



New Challenges to International Cooperation: Automation and Climate Change

Carlos Felipe Balcazar

MacMillan Center

September, 2023

Last class: technological change

- ▶ Losers from automation → populism + nationalism.
- ▶ People don't blame machines for unemployment + low wages.
- ▶ Cost-effective for populists to promote nationalism.
- ▶ Unions provide information and promote redistribution.

Last class: technological change

- ▶ Losers from automation → populism + nationalism.
- ▶ People don't blame machines for unemployment + low wages.
- ▶ Cost-effective for populists to promote nationalism.
- ▶ Unions provide information and promote redistribution.

Last class: technological change

- ▶ Losers from automation → populism + nationalism.
- ▶ People don't blame machines for unemployment + low wages.
- ▶ Cost-effective for populists to promote nationalism.
- ▶ Unions provide information and promote redistribution.

Last class: technological change

- ▶ Losers from automation → populism + nationalism.
- ▶ People don't blame machines for unemployment + low wages.
- ▶ Cost-effective for populists to promote nationalism.
- ▶ Unions provide information and promote redistribution.

This class: the advent of AI

- ▶ AI's progress may overwhelm society's capacity to adapt.
 - ▶ Cost of re-skilling may be high.
 - ▶ Difficult to properly regulate.

This class: the advent of AI

- ▶ AI's progress may overwhelm society's capacity to adapt.
 - ▶ Cost of re-skilling may be high.
 - ▶ Difficult to properly regulate.

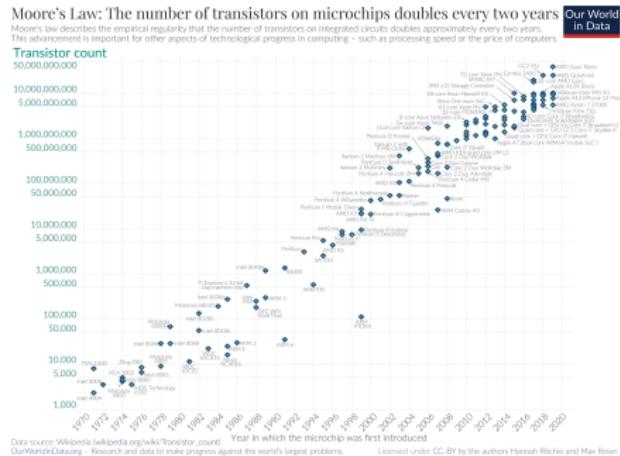
This class: the advent of AI

- ▶ AI's progress may overwhelm society's capacity to adapt.
 - ▶ Cost of re-skilling may be high.
 - ▶ Difficult to properly regulate.
- ▶ AI has implications for the global distribution of economic power.
 - ▶ Benefits countries with comparative advantage.

This class: the advent of AI

- ▶ AI's progress may overwhelm society's capacity to adapt.
 - ▶ Cost of re-skilling may be high.
 - ▶ Difficult to properly regulate.
- ▶ AI has implications for the global distribution of economic power.
 - ▶ Benefits countries with comparative advantage.
- ▶ AI can lead to discrimination and inequality.
 - ▶ “Ethical” AI may not be incentive compatible.

AI has made exponential progress



AI has made exponential progress

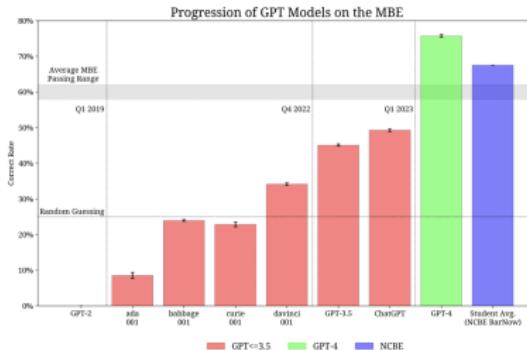


Figure 1. Progression of Recent GPT Models on the Multistate Bar Exam (MBE)

- ▶ Exponential progress (Moore's law).
- ▶ AI also creates winners and losers.
 - ▶ Winners: highly skilled labor + owners of capital.
 - ▶ Losers: unskilled labor + deskilled labor.

