

# Impact of AI Decal: *A World of Pure Automation?*

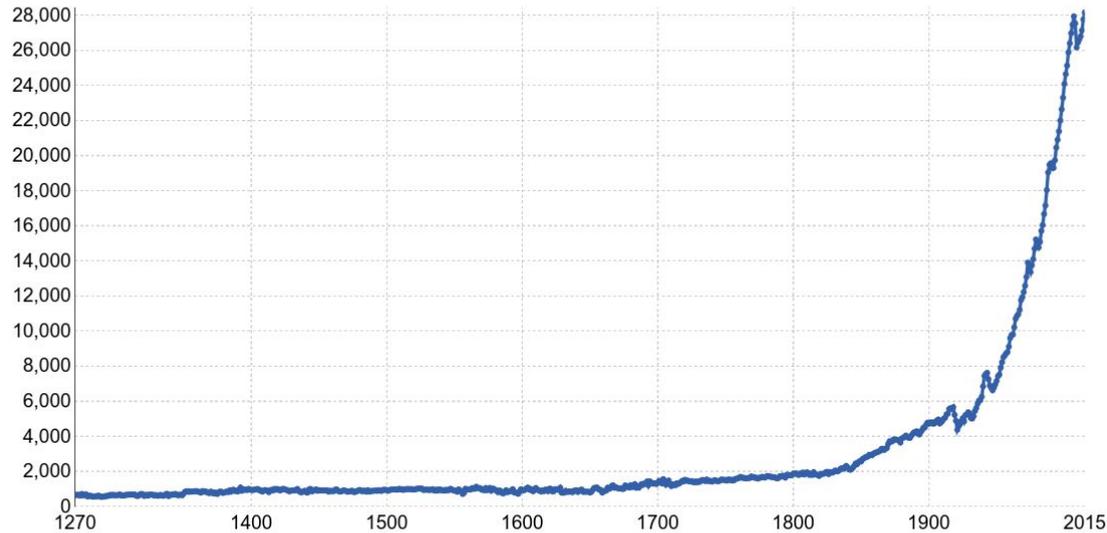
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Sajel Shah

Quiz: <https://tinyurl.com/impactsp19q4>



# History of Automation (1)

GDP per capita in England and the United Kingdom since 1270  
Adjusted for inflation and measured in British Pounds in 2013 prices

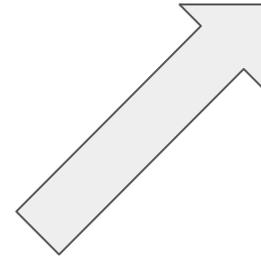
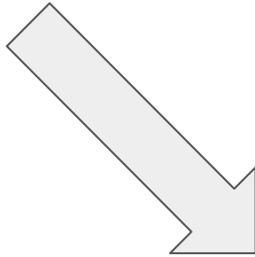


Data source: [Broadberry et al. and Bank of England](#)

[OurWorldInData.org](#) • CC BY-SA

Note: Data refers to England until 1700 and the UK from then onwards.

