“Deep Humanities”

Humanities in the age of Deep Learning

Deep Thinking vs Deep Learning

Stanford Univ, June 2019

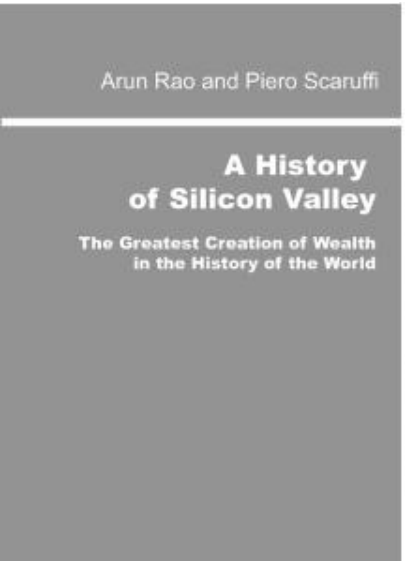
Piero Scaruffi

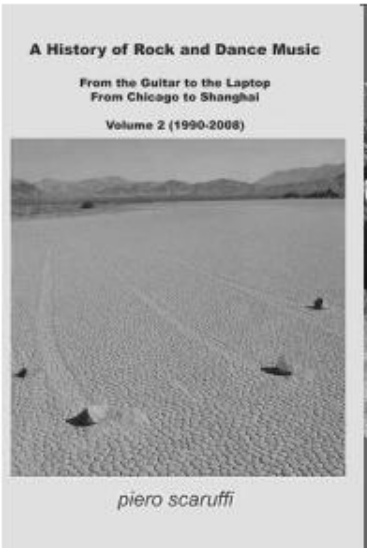
www.scaruffi.com

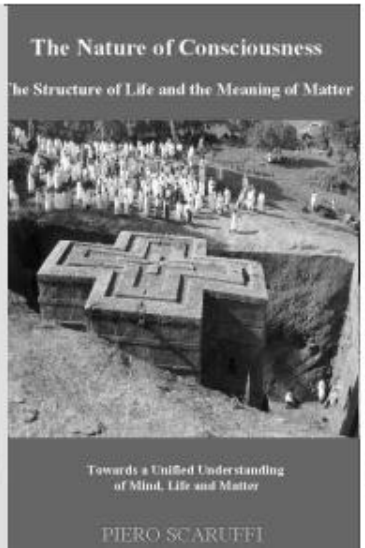
Piero Scaruffi

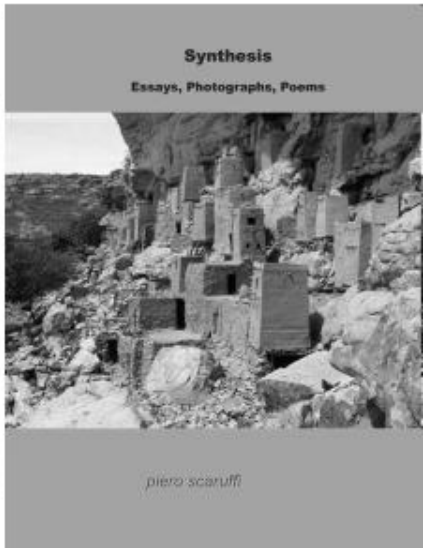
- Cultural Historian
- Cognitive Scientist
- Poet
- www.scaruffi.com

Intelligence is not Artificial (2013)
A History of Silicon Valley (2011)
Synthesis: Poems and Meditations (2010)
A History of Rock and Dance Music (2009)
A History of Jazz Music (2007)
Thinking about Thought (2006)



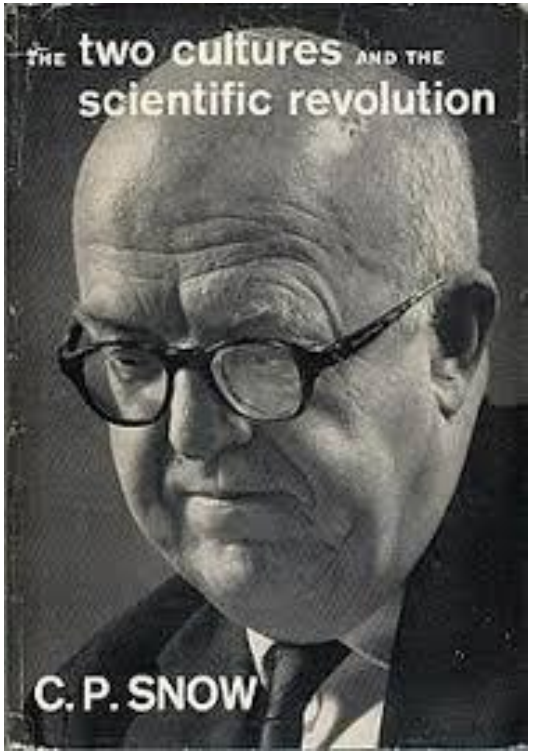




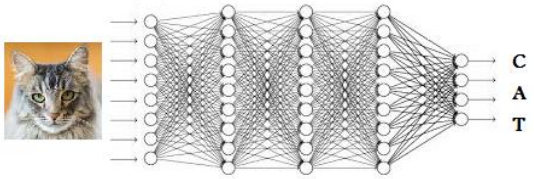


The Two Cultures

- CP Snow's May 1959 lecture

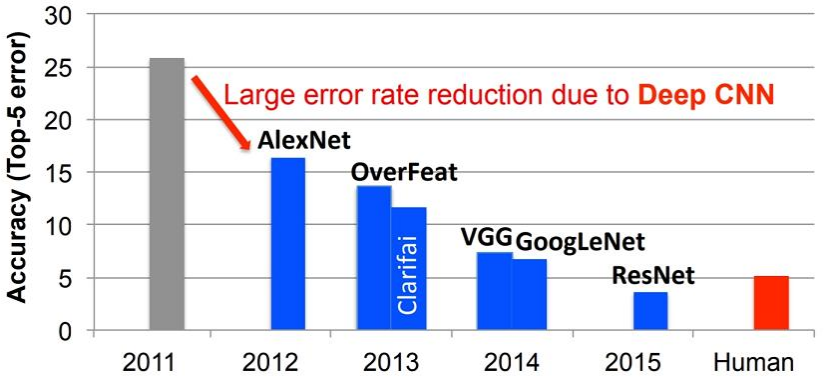


Deep Learning



Deep Learning = Multi-layer neural networks

A problem solved around 2006-12 with a combination of powerful GPUs (e.g. Nvidia), large training datasets (e.g. ImageNet) and computational tricks (e.g. AlexNet)



Shallow vs Deep Thinking

- Deep learning is **shallow thinking** (about big data)
- Traditionally, the humanities are "deep thinking" about small data
- Can we achieve ***deep thinking about big data***?