AI has made exponential progress

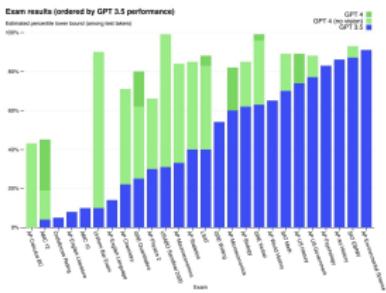


Figure 4. GPT performance on academic and professional exams. In each case, we simulate re-examination and scoring of the real exams. Exams are ordered from low to high based on GPT-3.5 performance. GPT-4 outperforms GPT-3.5 on most exams tested. To be comparative we report the lower end of the range of percentiles, but this creates some artifacts on the AP exams which have very wide scoring bins. For example although GPT-4 attains the highest possible score on AP Biology (55), this is only shown in the plot as 85th percentile because 15 percent of test-takers achieve that score.

- ▶ Exponential progress (Moore's law).
- ▶ AI also creates winners and losers.
 - ▶ Winners: highly skilled labor + owners of capital.
 - ▶ Losers: unskilled labor + deskilled labor.

AI has made exponential progress



- ▶ Exponential progress (Moore's law).
- ▶ AI also creates winners and losers.
 - ▶ Winners: highly skilled labor + owners of capital.
 - ▶ Losers: unskilled labor + deskilled labor.

AI has made exponential progress

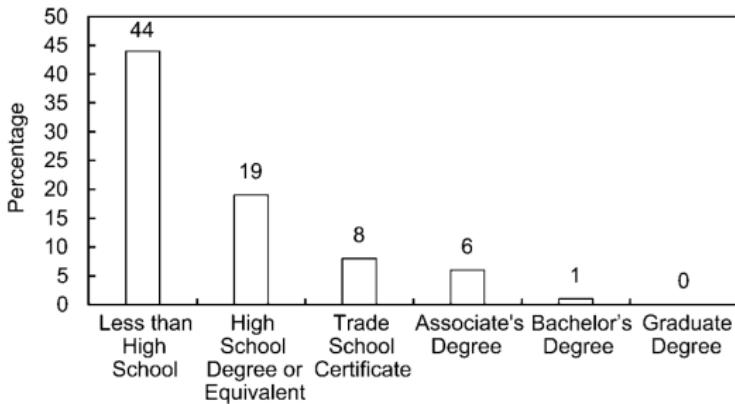
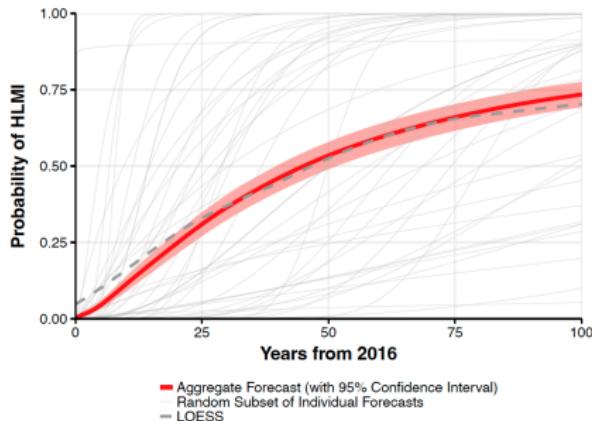


Fig. 12.3 Share of jobs with highly automatable skills by education

- ▶ Exponential progress (Moore's law).
- ▶ AI also creates winners and losers.
 - ▶ Winners: highly skilled labor + owners of capital.
 - ▶ Losers: unskilled labor + deskilled labor.

AI has made exponential progress



- ▶ Exponential progress (Moore's law).
- ▶ AI also creates winners and losers.
 - ▶ Winners: highly skilled labor + owners of capital.
 - ▶ Losers: unskilled labor + deskilled labor.

Re-skilling for complementarity

Table 1. Tabulating the current barriers to forecasting the future of work along with proposed solutions

Barrier	Potential solution
Sparse skills data	<ul style="list-style-type: none">• Adaptive skill taxonomies• Connect susceptible skills to new technology• Improve temporal resolution of data collection• Use data from career web platforms
Limited modeling of resilience	<ul style="list-style-type: none">• Explore out-of-equilibrium dynamics• Identify workplace skill interdependencies• Connect skill relationships to worker mobility• Relate worker mobility to economic resilience in cities• Explore models of resilience from other academic domains
Places in isolation	<ul style="list-style-type: none">• Labor dependencies between places (e.g., cities)• Identify skill sets of local economies• Identify heterogeneous impact of technology across places• Use intercity connections to study national economic resilience

- ▶ Recall, projections about AI are all else equal.
- ▶ Some skills are really difficult to automate.
- ▶ The problem is difference in access to re-tooling.

