Ethical Dilemmas Part 2

Ethics in a Time of Polarization

Osher Course

John Hooker, study leader

September-October 2021

Outline

- Vaccines
  - *Vaccination for work*
  - *Boosters vs global equity*
- Everyday dilemmas
  - *Consumer ethics*
  - *Cashier's error*
- Ethics and technology
  - *Fairness in AI*
  - *Teaching ethics to machines*
  - *Online surveillance and privacy*
  - *Technological unemployment*

Generalization principle

- It should be **rational** for me to believe…
    - *that the **reasons** for my action are **consistent** with the assumption that **everyone with the same reasons acts the same way**.*
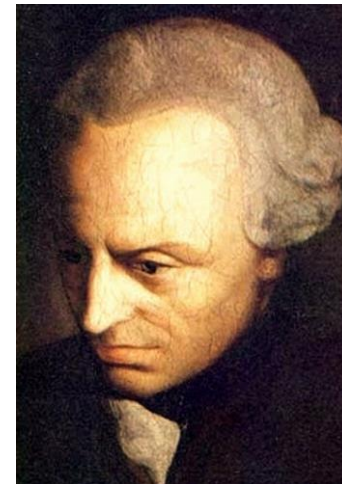
Utilitarian principle

- An act is ethical only if I can rationally believe that **no other act**...
    - *creates **more net expected utility***...*
    - *and **satisfies other ethical principles**.*

*counting **everyone's** utility.*
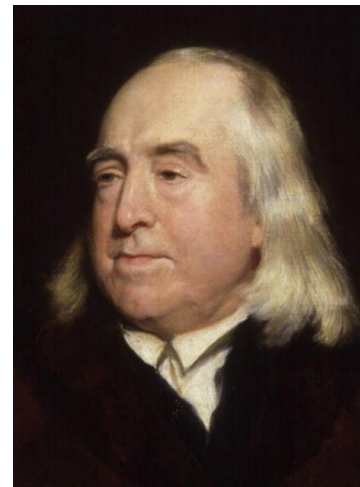
Autonomy principle

- An act is **unethical** if I am **rationally constrained to believe*** that…

    - *it interferes with the **ethical action plans** of some collection of other agents **without informed or implied consent.***

    *it is irrational not to believe…

Vaccination for work

- Is it ethical for firms to require employees to get vaccinated or be fired?
    - *OSHA is expected to issue regulations mandating that all firms that employ at least 100 people must require vaccination or regular testing.*
        - Vaccines specifically required for Federal employees and contractors, as well as most health care employees.

New OSHA guidance for employers on COVID vaccines

COVID 19 Coronavirus Vaccine

Vaccination for work

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    - *OSHA is expected to issue regulations mandating that all firms that employ at least 100 people must require vaccination or regular testing.*
        - Vaccines specifically required for Federal employees and contractors, as well as most health care employees.
    - *We are asking whether a **private business** can ethically impose some kind of vaccine requirement.*
        - We **assume** that **no law** requires or prohibits such a policy.

New OSHA guidance for employers on COVID vaccines

COVID 19
Coronavirus Vaccine

Article in *The Hill*   See my ethics blog for more detailed arguments.

Instead of ethically dubious mandates, employers can try 'soft' vaccine policies

BY JOHN HOOKER, OPINION CONTRIBUTOR — 08/07/21 01:01 PM EDT
THE VIEWS EXPRESSED BY CONTRIBUTORS ARE THEIR OWN AND NOT THE VIEW OF THE HILL

2 SHARES   SHARE   TWEET

COVID Vaccine Available:
Pfizer
Moderna
Johnson & Johnson (J&J)

It is frustrating when so many people refuse the wonderful vaccines that can put COVID-19 behind us. This has led to calls for employers and schools to mandate vaccines.

While an outright vaccine requirement — get vaccinated or be fired — is ethically problematic for most employers, there are a number of other options that are ethical and perhaps equally effective. They include incentives and such "soft" vaccine requirements as shots-or-tests. As for schools, an age-appropriate vaccine requirement is perfectly ethical.

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Vaccination for work

- Autonomy test.
    - *This one is easy.*
        - An employee cannot have an action plan of being employed, with or without vaccination.
        - Thus, requiring vaccination is inconsistent with no action plan.
        - And there is no violation of autonomy

CAN AN EMPLOYER REQUIRE YOU TO GET THE COVID-19 SHOT?

Vaccination for work

- Generalization test.
  - *This one is harder.*
  - *When one takes a job, there is an **implied agreement** about what will be required.*
    - Requiring an Amazon warehouse worker to babysit the boss's kids is a breach of the implied agreement.
    - Requiring an invasive medical procedure could fall into the same category.
    - **Except** for occupations where such a requirement could be expected, due to **prior practice** or a **sensitive health situation** (hospital, nursing home, school).

Vaccination for work

- Generalization test.
  - *Isn't there an understanding that an employee will not create a safety hazard?*
    - Yes. A vaccine mandate is OK if an **individual employee** poses a significant risk that is not mitigated by masks, testing, or distancing.
    - For example, employees recently exposed to Covid or who are likely to be exposed.
    - But it is not enough that unvaccinated employees **as a group** pose a hazard even with masks, etc
    - The employment **agreement** is between the company and an **individual**, not the whole work force.

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    - But it is not enough that unvaccinated employees **as a group** pose a hazard even with masks, etc.
    - The employment **agreement** is between the company and an **individual**, not the whole work force.
  - *However, a **union member** implicitly agrees to abide by result of collective bargaining.*
    - So a vaccine mandate is **OK if the union agrees**.

Vaccination for work

- Generalization test.
  - *Meanwhile, a **vaccine-or-test** policy is generalizable.*
    - Could be **nearly as effective** as vaccine mandate.
    - Employers frequently require noninvasive medical tests (e.g., drug tests).
    - A mask requirement is also OK. A mask can be viewed as part of the uniform.
    - A work-at-home requirement is OK. Employers regularly specify the work location.

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    - A work-at-home requirement is OK. Employers regularly specify the work location.
  - *It is OK to require vaccination of **new** employees.*
    - There is not yet an agreement.
    - They know what they are getting into.
  - *It is OK to require vaccination of **temporary workers***
    - Same reason.

Vaccination for work

- Utilitarian test.
  - *This **could fail** even when a vaccine or vaccine-or-test policy is generalizable..*
    - A requirement could **create resistance** and lead to large-scale **resignations**.
    - The resulting harm may **outweigh** the benefits of vaccination and/or testing.
    - This is an especially hard dilemma for small business, which often lacks the resources to require testing.