Shallow vs Deep Thinking

Shallow thinking about big data: a machine, trained with millions of frames of videos, can recognize cats in YouTube videos…

Google Brain (2012): 1.7 billion connections (and 16,000 processors) recognize cats in YouTube videos

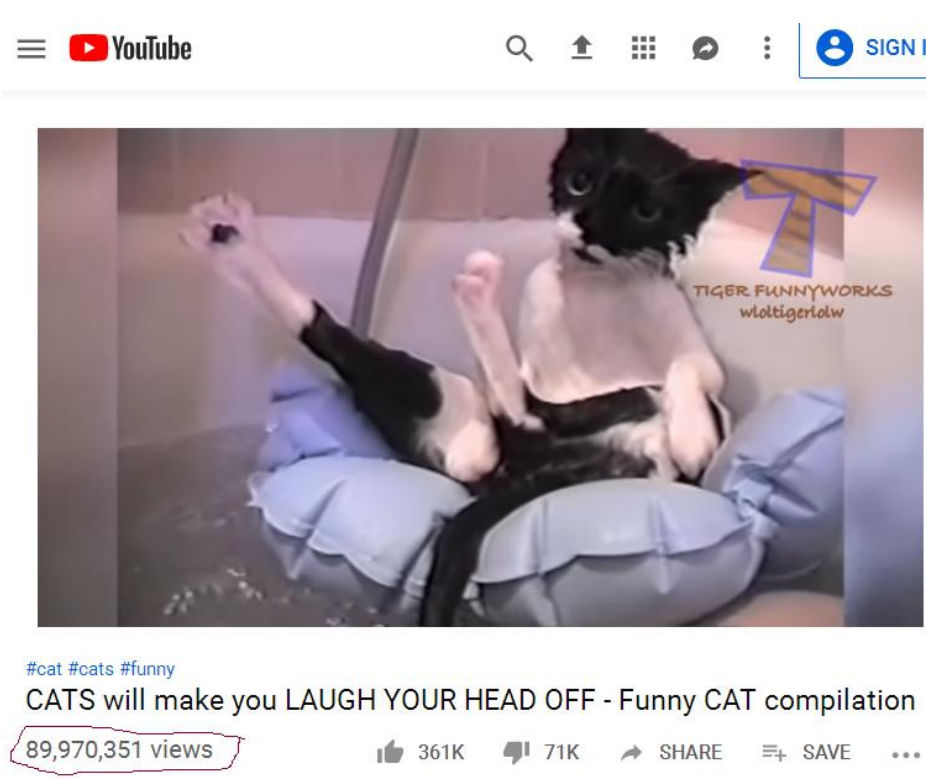
Shallow vs Deep Thinking

Deep thinking: but why are there so many cats on the Internet?

tubular insights

Cat Videos on YouTube: 2 Million Uploads, 25 Billion Views

CARLA MARSHALL - OCTOBER 29, 2014



Shallow vs Deep Thinking

March 2014, Reddit AMA ("ask me anything") with Tim Berners-Lee, inventor of the World-wide Web

Q: *"What was one of the things you never thought the internet would be used for, but has actually become one of the main reasons people use the internet?"*

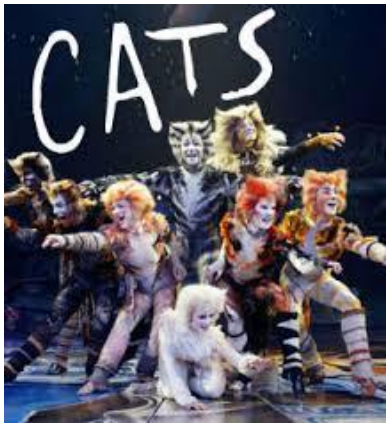
A: *“Kittens”*

Shallow vs Deep Thinking

- Which animals have been charismatic in history?
  - Cave paintings
  - Venationes
  - No cats in the Bible
  - Menageries
  - Automata
  - Cartoons

Shallow vs Deep Thinking

- Does it have to do with the unique role of cats in religion, philosophy, entertainment, science, …?
  - Egypt's cat god Bastet
  - Erwin Schrödinger's Cat
  - Jacques Derrida's Cat
  - Andrew Lloyd Webber's musical "Cats"



Shallow vs Deep Thinking

- Who started it?
  - Thomas Edison: “Boxing Cats” (1894)
  - Steven Chen: “Pajamas and Nick Drake” (2005), the first cat video on YouTube

Deep Learning = Shallow Thinking

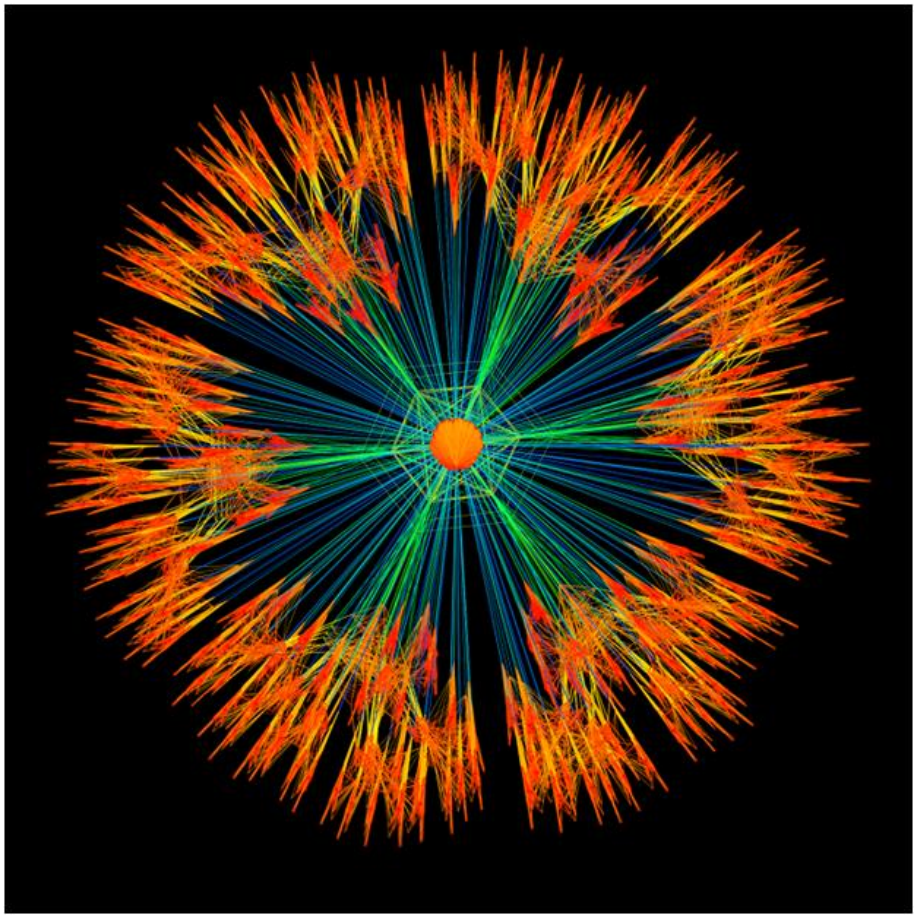
Intelligence = Algorithms + Big Data

$$\frac{\partial E}{\partial z_j} = \frac{dy_j}{dz_j}\frac{\partial E}{\partial y_j} = y_j(1-y_j)\frac{\partial E}{\partial y_j}$$

$$\frac{\partial E}{\partial y_i} = \sum_j \frac{dz_j}{dy_i}\frac{\partial E}{\partial z_j} = \sum_j w_{ij}\frac{\partial E}{\partial z_j}$$

$$\frac{\partial E}{\partial w_{ij}} = \frac{\partial z_j}{\partial w_{ij}}\frac{\partial E}{\partial z_j} = y_i\frac{\partial E}{\partial z_j}$$

+



(Credit: Margot Gerritsen)

Deep Learning = Shallow Thinking

Can all our problems be identified and solved via a purely data-driven approach?