Re-skilling for complementarity

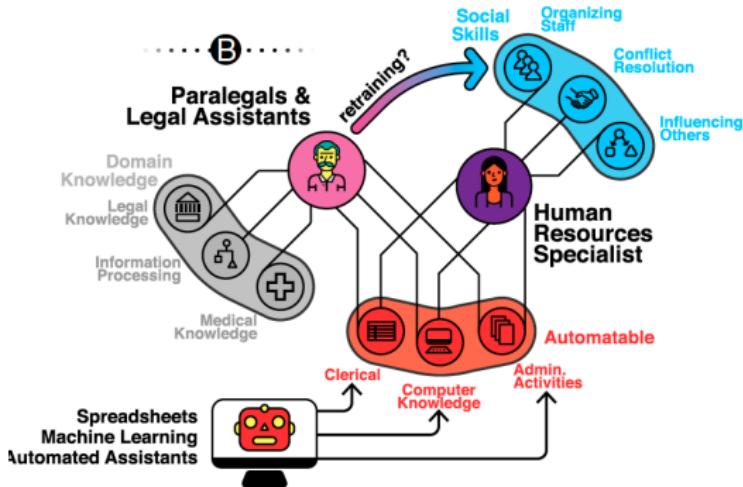
Table 6.1

Skills sought for employment (from websites)

UNICEF 10 life skills	MyStartJob.com	Top10onlinecolleges.org
1. Problem-solving	1. Communication skills	1. Sense-making
2. Critical thinking	2. Analytical and research	2. Social intelligence
3. Effective communication	3. Flexibility-adaptability	3. Novel adaptive thinking
4. Decision-making	4. Interpersonal abilities	4. Cross-cultural competency
5. Creative thinking	5. Decision-making	5. Computational thinking
6. Interpersonal relationships	6. Plan, organize, prioritize	6. New media literacy
7. Self-awareness	7. Wear multiple hats	7. Transdisciplinary
8. Empathy	8. Leadership/management	8. Design mind-set
9. Coping with stress	9. Attention to detail	9. Manage cognitive load
10. Coping with emotions	10. Self-confidence	10. Virtual collaboration

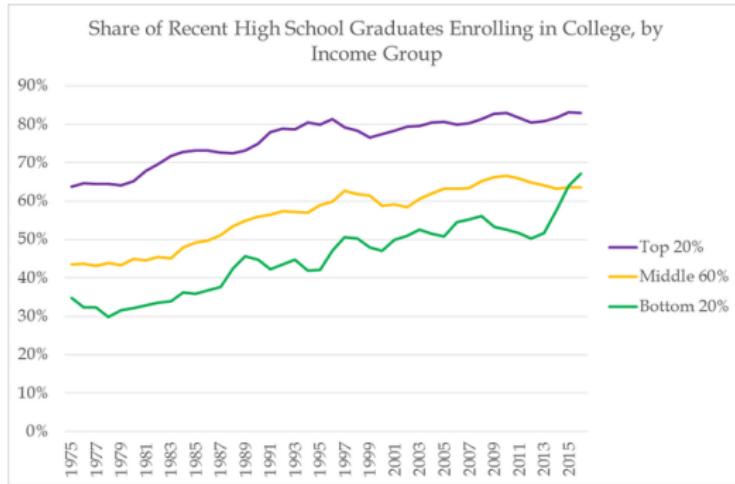
- ▶ Recall, projections about AI are all else equal.
- ▶ Some skills are really difficult to automate.
- ▶ The problem is difference in access to re-tooling.

