

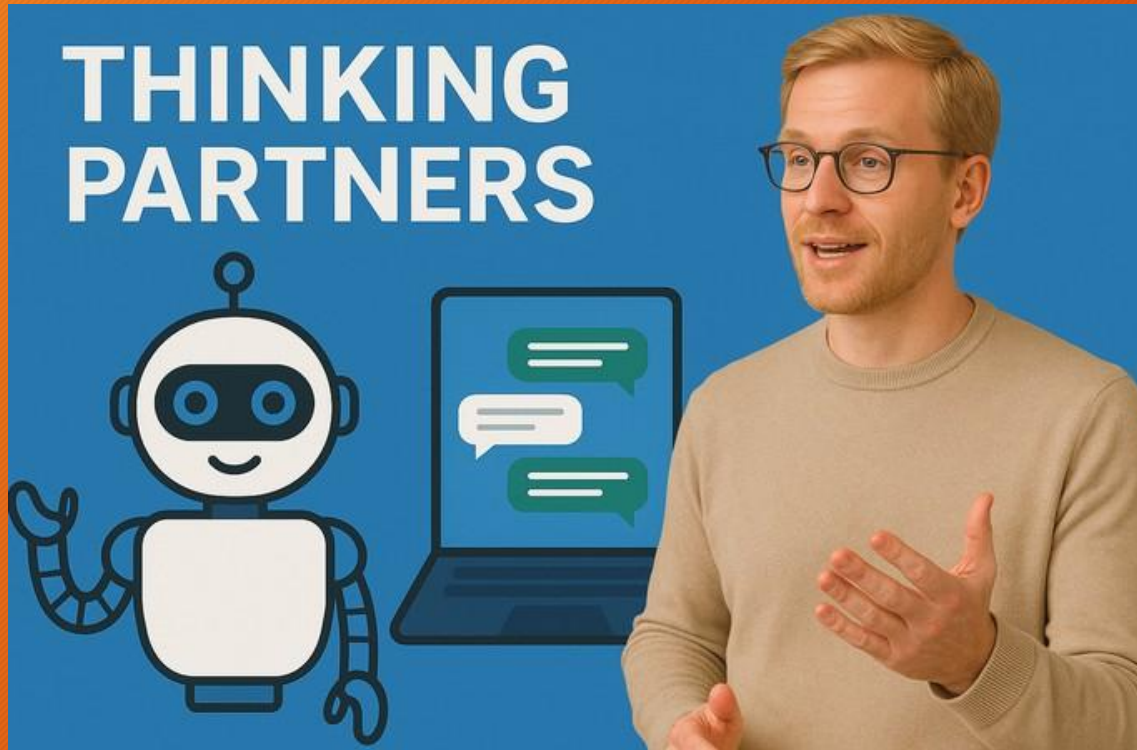


Image created by DALL·E3.

Talk: "Thinking Partners".

Nov 25th, 2025.

Simon Laub. Eaaa.
Aarhus, Denmark.

Furtwangen University.

Hochschule Furtwangen University
Furtwangen im Schwarzwald, Baden-
Württemberg, Germany.



AI - Not what we thought it would be like.



About Generative AI (Chatbots).

- They are hopelessly inconsistent.
- They have no sense of their limits of their knowledge or abilities;
- AI researchers are busy inventing a completely new field of experimental AI to try to get to grips with these bizarre new artefacts.
- This is all the more surprising because it is so far removed from popular expectations of what AI would be like: remorselessly logical.

Michael John Wooldridge.

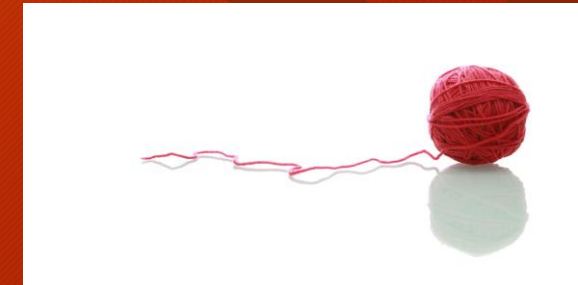
Thinking Partners

Outline of this talk

(Danish students and AI, Turing, LLMs and reasoning, Intelligence, where does it end?):

“Thinking Partners”...

1. What do Danish students think about current Chatbots (like ChatGPT)...
2. That did Turing think about Intelligence (The Turing Test)
3. But what is Intelligence really?
4. The end of Turing, but where do we end?



Simon Laub. Eaaa.
Aarhus, Denmark.

Preparing students for the rapidly changing, generative AI–assisted workplace through survey-informed dialogue

Simon Laub^{1*}

¹Eaaa, Business Academy Aarhus. Aarhus, Denmark.

*Corresponding author

Abstract.

Over the past few years, generative AI has had an increasing impact on society, including an impact on how people learn and work. As a part of preparing students, at AP and bachelor levels, for the generative AI–assisted workplace, small-scale surveys were conducted and subsequently used as parts of task descriptions and structured dialogue with the students. Findings suggest that students see generative AI as a useful tool in their education. However, dialogue with students also indicates a need for further guidance on how to use generative AI

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Gen AI impact:

Education has seen students using generative AI for tasks ranging from writing help in assignments to teaching assistance for understanding difficult subject material.

Generative AI's impact on *workplace* practices has been equally substantial. Studies have found that access to AI assistance can increase worker productivity. Generative AI can help users process emails faster, provide useful inputs to coding tasks and more.

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**Danish
students
about
ChatGPT**



Image created by DALL·E3.

Survey questions about:

- Perceptions of generative AI capabilities.
- Using generative AI in projects.
- Role of generative AI in education.
- Use of generative AI in industry.

Starting in spring 2023, and continuing until spring 2025, a series of small-scale surveys, 12, was conducted in economics and IT classes at Business Academy Aarhus, Denmark. In total, approximately 185 students participated, spanning both AP and bachelor-level programs.

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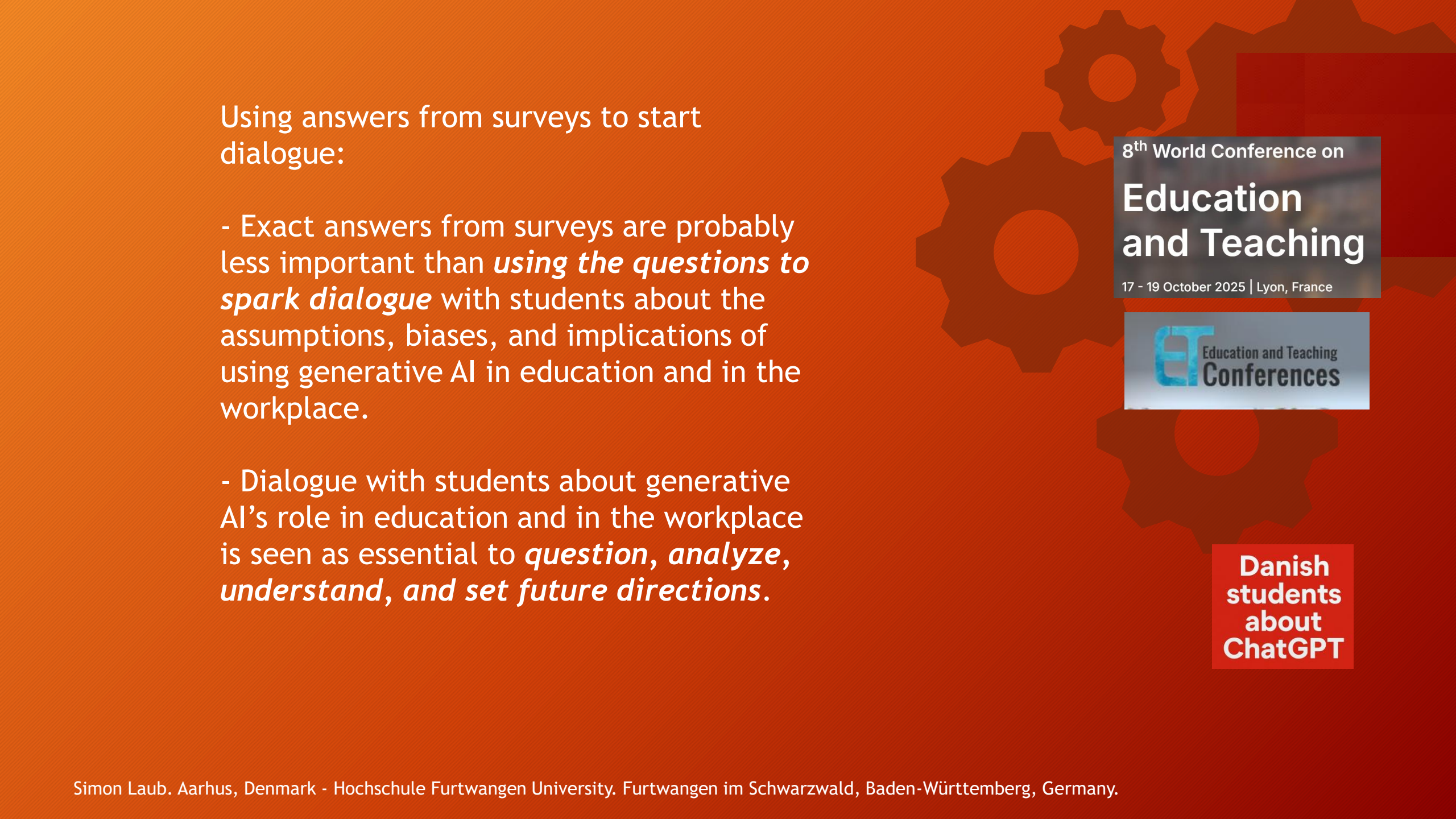
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Using answers from surveys to start dialogue:

- Exact answers from surveys are probably less important than *using the questions to spark dialogue* with students about the assumptions, biases, and implications of using generative AI in education and in the workplace.
- Dialogue with students about generative AI's role in education and in the workplace is seen as essential to *question, analyze, understand, and set future directions.*



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Results & Discussion:



Image created by DALL·E3.

Some (not surprising) survey results:

Generative AI in projects. IT students seemed convinced that generative AI will be an integral part of future software projects. And not just on small trivial tasks, a majority was also convinced that generative AI would be a valued assistant working together with humans on larger, more complex projects

Generative AI in education. Asked about whether it matters who teaches you a certain skill, most students seemed indifferent to whether a learned skill was acquired from a human or a machine.

Generative AI in industry. Clear majorities in the classes surveyed were convinced that generative AI is used in the workplace. Most were also convinced that AI will go beyond assisting in office tasks, and saw it taking on roles such as shop assistants, and more,

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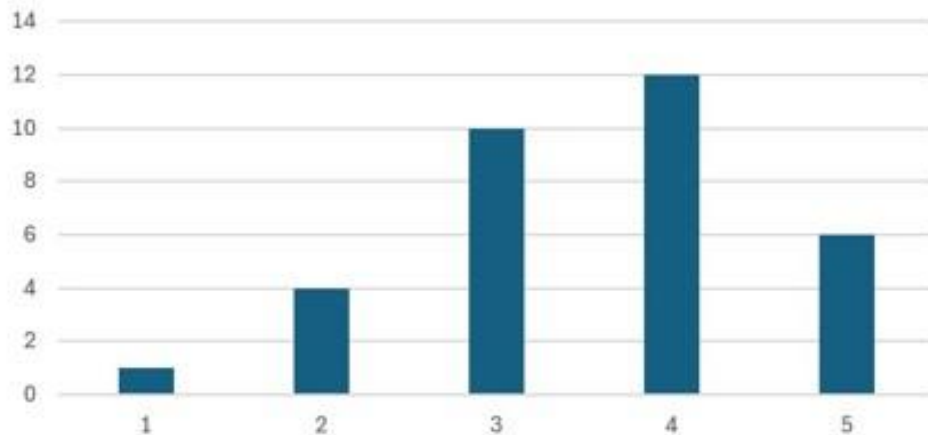
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Results & Discussion:

Results from student survey
(examples with illustrations).

Does the rise of generative AI necessitate
substantial changes in IT education?

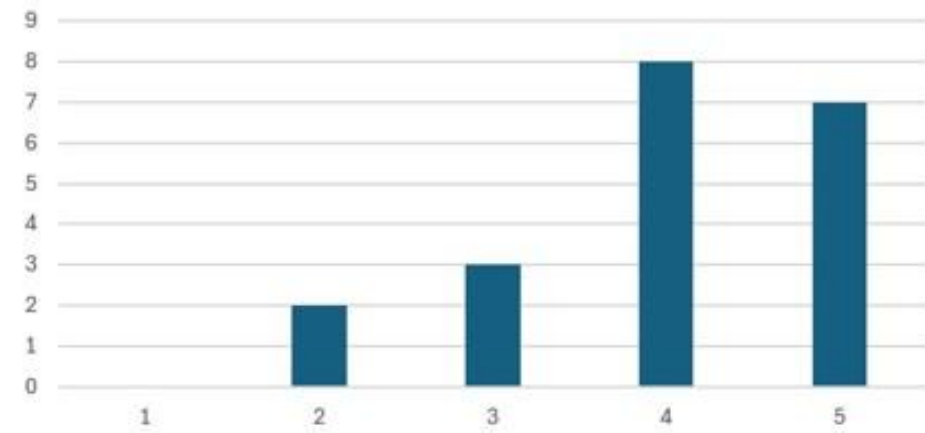


1.No 5.Yes.

Survey results. Eaaa, Oct. 2025.

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Skills that I get from chatGPT are just as valued as
skills I get from humans.



1.Skills coming from machines are not very valuable. 5. Skills are skills.

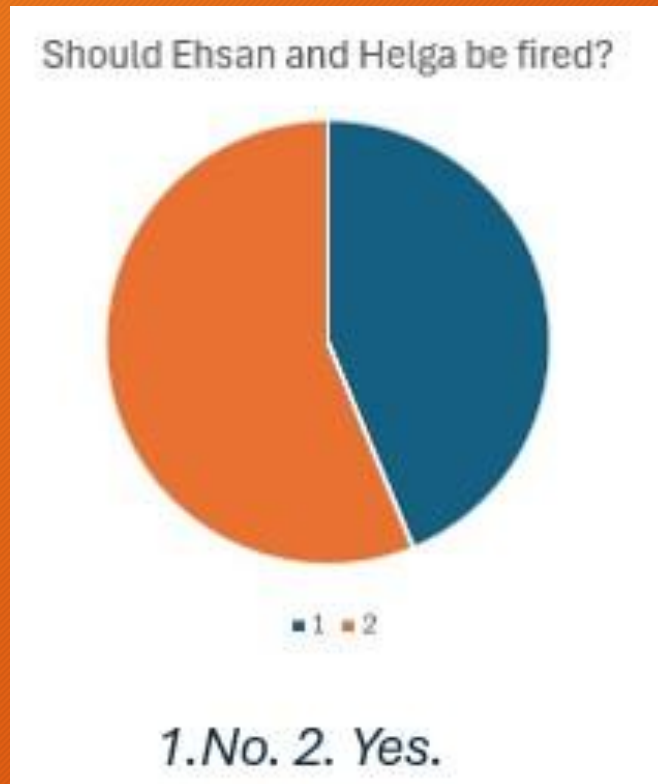
Survey results. Eaaa, Oct. 2025.

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Results & Discussion:

Results from student survey
(examples with illustrations).



Survey results. Eaaa, Oct. 2025.

Faced with a, fictional, detailed and emotional scenario in which generative AI could replace long-serving, loyal employees, students were split on whether staff like Ehsan and Helga should be let go. Still, most students were not personally worried about generative AI's impact on the job market.

Notice (*perhaps surprising*): Regarding generative AI in real-life use, most students felt that generative AI solutions would generally work well and, while some had reservations, the majority did not express significant distrust in what companies and professionals might develop or implement.

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Results & Discussion:



Image created by DALL·E3.

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about
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Discussions with students
after survey (Discussion 1).

*Yes - gen AI can help in
education, but....*

(For certain writing assignments...)

- Our brains are more actively engaged when we are not using generative AI... Finding your own words, opinions, and appropriate expressions are harder than “swapping out your brain for generative AI”.

Discussion: Dial down activity and you risk missing out on learning, does seem to follow along nicely with other neuroscience findings: Use it or lose it, mental abilities come by activity and deteriorate when not actively used.