- *"Data-driven science is a failure of imagination"* (Petr Keil, Charles Univ, Prague)
- Gerd Gigerenzer (Director, Max Planck Inst. for Human Development): any system that attempts to be overly rational is dangerous
- *"We understand what happened and how it happened, but we don't understand why it happened"* (Michael Bugeja, Iowa State Univ)
- Algorithms reinforce existing biases

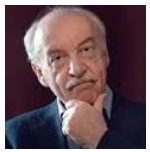

THE CONVERSATION December 13, 2018

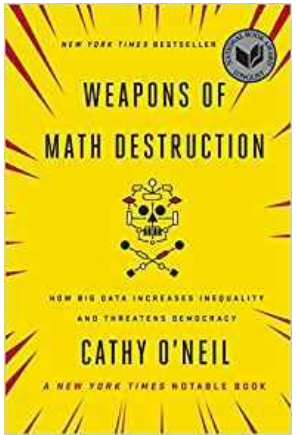
Arts + Culture Economy + Business Education Environment + Energy

How big data has created a big crisis in science

Kai Zhang

University of North Carolina





Deep Learning = Shallow Thinking

- Medicine is a science, but health care is an art
  - The relationship between physician and patient is at the heart of medicine

Deep Learning = Shallow Thinking

- Wikipedia and the monopoly of knowledge
  - Wikipedia is making all encyclopedias obsolete, which means that in a generation there will be only one source: Wikipedia
  - Wikipedia is mainly edited by
    - Anonymous people (the “mob”)
    - Political and special-interest groups
    - P.R. departments of corporations
    - P.R. agencies hired by celebrities and corporations
  - Wikipedia is also vulnerable to cyber-attacks that could wipe out the entire Wikipedia in one second (the Kish tablet, made of limestone, has survived 5200 years; the Dead Sea Scrolls, made of papyrus, survived 2,000 years)

Deep Learning = Shallow Thinking

- The demise of printed magazines, books and newspapers has resulted in a loss of privacy
- When you read a printed newspaper, the newspaper's company does not know which articles you read and does not know anything about you
- When you read the news on a website, the website "spies" on what you read and "cookies" may even inform it of other websites that you read, what you purchased and who your friends are
- Printed paper does not spy on you
- Websites spy on you
- Because they know you, the websites also create echo chambers that limit what you will see next

Humanity and Machines

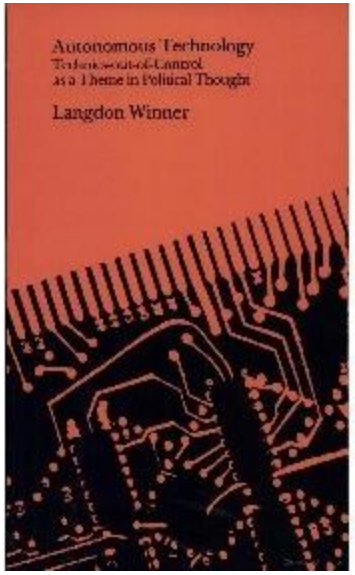
Technology Doomsdayers

- Jacques Ellul: “The Technological Society” (1954)
- Technology: a force that has escaped our control and that is transforming the human being

Humanity and Machines

Technology Doomsdayers

- Langdon Winner: "Autonomous Technology" (1977)
- Emergence of an elite class of scientists, technicians, and engineers, who displace the traditional political class as rulers of society
- Not "who rules?" but "**what** rules?"
- *“Technology in today’s world has run way ahead of our ability to exploit its riches to enhance our daily lives”*



Workplace Automation

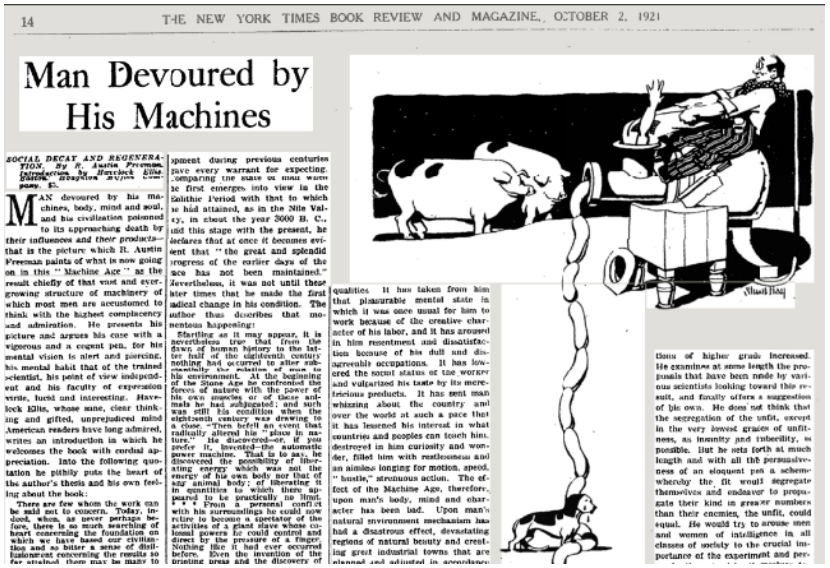
The question people ask: *"Will my job be automated?"*

1900: 41% of the US workforce is employed in agriculture

2000: 2% of the US workforce is employed in agriculture

"Man Devoured by His Machines" (New York Times, 1921)

Albert Einstein blames machines for unemployment (1931)



14 THE NEW YORK TIMES BOOK REVIEW AND MAGAZINE., OCTOBER 2, 1921

Man Devoured by His Machines

SOCIAL DECAY AND REGENERATION. By B. Austin Freeman. Introduction by Havelock Ellis. Illustrations by [illegible]. Houghton Mifflin Company. $2.

