

A brief history of artificial intelligence and what it can teach us

2nd Workshop on Correctness and Reproducibility for Earth System Software

What this talk is not

- Comprehensive
- Exhaustive
- Un-opinionated
- Going to be concerned with anything else a philosophy professor would get excited about

What we're talking about when we talk about AI



TensorFlow

The screenshot shows the Wikipedia article for "Machine learning". The page has a dark theme. At the top, there's a navigation bar with a menu icon, a globe icon labeled "WIKIPEDIA The Free Encyclopedia", a search icon, and links for "Donate", "Create account", and "Log in". Below the header, the title "Machine learning" is displayed in large, bold, black font. Underneath the title, there are tabs for "Article" (which is underlined) and "Talk". To the right of the tabs are links for "Read", "Edit", "View history", and "Tools". A note below the tabs says "From Wikipedia, the free encyclopedia". The main content of the page starts with a definition of machine learning as a field of study in artificial intelligence concerned with the development and study of statistical algorithms that can learn from data and generalise to unseen data, and thus perform tasks without explicit instructions. It mentions deep learning and neural networks as subdisciplines and previous machine learning approaches.

What can I help with?

Ask anything

Attach Search Study Voice

☰ WIKIPEDIA The Free Encyclopedia

Machine learning

Article Talk

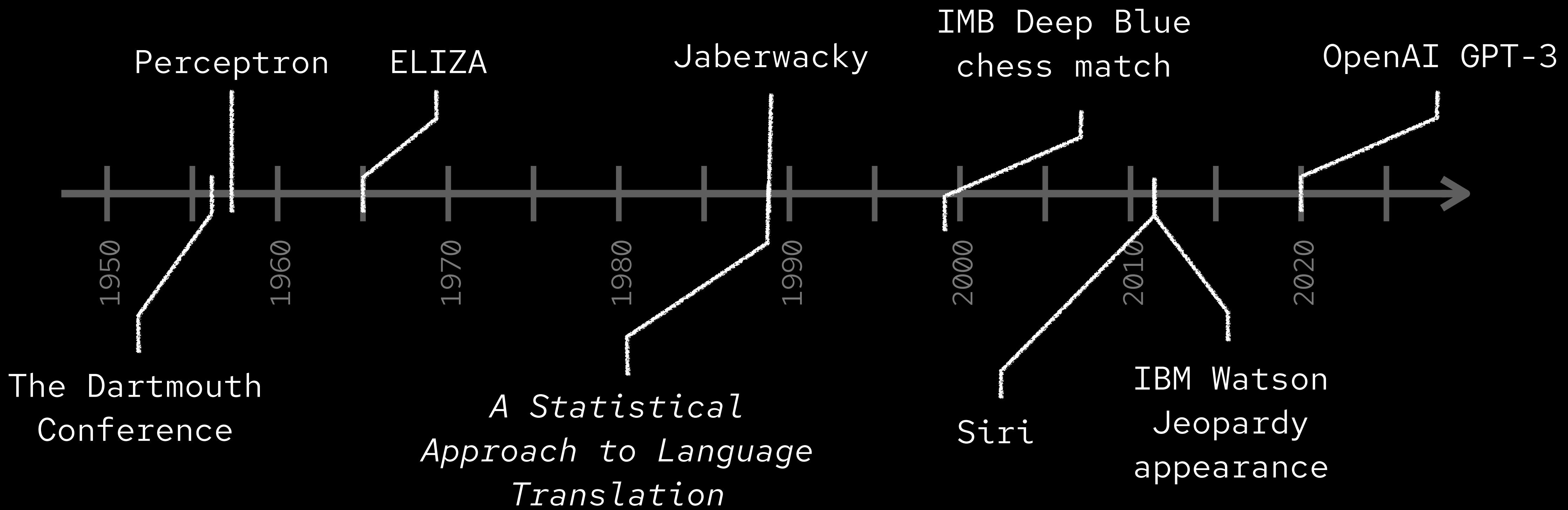
Read Edit View history Tools

From Wikipedia, the free encyclopedia

Machine learning (ML) is a [field of study](#) in [artificial intelligence](#) concerned with the development and study of [statistical algorithms](#) that can learn from [data](#) and [generalise](#) to unseen data, and thus perform [tasks](#) without explicit [instructions](#).^[1] Within a subdiscipline in machine learning, advances in the field of [deep learning](#) have allowed [neural networks](#), a class of statistical algorithms, to surpass many previous machine learning approaches in performance.^[2]