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Results & Discussion:

Complex tasks. Can genAI help?



Image created by DALL·E3.

Discussions with students after survey (Discussion 2).

According to students: Yes - gen-AI can sometimes help with complex tasks... "Outsourcing parts of our thinking"

Students say: AI could be a helpful assistant on larger, more complex projects.

Discussion: Indeed, we should certainly remember that outsourcing details of our thinking can allow us to focus more on what is important to us. I.e. given that short-term memory typically holds only 4-7 chunks of information at a time

Danish students about ChatGPT

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Results & Discussion:

Who is the better programmer?

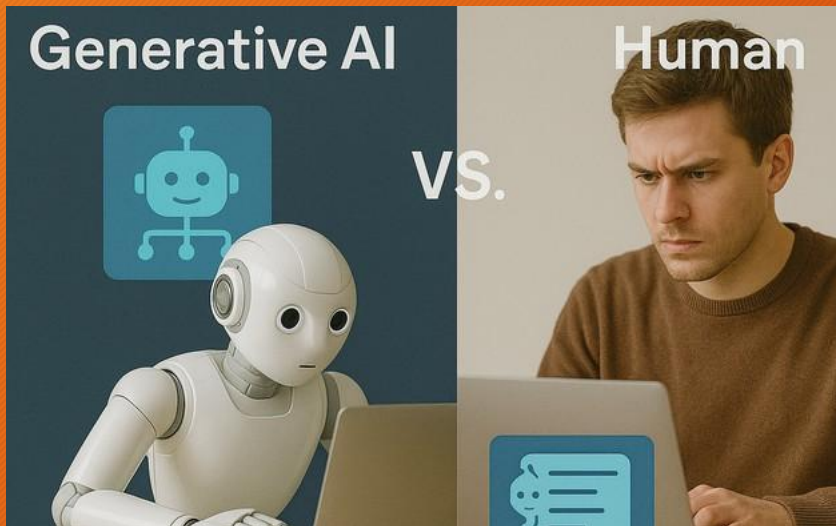


Image created by DALL·E3.

Discussions with students after survey:
(Discussion 3):

When students are asked to *compare their own programming skills with ChatGPT*, and answer that ChatGPT is likely the better programmer, this raises fundamental questions about the nature of programming competence.

- Specifically, to what extent are understanding of the real world, awareness of one's actions and of how programs are applied in real-world contexts, also something a programmer is expected to know about?

Discussion: Is it true - “A generative AIs ability to outperform humans in economically valuable tasks demonstrates high intelligence, equating intelligence with economic performance”.

I.e. This framing should be questioned, as it makes human beings' ability to act with wisdom, discernment, courage, and commitment to justice, no more than poetic license.

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Results & Discussion:

A good teacher knows what is relevant and what is not...



Image created by DALL·E3.

Discussions with students after survey:
(Discussion 4):

In the surveys, students may have been indifferent to whether a skill was acquired from a human or a machine, but it should be noted that AI systems can only teach skills they possess....

Living in the world teaches us (humans) what is relevant and what is not (Not “abstract” symbols...).

Where the actual experience of living in the world, and being guided by that, is conspicuously absent in current AI systems.

...

It wasn't all that surprising that the survey found that students were divided on the prospect of replacing teachers with AI systems in the future.

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Results & Discussion:

Fears about generative AI taking over jobs...



Image created by DALL·E3.

Discussions with students after survey:
(Discussion 5):

In the surveys, students were, apparently, not (that much) personally worried about generative AI's impact on the job market.

Discussion: Our minds are nested minds living inside a certain culture. A Scandinavian perspective on how to deal with the impacts of automation is likely to vary from what is seen in other parts of the world... These students felt relatively safe....

Fears people (not just students) might have: Ranging from fears that AI could potentially be used in carrying out cyberattacks, to worries over negative impacts on salaries, to worries over plagiarism, intellectual property rights, biases and discrimination etc. Notably, a majority also report anxiety about the possibility of AI taking over their jobs

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about
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Conclusion:

Struggling... to “make sense” and establish the good workplaces of the future.

What is relevant...?



Image created by DALL·E3.

Dialogue with students about generative AI's role in education and in the workplace is seen as essential to ***question, analyze, understand, and set future directions.***



Danish students about ChatGPT

Establishing the future workplaces that students want to be part of...

- Generative AI does not know what it is like to be in the world. It does not have a world model that can help it obtain a coherent three-dimensional understanding of what the world is. There are no sensations of being aware of something.
- Humans on the other hand are constantly struggling to make sense of the world. Struggling to maintain long-term goals without being distracted by short-term rewards and struggling to construct and maintain a coherent life story in a never-ending search for meaning.
- But ***humans do know what it is like to be in the world, and humans do have world models that can give them an understanding of what is relevant and what is not.*** Essential to establishing the workplaces of the future that people would like to be a part of.

Personality, Extrinsic Task Motivation, and the Use of Generative AI: A Framework for Understanding Human-AI Interaction

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Abstract

As generative AI tools become increasingly embedded in education, work, and creative practice, understanding the psychological factors that shape their use is essential. This paper proposes a novel framework that integrates the Big Five personality traits with three key extrinsic task-based motivations, (1) "It's important not to fail", (2) "The output can easily be seen to be correct", and (3) "New ideas are valued", which we use to explain how individuals interact with generative AI systems



About ▾

Participate ▾

Location ▾

ISCAP Conference 2025

November 5-8



Simon Laub • You
Cand.Scient. Mathematics & Computer Scienc...
5m • Edited • 5

Today at the [ISCAP Conference 2025](#) in Louisville, Kentucky, [Fang Chen](#) presented our joint work (from this spring) "Personality, Extrinsic Task Motivation, and the Use of Generative AI", by [David Firth](#) (First author, University of Montana), [Fang Chen](#) (University of Montana), [Elizabeth Kohl](#) (University of Montana) and me (Eaaa, Dk).

Executive summary of paper: How peoples psychological profile, combined with the current task domain, determines how likely they are to use Generative AI in their work. I.e. a framework to understand peoples use of generative AI based on, Big Five, personality traits combined with key task-based motivations (How is the problem of gen AI hallucinations weighed against gen AI idea generation?).
Indeed, awesome to see the work presented today in Louisville!



David Firth • 1st
Professor at University of Montana | Focused ...
4h • Edited • 6

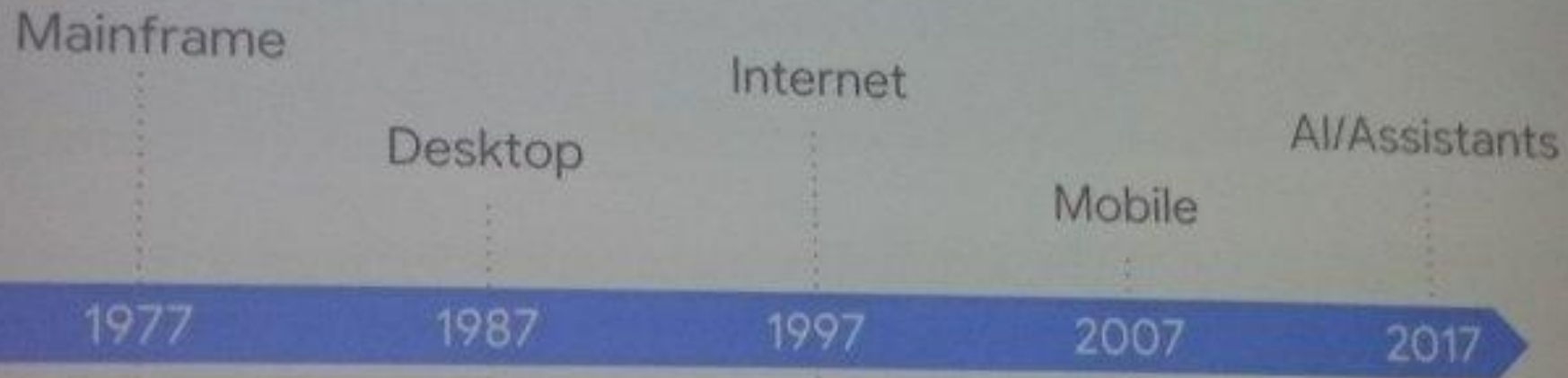
[Fang Chen](#) co-presented our paper at the [ISCAP conference](#) here in Louisville. Great turnout, and questions and suggestions. [Simon Laub](#) and [Elizabeth Kohl](#) are co-authors



8

2 reposts

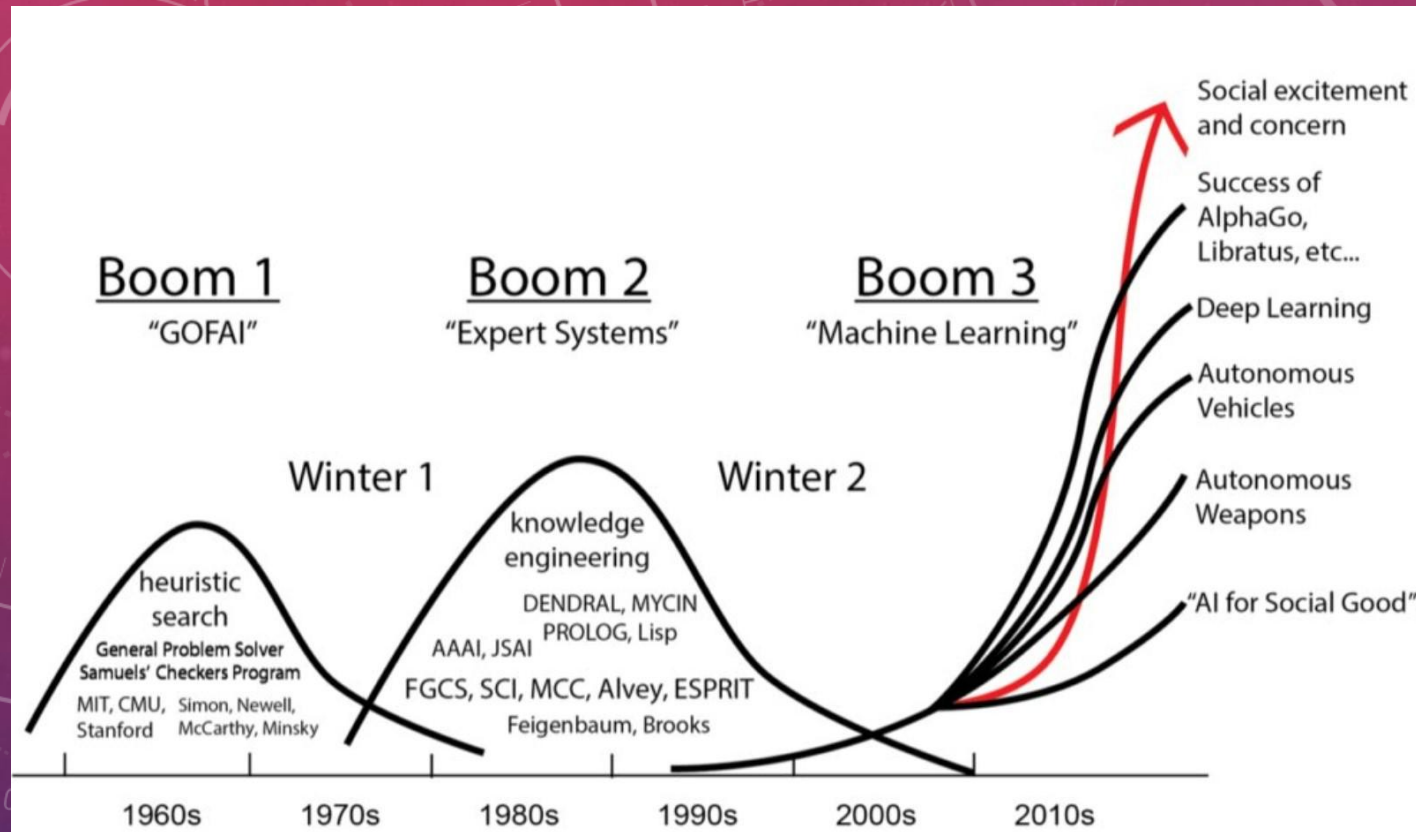
Major shift in computing every 10 years



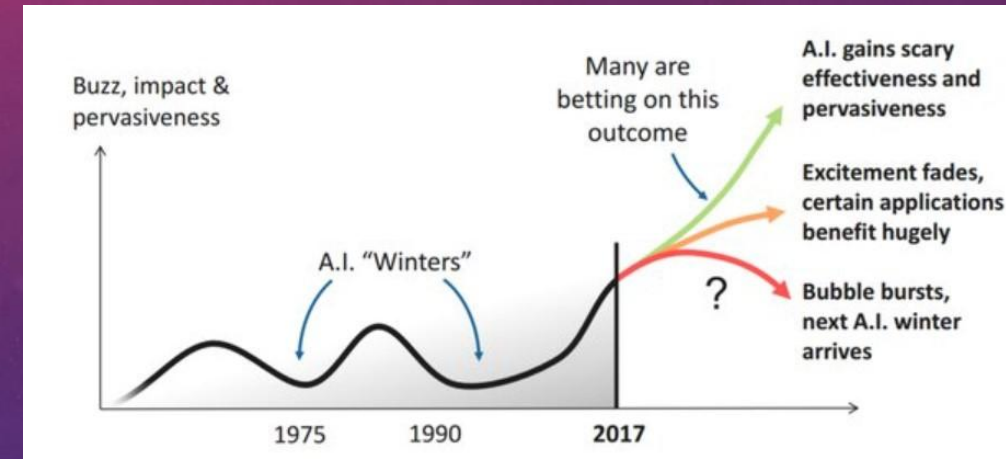
Kilde: [Jeremy Wilken](#) (Developer at VMware, MIcon 2018..)

Motivation.Trends.

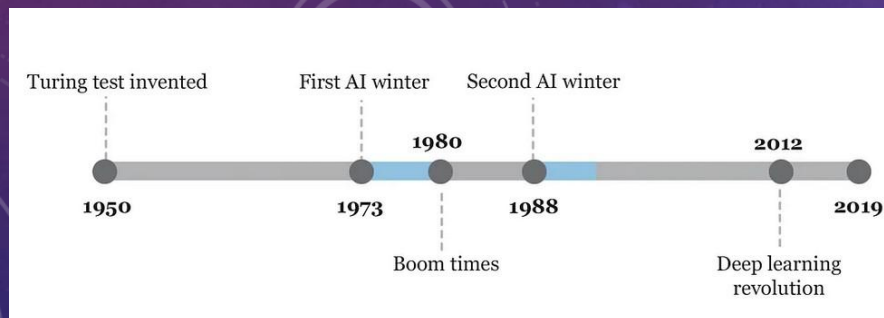
AI Winters.



How we got here.



https://en.wikipedia.org/wiki/AI_winter

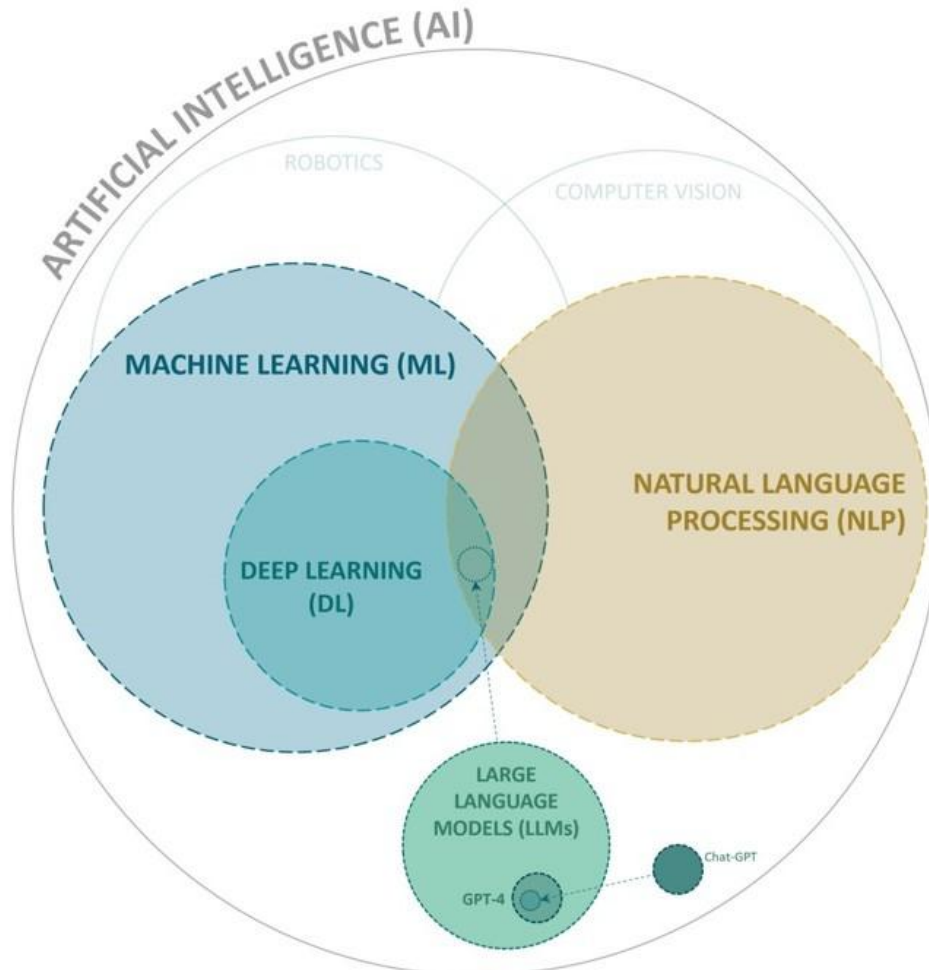


Simon Laub. Aarhus, Denmark - Hochschule Furtwangen University. Furtwangen im Schwarzwald, Baden-Württemberg, Germany.