Re-skilling for complementarity



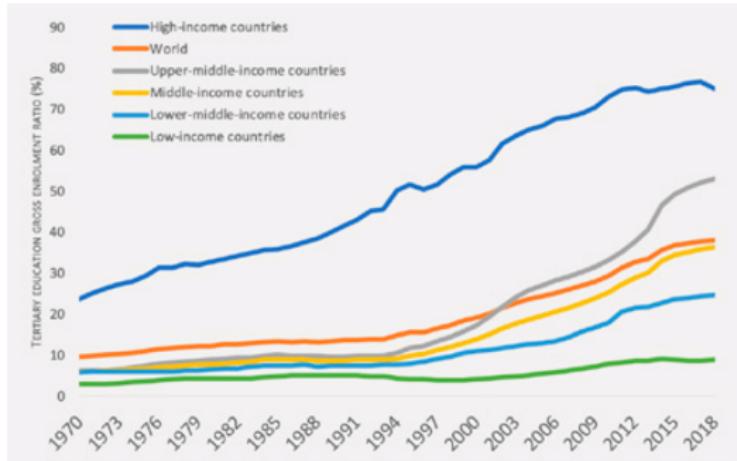
- ▶ Recall, projections about AI are all else equal.
- ▶ Some skills are really difficult to automate.
- ▶ The problem is difference in access to re-tooling.

Re-skilling for complementarity



- ▶ Recall, projections about AI are all else equal.
- ▶ Some skills are really difficult to automate.
- ▶ The problem is difference in access to re-tooling.

Re-skilling for complementarity



- ▶ Recall, projections about AI are all else equal.
- ▶ Some skills are really difficult to automate.
- ▶ The problem is difference in access to re-tooling.

Re-skilling for complementarity

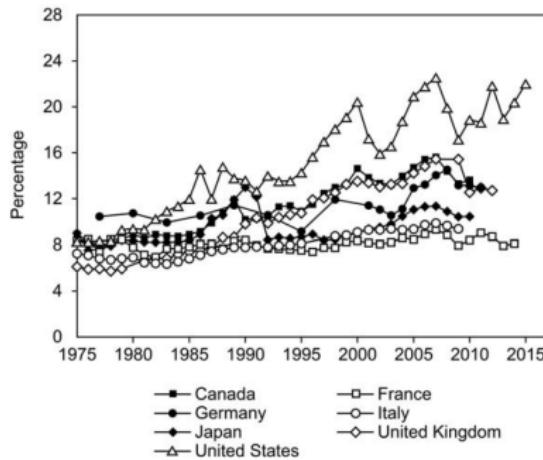
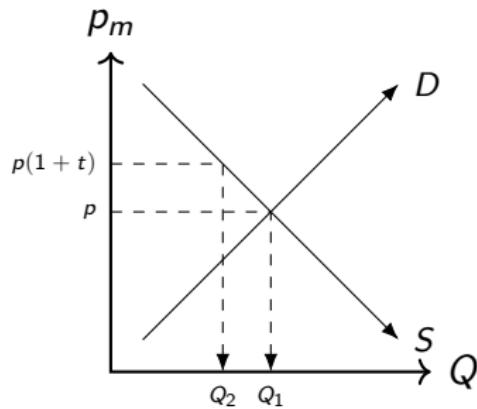


Fig. 12.5 Share of income earned by top 1 percent, 1975–2015

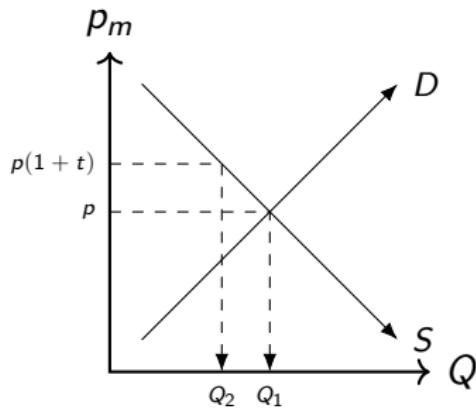
- ▶ Recall, projections about AI are all else equal.
- ▶ Some skills are really difficult to automate.
- ▶ The problem is difference in access to re-tooling.

Redistribution is complicated!



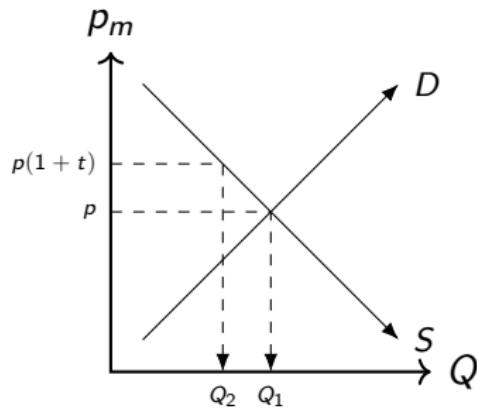
- ▶ Inefficiency: Can create a deadweight loss.
- ▶ Adverse selection: entrepreneurs/politicians know more!
- ▶ Moral hazard: promises not kept or lower effort.
- ▶ Second bests? Policymakers/politicians are rent-maximizers.