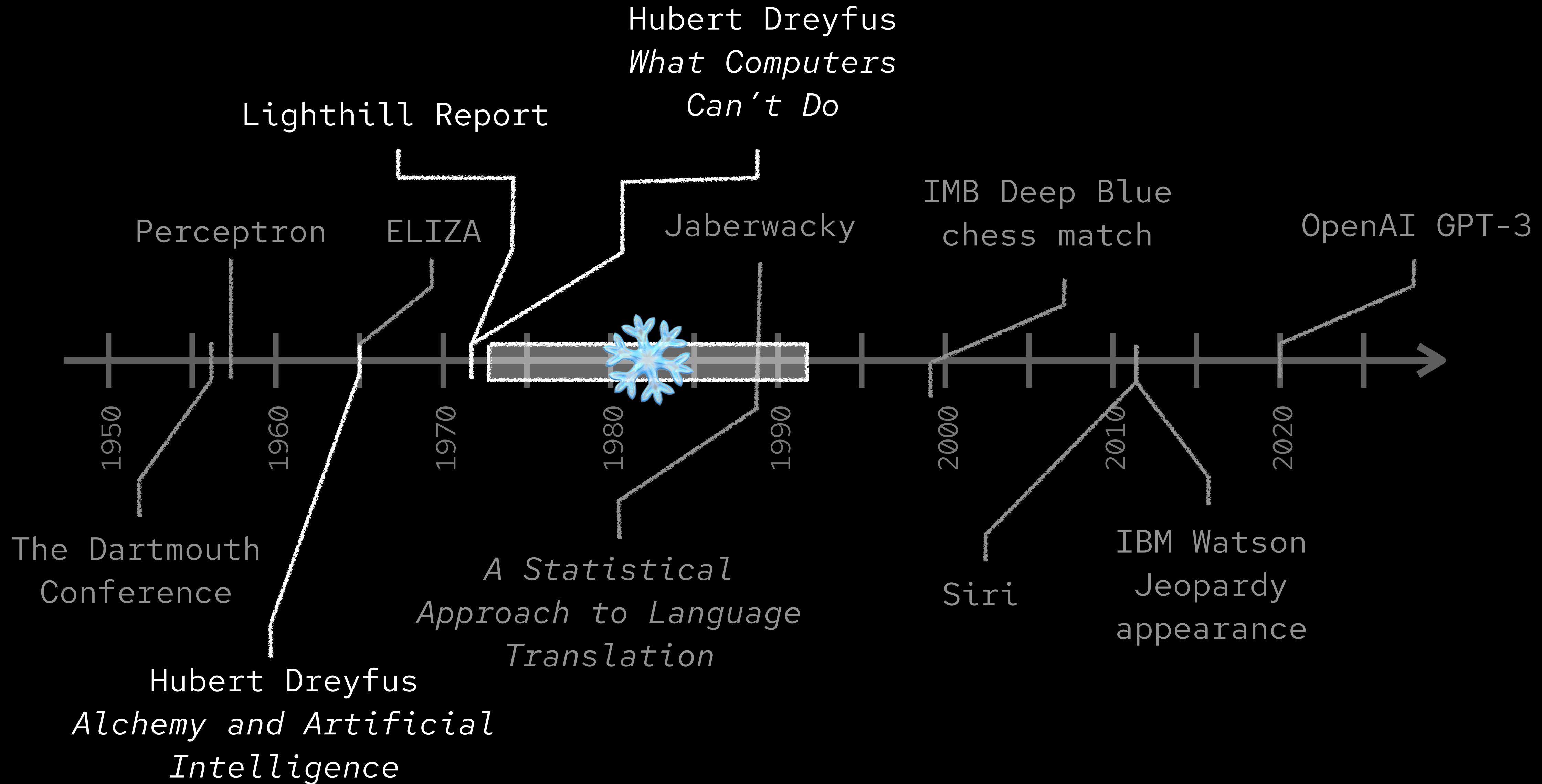
History of AI as a field

A non-exhaustive timeline



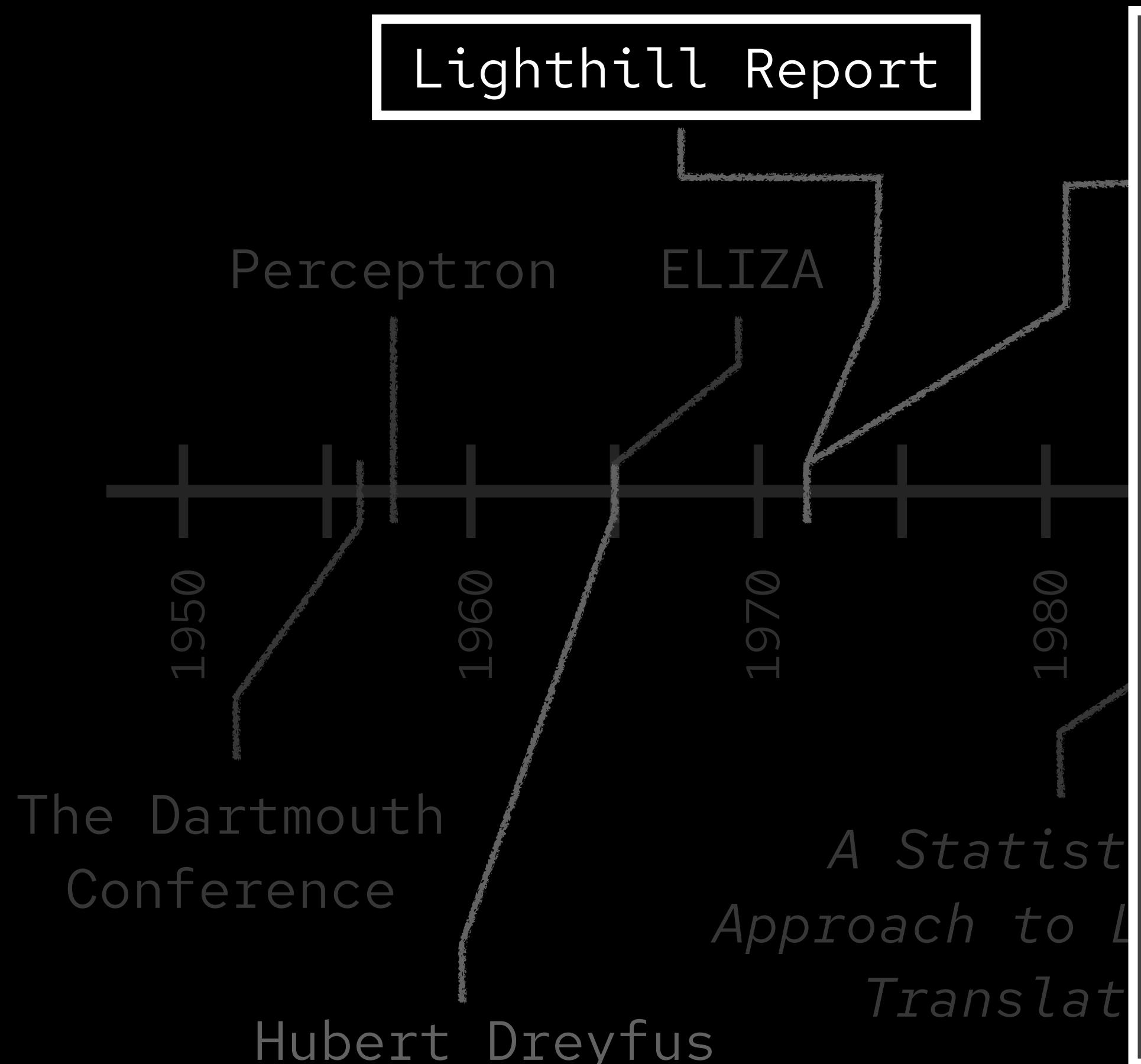
History of AI

significant criticism from the start



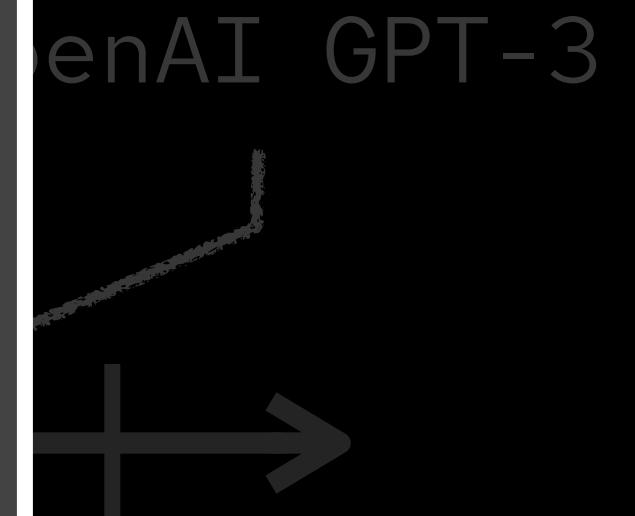
History of AI

significant criticism from the start



Hubert Dreyfus
What Computers

"Most workers in AI research and in related fields confess to a pronounced feeling of disappointment in what has been achieved in the past twenty-five years. Workers entered the field around 1950, and even around 1960, with high hopes that are very far from having been realized in 1972. In no part of the field have the discoveries made so far produced the major impact that was then promised."



History of AI

significant criticism from the start

Lighthill Report

Hubert Dreyfus
*What Computers
Can't Do*

Percep

1950

The Dartmouth
Conference

Hubert Dreyfus
*Alchemy and Artificial
Intelligence*

"It is the point of Dreyfus's book that human and artificial intelligence are in fact quite different—in particular, that human intelligence is unique. Not only that, but a great misunderstanding accounts for public confusion about thinking machines, a misunderstanding perpetrated by the unrealistic claims researchers in AI have been making, claims that thinking machines are already here, or at any rate, just around the corner."

— Pamela McCorduck, *Machines Who Think*

Approach to Language
Translation

GPT-3

appearance

History of AI

significant criticism from the start

Lighthill Report

"No piece of equipment makes sense by itself ... What makes an object a chair is its function, and what makes possible its role as equipment for sitting is its place in a total practical context. This presupposes certain facts about human beings (fatigue, the ways the body bends), and a network of other culturally determined equipment (tables, floors, lamps), and skills (eating, writing, going to conferences, giving lectures, etc.)"