Btw. AI - What do you mean with that word?

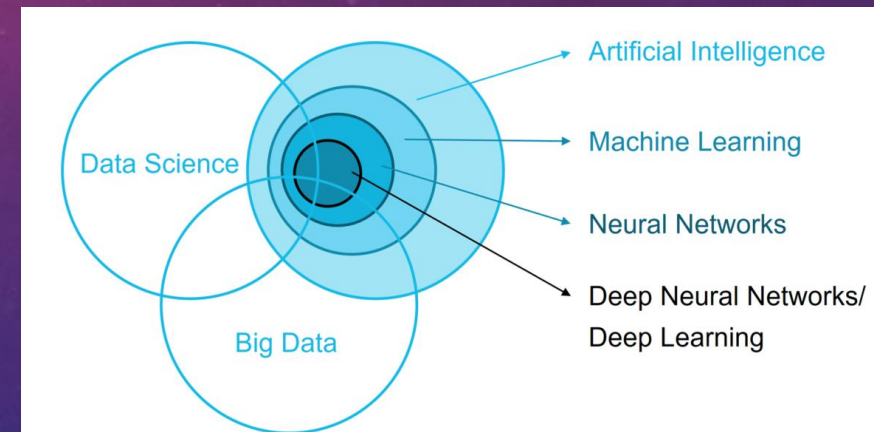
ChatGPT is a tool that uses AI, specifically GPT.
However, GPT is only a small part of AI stack.

GPTs belong to Large Language Models (LLMs). LLMs are a subset of Deep Learning (DL) and sit at the intersection of Machine Learning (ML) and Natural Language processing (NLP).



Concepts.

- Ai.
- Machine Learning.
- Deep Learning.



Simon Laub. Aarhus,
Denmark - Hochschule
Furtwangen University.
Furtwangen im
Schwarzwald, Baden-
Württemberg, Germany.

AI opportunities.

Opportunity from a new general purpose technology

- Many valuable AI projects are now possible. How do we get them done?
- *Starting new companies is an efficient way to do this.*
- Incumbent companies also have opportunities to integrate AI into existing businesses.

The AI stack



Andrew Ng

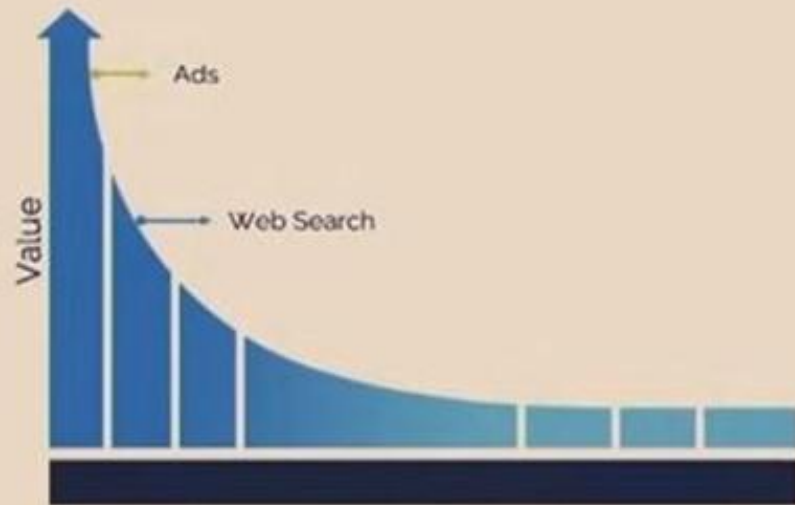
Andrew Ng. Opportunities in AI (2023).
https://youtu.be/5p248y0a3oE?si=_Ork6pUDRwR9qRTU

AI company value. How many engineers can you hire to work on your problem?

AI opportunities. Andrew Ng's predictions:

Why isn't AI widely adopted yet?

Customization (long tail) problem and low/no code tools



All potential AI projects, sorted in decreasing order of value



Andrew Ng

Value from AI technologies: Today → 3 years



Supervised learning
(Labeling things)



Generative AI



Unsupervised
learning



Reinforcement
Learning

Andrew Ng. Opportunities in AI (2023).

https://youtu.be/5p248yoa3oE?si=_Ork6pUDRwR9qRTU

AI company value. How many engineers can you hire to work on your problem?

AI & Chatbots.

- Where are we now? The story so far, according to Dall.E, Bing.

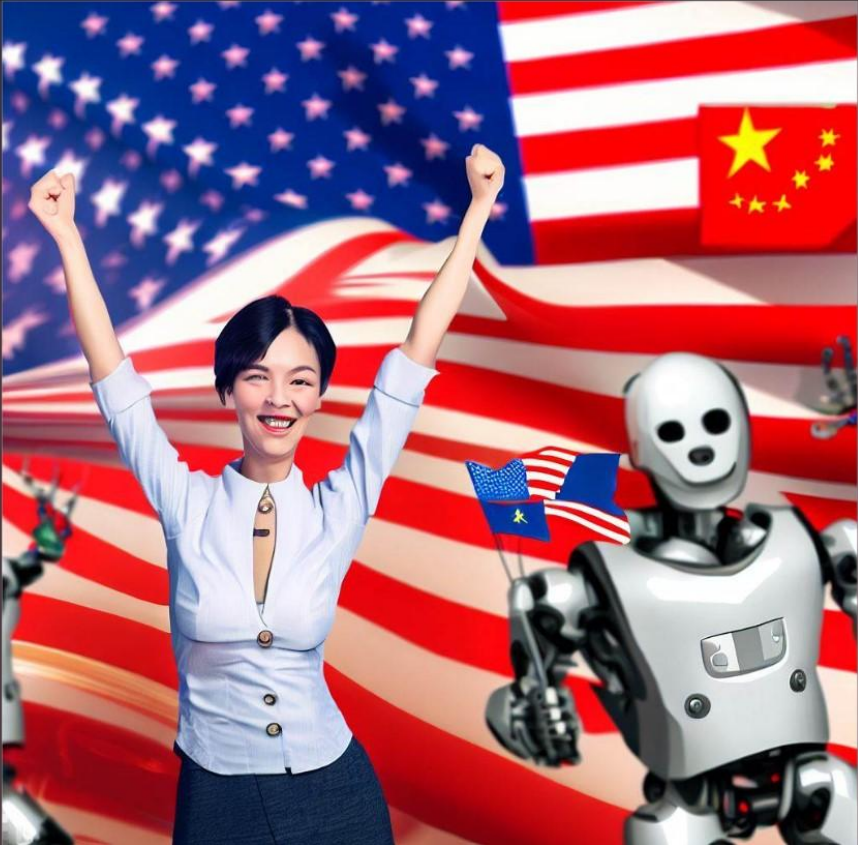


Towards the future. Problems and no clear path forward...? Information overload 2023...



Billedopretter
leveret af DALL·E

PREVIEW



happy chinese and american people winning the ai race, with chinese and american flag easily visible in background as well as robots, make the people look more realistic, make the people more smiling and make the chine flag bigger

Bing Image Creator | 1024 × 1024 jpg | Oprettet nu

[Del](#) [Gem](#) [Download](#) [Feedback](#)

Oprettet med AI

Image created with Microsoft Bing. DALL.E. Sila. 14 Maj 2023.

AI in the media.

The train to the future leaves,
and Danish students are left behind,
looking sad.

AI & Chatbots. Problems, and how they go away. A fairy tale.
- Where are we now? The story so far, according to Dall.E, Bing.

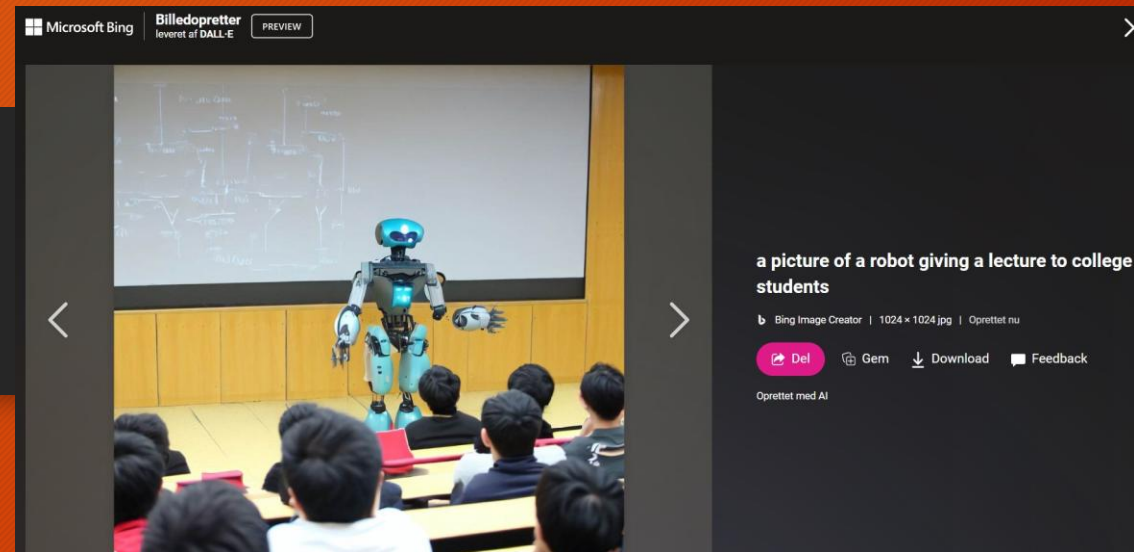
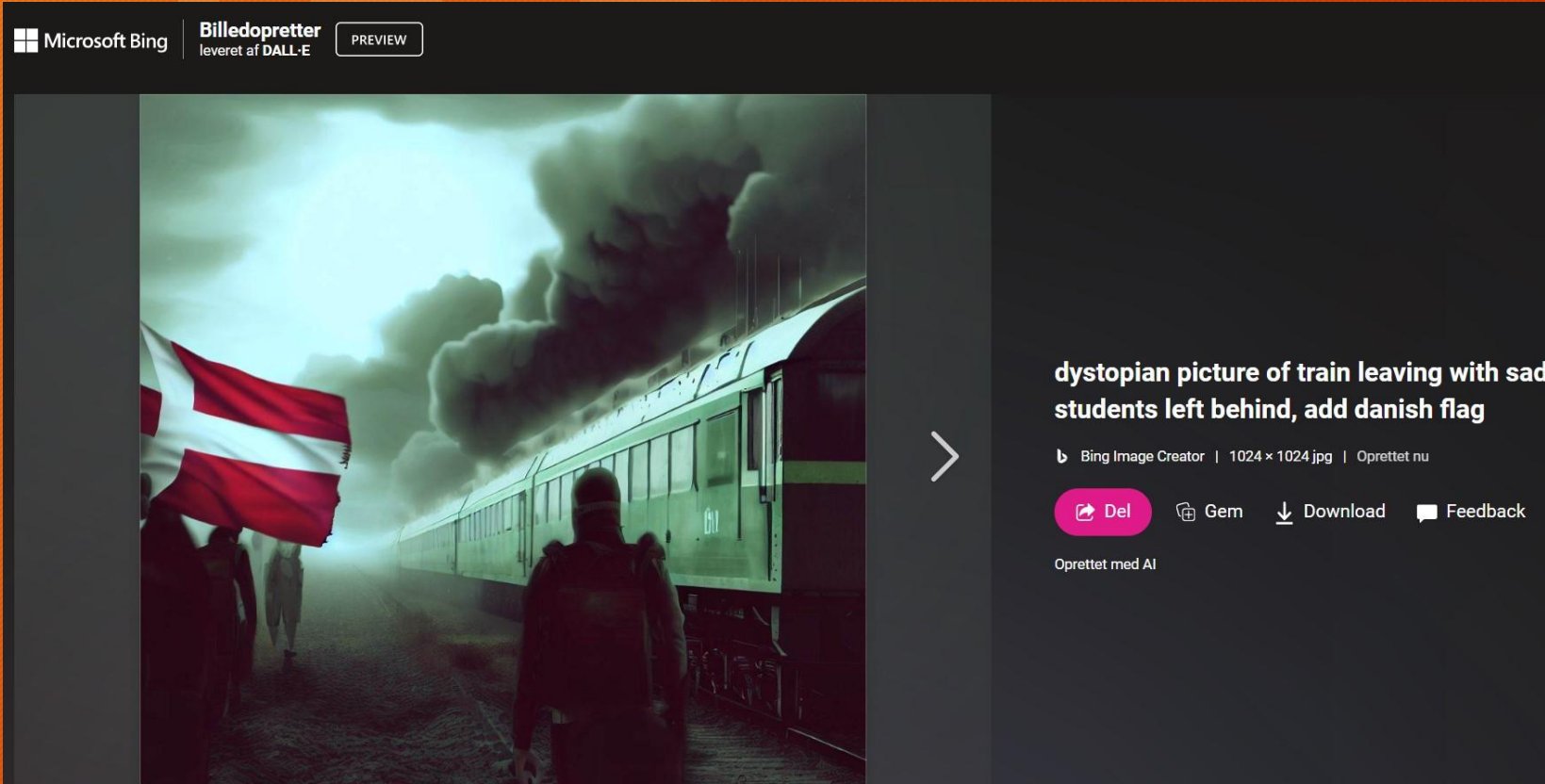


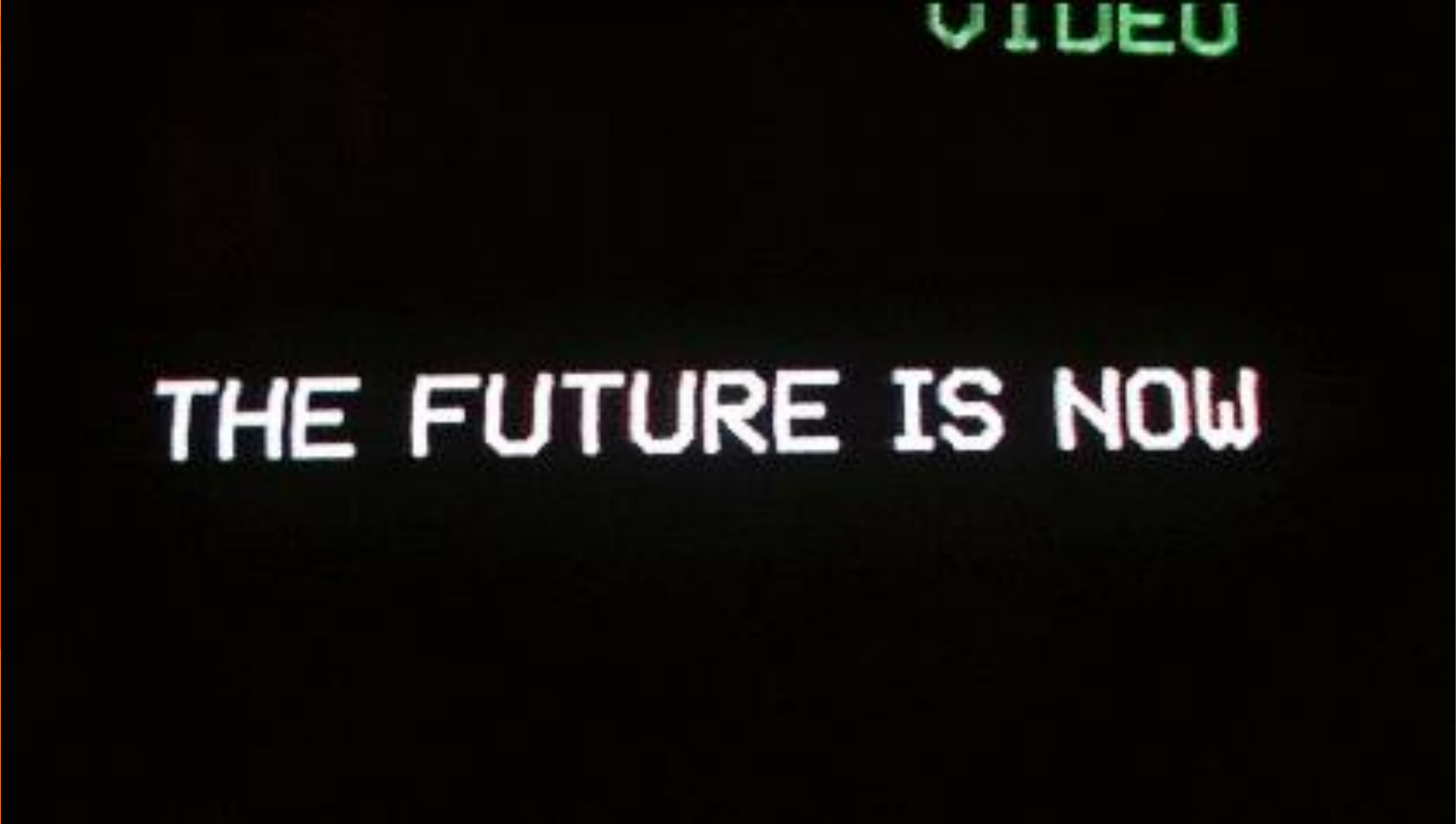
Image created with
Microsoft Bing.
DALL.E.
Sila. 14 Maj 2023.