Redistribution is complicated!



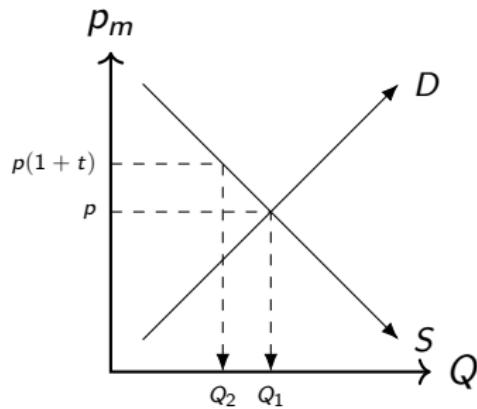
- ▶ Inefficiency: Can create a deadweight loss.
- ▶ Adverse selection: entrepreneurs/politicians know more!
- ▶ Moral hazard: promises not kept or lower effort.
- ▶ Second bests? Policymakers/politicians are rent-maximizers.

Redistribution is complicated!



- ▶ Inefficiency: Can create a deadweight loss.
- ▶ Adverse selection: entrepreneurs/politicians know more!
- ▶ Moral hazard: promises not kept or lower effort.
- ▶ Second bests? Policymakers/politicians are rent-maximizers.

Redistribution is complicated!



- ▶ Inefficiency: Can create a deadweight loss.
- ▶ Adverse selection: entrepreneurs/politicians know more!
- ▶ Moral hazard: promises not kept or lower effort.
- ▶ Second bests? Policymakers/politicians are rent-maximizers.

Class exercise: Can society keep up with AI's progress?

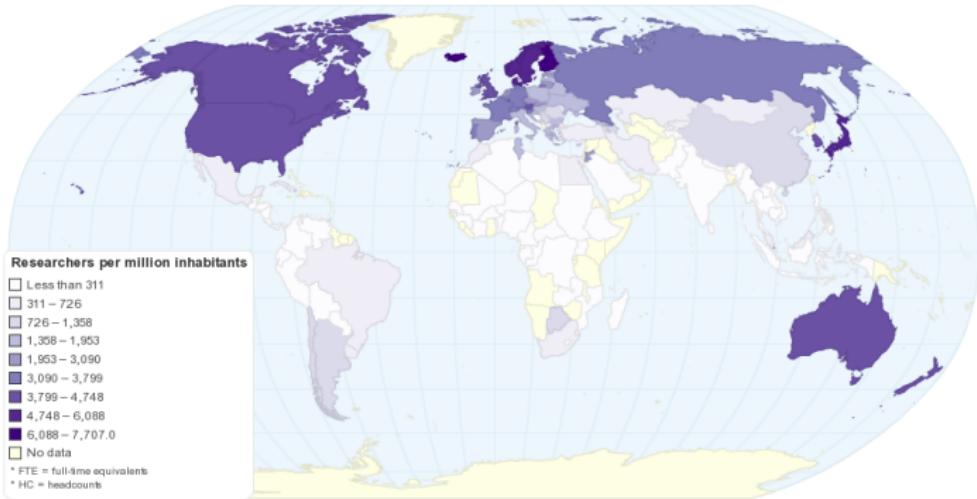
1. Make groups of 2/3 people.
2. Can the welfare system keep up with AI?
3. Is the service sector the answer?
4. 5 minutes.
 - ▶ Feel free to use the Internet.

reset

AI and trade: global implications

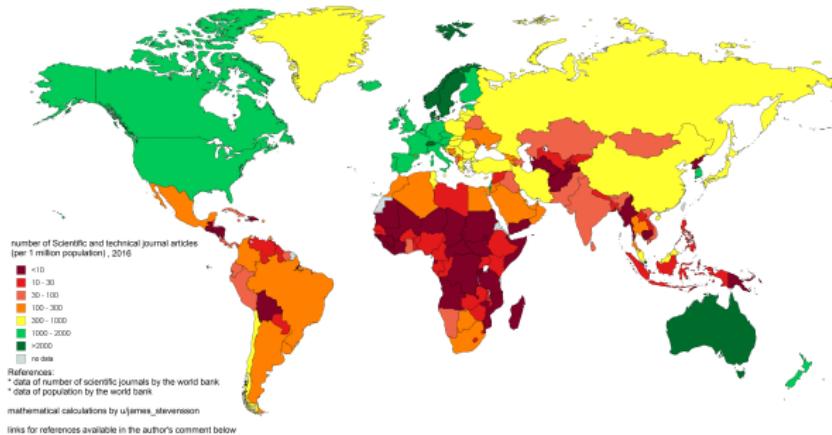
What does it mean to have a comparative advantage?