## History of Automation (2)

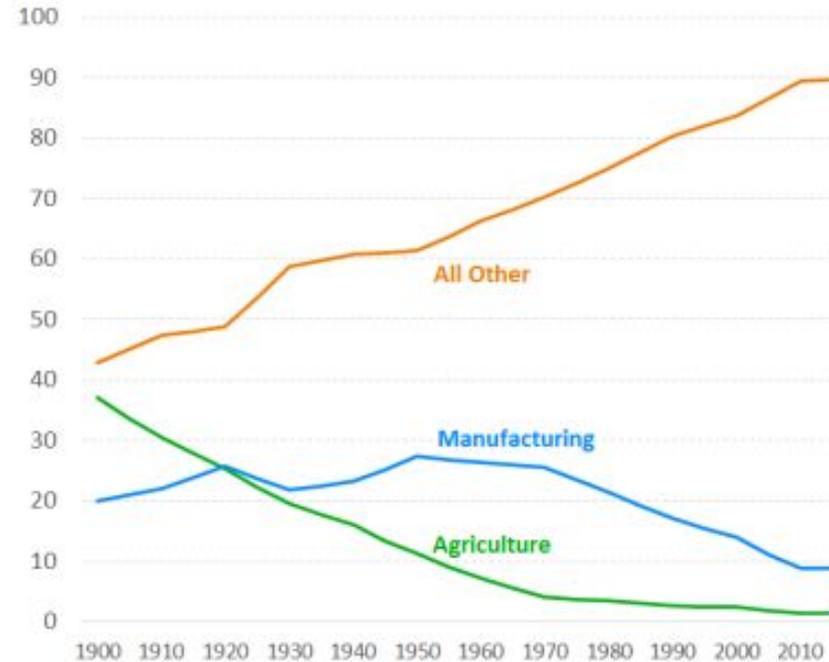


## History of Automation (3)



# History of Automation (4)

**Figure 1—Distribution of the Labor Force by Sector**  
Percent



Sources: "Productivity Trends in the United States" by John W. Kendrick for the National Bureau of Economic Research, 1961; US Bureau of Economic Analysis; NCCI

# History of Automation (5)

Industry Sector	Thousands of Jobs			Change		Percent Distributi	
	2006	2016	2026	2006–16	2016–26	2006	2016
<b>Total<sup>(1)</sup></b>	148,988.2	156,063.8	167,582.3	7,075.7	11,518.5	100.0	100.0
<b>Nonagriculture wage and salary<sup>(2)</sup></b>	137,190.9	144,979.3	155,724.8	7,788.4	10,745.5	92.1	92.9
<b>Goods-producing, excluding agriculture</b>	22,466.7	19,685.2	19,904.2	-2,781.5	219.0	15.1	12.6
Mining	619.7	626.1	716.9	6.4	90.8	0.4	0.4
Construction	7,691.2	6,711.0	7,575.7	-980.2	864.7	5.2	4.3
Manufacturing	14,155.8	12,348.1	11,611.7	-1,807.7	-736.4	9.5	7.9
<b>Services-providing excluding special industries</b>	114,724.2	125,294.1	135,820.6	10,569.9	10,526.5	77.0	80.3
Utilities	548.5	556.2	559.6	7.7	3.4	0.4	0.4
Wholesale trade	5,904.6	5,867.0	6,012.8	-37.6	145.8	4.0	3.8
Retail trade	15,353.2	15,820.4	16,232.7	467.2	412.3	10.3	10.1
Transportation and warehousing	4,469.6	4,989.1	5,353.4	519.5	364.3	3.0	3.2
Information	3,037.9	2,772.3	2,824.8	-265.6	52.5	2.0	1.8
Financial activities	8,366.6	8,284.8	8,764.6	-81.8	479.8	5.6	5.3
Professional and business services	17,566.2	20,135.6	22,295.3	2,569.4	2,159.7	11.8	12.9
Educational services	2,900.9	3,559.7	4,066.2	658.8	506.5	1.9	2.3
Health care and social assistance	15,253.3	19,056.3	23,054.6	3,803.0	3,998.3	10.2	12.2
Leisure and hospitality	13,109.7	15,620.4	16,939.4	2,510.7	1,319.0	8.8	10.0
Other services	6,240.5	6,409.4	6,761.4	168.9	352.0	4.2	4.1
Federal government	2,732.0	2,795.0	2,739.2	63.0	-55.8	1.8	1.8
State and local government	19,241.2	19,427.9	20,216.6	186.7	788.7	12.9	12.4
<b>Agriculture, forestry, fishing, and hunting<sup>(3)</sup></b>	2,111.2	2,351.5	2,345.4	240.3	-6.1	1.4	1.5
Agriculture wage and salary	1,218.6	1,501.0	1,518.0	282.4	17.0	0.8	1.0
Agriculture self-employed	892.6	850.5	827.5	-42.1	-23.0	0.6	0.5