MAN devoured by his machines, body, mind and soul, and his civilization poisoned to its approaching death by their influences and their products—that is the picture which B. Austin Freeman paints of what is now going on in this "Machine Age" as the result chiefly of that vast and ever-growing structure of machinery of which most men are accustomed to think with the highest complacency and admiration. He presents his picture and argues his case with a vigorous and a cogent pen, for his mental vision is alert and piercing, his mental habit that of the trained scientist, his point of view independent and his faculty of expression virile, lucid and interesting. Havelock Ellis, whose sane, clear thinking and gifted, unprejudiced mind American readers have long admired, writes an introduction in which he welcomes the book with cordial appreciation. Into the following quotation he pithily puts the heart of the author's thesis and his own feeling about the book:

There are few whom the work can be said not to concern. Today, indeed, when, as never perhaps before, there is so much searching of heart concerning the foundation on which we have based our civilization and so bitter a sense of disillusionment concerning the results to [illegible] there may be many to

opment during previous centuries gave every warrant for expecting. Comparing the slave of man when he first emerges into view in the Eolithic Period with that to which he had attained, as in the Nile Valley, in about the year 3000 B. C., and this stage with the present, he declares that at once it becomes evident that "the great and splendid progress of the earlier days of the race has not been maintained." Nevertheless, it was not until these later times that he made the first radical change in his condition. The author thus describes that momentous happening:

Startling as it may appear, it is nevertheless true that from the dawn of human history to the latter half of the eighteenth century nothing had occurred to alter profoundly the relative status of man to his environment. At the beginning of the Stone Age he confronted the forces of nature with the power of his own muscles or of those animals he had subjugated; and such was still his condition when the eighteenth century was drawing to a close. Then befell an event that radically altered his "place in nature." He discovered—or, if you prefer it, invented—the automatic power machine. That is to say, he discovered the possibility of liberating energy which was not the source of his own body nor that of any animal body; of liberating it in quantities to which there appeared to be practically no limit. From a personal conflict with his surroundings he could now retire to become a spectator of the activities of a giant slave whose colossal powers he could control and direct by the pressure of a finger. Nothing like it had ever occurred before. Even the invention of the printing press and the discovery of

qualities. It has taken from him that pleasurable mental state in which it was once usual for him to work because of the creative character of his labor, and it has aroused in him resentment and dissatisfaction because of his dull and disagreeable occupations. It has lowered the social status of the worker and vulgarized his taste by its meretricious products. It has sent man whizzing about the country and over the world at such a pace that it has lessened his interest in what countries and peoples can teach him. It has destroyed in him curiosity and wonder, filled him with restlessness and an aimless longing for motion, speed, "hustle," strenuous action. The effect of the Machine Age, therefore, upon man's body, mind and character has been bad. Upon man's natural environment mechanism has had a disastrous effect, devastating regions of natural beauty and creating great industrial towns that are

tions of higher grade increased. He examines at some length the proposals that have been made by various scientists looking toward this result, and finally offers a suggestion of his own. He does not think that the segregation of the unfit, except in the very lowest grades of unfitness, as insanity and imbecility, is possible. But he sets forth at much length and with all the persuasiveness of an eloquent pen a scheme whereby the fit would segregate themselves and endeavor to propagate their kind in greater numbers than their enemies, the unfit, could equal. He would try to arouse men and women of intelligence in all classes of society to the crucial importance of the experiment and per-

THE NEW YORK TIMES, THURSDAY, OCTOBER 22, 1931.

World Ills Laid to Machine By Einstein in Berlin Speech

Special Cable to THE NEW YORK TIMES.

BERLIN, Oct. 21.—Discussing the effects of natural science on man's life, Professor Albert Einstein in a lecture tonight deplored the fact that the industrial technique which was meant to serve the world's progress by liberating mankind from the slavery of labor was now about to overwhelm its creators.

He characterized the great distress of the present times as the result of domination by man-made machines, but blamed technique not as much as lack of organization in economic and social life, the stabilization of which is one of the chief tasks of the present time.

Regarding the direct effects of natural science upon life, Professor Einstein stressed the philosophic theory of determinism, which he said was almost generally recog-

nized today.

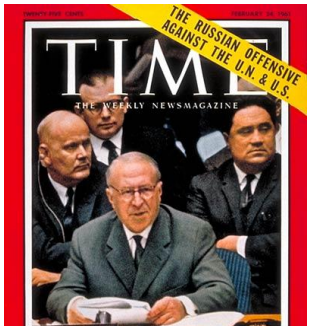
Workplace Automation

"The Automation Jobless" (TIME, 1961)

"A Robot is after your Job" (NYT, 1980)

Jeremy Rifkin's "The End of Work" (1995) predicts worldwide unemployment due to the automation of jobs in the manufacturing, agricultural and service sectors

"Robots and the Future of Unemployment" (Atlantic, 2009)



Business: THE AUTOMATION JOBLESS

Friday, Feb. 24, 1961

THE NEW YORK TIMES, WEDNESDAY, SEPTEMBER 3, 1980

PUMA (Programmable Universal Machines for Assembly) is General Motors's latest contribution in this area. Referring to people and robots as "interchangeable," G.M. will alternate workers and mechanical arms on an assembly line that may be the most complete integration of worker and machine since the automatic lunch feeder in Charlie Chaplin's "Modern Times." Robots set the work pace and if a mechanical arm breaks down, it is replaced by a human. G.M. is demonstrating a prototype of PUMA assembling a car dashboard. In some plants, jobs like this are now done by workers sitting at a bench with bins of parts in front of them. If a worker has

New technology isn't a panacea

a daily quota of, say, 60 dashboards, he may work very hard in the morning, produce 30 units, and take it easy in the afternoon. In eliminating this control, PUMA shuts off the worker's creativity and initiative — a critical productivity loss that is not measured.

Proponents of these changes argue that if we don't adopt new technologies such as robots as quickly as possible, we will fail to be competitive with countries that do, such as Japan. The ability to compete, however, depends on much more than technology. The Chrysler New Yorker, for example, is built with the latest in robots but is a poorly conceived gas guzzler and therefore virtually unmarketable.

In any case, potent labor-saving technologies are becoming far too pervasive to assume that enough jobs will automatically be created for the number of people displaced. Economic revitalization no longer means re-employment. And the devastating social cost of unemployment is not reckoned in the savings that technology promises.

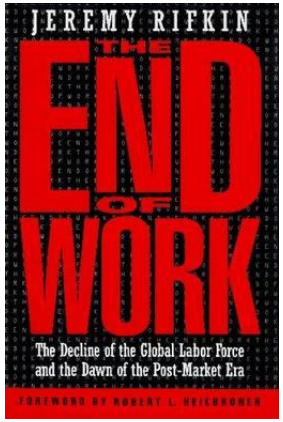
Such a socially destructive use of technology need not be inevitable. Jobs for workers displaced and improved working conditions for those who remain ought to be a condition for the introduction of robots. Produc-

DETROIT — Technological innovation is widely billed as a miracle cure for the United States' economic ills. Its aftereffects, however, may be far from benign. The introduction of revolutionary new technologies such as robots — versatile computer-controlled mechanical arms — raise two painful possibilities: sizable losses of jobs and a deteriorated quality of working life.