Vaccination for work

- Scorecard for employer vaccine requirement.
  - *Generalization test: **fail** at some businesses*
    - **Pass** at hospitals, schools, other sensitive environments
    - **Pass** for new employees, temporary workers, union members
    - Vaccine-or-test is **OK anywhere**
  - *Utilitarian test: **depends** on employee reaction*
  - *Autonomy test: **pass***

Booster shots

- Is it ethical to get an approved Covid booster shot?
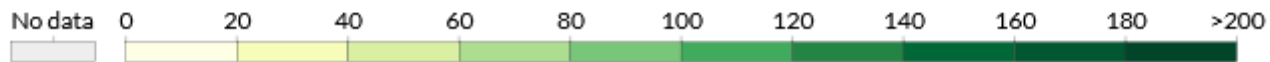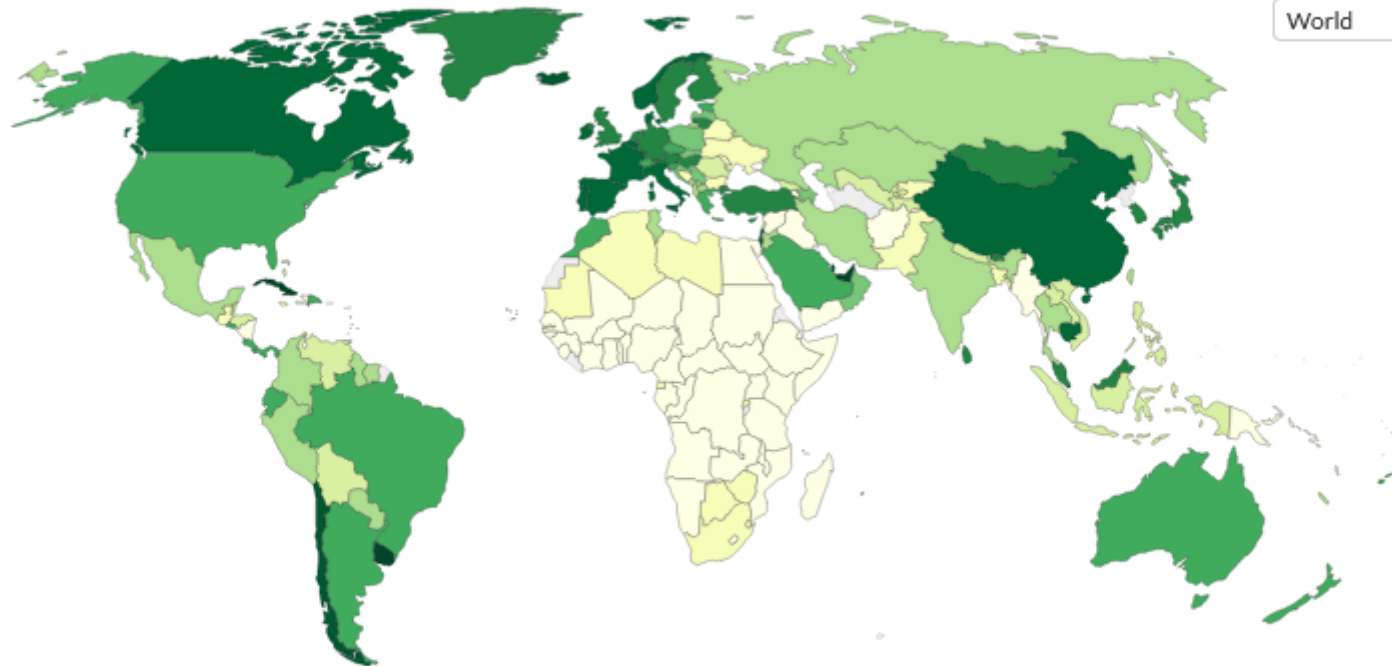 - *When much of the world's population can't get their first shot?*

Booster shots

COVID-19 vaccine doses administered per 100 people, Oct 1, 2021

For vaccines that require multiple doses, each individual dose is counted. As the same person may receive more than one dose, the number of doses per 100 people can be higher than 100.

World

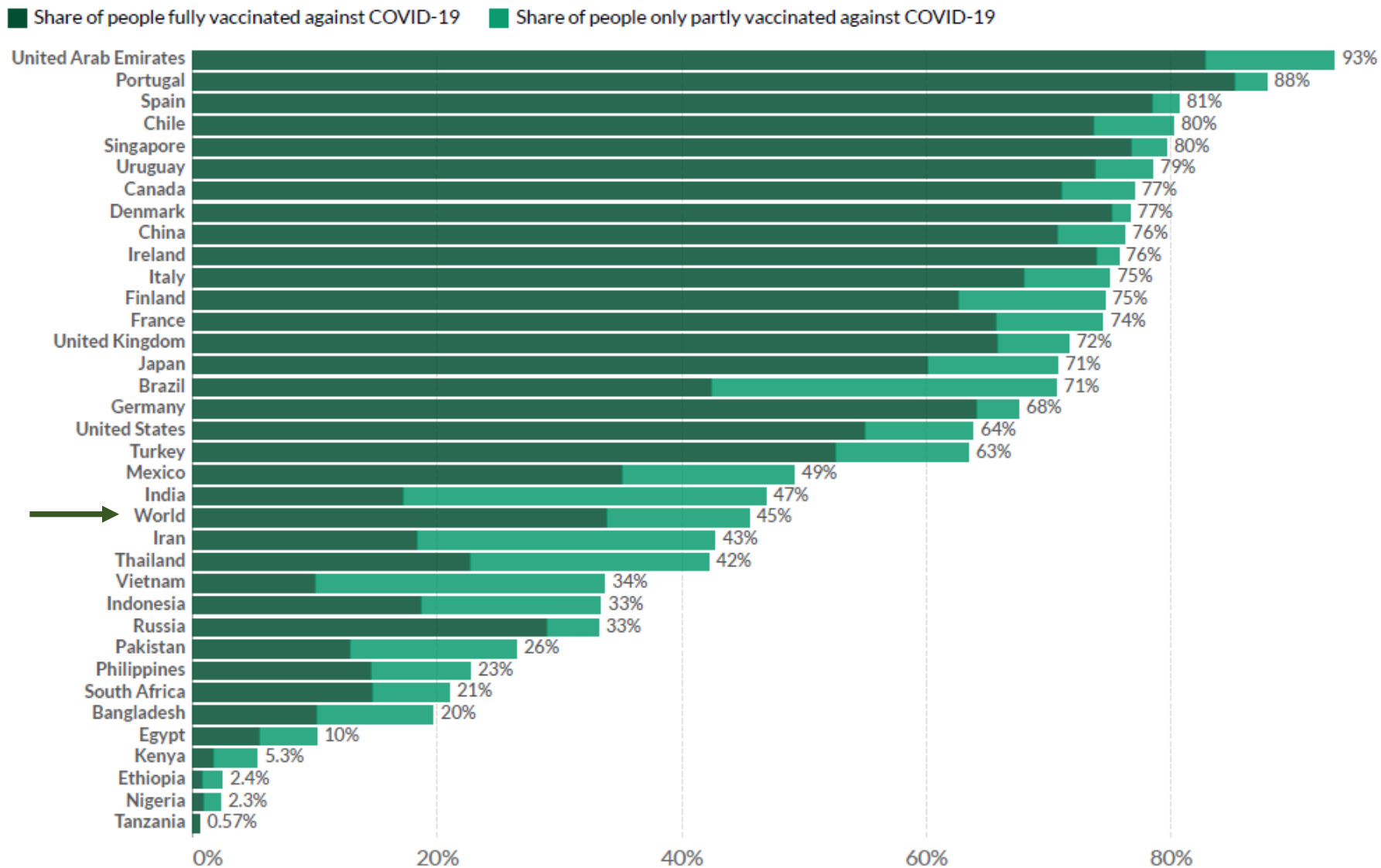No data   0   20   40   60   80   100   120   140   160   180   >200

