

Ask AI about tomorrow's visitors

Sharing economy

- Accommodating temporarily something that is not used now to someone who needs it.
- Companies do not own “goods”, but make profit by mediating.
- Thus, they reduce the cost and risk of having “goods”.
- However, if the “goods” are labour force, it means that they pass-on burdens to the labourers.
- Non-regular work and irregular shift will increase.





Arvind Narayanan ✓

@random_walker

フォローする



This app by [@hirevue](#) is an example of AI whose only conceivable purpose is to perpetuate societal biases. [Thread]
[theadders.com/p/26101/ai-scr ...](https://theadders.com/p/26101/ai-scr...)

🌐 英語から翻訳

Using voice and face recognition software, HireVue lets employers compare a candidate's word choice, tone, and facial movements with the body language and vocabularies of their best hires. The algorithm can analyze all of these candidates' responses and rank them, so that recruiters can spend more time looking at the top performing answers.

1:57 - 2017年8月28日

Automatic evaluation of humans

居眠りさせないオフィス開発へ まぶた監視→室温下げる

An office that will not allow workers to sleep: It watches workers' eye lids and sends cold air, if it judges that one is sleeping.



仕事中にウトウトしてきたら、部屋の温度が自動的に下がって眠気を吹き飛ばす——。NECとダイキン工業は25日、オフィスでの居眠りを防ぐシステムを共同開発すると発表した。2020年にも実用化し、生産性の向上をめざす企業に売り込む考えだ。

システムの仕組みは、こうだ。まずはパソコンの画面にカメラをつけるなどして、働き手のまぶたの動きを追う。まぶたの動き方に変化が出れば、眠気におそわれ始めたと判断。部屋のエアコンの設定温度を一時的に数度下げて働き手に刺激を与え、目覚めを促す。

NECは得意の顔認証技術を生かし、まぶたの動きを追う技術を開発する。まぶたの動きの分析には人工知能(AI)を使う。

笑顔でないと出勤登録できず 出退勤管理システム開発 外食産業向けに

6/17(日) 5:00配信



笑顔度の確認システムを先行導入する175°DENO担担麺の札幌北口店。接客の現場に出る前に笑顔でないと出勤登録ができない

https://headlines.yahoo.co.jp/hl?a=20180617-00010000-doshin-bus_all (現在は削除されている)(now deleted)

顔認証技術で「笑顔度」判断

顔認証技術を使って笑顔かどうかを測定する機能を設けた出退勤管理システムを、業務用ソフト制作のイー・カムツール（札幌）が開発した。従業員の出勤時間登録に顔認証を使い、一定のレベルを上回る「笑顔度」であるとシステムが判断すると、出勤登録できるようにする。担担麺専門店を展開する175（いちななご）＝札幌＝が導入を決定。笑顔の接客を心がける飲食店での普及を目指す。（宇野沢晋一郎）

If you don't smile, you are not registered as coming to work

い出退勤管理システムを搭載したタブレット端末の画面に自分のIDを打
端末のカメラが作動し、顔写真を撮影。ID登録している人物と同一
要素から、笑
定していま
しっかり笑顔
を作ることが求められる。

「笑顔はサービスの一つ」

札幌や東京などに担担麺専門店「175。（ひゃくななじゅうごど）DENO担担麺」を展開する175は来年中に全7店でこのシステムを導入する。同社のシステム管理者、柳橋優樹さんは「笑顔はサービスの一つで、顧客満足度の高さにつながる。従業員に毎日の笑顔をチェックをする習慣にしてほしい」と話す。既に導入済みの札幌北口店のある従業員は「前日に寝不足の時は、翌朝の顔認証で表情の硬さに気付くときもある」と話した。

かつて、出退勤の管理にはタイムカードが使われていたが、不在の従業員のカードを他人が記録するなどの不正を防げなかった。顔などの生体認証を使ったシステムは他人では記録できない。アルバイトなどの出勤管理目的でも普及が進んでおり、NECなど大手企業の参入も増えている。

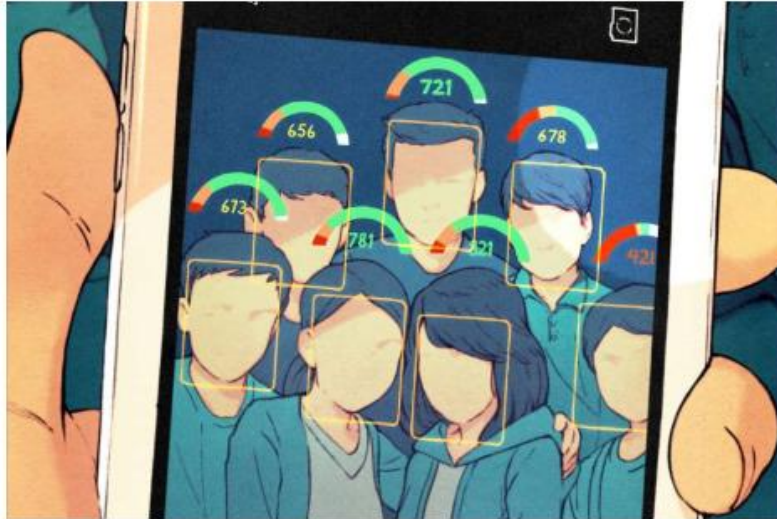
The odd reality of life under China's all-seeing credit score system