Hubert Dreyfus
Alchemy and Artificial Intelligence

Hubert Dreyfus
*What Computers
Can't Do*

aberrwacky

1990

cal
nguage

translati

IMB Deep Blue
chess match

2000

Siri

2010

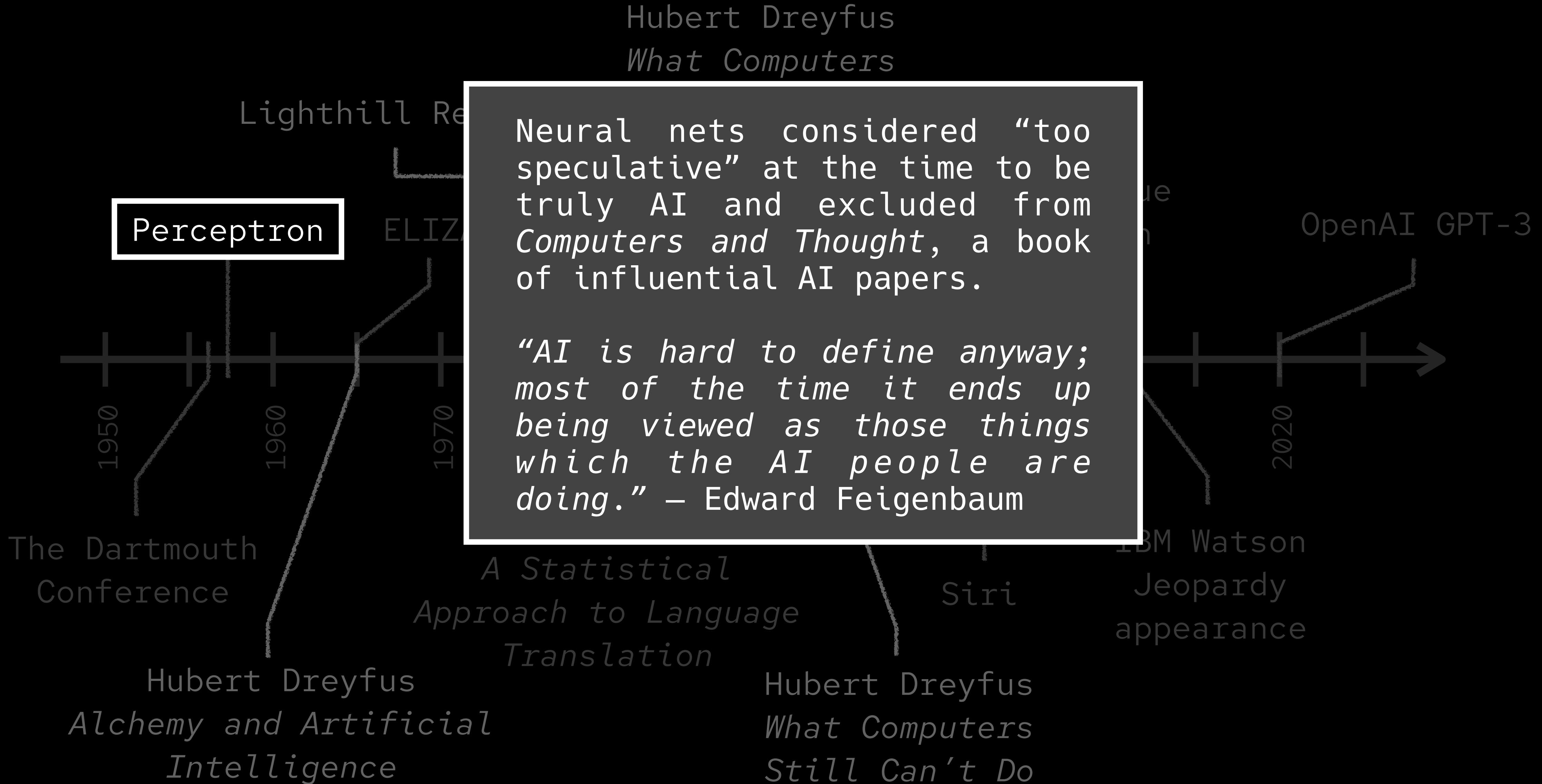
IBM Watson
Jeopardy
appearance

OpenAI GPT-3

Hubert Dreyfus
*What Computers
Still Can't Do*

History of AI

significant criticism from the start



Considerations for the AI of today

Considerations for the AI of today

What we mean when we talk about AI



products, generative AI, LLMs



TensorFlow