AI and trade: global implications



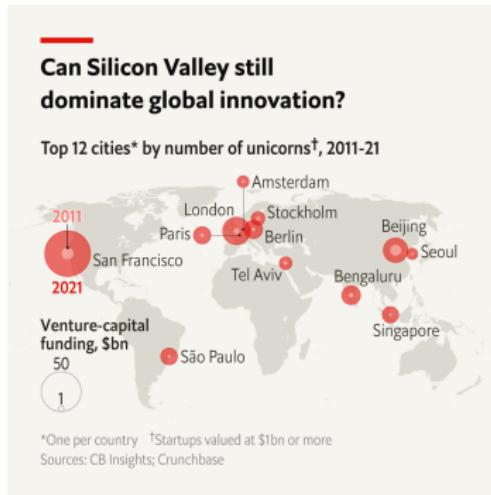
- To exports AI intensive products → global knowledge economy.
- Market concentration of high-value added → global inequality.
- Will developing countries catch-up (knowledge externalities)?

AI and trade: global implications



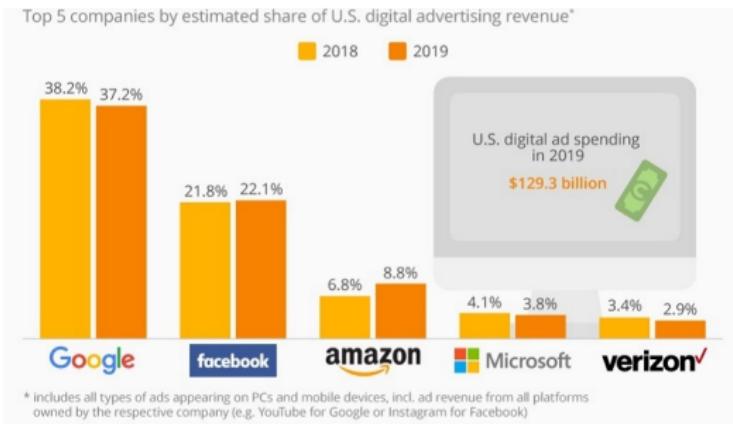
- To exports AI intensive products → global knowledge economy.
- Market concentration of high-value added → global inequality.
- Will developing countries catch-up (knowledge externalities)?

AI and trade: global implications



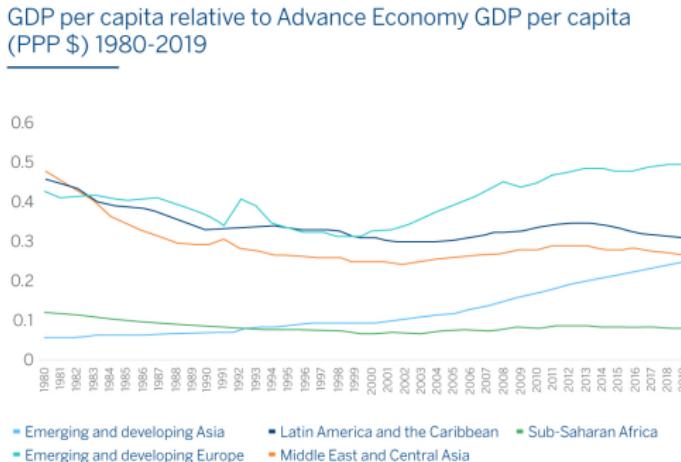
- To exports AI intensive products → global knowledge economy.
- Market concentration of high-value added → global inequality.
- Will developing countries catch-up (knowledge externalities)?