Looking for love? In China, a good credit score could get you access to exclusive singles



By CHARLES ROLLET

Tuesday 5 June 2018



Credit Kevin Hong

In the UK, credit scores are mostly used to determine whether people can get a credit card or loan. But in China, the government is developing a much broader “social credit” system partly based on people’s routine behaviours with the [ultimate](#) goal of determining the “trustworthiness” of the country’s 1.4 billion citizens.

You are judged from you data (what you buy, what you watch, who you are, whom you are with, etc.) in almost every social situation

<https://www.wired.co.uk/article/china-social-credit>

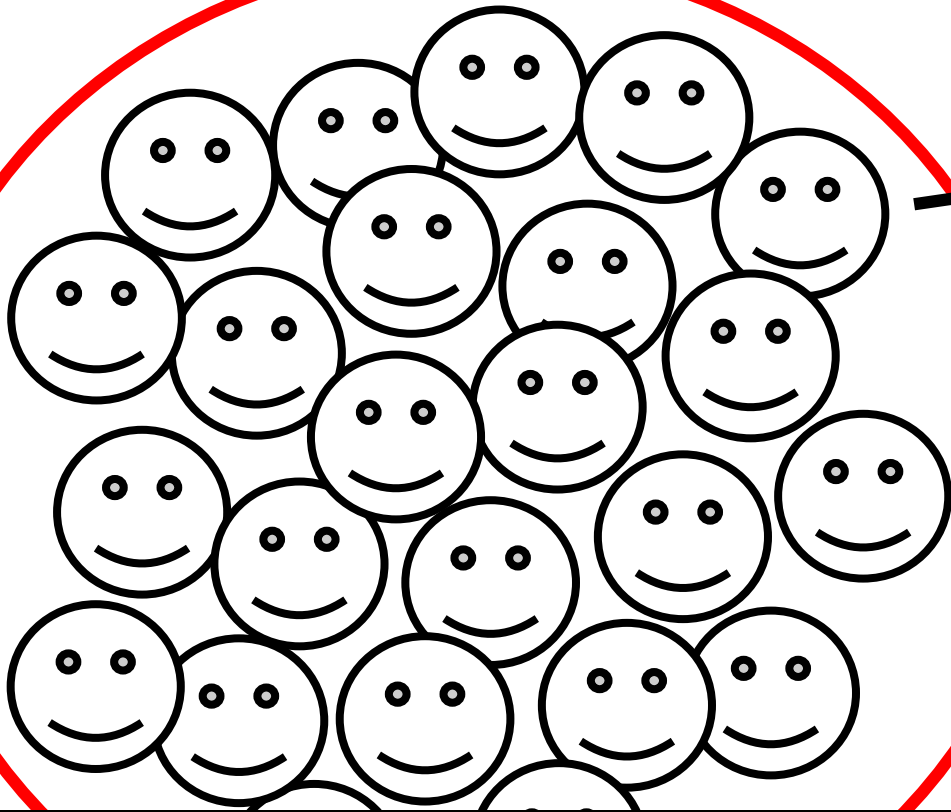
Profiling with (big) data

Ground  **Judgment**

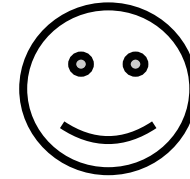
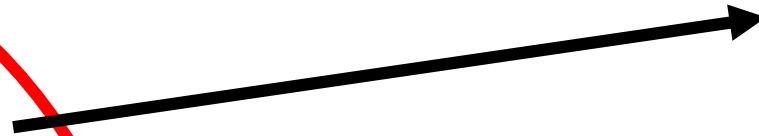
- Consumptions
- Credit score
- Habits relevant to health
- Where you live
- Social relations
- and so on and so on

- Aptitude for jobs
- Probability of crime and recidivism
- Loan application
- Insurance fee
- and so on and so on