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Considerations for the AI of today

What we mean when we talk about AI

AGI



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Voice



products, generative AI, LLMs



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WIKIPEDIA
The Free Encyclopedia

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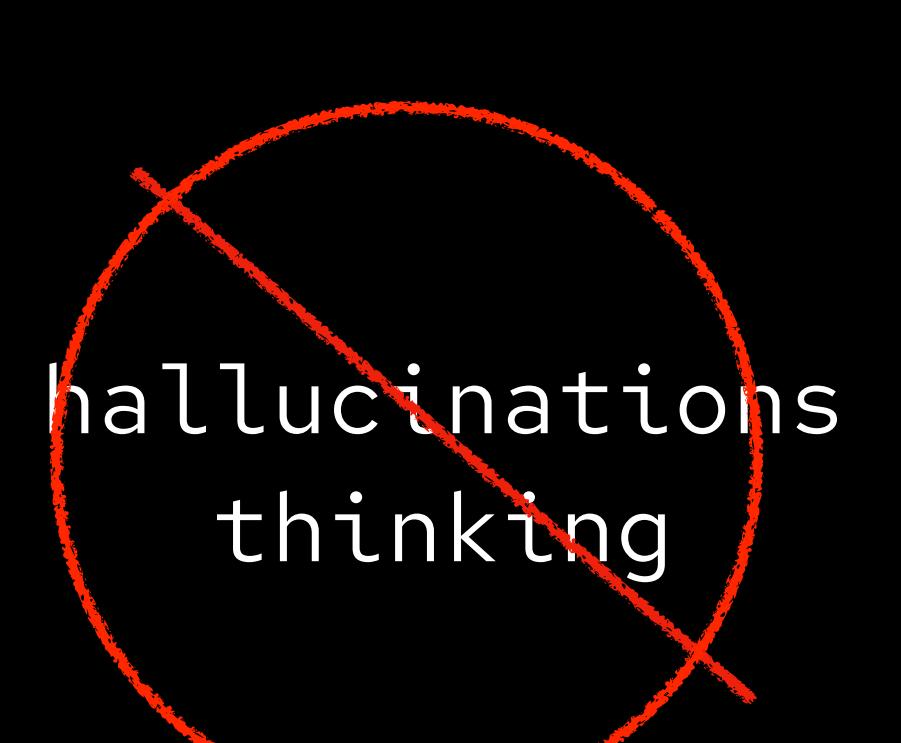
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machine learning, speech recognition,
classification models, etc