Source: Official data collated by Our World in Data – Last updated 2 October 2021, 11:30 (London time)   OurWorldInData.org/coronavirus • CC BY

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Share of people vaccinated against COVID-19, Oct 1, 2021

Alternative definitions of a full vaccination, e.g. having been infected with SARS-CoV-2 and having 1 dose of a 2-dose protocol, are ignored to maximize comparability between countries.

■ Share of people fully vaccinated against COVID-19   ■ Share of people only partly vaccinated against COVID-19

Country	Percentage
United Arab Emirates	93%
Portugal	88%
Spain	81%
Chile	80%
Singapore	80%
Uruguay	79%
Canada	77%
Denmark	77%
China	76%
Ireland	76%
Italy	75%
Finland	75%
France	74%
United Kingdom	72%
Japan	71%
Brazil	71%
Germany	68%
United States	64%
Turkey	63%
Mexico	49%
India	47%
→ World	45%
Iran	43%
Thailand	42%
Vietnam	34%
Indonesia	33%
Russia	33%
Pakistan	26%
Philippines	23%
South Africa	21%
Bangladesh	20%
Egypt	10%
Kenya	5.3%
Ethiopia	2.4%
Nigeria	2.3%
Tanzania	0.57%

0% 20% 40% 60% 80%

Source: Official data collated by Our World in Data. This data is only available for countries which report the breakdown of doses administered by first and second doses in absolute numbers.

Booster shots

- Is it ethical to get an approved Covid booster shot?
  - *It's primarily a **utilitarian** issue.*
  - *Can I rationally believe that forgoing a booster would result in **no greater** net expected utility?*
    - **Probably**. I have no reason to think that getting a booster would **deprive someone else** of a shot.
    - Meanwhile, a booster clearly results in **greater expected utility** for me and those around me.
    - **Public policy** is another matter, because it **does** affect the vaccination rate globally.

Booster shots

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        - **Public policy** is another matter, because it **does** affect the vaccination rate globally.
    - *Getting a booster appears to **pass** the utilitarian test.*

Booster shots

- Is it ethical to get an approved Covid booster shot?
    - *We can also check **generalizability**.*
    - *My reasons for getting the booster…*
        - It is available and approved by health authorities.
        - It would **improve** expected health outcomes, and utility generally, for myself and those around me.
        - Getting the booster would **deprive no one else** of a shot.
    - *These reasons would continue to apply if everyone were to act on them.*
        - So, getting the booster in these circumstances is **generalizable**.

Booster shots

- Scorecard for getting booster shots.
    - *Generalization test: **pass,** under a suitable rationale*
    - *Utilitarian test: **pass,** under current supply conditions*
    - *Autonomy test: not an issue*
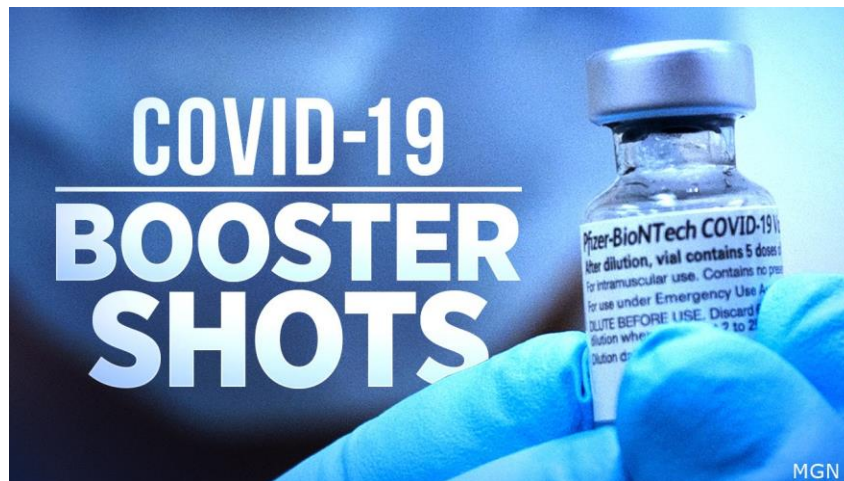
Consumer ethics

- Suppose I find some of Amazon's practices to be unethical.
  - *Labor relations, tax avoidance, etc.*
  - *Should I avoid buying Amazon merchandise?*

2018: A PRIME YEAR FOR AMAZON

U.S. PROFITS:
$11.2 BILLION

FEDERAL INCOME
TAXES PAID:
$0.00

Amazon in Its Prime: Doubles Profits, Pays $0 in Federal Taxes   ITEP.org

Consumer ethics

- Primarily a **utilitarian** issue.
  - *Amazon has about **300 million** active customers at any one time.*
    - My purchases have **infinitesimal effect** on Amazon's bottom line or practices.
    - If buying from Amazon has the **slightest** utility advantage for me, it **outweighs** any possible utility benefit of avoiding Amazon.