Q:

*Why is modern automation different than previous technological changes?*

# Why Modern Automation is Different

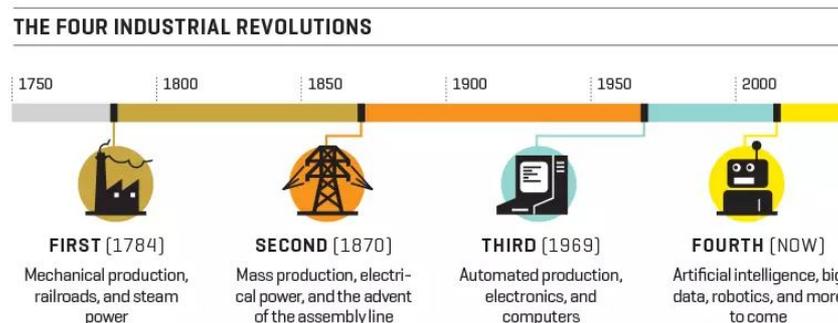
→ Automation in the past open up new kinds of jobs

- ◆ *“Since the dawn of the industrial age, a recurrent fear has been that technological change will spawn mass unemployment. Neoclassical economists predicted that this would not happen, because people would find other jobs, albeit possibly after a long period of painful adjustment. By and large, that prediction has proven to be correct.”*

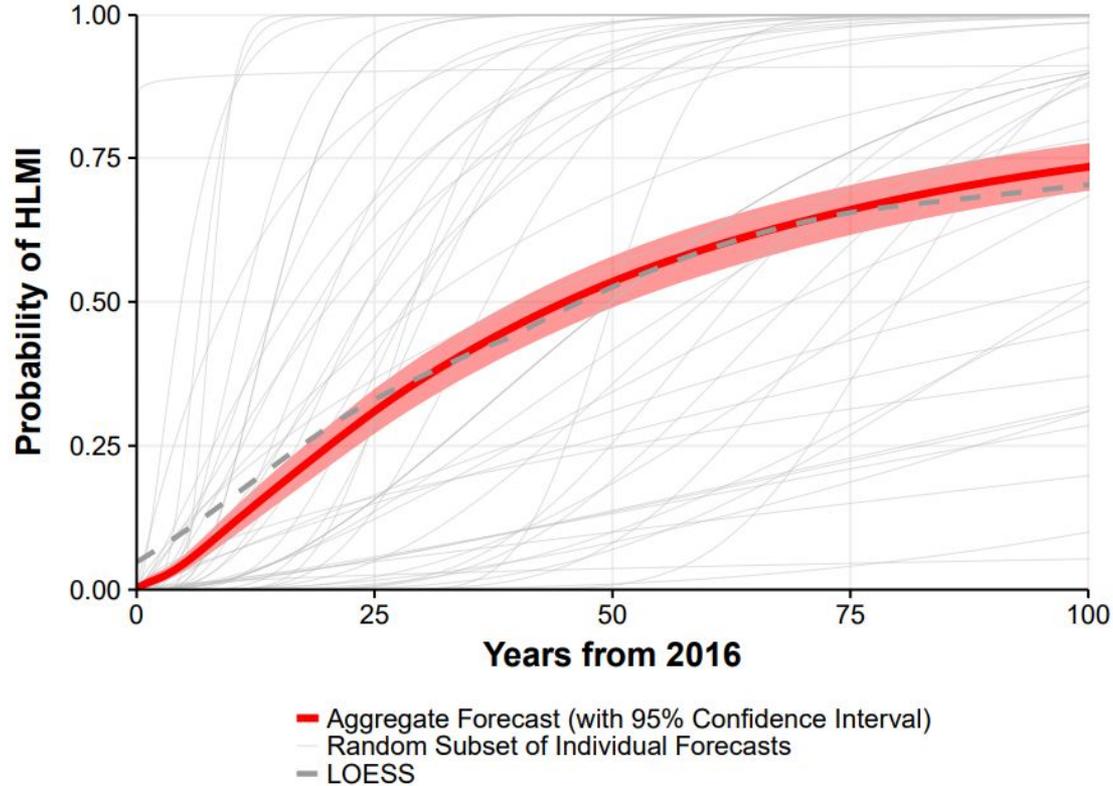
→ Modern automation seeks to replace nearly all physical and mental tasks

- ◆ What new job is there left for humans to take?