The threat of lost jobs, although also dependent on social and economic factors, is especially critical. Auto

A Robot Is After Your Job

By Harley Shaiken



The Atlantic

Robots and the Future of Unemployment

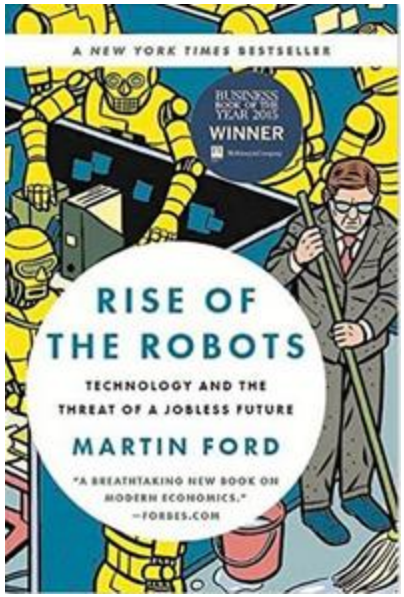
MIKE KONCZAL AUG 10, 2009

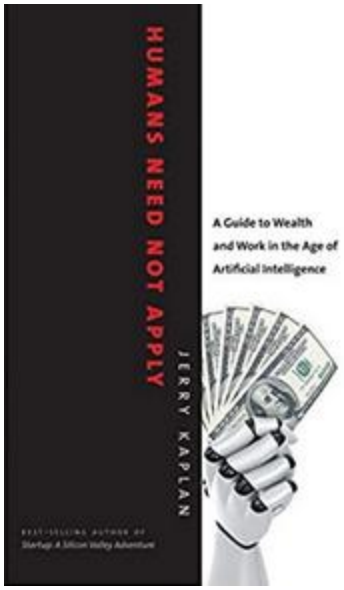
Workplace Automation

You do sell a lot of copies if you predict the apocalypse

Martin Ford's "Rise of the Robots - Technology and the Threat of a Jobless Future" (2015)

Jerry Kaplan's "Humans Need Not Apply" (2015)





What happened 8 years later: record unemployment…

U.S. Department of Commerce

News: Unemployment is at its Lowest Level in 54 years

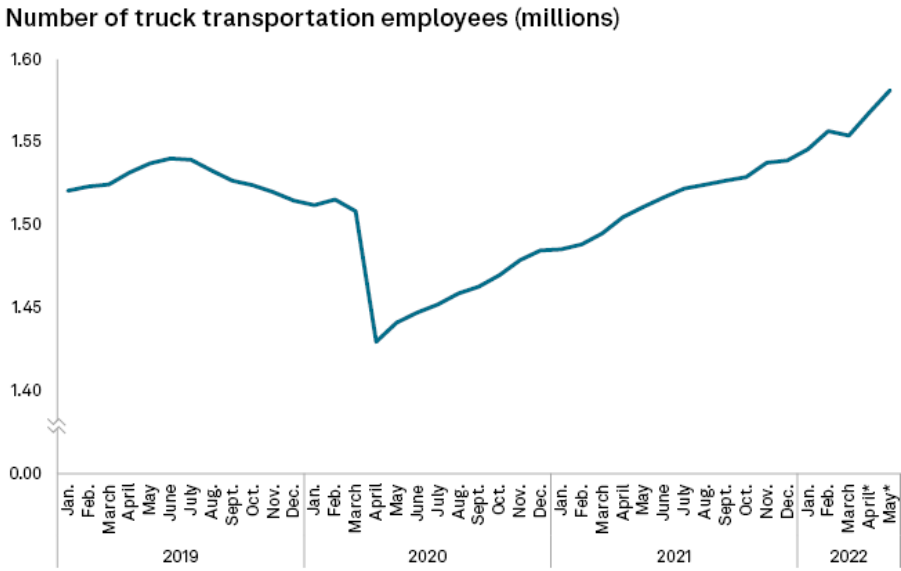
February 3, 2023

Workplace Automation

2009: Google launches the project for the self-driving car

What happened 13 years later: record number of truck drivers

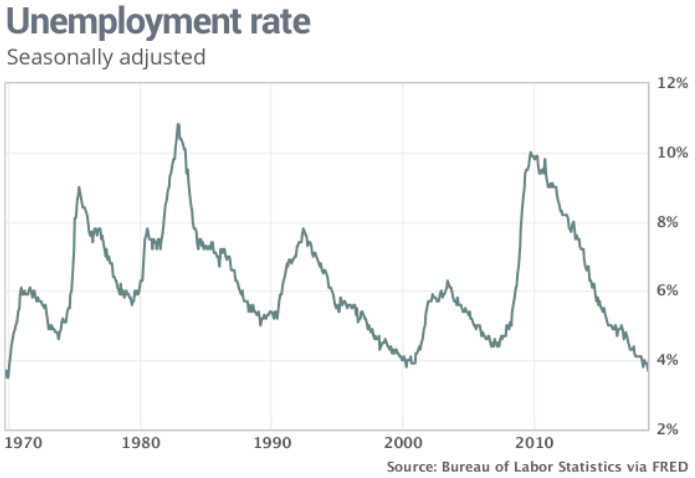
1.8 million American truck drivers could lose their jobs to robots. What then?



Workplace Automation

The question we should ask:

"Why are there still so many jobs?"



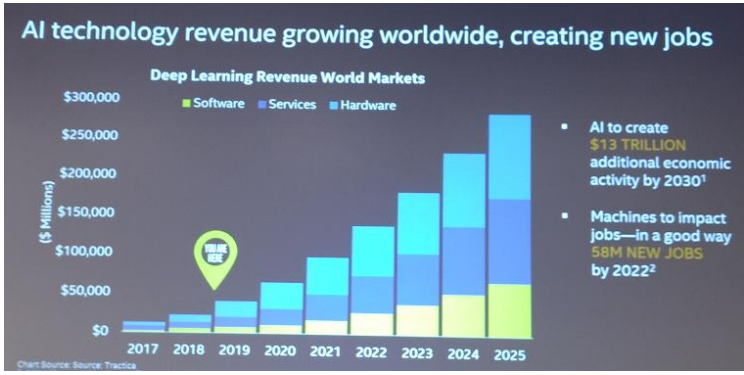
Journal of Economic Perspectives—Volume 29, Number 3—Summer 2015—Pages 3–30

Why Are There Still So Many Jobs? The History and Future of Workplace Automation

David H. Autor

MIT Economics

Could it be that "hyper-employment", not under-employment, is the future?