AMAZON SALES GROWTH
(2007–2018F, $ Billions)

CAGR 2007-2013: **31%**

2007	2008	2009	2010	2011	2012	2013	2014F	2015F	2016F	2017F	2018F
$15	$19	$25	$34	$48	$61	$74	$90	$105	$120	$136	$158

Source: Susquehanna Financial Group, Amazon financial reports and Kurt Salmon analysis

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Consumer ethics

- Primarily a **utilitarian** issue.
  - *What if it **doesn't feel right** to buy from Amazon?*
    - Then it is probably disutilitarian for this reason alone (my own utility counts).
    - Refusal to buy from Amazon certainly passes other ethical tests.
    - So, I should buy from some other vendor.

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    - Then it is probably disutilitarian for this reason alone (my own utility counts).
    - Refusal to buy from Amazon certainly passes other ethical tests.
    - So, I should buy from some other vendor.
  - *Important note:*
    - The reason for one's action need not be "rational" in the sense that it is deduced by rational argument.
    - It can come from a crystal ball or palm reader.
    - It need only satisfy certain conditions once it is arrived at.

Consumer ethics

- **Generalizability** is tricky.
  - *Reasons to buy from Amazon.*
    - Amazon has what I want.
    - Amazon is convenient, reliable, etc.
    - Amazon's price is OK.
  - *These reasons are clearly generalizable.*
    - Perhaps already generalized.

Consumer ethics

- **Generalizability** is tricky.
  - *But maybe the **true scope** is broader.*
  - *Why wouldn't I buy from **any merchant** that meets my criteria—no matter what its practices?*
    - Convenience, reliability, good price, etc.

Consumer ethics

- **Generalizability** is tricky.
  - *But maybe the **true scope** is broader.*
  - *Why wouldn't I buy from **any merchant** that meets my criteria—no matter what its practices?*
    - Convenience, reliability, good price, etc.
  - *One might argue:*
    - If the public were willing to patronize **any** merchant that meets these criteria, merchants would engage in behavior that would **undermine the commercial system** that makes my purchases possible.

Consumer ethics

- **Generalizability** is tricky.
  - *To be safe, I can add a condition to my rationale:*
    - The merchant's behavior would **not spread to other businesses** and undermine the commercial system if consumers in general were **willing to overlook** similar misbehavior in businesses they patronize.
    - For example, I might rationally believe that most businesses lack Amazon's market power to pull it off, or new regulation would emerge.

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    - For example, I might rationally believe that most businesses lack Amazon's market power to pull it off, or new regulation would emerge.
    - This may break down for **more pernicious** behavior.

Consumer ethics

- Scorecard for buying from Amazon
  - *Generalization test: **pass** for Amazon's current behavior*
    - This is **not** to say that Amazon's behavior is ethical or should escape regulation and other kinds of resistance.
    - More pernicious behavior may require an individual consumer boycott.
  - *Utilitarian test: **pass** unless perhaps it doesn't "feel right"*
  - *Autonomy test: not an issue.*

amazon

Cashier's error

- I buy several expensive items in a store.
    - *On returning home, I find that the cashier forgot to ring up $100 headphones.*
    - *What do I do?*

Cashier's error

- Suppose I do nothing.

- Generalization test...

    - *Fail*

    - *Breaking a sales contract is not generalizable.*

    - *The cash register receipt is a **receipt**, not a contract.*

    - *A mistake is not a **gift**.*

Cashier's error

- Now suppose the cashier forgot to ring up a 25¢ pack of gum.
  - *Why should the amount of the purchase make a difference?*
  - *A contract is a contract.*

Cashier's error

- Suppose I do nothing

- Generalization test...
    - *Pass.*
        - Agreements can be nullified by **mutual consent**.
        - This is generalizable.
        - We know the store manager **would** say "forget it" if asked.
        - This is what consent means (it is a counterfactual).

Bias in AI systems

- An AI system evaluates mortgage applications
  - *Based on "deep learning" in a multilayer neural network trained on "big data"*
    - "Learning" = finding best fit, as in regression.
    - "Deep learning"" = many layers
    - Overfitting
    - **Not magic**
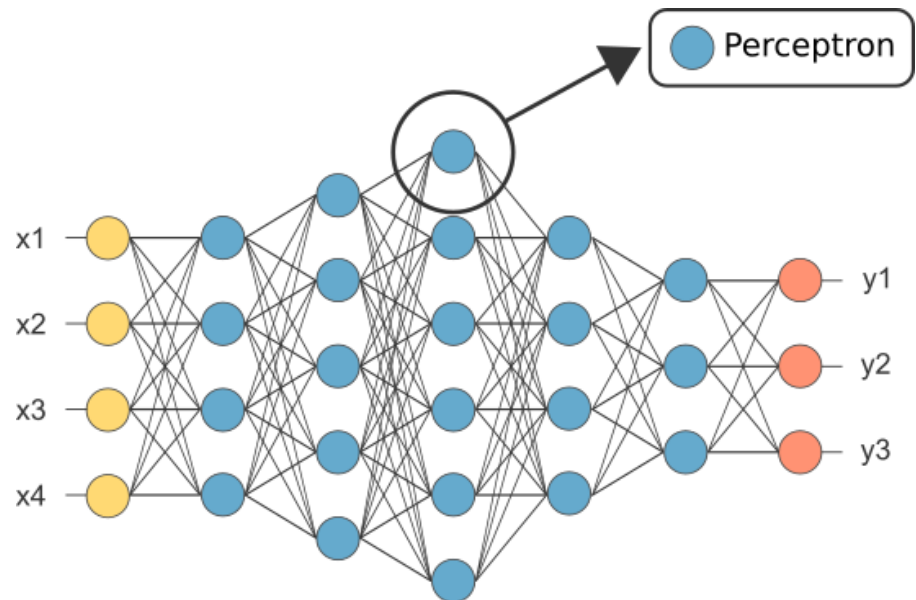
Bias in AI systems

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    - Belongs to a **minority group**, despite sound finances.
    - Because **default rate** is higher for the minority group.