→ Does not require AGI - separate narrow intelligences for each task to complete



# Timelines for Modern Automation

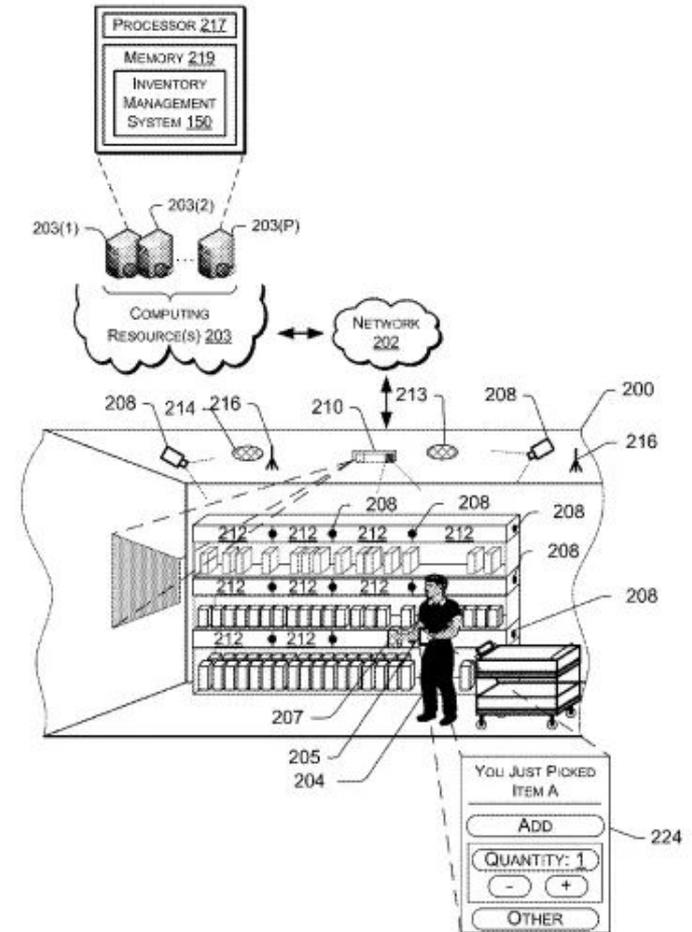


A woman with curly hair, wearing a light-colored cardigan over a white top, is standing in a grocery store aisle. She is looking down at a brown paper shopping bag she is holding, and she is placing a clear plastic container of food into it. The background shows shelves stocked with various grocery items.

INTRODUCING  
**amazon** go

# Amazon Go Store

- Completely automated grocery store, goal is to completely replace human workers with automated systems
- Cameras and other sensors to detect which item that a customer is purchasing
- Goal to use this automation to improve customer convenience



# Automation in Industry (Present)

- Different impact on different industries
  - ◆ Decline in travel agent jobs
  - ◆ Creates new jobs for engineers (computer scientists)
- Does not lead to net job gain
  - ◆ Companies will not invest in automation if the costs of current implementation is less than that of automation
- Does not lead to net job loss either
  - ◆ While jobs are eliminated in a particular industry, automation does not overall reduce number of jobs in the economy
  - ◆ Money saved by consumers in one sector is used to buy something else
- The rate of automation will not surpass the rate of job creation



# Impact on Productivity and Lifestyle

- Limiting automation to protect workers will hurt growth
  - ◆ focus instead should be on easing displaced workers' transitions into new jobs.
- Greater manufacturing output per employee
- Fuels company growth by opening more jobs and product lines
- Gives employees higher-value tasks such as problem solving, finding solutions, and developing new ideas
- In the future...
  - ◆ Complete automation of tasks in specialized industries
    - Effects on level of education needed for specific tasks