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WIKIPEDIA
The Free Encyclopedia

Machine learning

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machine learning, speech recognition,
classification models, etc

Considerations for the AI of today

Acknowledging limitations

Considerations for the AI of today

Acknowledging limitations

LLMs are not reproducible or verifiable

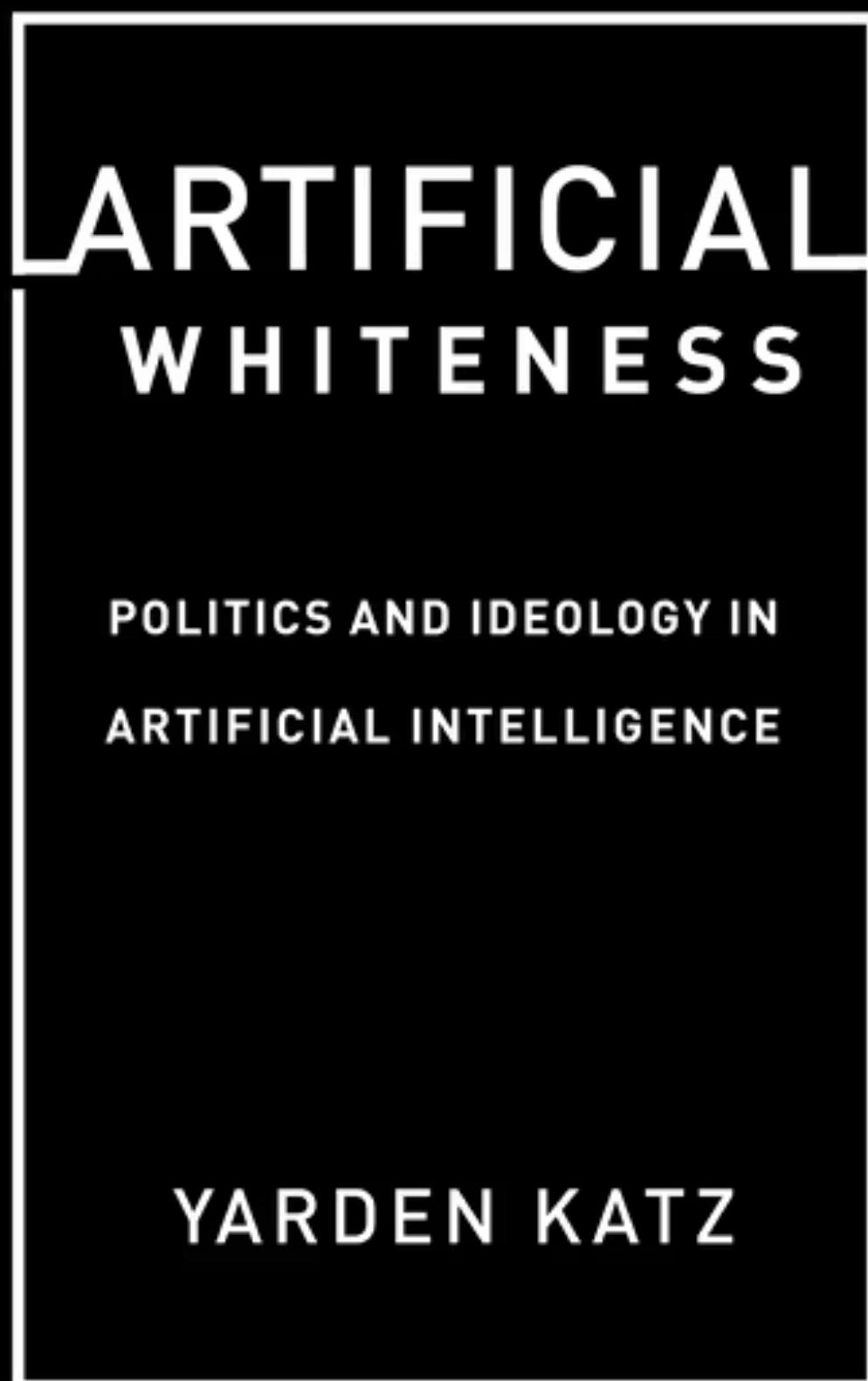
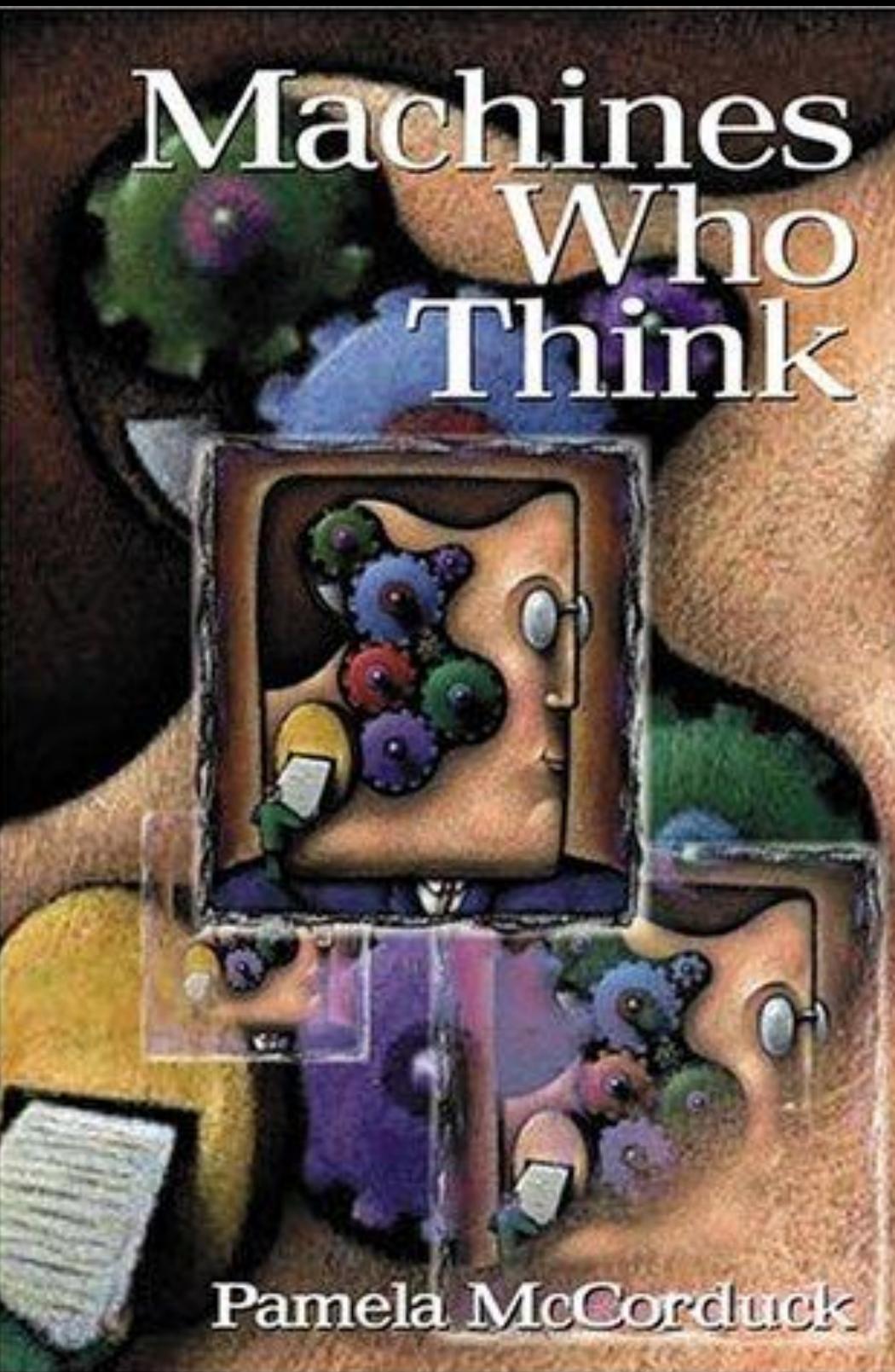
Considerations for the AI of today

Objectivity Bias

Considerations for the AI of today

Inevitability

Sources and Supplemental Reading



- IBM - The History of AI
- Lighthill Report
- Dreyfus - *Alchemy and Artificial Intelligence*
- Dreyfus - *What Computers Can't Do*