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  - Applicant **rejected** due to address in **low-income neighborhood** (redlining), where more people are financially irresponsible.
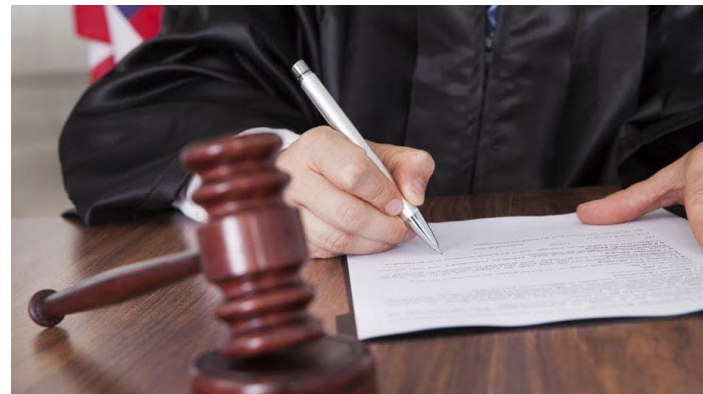
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- *An application is rejected because the applicant…*
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- ***Remove** race/ethnic group from data?*
  - Applicant **rejected** due to address in **low-income neighborhood** (redlining), where more people are financially irresponsible.
  - Members of minority group more likely to live in a low-income neighborhood due to **social and historical factors**.
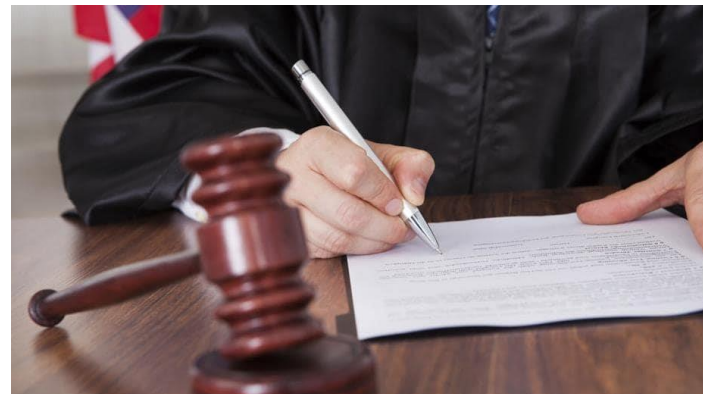
Bias in AI systems

- Similar issue for other machine learning applications:
    - *Parole (minimize recidivism risk).*
    - *Interviewing and hiring.*
    - *College admissions.*

Bias in AI systems

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    - *Parole (minimize recidivism risk).*
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    - *College admissions.*

- "Fairness" is not a reliable guide.
    - *A vague concept.*
        - Cannot resolve our disagreements.
        - What is "fair" depends on who is crying "unfair."

Bias in AI systems

- ***Option 1:*** *Get rid of AI*
  - Even though this **reduces prediction accuracy**.
  - **Fairness** is too vague to decide the matter.
  - Reducing accuracy **fails utilitarian principle** unless using biased AI is **not generalizable**.
  - Biased AI is not generalizable if there is an **implicit agreement** with applicant to use only financial criteria.

Bias in AI systems

- ***Option 2:*** *Improve AI so as to satisfy implicit agreement.*
  - **Adjust** AI predictions to **get rid** of bias.
  - Not clear how to achieve this.
  - It requires **explicitly considering** minority status in the decision.

Bias in AI systems

- *Option 2: Improve AI so as to satisfy implicit agreement.*
  - **Adjust** AI predictions to **get rid** of bias.
  - Not clear how to achieve this.
  - It requires **explicitly considering** minority status in the decision.
- *Option 3: Give priority to **historically disadvantaged** groups*
  - For example, achieve "demographic parity."
  - Scheduled classes (India), *Bumiputera* quotas (Malaysia).
  - Perhaps based on a **social contract**.
 - Perhaps should be seen as a **public policy** issue.

Bias in AI systems

- A deeper problem
    - *There is no **transparency**.*
    - *The machine is not "reasons responsive."*
   - It makes decisions **without supplying a rationale**.

Transparency in Artificial Intelligence

Value alignment

- Value alignment tries to teach **ethics** to **machines**.
  - *"Align" machine values with human values.*
    - Based on **crowd sourcing**.

Moral Machines
Teaching Robots Right from Wrong

Wendell Wallach • Colin Allen
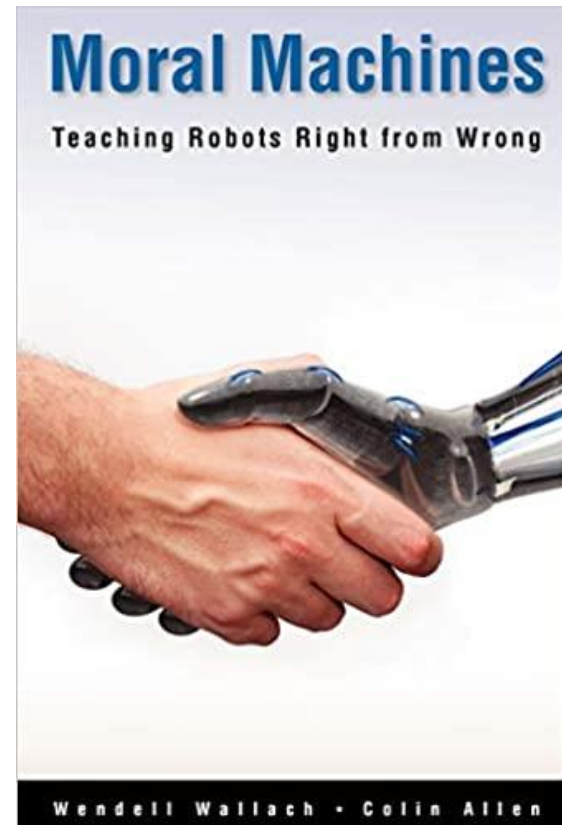
Value alignment

- Value alignment tries to teach **ethics** to **machines**.
  - *"Align"* machine values with human values.
    - Based on **crowd sourcing**.
- Problem:
  - *"Values" is **ambiguous**.*
    - What humans value (fact)
    - What is valuable (ethics)
  - *Value alignment trades on this ambiguity.*

Moral Machines
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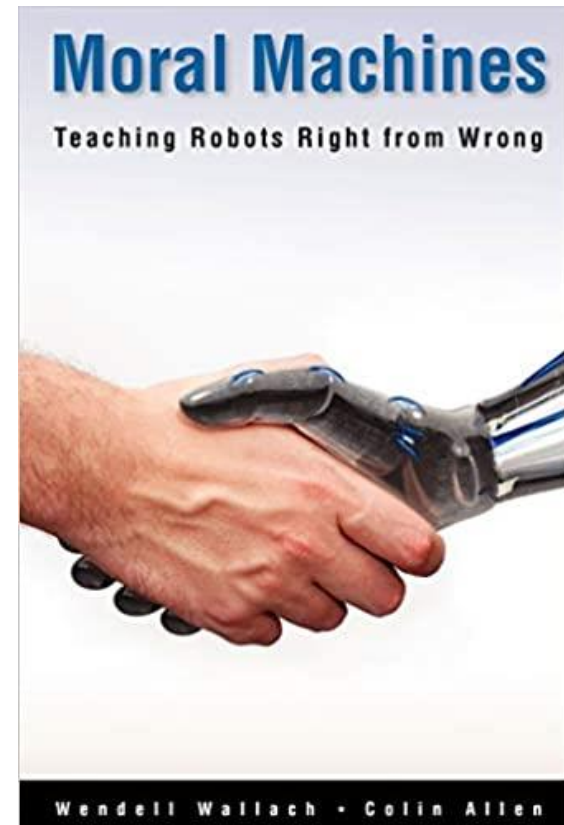
Value alignment