Workplace Automation

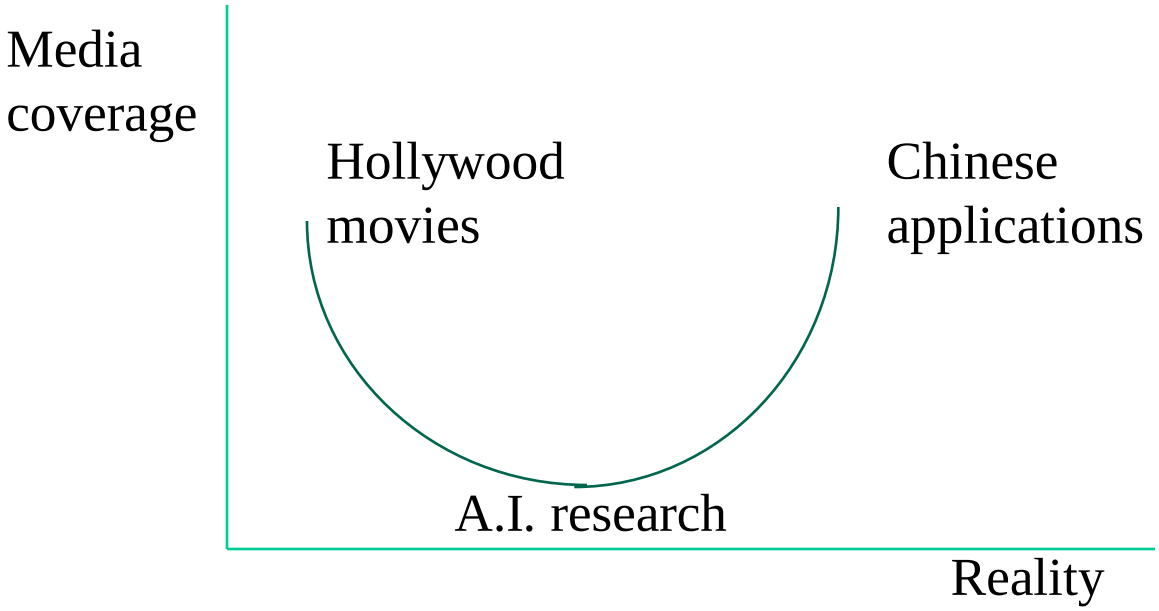
Total investment in self-driving technology between 2014 and 2018: more than $100 billion

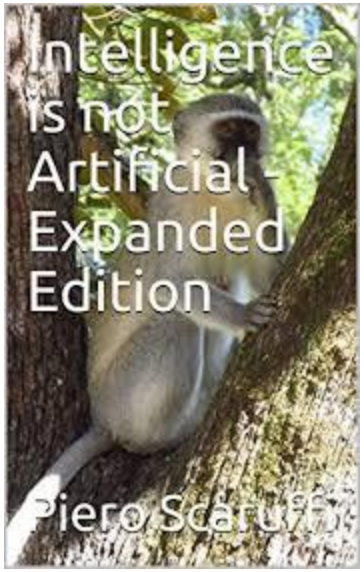
Number of drivers replaced by self-driving cars: zero

An A.I. Disclaimer

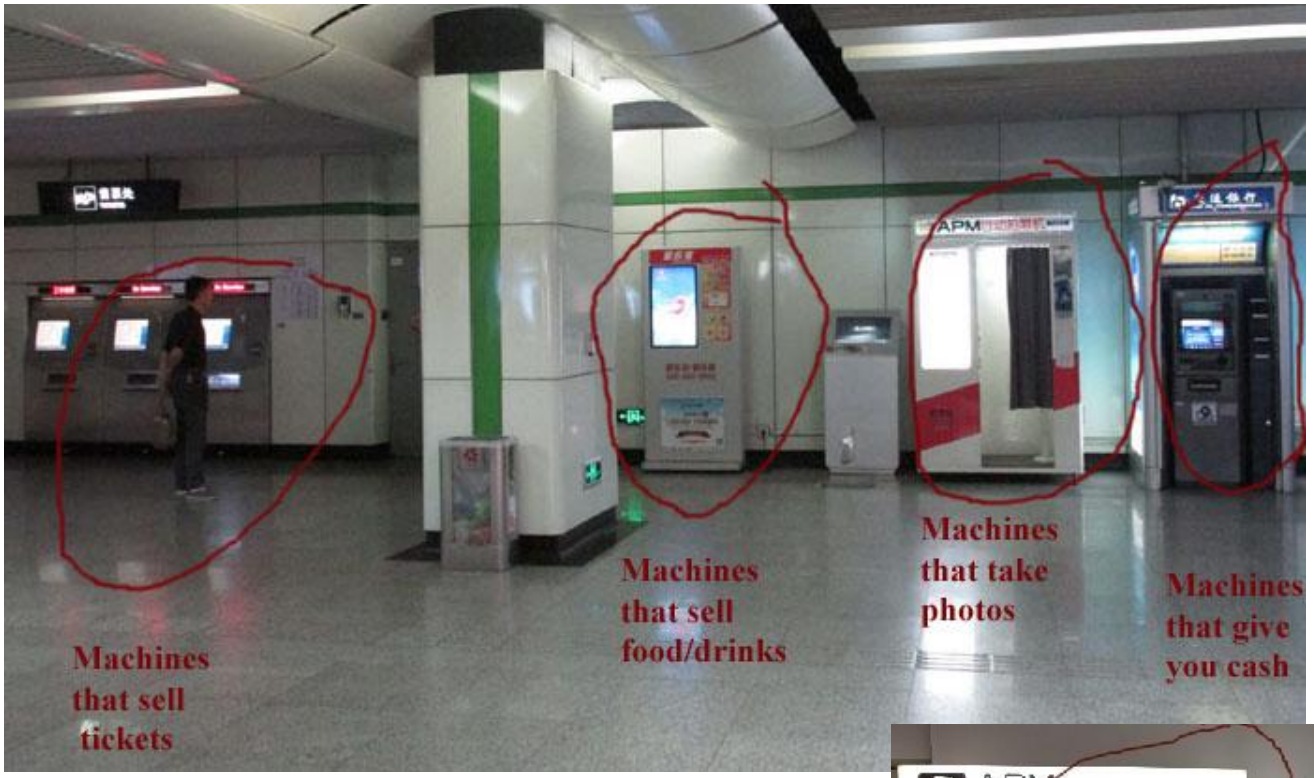
Most of what is discussed:

- Hollywood A.I.: science fiction
- Chinese A.I.: new kinds of automation

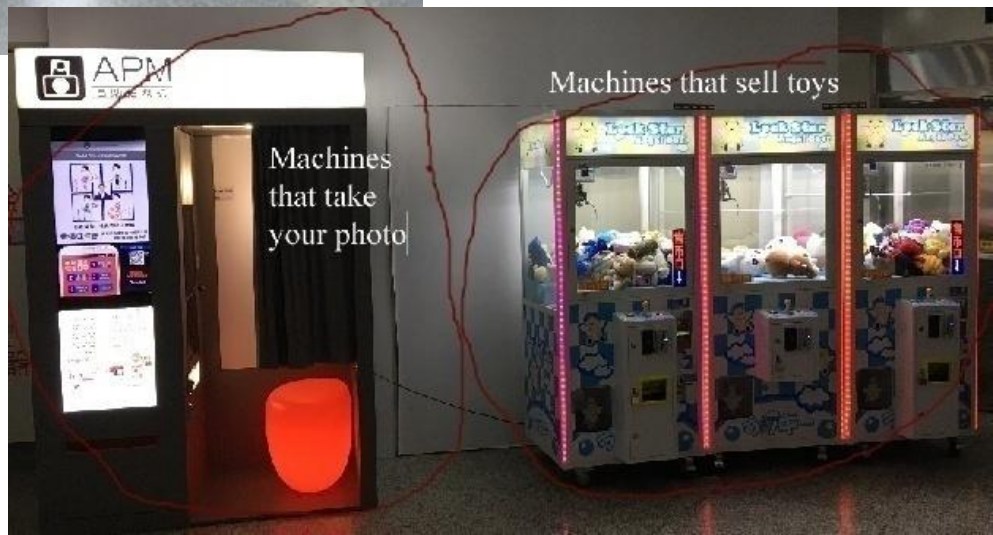




We are surrounded



We are already surrounded by robots…



We are surrounded

We are surrounded

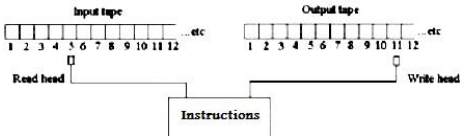
Some Saw it Coming…

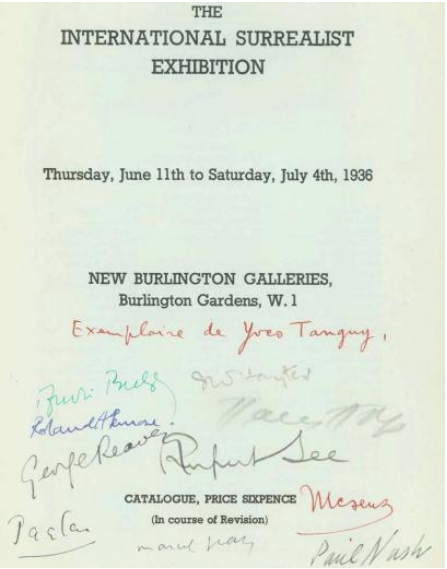
Macy Conference on Cybernetics (March 1946, New York)

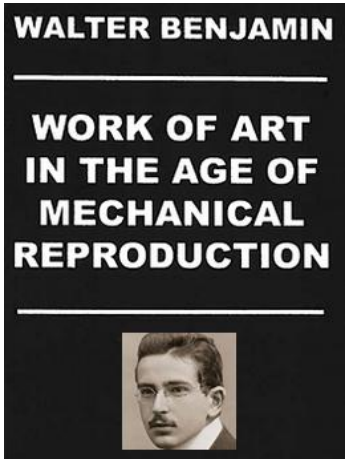
- John von Neumann (computer science)
- Rafael Lorente de No (neurophysiology)
- Norbert Wiener (mathematics)
- Arturo Rosenblueth (physiology)
- Warren McCulloch (neuropsychiatry)
- Gregory Bateson (anthropology)
- Margaret Mead (anthropology)
- Walter Pitts (mathematics)
- Ralph Gerard (neurophysiology)
- Heinrich Kluever (psychology)
- Lawrence Frank (sociology)
- Molly Harrower (psychology)
- Lawrence Kubie (psychoanalysis)
- Filmer Northrop (philosophy)
- Paul Lazarsfeld (sociology)

Interdisciplinary Thinking

1936: Computation, Surrealism, “Modern Times” and “The Work of Art in the Age of Mechanical Reproduction” have in common?







Interdisciplinary Thinking

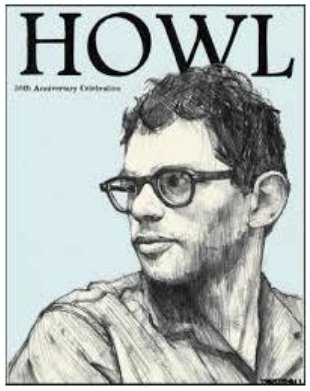
1955: A.I., “Howl”, Rock & Roll and Disneyland

AI Magazine Volume 27 Number 4 (2006) (© AAAI)

A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence

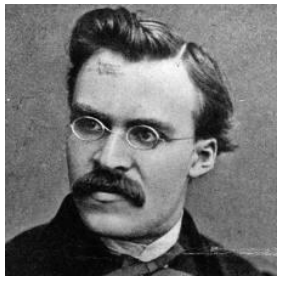
August 31, 1955

John McCarthy, Marvin L. Minsky, Nathaniel Rochester, and Claude E. Shannon



Interdisciplinary Thinking

VanGogh and Nietzsche went mad in the same year, 1888, one year after Emile Berliner invented the gramophone (that records sounds) and in the same year in which Kodak introduced the first consumer camera (that records images).



The Role of the Humanities

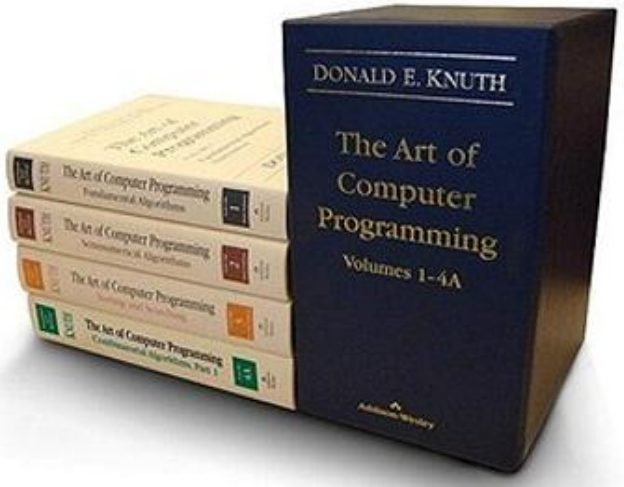
- Humanities should not behave simply as a reactionary force to every tech/science revolution
- That was the role of the Catholic Church in the times of Copernicus, Galileo, Newton and Darwin
- The humanities love to tell scientists and engineers what they should do with their science and tech (e.g. ethical issues)
- But the humanities are less good at telling themselves what role they should play in progress
- Sometimes it feels like the humanities are opposed to progress in itself, to any kind of progress
- The humanities seem to subscribe to the notion that progress happens "despite" them; and then society (led by the humanities) has to limit the damage caused by progress

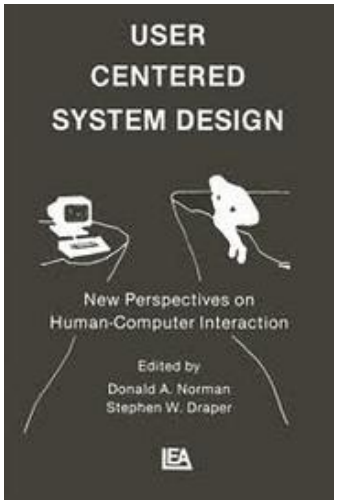
Death of the Humanities?