# A Picture of the Future: Utopia

- Post-scarcity society: production of necessities produced by automated robots
- No need to work in order to survive

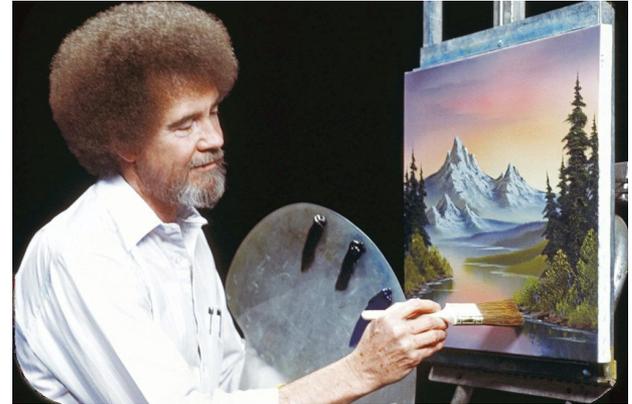


# The Meaning of Life

Laziness?



Freedom?



# A Picture of the Future: Dystopia

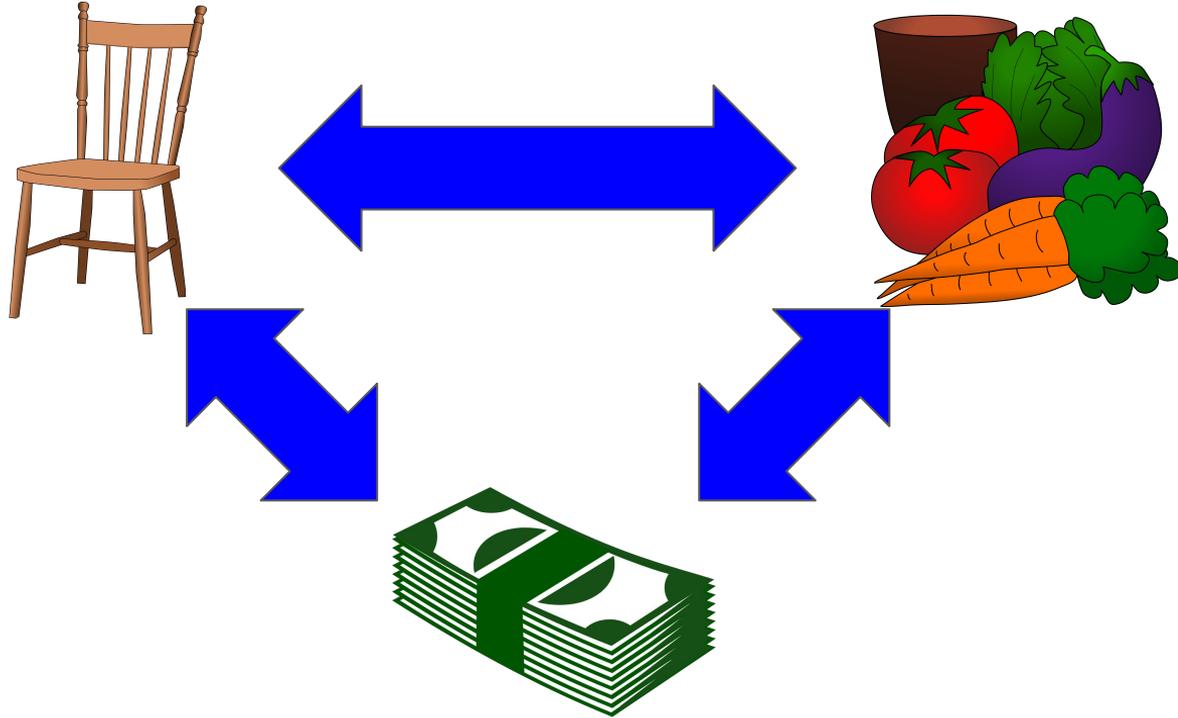
- Massive percentages of the population will be out of jobs and unable to make money
- Extreme inequality
  - ◆ those who own the means of automation get everything
  - ◆ those that depend on labor for pay get nothing