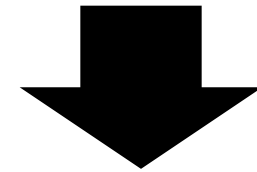
Where statistics goes wrong



80% out of this group have a tendency toward violence

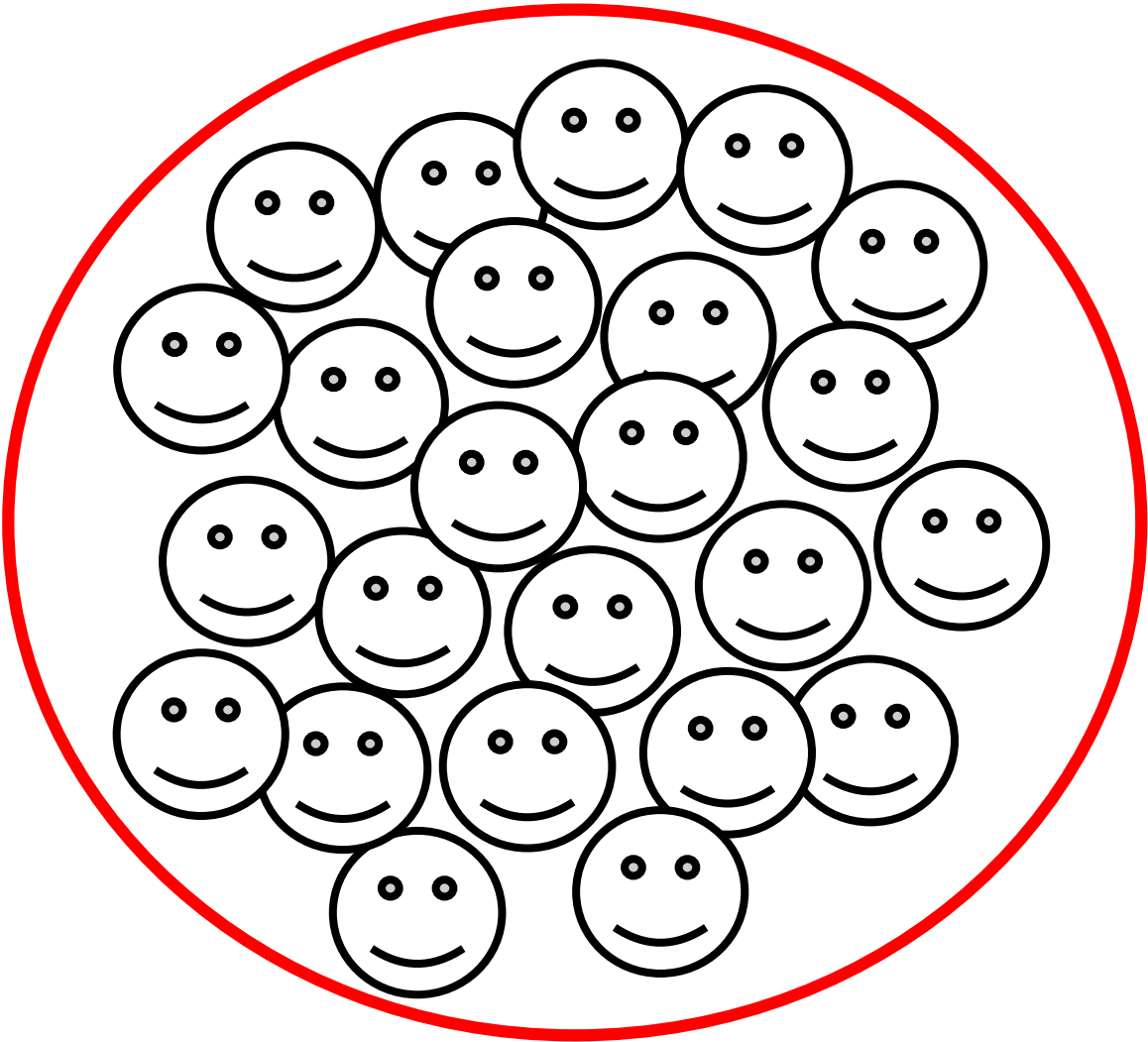


This guy will be violent with the probability of 80%



This guy is dangerous.