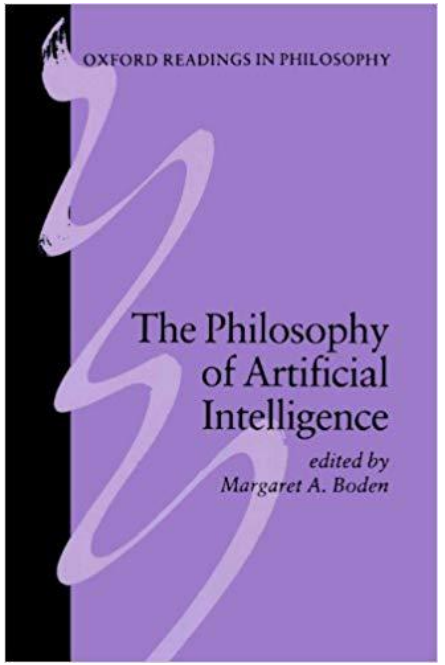
- The “death” of the humanities has always be wildly exaggerated
- Italy, 1960s: Greek, Latin, calligraphy and the Catholic scriptures were pillars of the humanities.
- The rhetoric of the “crisis of the humanities” has been a constant throughout history because the definition of humanities changes all the time

What are the Humanities for the century of automation?

- 21st century humanities should perhaps include
  - Writing software
  - Building robots and gadgets
  - User experience
  - A.I. as philosophy of mind







The Humanities
for the century of automation

- What is truly human in a deterministic world?
- Is there an antidote to the reductive forces of scientific rationalism?
- This is an old dilemma
- In particular, the Romantics reacted against the mechanistic ideology of the Enlightenment

The Humanities
for the century of automation

- The Enlightenment: The universe is deterministic, living organisms are machines
- Julien Offray de LaMettrie's man-machine (1748)


L'HOMME

MACHINE.

Est-ce là ce Rolon de l'Essence suprême,
Que l'on nous peint si lumineux?
Est-ce là cet Esprit survolant à nous mêmes?
Il naît avec nos sens, croît, s'affaiblit
comme eux.
Hélas! il périra de même.
VOLTAIRE.

A LEYDE,
DE L'IMP. d'ELIE LUZAC, FILS.
M. DCC. XLVIII.

The Humanities
for the century of automation

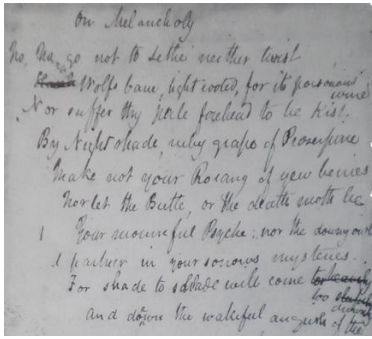
- The Romantics
- The difference between humans and automata
- Madness (not a disease, but a precious gift)
  - Friedrich Hölderlin, Goethe's Faust, Mary Shelley's Dr Frankenstein (1818)...
  - Rumours concerning Beethoven's madness started as early as 1816
  - It becomes "sublime madness" in 1844 (Henri Blanchard’s review of his late quartets)
  - Robert Schumann (1810-1856)
- Grief

The Humanities
for the century of automation

- Madness in the age of Facebook
  - My #1 Facebook post of all times was a random string of characters

The Humanities
for the century of automation

- The Romantics
- The difference between humans and automata
- Grief
  - *"Suffering is permanent, obscure and dark. And has the nature of infinity"* (William Wordsworth)
  - *"Do you not see how necessary a World of Pains and troubles is to school an Intelligence and make it a soul?"* (John Keats)

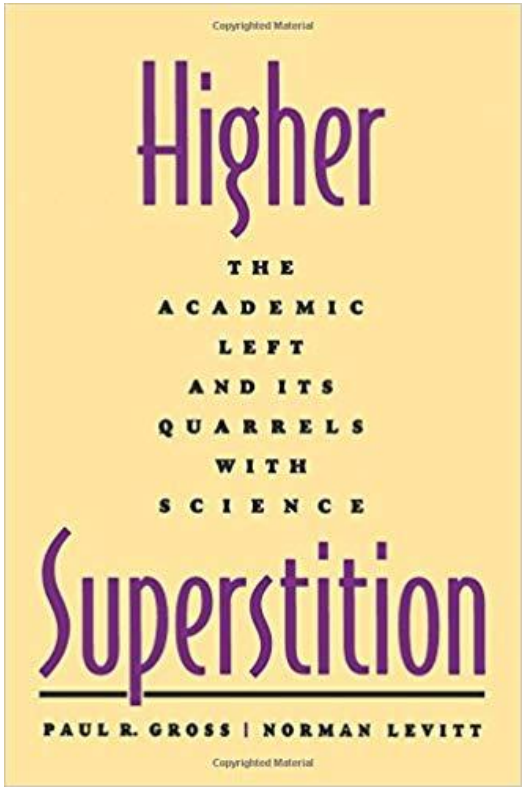


Ode on Melancholy
John Keats


Giacomo Leopardi

The Humanities
for the century of automation

- Lots of anti-scientific theories discussed in this book:



A tribute of sorts…

- The first person to discuss A.I. and the Humanities: British teenager Mary Shelley

FRANKENSTEIN;

OR,

THE MODERN PROMETHEUS.

IN THREE VOLUMES.

Did I request thee, Maker, from my clay
To mould me man? Did I solicit thee
From darkness to promote me?—
PARADISE LOST.

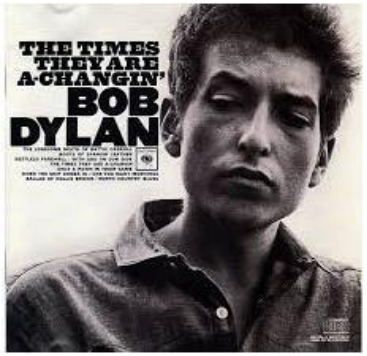
VOL. I.

London:
PRINTED FOR
LACKINGTON, HUGHES, HARDING, MAVOR, & JONES,
FINSBURY SQUARE.

1818.

The Counterculture

What does a counterculture look like in the age of automation?



The Two Cultures

- Historical contexts
  - 1959: CP Snow writes during the Cold War: much of the new science is employed in a vast program of M.A.D. (mutually-assured destruction)

The Two Cultures

- Historical contexts
  - 2019: much of the new science is employed in programs of "state terrorism"
    - US & allies kill more civilians in Afghanistan than the Taliban
    - Russia's cyber-warfare against democracies
    - China's vast surveillance system
    - US drones assassinate "terrorists" around the world with no trial

The New York Times

U.S. and Afghan Forces Killed More Civilians Than Taliban Did, Report Finds

THE WALL STREET JOURNAL.

'Putin Has Won': Mueller Report Details the Ways Russia Interfered in the 2016 Election

The New York Times

Inside China's Dystopian Dreams: A.I., Shame and Lots of Cameras

The New York Times

Drone Strike Statistics Answer Few Questions, and Raise Many

Bridging the Two Cultures

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Questions

- *"Computers are useless: they can only give you answers"* (Pablo Picasso, 1964)
- We have too many answers, not enough questions