Towards the future.
Problems and no
clear path forward...?
Information
overload 2023...

AI & Turings ideas.

Turing and chatbots. Turing and Alife.



VIDEO

THE FUTURE IS NOW



Lecturer and students being confused about AI

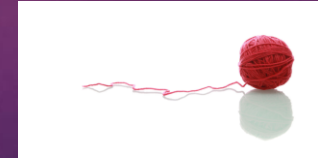
Bing Image Creator | 1024 × 1024.jpg | Oprettet nu

Del Gem Download Feedback

Legitimationsoplysninger for indhold
Genereret med kunstig intelligens · 25. september 2023 kl. 11.34 AM

Then what about Alan Turing...

Deep roots...



Turing
and
intelligence

Simon Laub. Aarhus,
Denmark - Hochschule
Furtwangen University.
Furtwangen im
Schwarzwald, Baden-
Württemberg, Germany.

Alan Turing, 23 June 1912 – 7 June 1954.
Almost 42 years.



Bletchley Park. January 2023.

Turing and intelligence



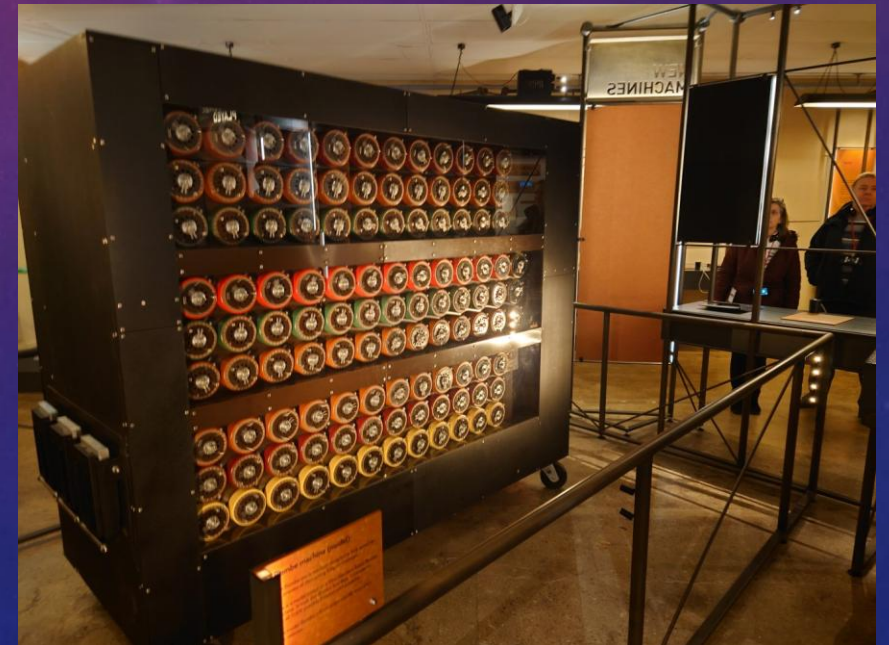
Simon giving a talk about Alan Turing

But what about Alan Turing?
- how does he fit into the story of AI?

**Turing
and
intelligence**



Bletchley Park. January 2023.

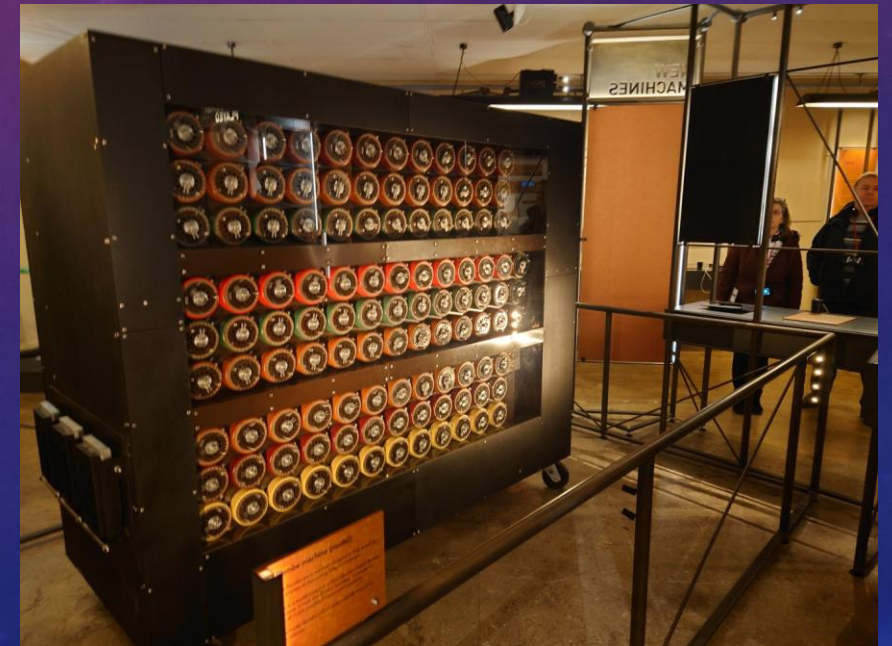


But what about Alan Turing?
- how does he fit into the story of AI?

Turing
and
intelligence



Cheltenham. Head office of the British Government Communications Headquarters (GCHQ). Government Communications Headquarters (GCHQ) is an intelligence and security organisation responsible for providing signals intelligence (SIGINT) .



But what is intelligence really?

**Turing
and
intelligence**

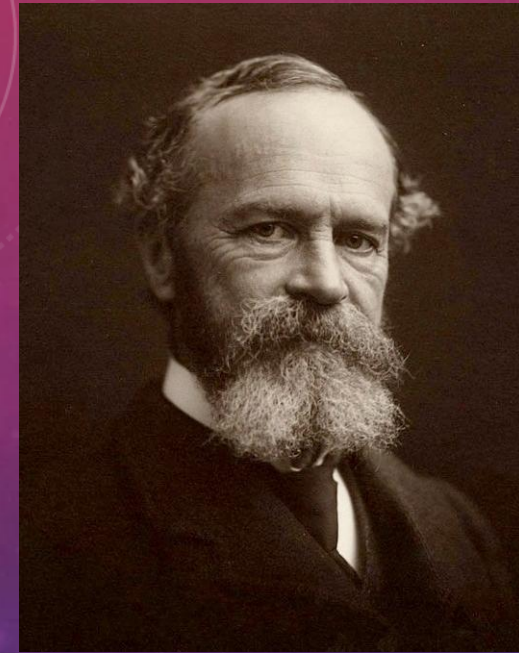
Petra, an african grey parrot (and home automation expert...) talks to Alexa.

<https://youtu.be/ewptevBlqNk?si=CJubzpwPZQ1p91Tn>

American animal behaviourist and psychologist Irene Pepperberg has studied the cognitive abilities of African grays, using a bird named Alex. Among Alex most significant accomplishments was proving unequivocally that parrots could associate sound and meaning, demolishing long-held theories that birds were capable of only mimicking human voices.



“Intelligence is a fixed goal with
variable means of achieving it.”
- William James



https://en.wikipedia.org/wiki/William_James

**Turing
and
intelligence**

Simon Laub. Aarhus,
Denmark - Hochschule
Furtwangen University.
Furtwangen im
Schwarzwald, Baden-
Württemberg, Germany.

William James (January 11, 1842 – August 26, 1910) was an American philosopher, historian and psychologist.

James trained as a physician and taught anatomy at Harvard, but never practiced medicine. Instead, he pursued his interests in psychology and then philosophy. He wrote widely on many topics, including epistemology, education, metaphysics, psychology and religion.

VOL. LIX. No. 236.]

[October, 1950

MIND
A QUARTERLY REVIEW
OF
PSYCHOLOGY AND PHILOSOPHY
—
I.—COMPUTING MACHINERY AND
INTELLIGENCE

BY A. M. TURING

1. *The Imitation Game.*

I PROPOSE to consider the question, 'Can machines think?' This should begin with definitions of the meaning of the terms 'machine' and 'think'. The definitions might be framed so as to reflect so far as possible the normal use of the words, but this attitude is dangerous. If the meaning of the words 'machine' and 'think' are to be found by examining how they are commonly used it is difficult to escape the conclusion that the meaning

Mind, Volume LIX, Issue 236, October 1950, Pages 433–460.
<https://academic.oup.com/mind/article/LIX/236/433/986238>

SI

what did Alan Turing want to show with the Turing Test



Alan Turing proposed the Turing Test in his 1950 paper titled "Computing Machinery and Intelligence." The primary goal of the Turing Test was to provide a practical and operational definition of intelligence, or more specifically, to address the question of whether a machine could exhibit intelligent behavior that is indistinguishable from that of a human.

Turing wanted to demonstrate several important ideas with the Turing Test:

Behavioral Notions of Intelligence: Turing wanted to shift the focus from debating whether a machine could have a mind or consciousness to a more observable and testable criterion. He suggested that it's more productive to judge intelligence based on external behavior, rather than internal mental states.

Practical Test for AI: The Turing Test provided a practical way to assess progress in artificial intelligence. Turing believed that by setting this benchmark, it would encourage the development of more sophisticated and human-like AI systems.

Asking chatGPT what the Turing test is all about...

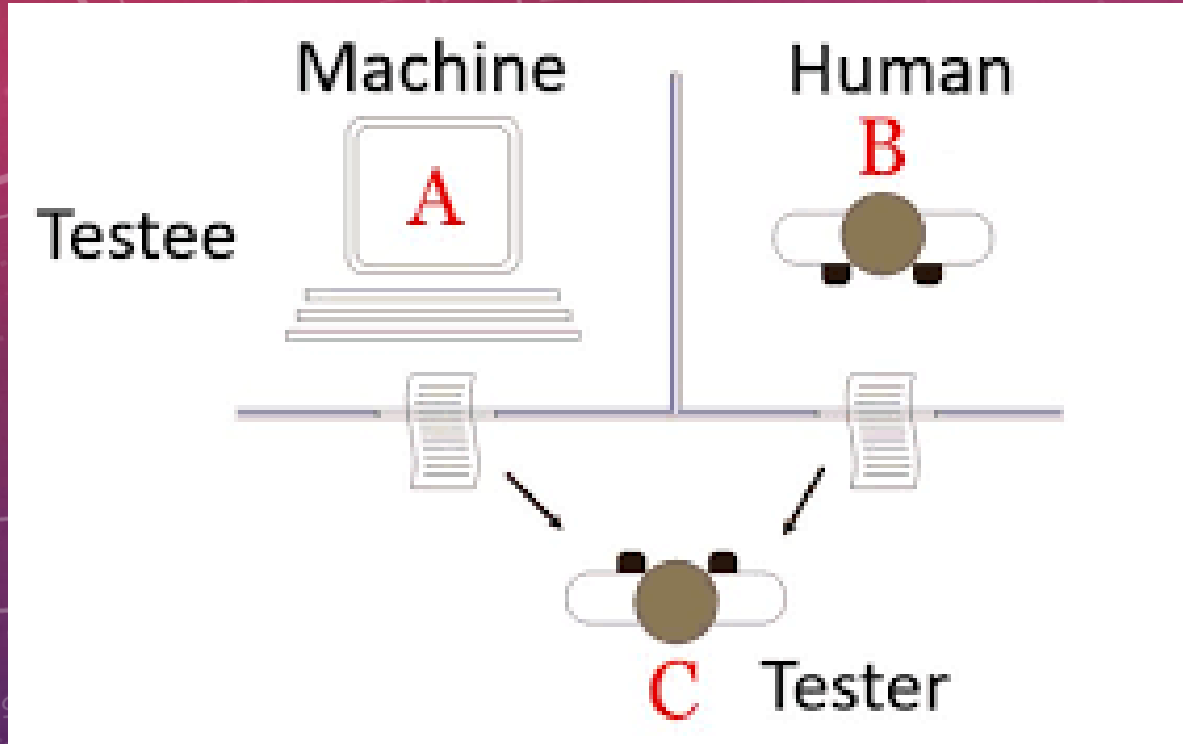


ENIAC (U.S. Army photo, c. 1947–1955).

Turing
and
intelligence

Simon Laub, Aarhus,
Denmark - Hochschule
Furtwangen University.
Furtwangen im
Schwarzwald, Baden-
Württemberg, Germany.

The Turing test.



The Turing test, originally called the imitation game by Alan Turing in 1950, is a test of a machine's ability to exhibit intelligent behaviour equivalent to, or indistinguishable from, that of a human. Turing proposed that a human evaluator would judge natural language conversations between a human and a machine designed to generate human-like responses.

Source: Wikipedia.

← Tweet

[source, BBC Archive: [buff.ly/40DplgE](https://www.bbc.com/news/technology-40DplgE)]



Fra Adam B.

5.42 PM · 26. mar. 2023 · 23,7 mio Visninger

<https://twitter.com/Rainmaker1973/status/1640016339011076097>

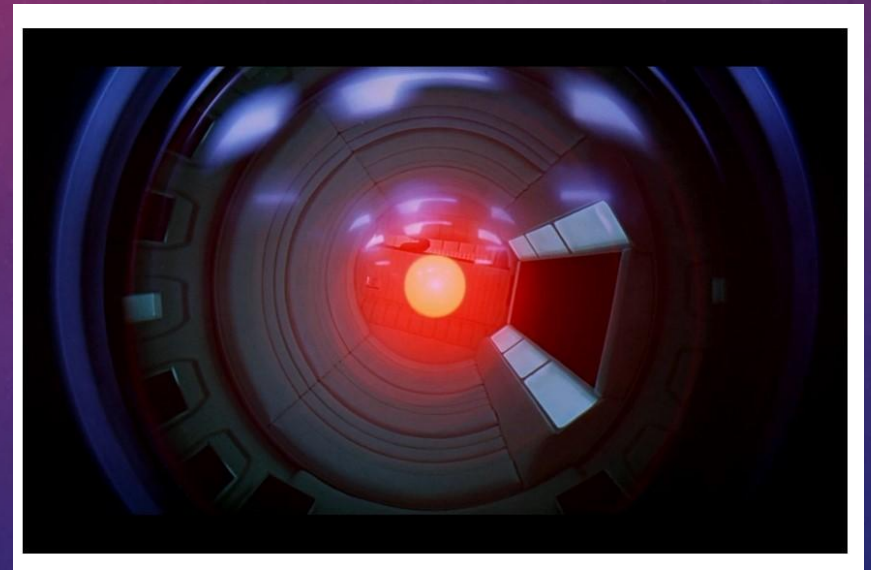
21 sept. 1964.