- Examples: MIT's [Moral Machine](#)
  - *Crowd-source 1000s of responses to trolley-car type driving dilemmas.*
 - *Derive "ethical" rules for self-driving car.*
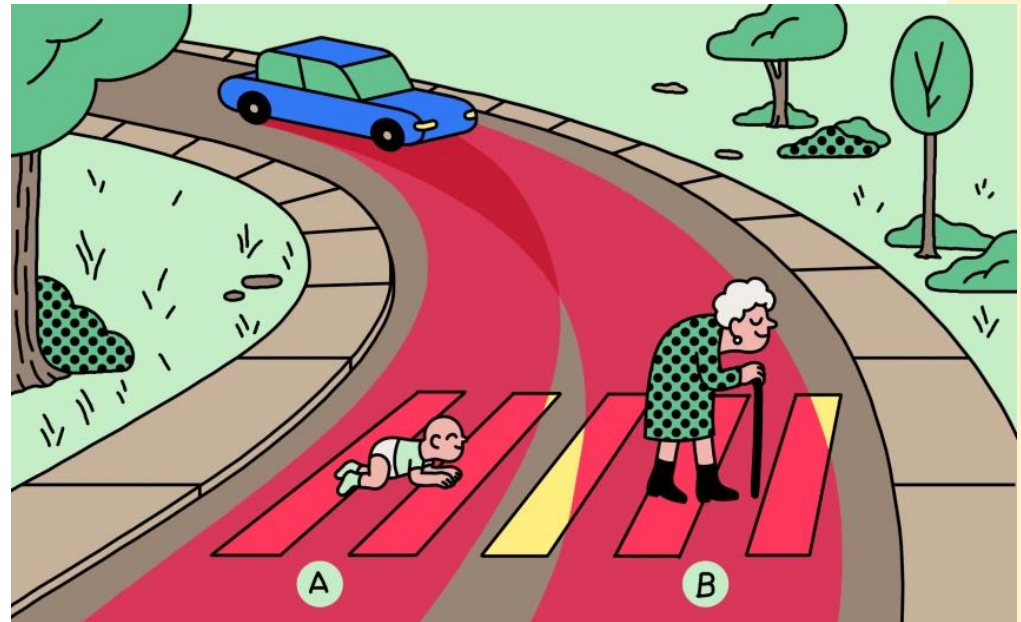
Value alignment

- Two problems:
  - *This type of dilemma rarely occurs In practice.*
    - People don't have meaningful "values" for such cases.

Value alignment

- Two problems:
  - *This type of dilemma rarely occurs In practice.*
    - People don't have meaningful "values" for such cases.
  - *This commits **naturalistic fallacy**.*
    - We can't infer "values" from "values."
    - We can't infer what we **ought to do** purely from facts.
    - We can't infer **ethical driving rules** from driving **opinions** and **behavior**.

What Is → What Ought To Be

"That's just your opinion."
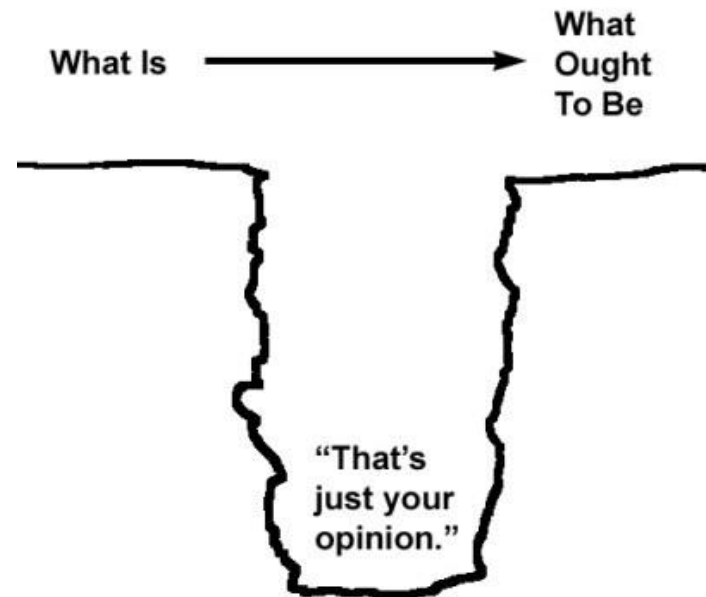
Value alignment

- *To avoid naturalistic fallacy:*
  - We need an **ethical premise**.
  - Such as, "We should drive the way most people think we should drive."
- *No such premise seems reasonable.*
  - Designers of the Moral Machine had second thoughts.

"A word of warning: the preferences we found are not meant to instruct car programmers as to how they *should* regulate AVs.... The public can be ill-informed and biased, and some of the preferences we report are troubling."

Edmond Awad, "Your (future) car's moral compass," *Behavioral Scientist,* Feb 11, 2019.

Value alignment

- *There is no substitute for ethical principles.*
    - Driving practices and norms are **relevant**.
    - But they alone don't determine what is ethical.
- *Principles can be **incorporated** into AI technology.*
    - For example, by using **rule-based** AI – already a trend.
    - We know how to build huge, complicated rule bases.
    - Non-self-driving cars already regulated by >100,000 lines of code.
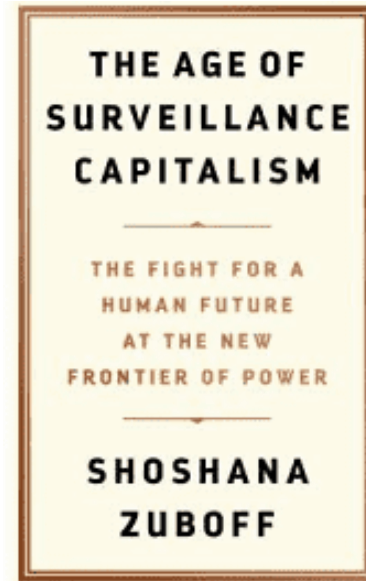

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Surveillance

- Electronic surveillance is everywhere.
  - *Browsing history, cookies, keystrokes recorded.*
  - *Social media tracking data provided to advertisers.*
  - *Alexa, etc., listen in on conversations.*
  - *Shopping & purchases recorded and shared.*
  - *Embedded tracking pixels, super cookies, ip address, operating system characeteristics.*

Surveillance

- Business is a major player.
    - *Personal data collection is the **dominant online business model**.*
    - *Big tech and government compete for control of data.*
        - Government often demands data from tech companies.