# Open Questions in an Automated World

- What gives a commodity value?
  - ◆ Labor may no longer be in the equation, but supply and demand may still apply
- How do we fairly distribute the fruits of automated work? Who should be allowed to dictate this?
- How will countries that don't achieve automation fare?

What gives something monetary value?



*What dictates the conversion rate of each product?*

# Universal Basic Income

- Some set amount of money given to every person, no strings attached
- Exact amount varies
  - ◆ Just enough to survive
  - ◆ Enough for a “middle-class” lifestyle
    - Much less popular
- Potential replacement for welfare systems
- Currently being tested out by Y Combinator and Stockton, as well as some small regions/cities
- A potential 2020 candidate, Andrew Yang, is basing his entire campaign on implementing UBI

# Impact of AI Decal: *Activity*



# Discussion!

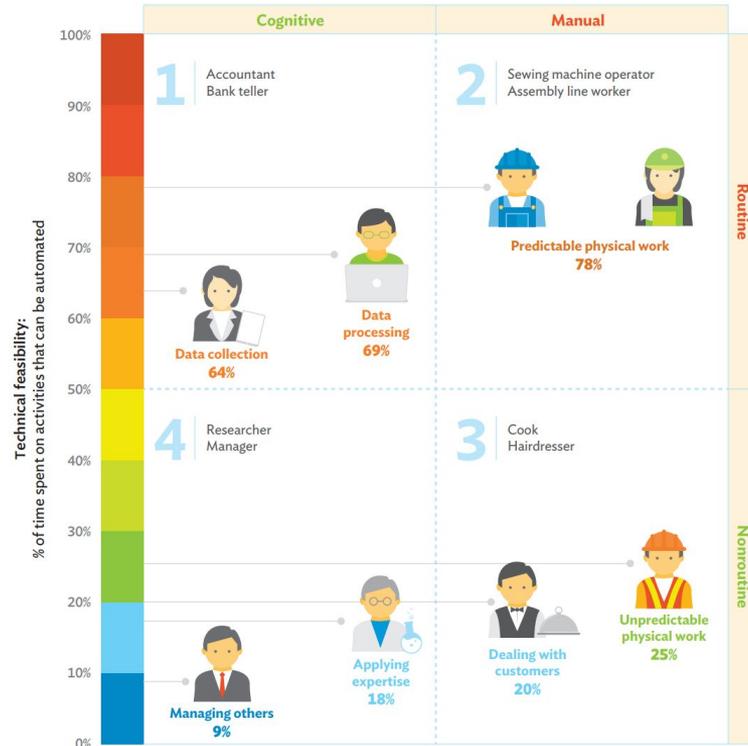
- What parts of this industry can and will be automated in the future?
  - ◆ What are some of the challenges of automation in the industry?
  - ◆ How will it be automated?
- How will this impact our lives in terms of
  - ◆ Quality
  - ◆ Productivity
  - ◆ Job creation
  - ◆ Education
  - ◆ Other aspects that can be affected
- What parts of this industry cannot be automated at all?
  - ◆ Why not?
  - ◆ What societal preconceptions might prevent this industry from being automated?

# Industries/Examples

- Consumerism (Amazon Go Store)
- Legal
- Healthcare
- Accounting/Finance/Economics
- Restaurants
- Entertainment
- Trucking and Taxis

# Thoughts from Experts (2)

## 2.1.9 Impact of automation on jobs



Note: Percentages are from Frey and Osborne (2017) estimates on probability of automation. Framework is based on Acemoglu and Autor (2011).

# **Impact of AI Decal:** *Next: The Self-Driving Cars of Today and Tomorrow*