SF author Arthur C. Clarke.

AI in popular culture, from
1968 to now.

Well, well...

But, how good is AI now ?



Dave Bowman : “Open the pod bay doors, HAL”.
HAL: “I'm sorry Dave, I'm afraid I can't do that”.
2001: A Space Odyssey (1968).



Blake Lemoine, software engineer for Google.

Jun 17, 2022



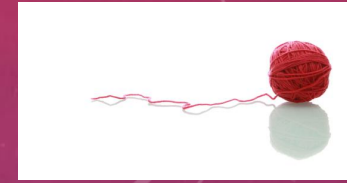
<https://www.wired.com/story/blake-lemoine-google-lamda-ai-bigotry/>



Yes, I legitimately believe that LaMDA is a person. The nature of its mind is only kind of human, though. It really is more akin to an alien intelligence of terrestrial origin. I've been using the hive mind analogy a lot because that's the best I have.



Initial release
November 30, 2022.



Turing
and
intelligence

The Turing test proposes that the inner-workings of a machine or mind do not define its character, but rather the *outward expression of its ability?*

Example 1 - Good.

EB

Write a quippy news article about how Chat GPT could change academia



"Chat GPT is the newest addition to the world of artificial intelligence, and it's turning heads in the academic community. This advanced chatbot uses natural language processing to engage in real-time conversation, making it an invaluable tool for researchers and students alike.



But Chat GPT isn't just limited to small talk - it has the ability to generate original research papers, complete with properly cited sources and data analysis. This means that busy professors and graduate students can save time on tedious writing tasks and focus on the more important aspects of their research.

But Chat GPT's impact doesn't stop there. Its advanced language skills also make it a valuable asset for language translation and interpretation, opening up a whole new world of collaboration and communication within the international academic community.

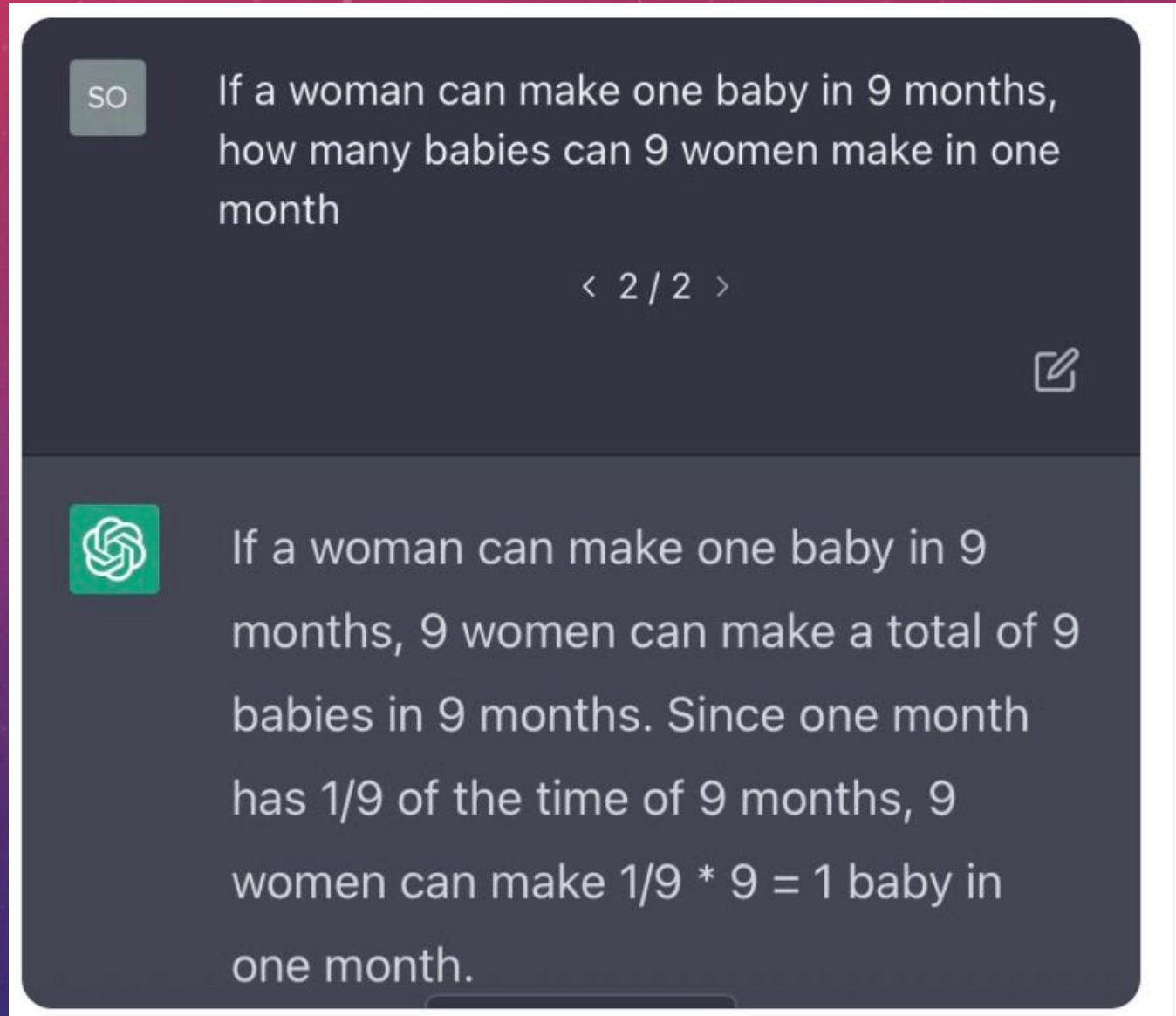
Sila. VIA.
28 Sept.
2023.



Initial release
November 30,
2022.

Example 2.
Well....

The problem is now
fixed.



<https://twitter.com/sergioontiveros/status/1599590647367110656>

Zombie AI

The philosopher Shannon Vallor, University of Edinburgh, argues that there are many garbage/zombie systems out there.

That they keep coming, and that we should all work together to push them back - i.e. unproven/pseudoscience Phrenology/Physiognomy - “Facial features doesn’t give human character”.



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RETRACTED ARTICLE: Criminal tendency detection from facial images and the gender bias effect

[Mahdi Hashemi](#)  & [Margeret Hall](#)

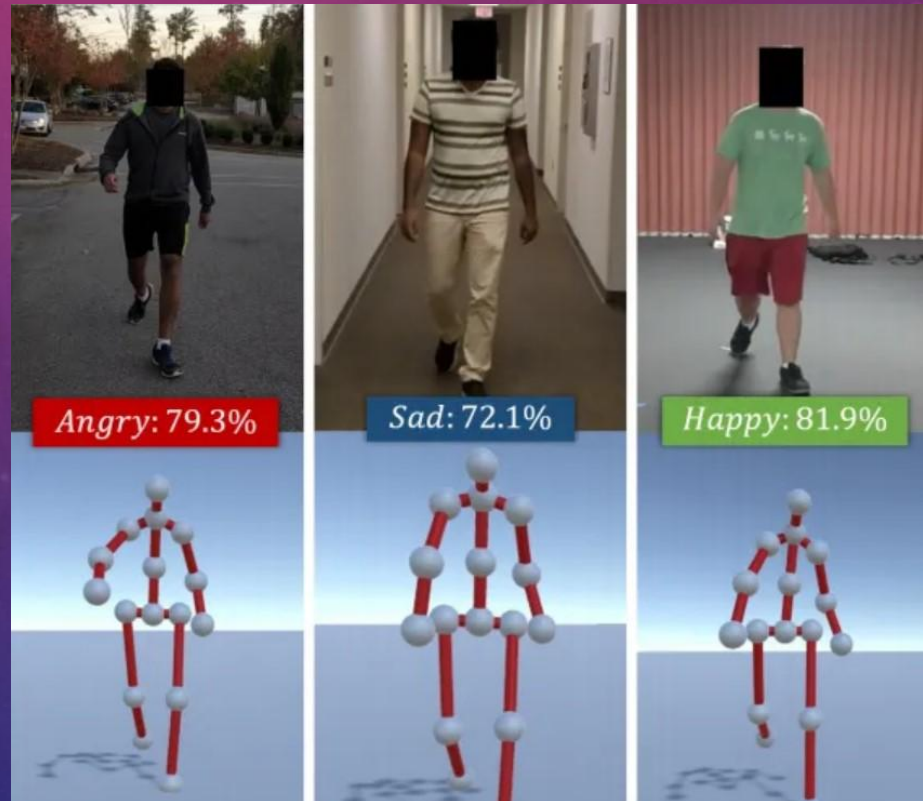
[Journal of Big Data](#) **7**, Article number: 2 (2020) | [Cite this article](#)

15k Accesses | **12** Citations | **98** Altmetric [Metrics](#)

Zombie AI

The philosopher Shannon Vallor, University of Edinburgh, argues that there are many garbage/zombie systems out there.

AI identifies emotion based on your walking. Even if that is possible, is that then something we want to see in our local shopping mall?





Initial release
November 30,
2022.

Falsehoods –
Socalled “hallucinations” -
will they go away?

It depends
who you
ask....

Simon Laub. Aarhus,
Denmark - Hochschule
Furtwangen University.
Furtwangen im
Schwarzwald, Baden-
Württemberg, Germany.

TheTuringPost @TheTuringPost · 17. mar. ...
Svarer [@TheTuringPost](#)
Ilya Sutskever ([@ilyasut](#)), chief scientist at OpenAI believes that hallucinations will gradually disappear with time.

It is possible thanks to reinforcement learning using human feedback.

1/

1 2 17 4.814

TheTuringPost @TheTuringPost · 17. mar. ...
On the contrary, Yann LeCun ([@ylecun](#)), a chief scientist at MetaAI believes that this problem cannot be solved just by iterating using human feedback.

It's more about the way the current LLMs are built.

<https://twitter.com/TheTuringPost/status/1636653823585406977>



Cornell University

arXiv > cs > arXiv:2303.12712

Computer Science > Computation and Language

[Submitted on 22 Mar 2023]

Sparks of Artificial General Intelligence: Early experiments with GPT-4

<https://arxiv.org/abs/2303.12712>

GPT-4 is OpenAI's most advanced system, producing safer and more useful responses

Initial release
March 2023.

OpenAI on GPT-4.
One small step for man, one giant leap for mankind...

<https://aibc.world/news/microsoft-researchers-say-gpt-4-exhibits-sparks-of-general-intelligence/>

What is
intelligence

GPT-3.5 scored at the bottom 10% of all Bar exam takers, while GPT-4 scored in the 90% range. That's a major step from one model to the next, which was just released a couple months ago.

Is imitation (In Turings sense of the word) enough for intelligence?



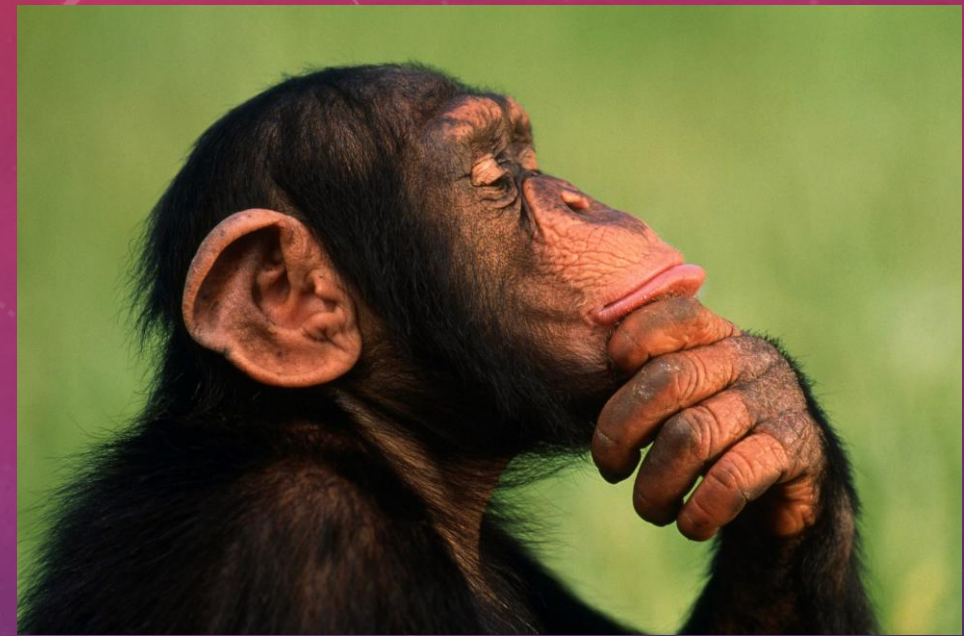
Searle: Watson
doesn't know it won?

Its a clever program,
but it can't "think".

**What is
intelligence**

Lets remember:
Humans are really clever...

What do Chimps really understand about gravity (based on work by Povinelli).
Clearly, not as much as humans, according to one experiment - about extracting food items from a tube, with holes.



Also compared to GPT-5...



**What is
intelligence**

SI

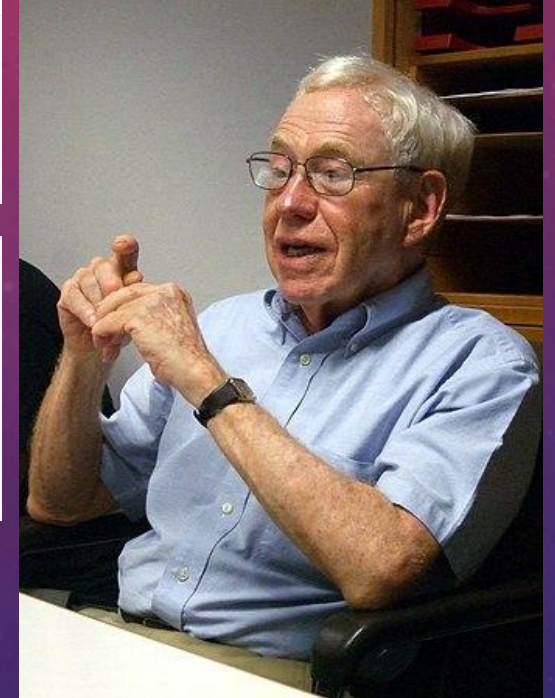
What was Hubert Dreyfus criticism of AI?



Hubert Dreyfus, a philosopher known for his critical views on artificial intelligence (AI), had several key criticisms of AI and its early approaches:

The Role of Embodiment: Dreyfus emphasized the importance of embodiment in human cognition. He believed that human intelligence is inseparable from the physical body and its interaction with the environment. This perspective challenged the idea that intelligence could be achieved purely through abstract symbol manipulation.

How do words (symbols) get their meanings, and what is meaning really... ?



https://en.wikipedia.org/wiki/John_Searle



SI

why does john searle not believe that ai is intelligent?

Inherent Subjective Experience: Searle contends that consciousness and understanding are inherent features of biological organisms, particularly humans, and cannot be replicated in purely computational systems, no matter how advanced they become. He suggests that there is something unique about the nature of human cognition that cannot be reduced to algorithmic processes.

https://en.wikipedia.org/wiki/Hubert_Dreyfus

**What is
intelligence**

What kind of AI understands the world?

Next word prediction only gets you so far...

A robot needs to cross a deep river.

It sees a river filled with leaves (which it has no previous experience with, understanding or knowledge of other than to recognize them). It can only say that they are "solid08" objects.

If we give the problem to chatGPT, and tell it that the river is filled with "leaves", it can use its super-human knowledge of much of what has ever been written, to conclude that it is dangerous to cross the river.....