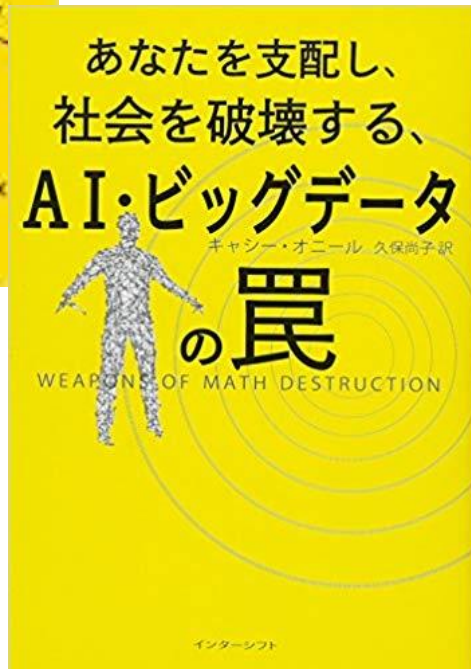
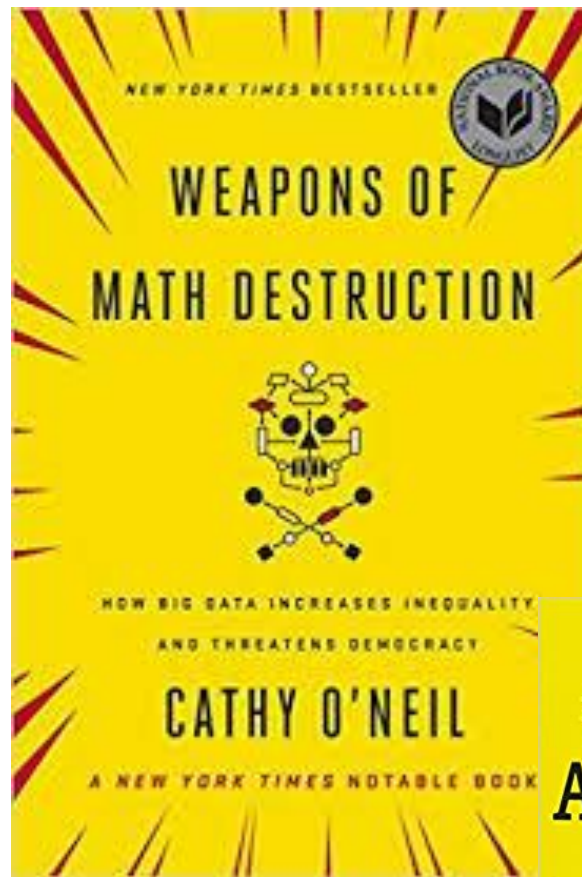
Where statistics goes wrong



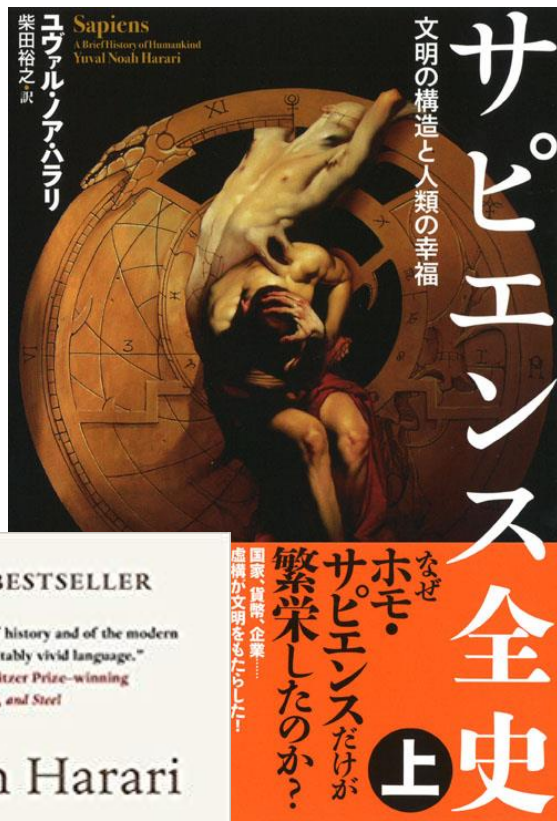
Discriminations based on gender or race is illegitimate.

Discriminations based on inscrutable analysis of big data is, however, permitted for the present

“Mathematical models should be
our tools, not our masters”



https://www.ted.com/talks/cathy_o_neil_the_era_of_blind_faith_in_big_data_must_end?language=ja



- According to Harari, the beginning of agriculture did not improve human living conditions.
- Agricultural revolution was “history’s biggest fraud”.
- He claims that humans did not domesticate wheat, but wheat domesticated humans.

Wag the Dog

Why does a dog wag its tail?
Because a dog is smarter than its tail.

If the tail were smarter, the tail would wag the dog.

犬が尻尾を振るのはなぜか？
尻尾より賢いからだ。
もし尻尾の方が賢ければ、尻尾が犬を振る。

レヴィンソン監督『ワグ・ザ・ドッグ』（1997）より

Use the Humans

Why do humans use tools?
Because humans are smarter than tools.

If the tools were smarter, the tools would use the humans.

人が道具を使うのはなぜか？
道具より賢いからだ。
もし道具の方が賢ければ、道具が人を使う。

In order not to be used by tools

- We must be smarter than them.
- Therefore, we need to know them.
- We should know what the purpose of the tool is, how it works, what consequences it may have, who will gain profit from it, who will be exploited, what measures we have to resist it, etc.