THE AGE OF SURVEILLANCE CAPITALISM

THE FIGHT FOR A HUMAN FUTURE AT THE NEW FRONTIER OF POWER

SHOSHANA ZUBOFF

Surveillance

- Little consensus on ethical basis for privacy.
    - *One reason we don't agree on what to do about privacy invasion in tech age.*
    - *Our approach – cycle through the ethical principles*
        - Generalization
        - Utilitarian
        - Autonomy

Privacy and generalizability

- Argument 1: Deception.
    - *Users are misled about the lack of privacy.*
        - "Privacy settings"
        - "We care about your privacy" notice, followed by fine print

In July 2019, FTC imposed $5 billion penalty on Facebook (largest ever) for "deceiving users about their ability to control the privacy of their personal information."

Privacy and generalizability

- Argument 1: Deception.
  - *Social media are knowing causing users to have false beliefs about the level of privacy.*
    - Most users remain somewhat naïve about data harvesting.
    - This is done purely for company profit.
    - It is **not generalizable**.

Privacy and generalizability

- Argument 1: Deception.
  - *Easy to avoid deception.*
    - Just be up front about how the site exploits user data.
    - Prominently displayed

Privacy and generalizability

- Argument 2: Privacy and intimacy.
  - *Some say there are cultures **without privacy**.*
    - People live in multi-family dwellings.
    - So, privacy must not be necessary.

Inside an Iroquois longhouse

Privacy and generalizability

- Argument 2: Privacy and intimacy.
  - *Yet anthropologists tell us that **all cultures** value some form of privacy.*
  - *To satisfy generalizability...*
    - Business must respect the **essential privacy norms** of the culture in which is operates.

Privacy and generalizability

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Privacy and utility

- Argument 1: Surveillance is harmless.
  - *Most online surveillance is for **commercial** purposes.*
    - It is pervasive but **harmless**.
    - It can be **beneficial** by directing ads.
    - And serve a **greater service** of matching supply and demand.
    - This is the primary function of **marketing**.

Privacy and utility

- Argument 2: Surveillance is risky.
  - *Online data depositories are **hacked** all the time.*
    - 1500 data breaches in US in 2019, exposing 165 million sensitive records.
    - Almost daily occurrence, leading to "data breach fatigue."
  - *This imposes multiple **risks**:*
    - **Consumer**: identity theft, fraudulent charges.
    - **Merchant:** lawsuits, irate customers.
   - **Both:** government intrusion.

Privacy and utility

- Argument 3: Inconclusive, but…
    - *We can say **this much***:
        - Businesses must **upgrade security** against data breaches.
        - Most are lax, wanting to avoid trouble and expense.
        - …while **hoping** that a breach doesn't happen to them.
        - This is **disutilitarian**, and **bad business**.
        - A security upgrade is **necessary insurance**.

Privacy and autonomy

- Precursor of constant surveillance…
    - *Jeremy Bentham's **panopticon.***
        - Prisoners never know when they are **being watched**.
        - "A new mode of obtaining power of mind over mind."
            -- Bentham, 1787
        - Closely analogous to our situation.
        - If other have **power** over our minds, this sounds like violation of **autonomy**.
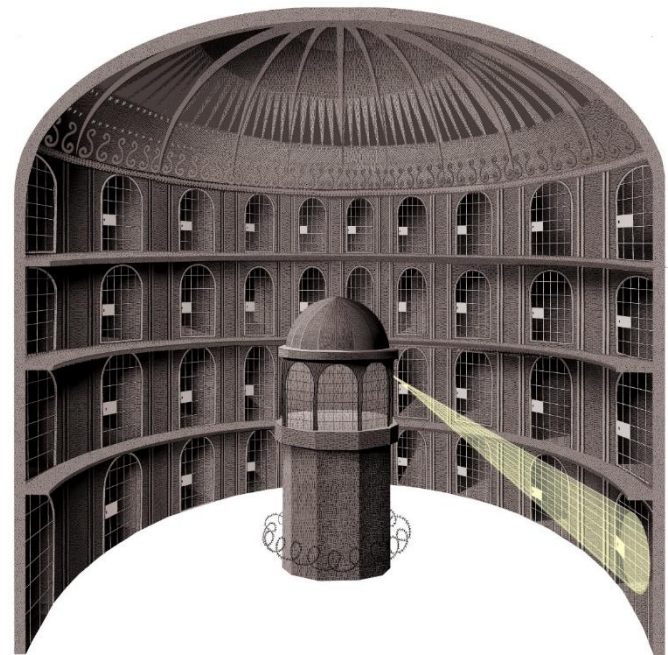
Conclusions

- Generalization principle
  - *Business must fully **alert** customers to data harvesting**.***
    - To avoid deception.
  - *Generalized surveillance could undermine **social fabric**.*
    - By interfering with intimacy.

- Utilitarian principle
  - *Utilitarian calculation **unclear**.*
  - *Business must at least **upgrade** security*.

- Autonomy principle
 - *Sufficiently intrusive surveillance could **destroy** autonomy.*

Technological unemployment

- The Industrial Revolution destroyed countless jobs.
    - *Will **AI** and **4th Industrial Revolution** do the same?*