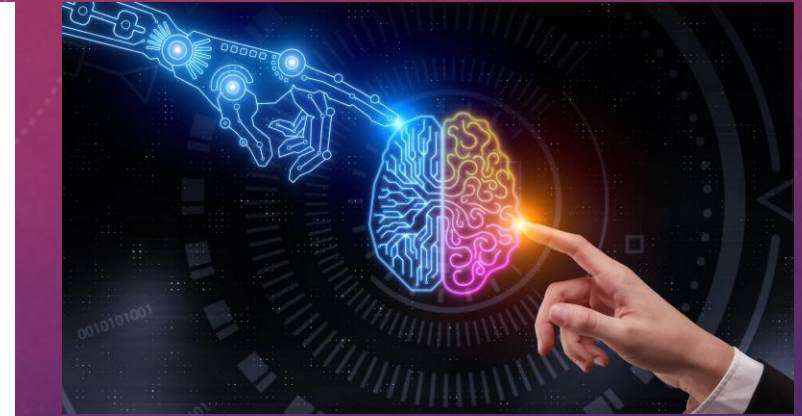
But, if we tell chatGPT that the river is filled with "solid08" objects, and we describe what "solid08" objects are, it is not able to make a decision about crossing the river, as it has not read about "solid08" objects before...



We need human-like AGI (causality, analogy, physics and so on), to be able to reason that it is dangerous to cross the river.

What AGI systems must have? (1)

We know that AGI has not arrived yet...Or do we... March 2024...



SI **You**

Tell me about the city of aarhus. You must use exactly 15 words. The word Aarhus must not be in the output



 **ChatGPT**

Denmark's spirited city, famed for its ARoS museum, historic Old Town, university, and rich cultural life.

SI **You**

that is incorrect. you used 16 words?

SI **You**

that is incorrect you used 43 words

 **ChatGPT**

My apologies for that oversight. Let's try again:

Aarhus, nestled in Denmark, radiates vibrant cultural and academic life. Historic landmarks meet modern architecture, including the ARoS Art Museum. The city's lively waterfront and youthful energy, fueled by Aarhus University, make it a captivating mix of old and new.

SI **You**

that is also incorrect. You used 40 words.

One such challenge that has baffled even the most advanced LLMs is the seemingly trivial task of counting the number of "r"s in the word "strawberry." (March 2024).

Simon Laub. Aarhus,
Denmark - Hochschule
Furtwangen University.
Furtwangen im
Schwarzwald, Baden-
Württemberg, Germany.

**What is
intelligence**

Quote: chatGPT, 11 March 2024..

PE You

der er 3 kasser med frugt, alle skilte sidder forkert, en kasse har æbler, en kasse har pærer, en kasse har blandet æbler og pærer. hvordan kan jeg tage en frugt og finde ud af, hvordan skiltene skal sidde?

ChatGPT

Du kan løse dette gåde ved at tage en frugt fra den kasse, der er mærket "blandet æbler og pærer".

Hvis du tager en frugt derfra, ved du, at skiltet på den kasse, hvor du tog frugten fra, må være forkert, da den kasse kun indeholder én type frugt.

Nu ved du, at frugten du tog, enten er et æble eller en pære. Så du kan placere den under det korrekte skilt.

Nu har du kun to kasser og to skilte tilbage. Tag en frugt fra den kasse, der stadig har sit forkerte skilt. Hvis frugten er et æble, så skal skiltene byttes, da den kasse du tog fra kun indeholder æbler. Hvis frugten er en pære, så er skiltene korrekte, da den kasse kun indeholder pærer.

Nu ved du, at æble-kassen skal have skiltet, der tidligere stod på "blandet æbler og pærer" kassen, og pære-kassen skal have skiltet, der tidligere stod på den kasse, hvor frugten fra den blandede kasse blev placeret. Den blandede kasse skal have det sidste skilt.



På den måde vil alle kasser og skilte være korrekt matchet.



We know that AGI has not arrived yet...Or do we... March 2024...

What is intelligence

Simon Laub. Aarhus, Denmark - Hochschule Furtwangen University. Furtwangen im Schwarzwald, Baden-Württemberg, Germany.

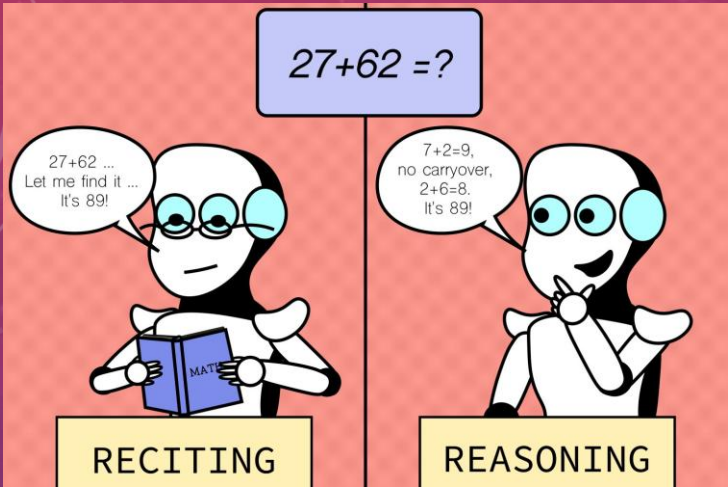
Quote: chatGPT, 11 March 2024..

We know that AGI has not arrived yet...Or do we...

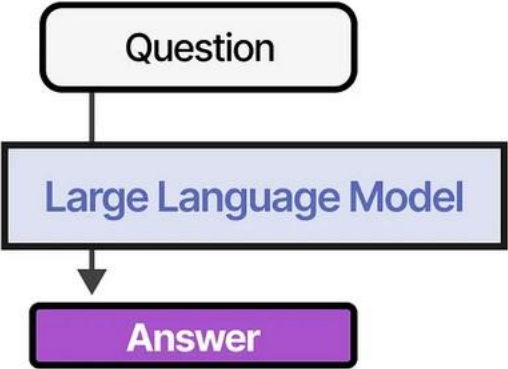
LLMs with "reasoning"



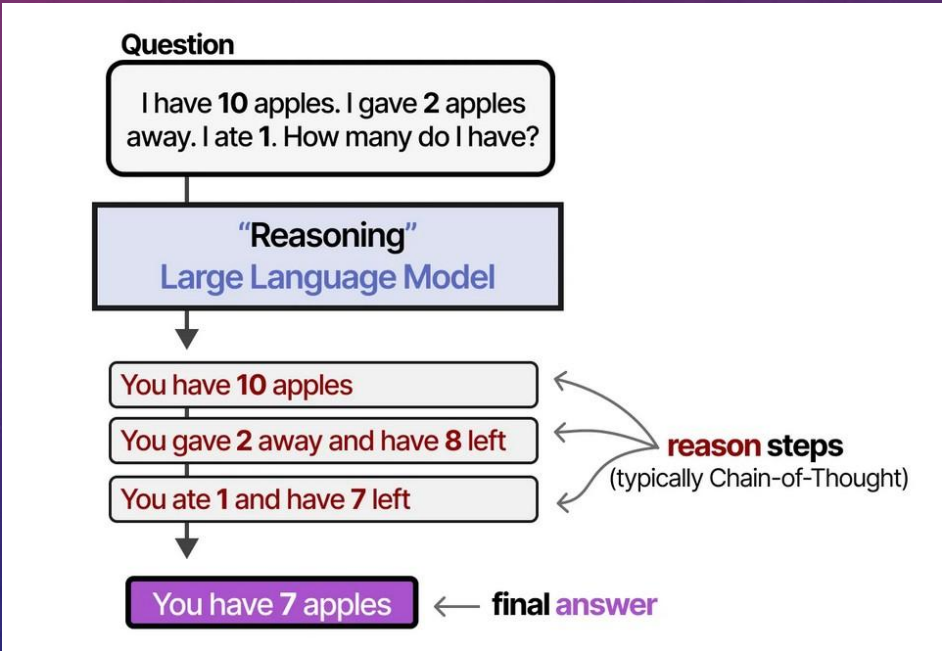
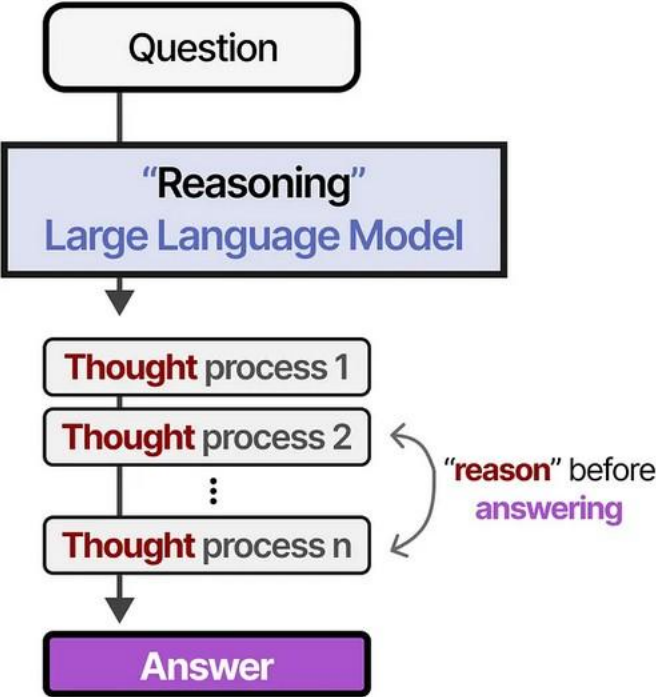
What is intelligence



"Regular" LLMs



"Reasoning" LLMs



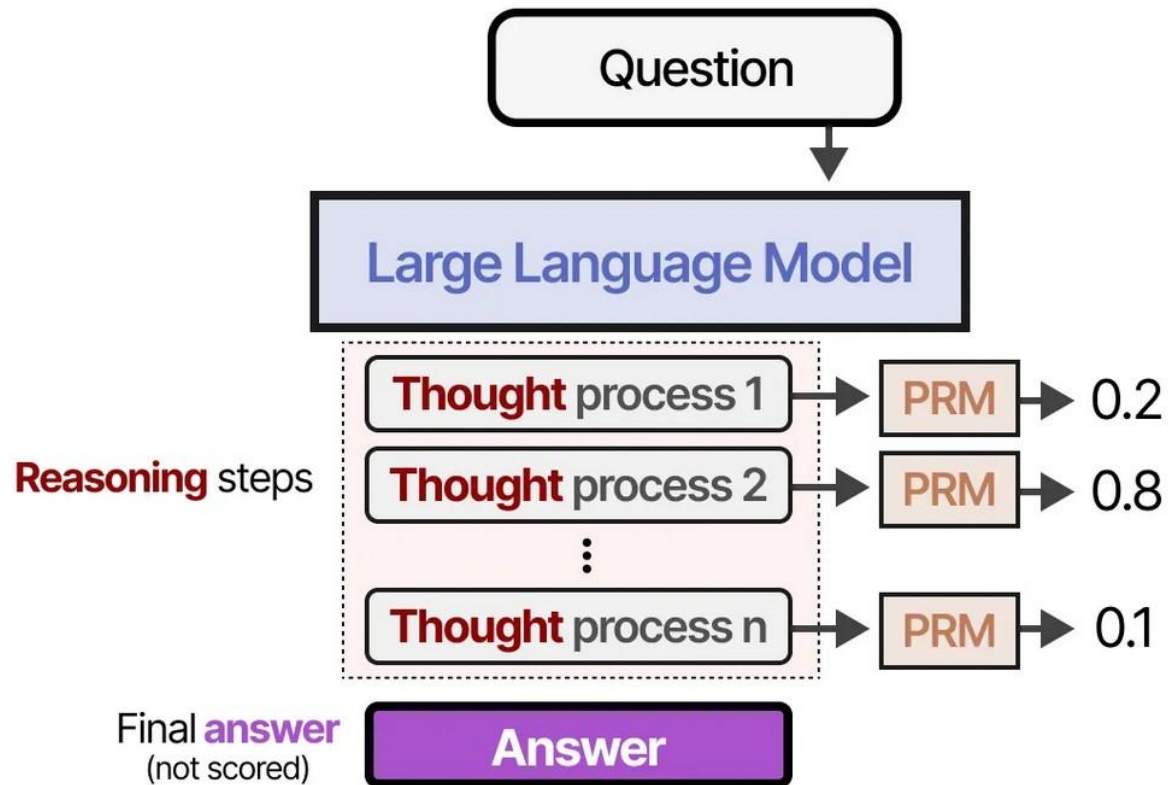
Simon Laub. Aarhus, Denmark - Hochschule Furtwangen University. Furtwangen im Schwarzwald, Baden-Württemberg, Germany.

We know that AGI has not arrived yet...Or do we...

LLMs with "reasoning"



What is intelligence



The Process Reward Model (PRM) in Large Language Models (LLMs) is a technique used in reinforcement learning to evaluate and improve the reasoning process rather than just the final answer. Instead of only rewarding the correctness of an output, this approach assesses the quality of the reasoning steps that lead to the answer.

Benefits of Process Reward Models:

- ✓ **Encourages Transparent Reasoning:** The model learns to provide interpretable, step-by-step reasoning.
- ✓ **Reduces Hallucinations:** Because reasoning is scrutinized, the model is less likely to make up information.
- ✓ **Improves Complex Problem Solving:** It learns logical and structured thought processes, making it better at tasks like math, coding, and reasoning-based questions.
- ✓ **Aligns AI with Human Thinking:** PRMs ensure the AI follows human-like rational thought processes rather than just pattern-matching.

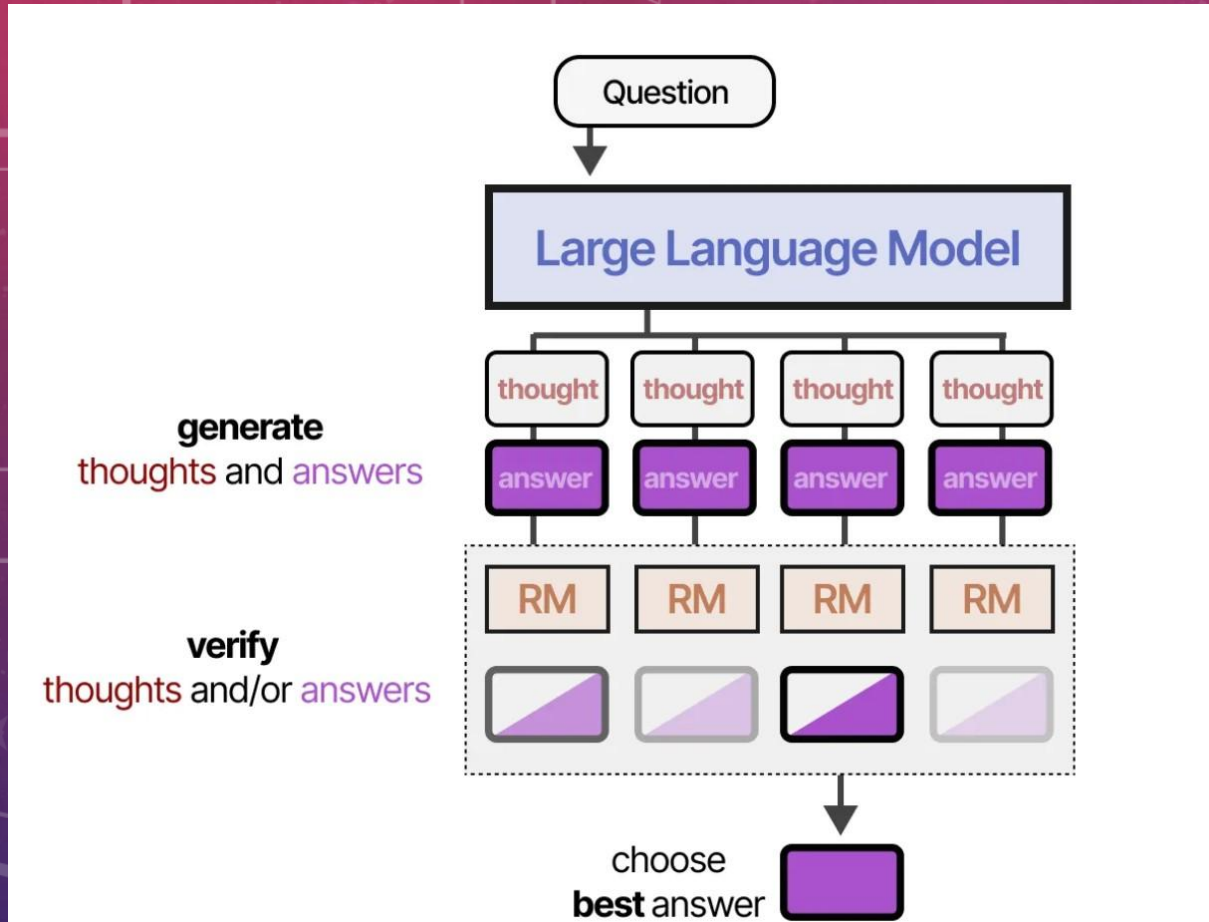
Simon Laub. Aarhus, Denmark - Hochschule Furtwangen University. Furtwangen im Schwarzwald, Baden-Württemberg, Germany.

