“Deep Humanities”
Humanities in the age of Deep Learning
Stanford Univ, June 2019

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*Intelligence is not Artificial* (2013)
*A History of Silicon Valley* (2011)
*A History of Rock and Dance Music* (2009)
*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?

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

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\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”, 2017)

• Algorithms reinforce existing biases
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
  – E.g.: Danton Char, Nigam Shah and David Magnus (Stanford, 2018)
Humanity and Machines

Technology Doomsdayers


– 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)
Workplace Automation

“The Automation Jobless” (TIME, 1961)
“A Robot is after your Job” (NYT, 1980)


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

The question we should ask:

“Why are there still so many jobs?”

Could it be that “hyper-employment”, not under-employment, is the future?
An A.I. Disclaimer

Most of what is discussed:

- Hollywood A.I.: science fiction
- Chinese A.I.: new kinds of automation
We are already surrounded by robots…
We are surrounded

Machines to check your ticket

Machines to check your luggage
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
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 been 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?
- 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)
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
A tribute of sorts…

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

• "Computers are useless: they can only give you answers" (Pablo Picasso, 1964)
• We have too many answers, not enough questions
The End (or the beginning?)

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