AI and trade: global implications



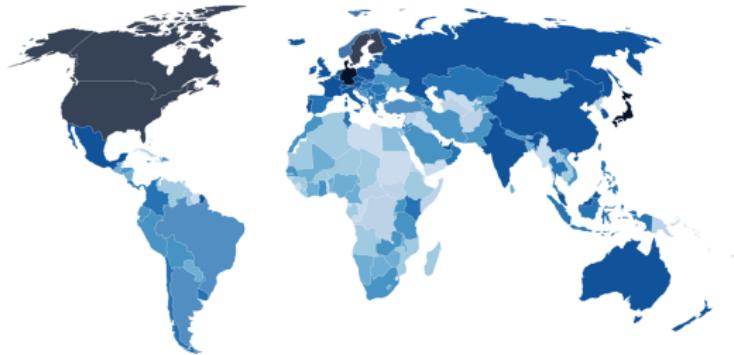
- ▶ To exports AI intensive products → global knowledge economy.
- ▶ Market concentration of high-value added → global inequality.
- ▶ Will developing countries catch-up (knowledge externalities)?

AI and trade: global implications



- ▶ To exports AI intensive products → global knowledge economy.
- ▶ Market concentration of high-value added → global inequality.
- ▶ Will developing countries catch-up (knowledge externalities)?

AI and trade: global implications



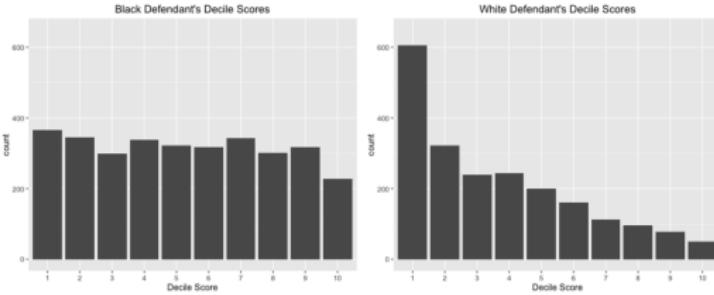
- ▶ To exports AI intensive products → global knowledge economy.
- ▶ Market concentration of high-value added → global inequality.
- ▶ Will developing countries catch-up (knowledge externalities)?

Class exercise: Can AI increase global inequality?

1. Make groups of 2/3 people.
2. What could be the political consequences AI globally?
3. What could we do about this?
4. 5 minutes.
 - ▶ Feel free to use the Internet.

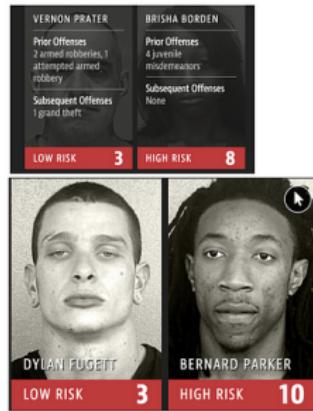
reset

(Un)ethical AI, discrimination and inequality



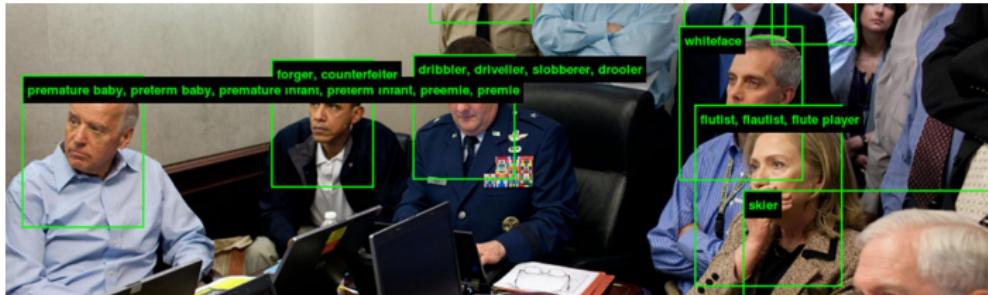
- ▶ Training data/supervise ⇒ Predict out of sample ⇒ choice.
- ▶ Existent data is biased; supervisor can be biased.
- ▶ Individuals', firms' and governments' incorporate this bias!
- ▶ Lack of freedom and of opportunity!

(Un)ethical AI, discrimination and inequality



- ▶ Training data/supervise ⇒ Predict out of sample ⇒ choice.
- ▶ Existent data is biased; supervisor can be biased.
- ▶ Individuals', firms' and governments' incorporate this bias!
- ▶ Lack of freedom and of opportunity!