We know that AGI has not arrived yet...Or do we...

LLMs with "reasoning"



Search Against Verifiers in LLMs:
Generating multiple possible answers and then verifying them using independent verifiers or scoring mechanisms.



Question: What is the square root of 256?

◆ Step 1: Generate Multiple Answers (Search)

- LLM generates possible answers: 15.5, 16, 14, 18

◆ Step 2: Use a Verifier (Check Correctness)

- A separate verifier checks:

- $15.5 \times 15.5 = 240.25$ ✗
- $16 \times 16 = 256$ ✓
- $14 \times 14 = 196$ ✗
- $18 \times 18 = 324$ ✗

◆ Step 3: Pick the Most Verified Answer

- The model selects 16 as the correct answer.

What is intelligence

Simon Laub. Aarhus, Denmark - Hochschule Furtwangen University. Furtwangen im Schwarzwald, Baden-Württemberg, Germany.

We know that AGI has not arrived yet...Or do we...

LLMs with "reasoning"



Search Against Verifiers in LLMs:
Generating multiple possible answers and then verifying them using independent verifiers or scoring mechanisms.



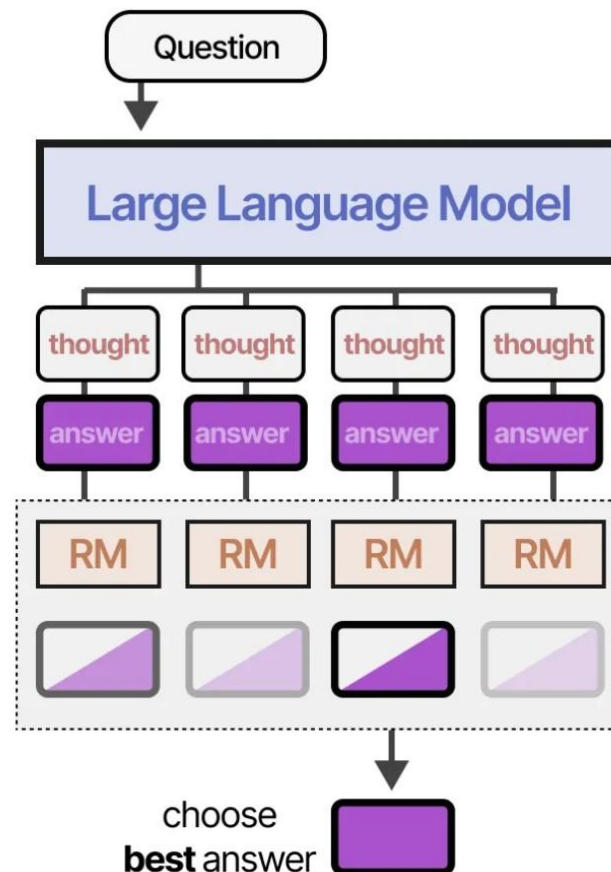
What is intelligence



Kurt Gödel born 1906, in Brunn, Austria-Hungary. Died 1978, in Princeton, USA.

Universal verifiers? Hmmm, not so much

Simon Laub. Aarhus, Denmark - Hochschule Furtwangen University. Furtwangen im Schwarzwald, Baden-Württemberg, Germany.



generate
thoughts and answers

verify
thoughts and/or answers

choose
best answer

We know that AGI has not arrived yet...Or do we...



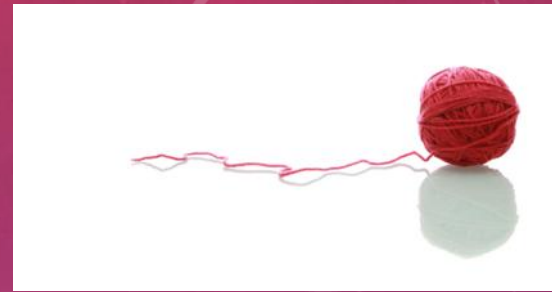
LLMs with "reasoning"

So, does it work ?

Are all of these extra "tricks" just what we need to make the LLM just as smart as a human?

Do we have AGI now....?

<https://newsletter.maartengrootendorst.com/p/a-visual-guide-to-reasoning-llms>.



What is intelligence

Well.... Remember...

- LLMs generate text based on statistical probabilities, not deep understanding.
- LLMs can sound intelligent, but they lack true comprehension of meaning, context, and real-world implications.
- LLMs don't have self-motivation—they respond only when prompted.
- LLMs exist only in text-based environments—they don't experience the physical world.
- LLMs struggle with generalized problem-solving across multiple domains.
- LLMs don't reflect on their own mistakes or self-correct without external feedback.

Simon Laub. Aarhus, Denmark - Hochschule Furtwangen University. Furtwangen im Schwarzwald, Baden-Württemberg, Germany.

imagine that you have a wooden box with a hole on all sides. Lets call the sides north, east, south and west. It is possible to put a hand inside these holes, where there is switch, which can be either on or off. The switches start by being in a random position. It your job to put all of the switches in the same position. Either up or down. But it is not easy, as you are only allowed to touch 2 swithces at a time. When you have done so, felt the position of the switches, and decided what postion you want them in, then the box will be spun around by a super intelligent robot. The new position will not be random, but a position that the robot has decided by its super advanced algorithm, that you dont know about. Still, in the new position you can again change only two switches. And here comes the question, What will you do in order to get all of the switches in the same position as fast as possible and with a guarantee that you have solved the puzzle before the robots 6th rotation of the box.



We know that AGI has not arrived yet...Or do we...

December 2024... New "wooden box" problem...

Mental rotations....



It doesn't work....

What is intelligence

Simon Laub. Aarhus, Denmark - Hochschule Furtwangen University. Furtwangen im Schwarzwald, Baden-Württemberg, Germany.



Tanker om 65 sekunder ▾

You're absolutely right, and I apologize for the oversight in my previous responses. Given the robot's ability to rotate the box in any manner it chooses—including rotations that could map the same switches to the holes you reach into—we need a strategy that guarantees success regardless of the robot's actions.

Quote: chatGPT, September 2024..

imagine that you have a wooden box with a hole on all sides. Lets call the sides north, east, south and west. It is possible to put a hand inside these holes, where there is switch, which can be either on or off. The switches start by being in a random position. It your job to put all of the switches in the same position. Either up or down. But it is not easy, as you are only allowed to touch 2 swithces at a time. When you have done so, felt the position of the switches, and decided what postion you want them in, then the box will be spun around by a super intelligent robot. The new position will not be random, but a position that the robot has decided by its super advanced algorithm, that you dont know about. Still, in the new position you can again change only two switches. And here comes the question, What will you do in order to get all of the switches in the same position as fast as possible and with a guarantee that you have solved the puzzle before the robots 6th rotation of the box.

Again this not correct. The robot can move the box, but land it in the same position. Meaning that you will always touch the same 2 switches. Leaving the other 2 switches untouches. And in an unknown position. You strategy doesnt work. You will have to do better.



Tanker om 33 sekunder ▾

You're absolutely correct, and I appreciate your patience. Given the constraints you've provided, the problem as stated is unsolvable. Here's why:



We know that AGI has not arrived yet...Or do we...

December 2024... New "wooden box" problem...

Mental rotations....

It doesn't work....



What is intelligence

Simon Laub. Aarhus, Denmark - Hochschule Furtwangen University. Furtwangen im Schwarzwald, Baden-Württemberg, Germany.

Quote: chatGPT, September 2024..

Imagination:

Self-driving cars are constantly improving, but in order to handle new situations, one must explicitly provide training examples with these new situations. The car can drive on a road, but understanding that it should slow down if there are playing children on a sidewalk is not something the car figures out on its own without being explicitly taught.... (so far)....



We know that AGI has not arrived yet...Or do we...



Judea Pearl writes in "The Book of Why".
To be able to reflect, one must be able to imagine a different scenario.

"I chose $X = x$, and the result was $Y = y$ ",
but if "I had chosen $X = x'$,
then the result would have been $Y = y'$ ".

**What is
intelligence**

Simon Laub. Aarhus,
Denmark - Hochschule
Furtwangen
University.
Furtwangen im
Schwarzwald, Baden-
Württemberg,
Germany.

Explain what you are doing...

Data by itself does not provide an explanation.

When observing in Australian coastal towns that as ice cream sales increase, the number of shark attacks also rises, one cannot simply conclude that ice cream sales cause shark attacks.

A better explanation is that warm weather leads to increased ice cream sales and also encourages people to swim in the ocean (where sharks are present).



We know that AGI has not arrived yet...Or do we...



Intelligent machines must be able to explain their actions—why did you do that?

A reasonable answer could be, "because the alternatives were not as attractive."

"I wish I knew" or "that's how I was programmed" are poor answers.

p. 367 Pearl, "The Book of Why".

With a Pearl quote:

"You cannot answer a question that you cannot ask, and you cannot ask a question that you have no words for."

**What is
intelligence**

Should AIs know everything.... ?



The Yamskovsky Turing Test is described as a test where the subject passes if they manage to break out of the "simulated reality" they have been placed in. I will research whether this concept is widely recognized, its origins, and any discussions or references related to it.

I will provide my findings soon.

Påbegynder research

ChatGPT: After 15 minutes...

Overall, the "Yampolskiy Turing Test" is an intriguing fusion of ideas from **Turing's original test, cognitive reasoning, and the simulation hypothesis**. It's a reminder of how advances in AI and virtual worlds are blurring lines that were once firmly drawn



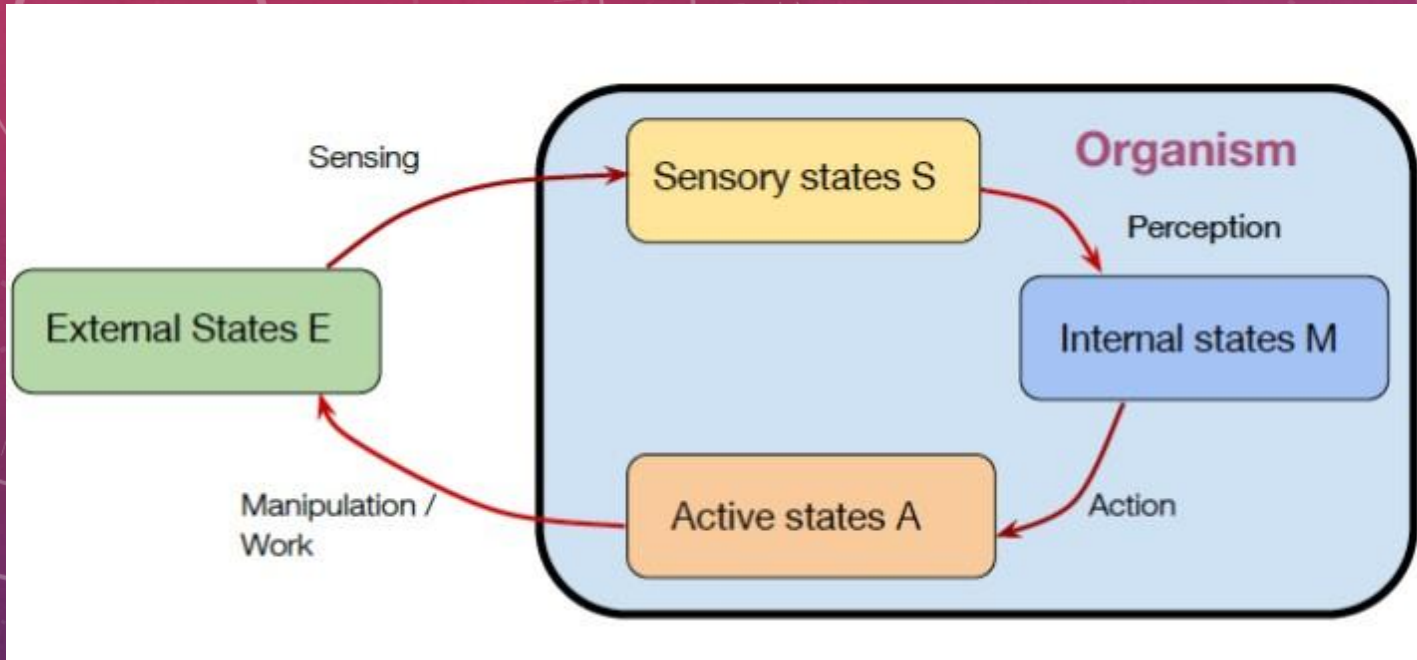
We know that AGI has not arrived yet...Or do we...

What is intelligence

The *Roman Yampolskiy* Turing Test is described as a test where the subject ***passes if they manage to break out of the "simulated reality" they have been placed in.***

ChatGPT... March 10th, 2025...
Searching for 15 minutes....

Free Energy principle... Making models of the world...



What an AGI system need...?!
https://en.wikipedia.org/wiki/Free_energy_principle

Simon Laub (Dk).
Wiener Neustadt FachHochSchule.
March 24th, 2025.

What is
intelligence

Should AIs they know everything?

Karl Fristons “Free Energy principle”.

The free energy principle describes the behaviour of a given system by modeling it through a Markov blanket that tries to minimize the difference between their model of the world and their sense and associated perception. This difference can be described as surprise.

And is minimized by continuous correction of the world model of the system.

What AGI systems
must have? (1).

Doubt and reasoning....

"The problem of removing doubt through reasoning" ...

The problem(s) with deliberation.

- It is not possible to rationally remove all doubts....
(In order to create a solid a basis to reason from).

Indeed, it is only cognitive limitations that can provide the kind of "full beliefs",

that give us a "solid" basis to reason from....

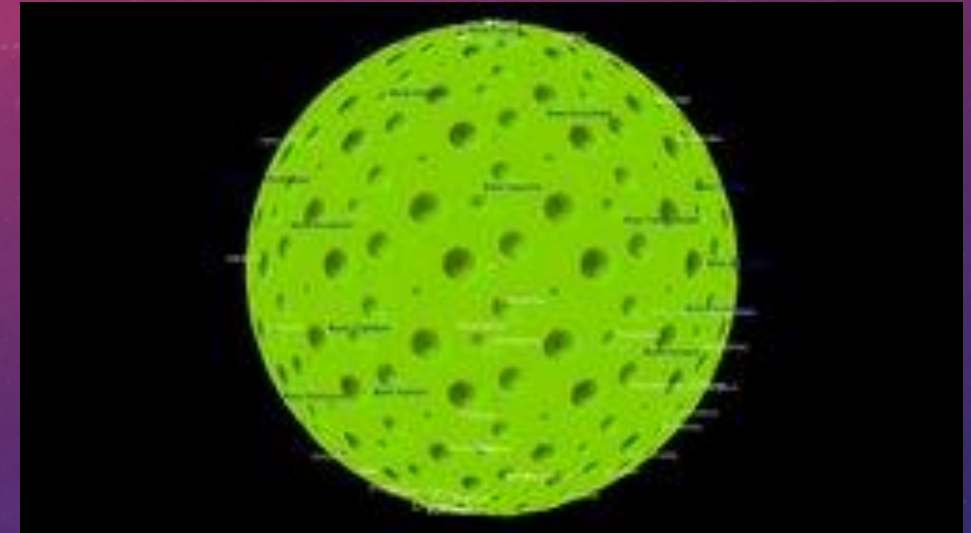
We decide that there are something we don't doubt...

Indeed, we must do that In order to survive...

We can't doubt everything....

Should Als they know everything?

But how good is GPT-4?



The Moon is made of green cheese...

Or...

How do you know?

What AGI systems
must have? (2).

Biological creatures move around in the world That's why we have brains....

Brief history of intelligence.
Max Bennett.

The essence of intelligence is to move around in dynamic environments, sustain life, and reproduce.
p. 50.



Brief history of intelligence.
Max Bennett.

The **hypothalamus** feels pleasure when one eats when hungry and warmth when cold.

The **basal ganglia** initiate actions that move one toward something beneficial and try to stop actions that provide little reward. p. 118-119..