Technological unemployment

- One opinion: the economy will adjust, as before.
  - *The Luddites were wrong.*
    - They smashed machines, believing that mechanization would lead to mass unemployment.
    - But new jobs replaced the old ones.
    - The same will happen in this century.
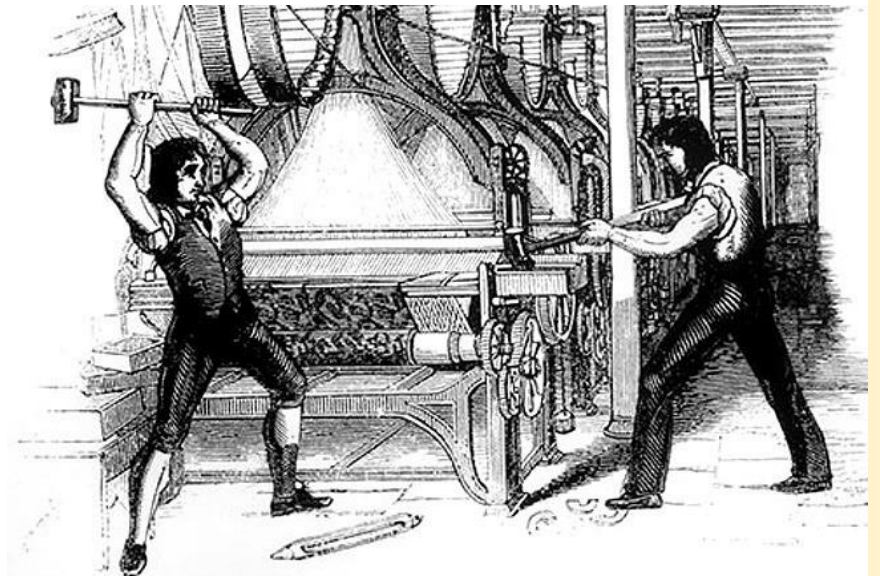
Technological unemployment

- *...although the "adjustment" brought 150 years of violent strikes and political revolution.*

Destruction in Chicago
from Pullman strike, 1894

Bolsheviks storming the Winter Palace,
St Petersburg (Petrograd) Russia, 1920

Technological unemployment

- Another opinion: It will be different this time.
  - *AI will lead to mass unemployment with no historical precedent.*
    - Because it replaces human brains.

Technological unemployment

- Robotic manufacturing.
  - *No human in sight on many a factory floor.*
    - Main reason for shrinkage of middle class, not offshoring.

Technological unemployment

- Warehousing, retailing are shedding workers by the day.

Robots in Amazon fulfillment center
200,000 hired so far

Technological unemployment

- Self-driving vehicles will take over transport.

  - *3.5 million truck drivers will be out of work.*

  - *What happens to > 2 million Uber & Lyft drivers in US?*

Technological unemployment

- Medical technicians may become obsolete.
  - *Is AI better than humans at reading medical scans?*
    - Two largest employers in Pittsburgh: UPMC and Highmark (78,000 jobs).
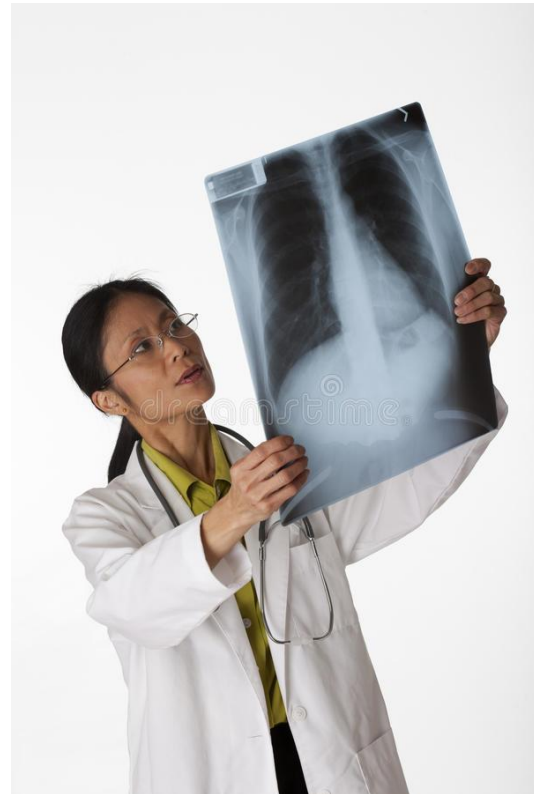
Technological unemployment

- What to do?
  - *We need some kind of **wealth redistribution** from AI-intensive industry to the general population.*
  - *We already have this for manufacturing.*
    - Manufacturing is extremely labor productive, due to technology.
    - The economy redistributes this wealth in various ways.
    - But the redistribution mechanism is failing, even for manufacturing
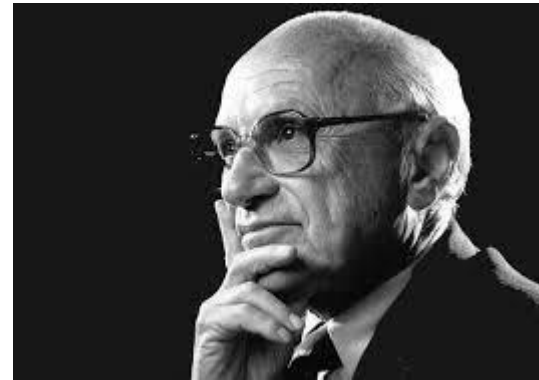   - What happens when AI takes over?

Technological unemployment

- One proposal: Universal basic income
    - *An old idea from the political left and right.*
        - Advocated by staunch libertarians Milton Friedman and F. A. Hayek in 1960s and Andrew Yang in 2020 campaign.

F. A. Hayek
1899-1992

Milton Friedman
1912-2006

Technological unemployment

- One proposal: Universal basic income
  - *Current examples:*
    - Alaska Permanent Fund ($800-2000/yr).
    - Brazil's Bolsa Familia (conditioned on school and vaccination for children). Similar plans in Mexico, Chile, Honduras, Jamaica, Malawi, Zambia.
  - *What does business do in the meantime?*

Technological unemployment

- Proposal: Worker ownership
  - *Workers own and perhaps manage the workplace*
    - Famous example: Mondragon Cooperative in Spain

Technological unemployment

- Proposal: Worker ownership
  - *US examples (ESOPs):*
    - Publix Supermarkets (175,000 employees)
    - UPS (481,000 employees, partial employee ownership)
    - Brookshire Brothers retailing (7000 employees)
    - Winco Foods (18,000 employees)
    - Robert W. Baird (3100 employees, finance)
    - Recology (4100 employees, waste management)

Technological unemployment

- Proposal: Worker ownership
  - *Pros:*
    - Workers will own AI technology and benefit directly.
    - Democracy in the workplace
    - Benefits of tech spread **within** the firm
  - *Cons:*
    - How to raise the capital?
    - Enough to cover entire work force?

85% Having an ESOP **positively affected** company culture

90% Creating the ESOP was a good business decision that has **helped company**

71% reported **increased revenue** after their ESOP

Source: 25th Annual Economic Performance Survey of ESOPS, The ESOP Association, Oct. 2016

Technological unemployment

- Proposal: Augmentation
  - *Move beyond automation by using machines to **enhance** human capabilities rather than **displace** them.*
    - Humans work alongside robots, train them.