(Un)ethical AI, discrimination and inequality



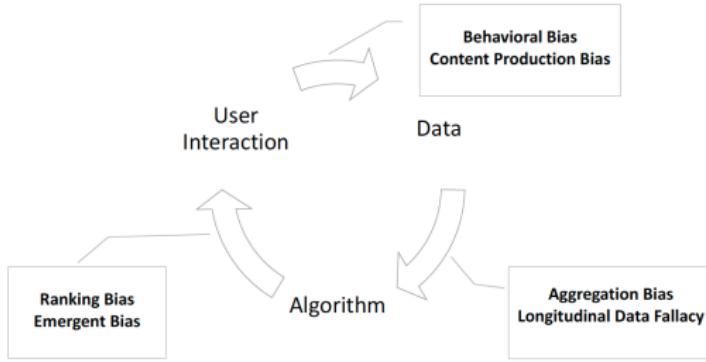
- ▶ Training data/supervise ⇒ Predict out of sample ⇒ choice.
- ▶ Existential data is biased; supervisor can be biased.
- ▶ Individuals', firms' and governments' incorporate this bias!
- ▶ Lack of freedom and of opportunity!

(Un)ethical AI, discrimination and inequality



- ▶ Training data/supervise ⇒ Predict out of sample ⇒ choice.
- ▶ Existent data is biased; supervisor can be biased.
- ▶ Individuals', firms' and governments' incorporate this bias!
- ▶ Lack of freedom and of opportunity!

Challenges for ethical AI



- ▶ **Data availability reinforces bias:**
 - ▶ Bias against minorities and other nations.
- ▶ **Lack of understanding of AI:**
 - ▶ Widespread support for AI.
 - ▶ How it works and consequences. (e.g., YouTube.)

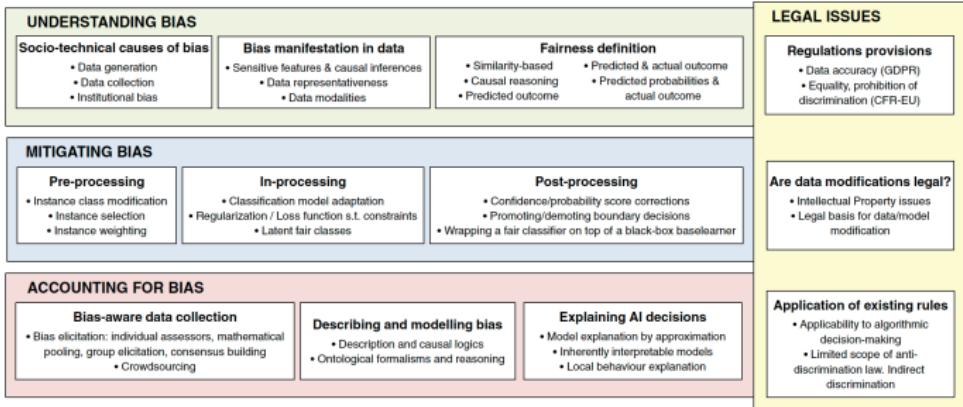
Challenges for ethical AI



Fig. 4. Geographic distribution of countries in the Open Images data set. In their sample, almost one third of the data was US-based, and 60% of the data was from the six most represented countries across North America and Europe, from [142] © Shreya Shankar.

- ▶ Data availability reinforces bias:
 - ▶ Bias against minorities and other nations.
- ▶ Lack of understanding of AI:
 - ▶ Widespread support for AI.
 - ▶ How it works and consequences. (e.g., YouTube.)

Challenges for ethical AI



- Data availability reinforces bias:
 - Bias against minorities and other nations.
- Lack of understanding of AI:
 - Widespread support for AI.
 - How it works and consequences. (e.g., YouTube.)

Challenges for ethical AI



- ▶ Data availability reinforces bias:
 - ▶ Bias against minorities and other nations.
- ▶ Lack of understanding of AI:
 - ▶ Widespread support for AI.
 - ▶ How it works and consequences. (e.g., YouTube.)

Class exercise: is it possible to design “ethical” AI?

1. Make groups of 2/3 people.
2. What does “ethical” mean?
3. Are current incentives of govt. and firms conducive to this?
4. 5 minutes.
 - ▶ Feel free to use the Internet.

reset

Next class...

Why is AI good for authoritarianism?