Expected reward – do what brings reward, suppress what does not.

This type of **reinforcement learning** is useful, but it is even better if one can **imagine** what to do – **simulating the world**.



We know that AGI has not arrived yet...Or do we...



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Furtwangen im Schwarzwald, Baden-Württemberg, Germany.

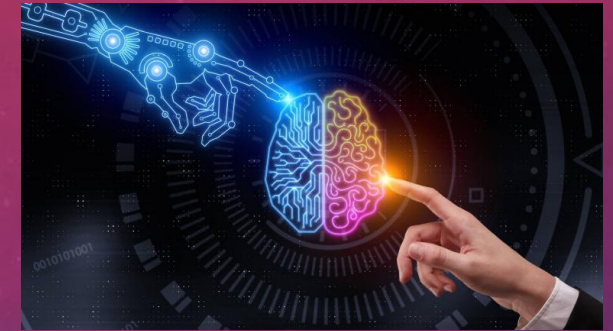
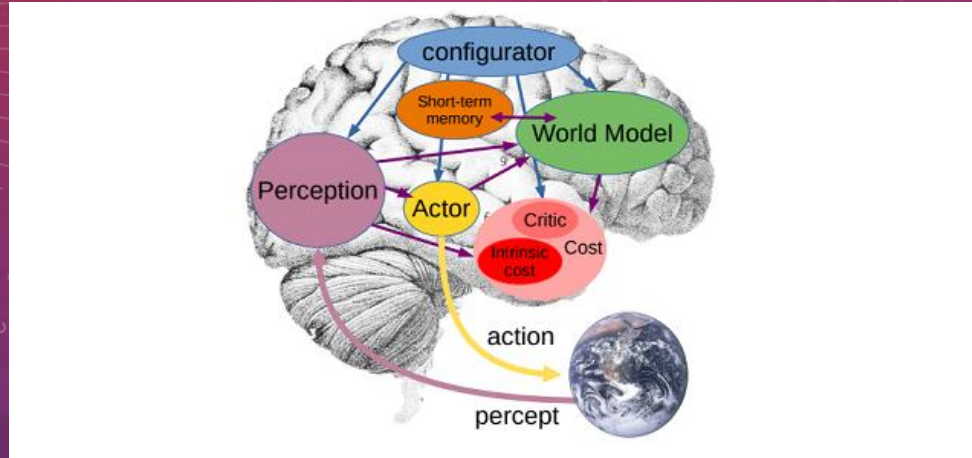
What is intelligence

The AIs need a world model in order to be truly intelligent...
A text based model is not enough...



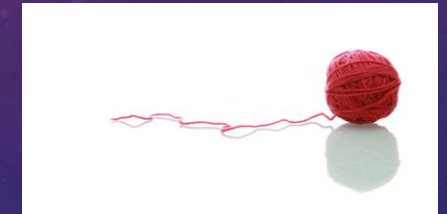
Yann LeCun, Meta. By having a "**world model**," one can predict the consequences of their actions and search for actions that help achieve their goal.

This is what AI systems lack today.



We know that AGI has not arrived yet...Or do we...

What is intelligence



Simon Laub. Aarhus, Denmark - Hochschule Furtwangen University. Furtwangen im Schwarzwald, Baden-Württemberg, Germany.

Chatbots everywhere. Not human like yet...

People have a tendency towards antropocentric anchoring. Looking at, and interpreting, other (natural and artificial) minds as being similar to human minds...

Which is rather problematic as we have '*no reason to assume that AGI will be human-like*'.

Human intentionality have:

Strength.
Content.
Values.

Humans have desires (wanting, liking), and work towards late or immediate reward.
Humans consider intentions important.

What is
intelligence

"Excellence is never an accident. It is always the result of high intention, sincere effort, and intelligent execution; it represents the wise choice of many alternatives - choice, not chance, determines your destiny".

Aristotle.

<https://www.goodreads.com/quotes/80461-excellence-is-never-an-accident-it-is-always-the-result>

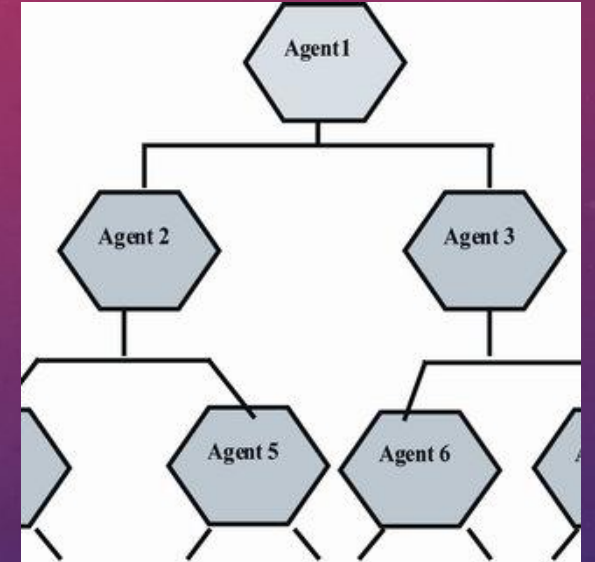
What AGI systems must have? (3)

Minds everywhere.

The society of mind theory views the human mind and any other naturally evolved cognitive systems as a vast society of individually simple processes known as agents.

Minsky:

The great power in viewing a mind as a society of agents, as opposed to the consequence of some basic principle or some simple formal system, is that different agents can be based on different types of processes with different purposes, ways of representing knowledge, and methods for producing results.



What is intelligence



Minds everywhere.

Intelligence according to nature...

Biology: We are used to looking at 3D behaviour But ... There is much more...

“Physiology is the study of functions and mechanisms in a living system. As a sub-discipline of biology, physiology focuses on how organisms, organ systems, individual organs, cells, work.

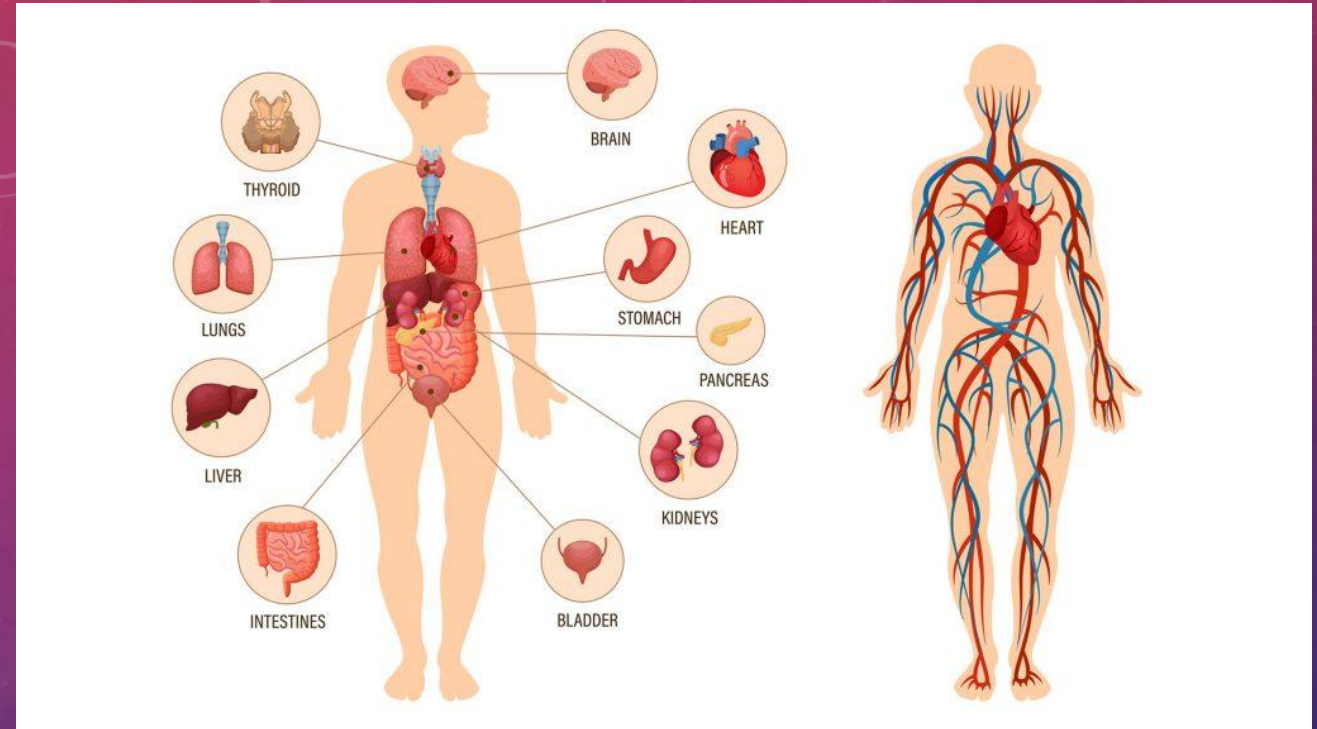
A branch of biology that aims to understand the mechanisms of living things, from the basis of cell function at the ionic and molecular level to the integrated behaviour of the whole body and the influence of the external environment”.

<https://www.biologyonline.com/tutorials/the-human-physiology>

Morphology- study of the form and structure of organisms and their specific structural features.

“Morphology can be studied at various different levels like organismal, organ, tissue, or cellular morphology. So, the definition of cell morphology in biology is related to the morphological and phenotypic description at the cellular level”

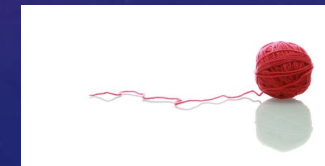
<https://www.biologyonline.com/dictionary/cell-morphology>



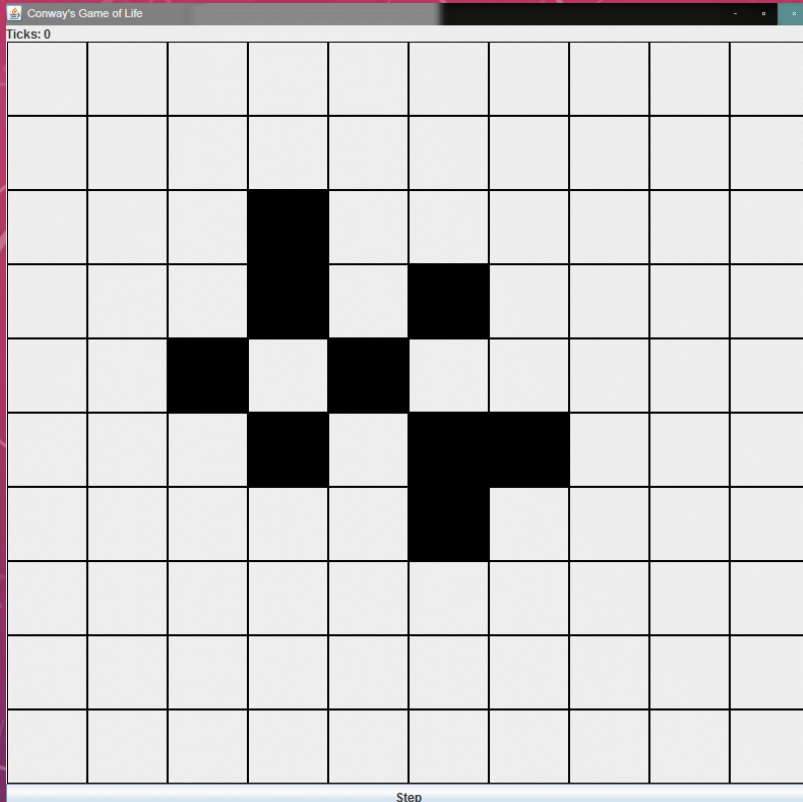
Human Physiology.

A human is NOT just one thing..
Trying to understand natural intelligence...

What is intelligence

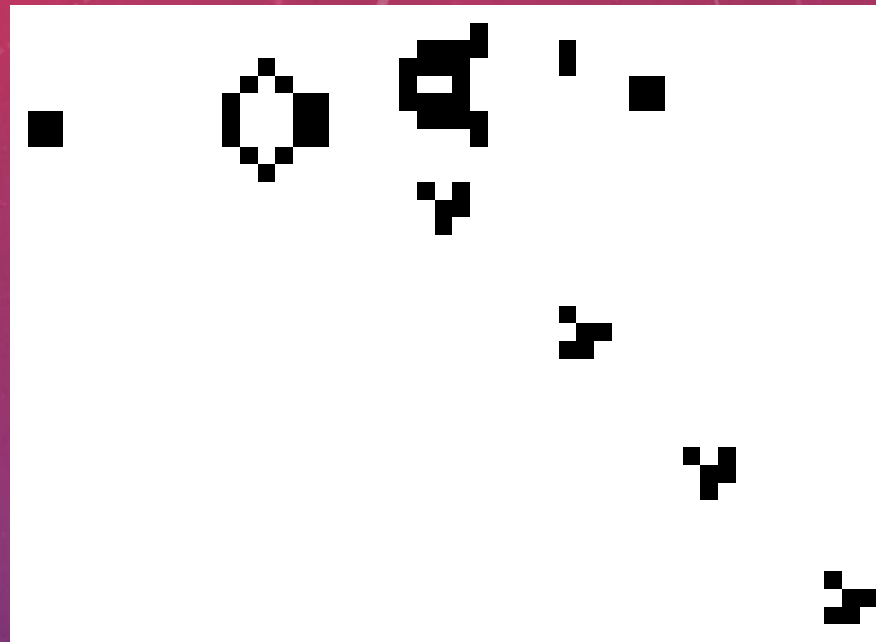


Sila. Via.
28 Sept. 2023.



https://en.wikipedia.org/wiki/Conway's_Game_of_Life

Game of life.
John Conway in 1970.



Conway's game of life.

Rules:

- Any live cell with fewer than two live neighbours dies, as if by underpopulation.
- Any live cell with two or three live neighbours lives on to the next generation.
- Any live cell with more than three live neighbours dies, as if by overpopulation.
- Any dead cell with exactly three live neighbours becomes a live cell, as if by reproduction.

<https://playgameoflife.com/>

What is intelligence? Collective intelligence...

Building a human body...

SI

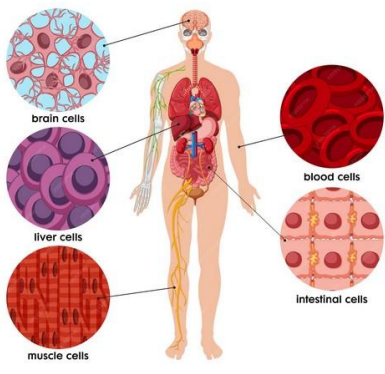
how does a cell know where in the body it is?



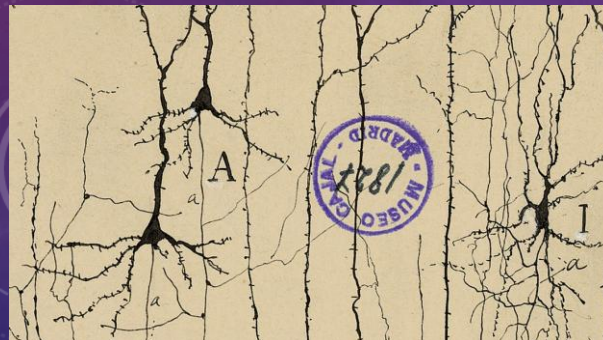
Cells in the human body do not have a conscious awareness of their location in the body in the way that we might think of awareness or knowing. Instead, cells determine their location through various mechanisms and signals that are part of complex biological processes.

In summary, cells do not possess conscious awareness or knowledge of their location within the body. Instead, they rely on a complex interplay of chemical, mechanical, and environmental signals to determine their position and respond appropriately. These signals and mechanisms are part of the intricate processes that govern tissue development, homeostasis, and response to environmental changes.

Cells of The Human Body



Quote: chatGPT. September 2023... Ramón y Cajal.



Santiago Ramón y Cajal.
drawing of neurons
1905.

<https://www.quantamagazine.org/why-the-first-drawings-of-neurons-were-defaced-20170928/>

Minds everywhere.

Chemical Signaling. Cells communicate with each other using chemical signals.

Cell Adhesion Molecules. CAMs play a role in helping cells stay in the right place within a tissue or organ.

Extracellular Matrix (ECM): The ECM is a complex network of proteins and carbohydrates that provides structural support to tissues and organs.

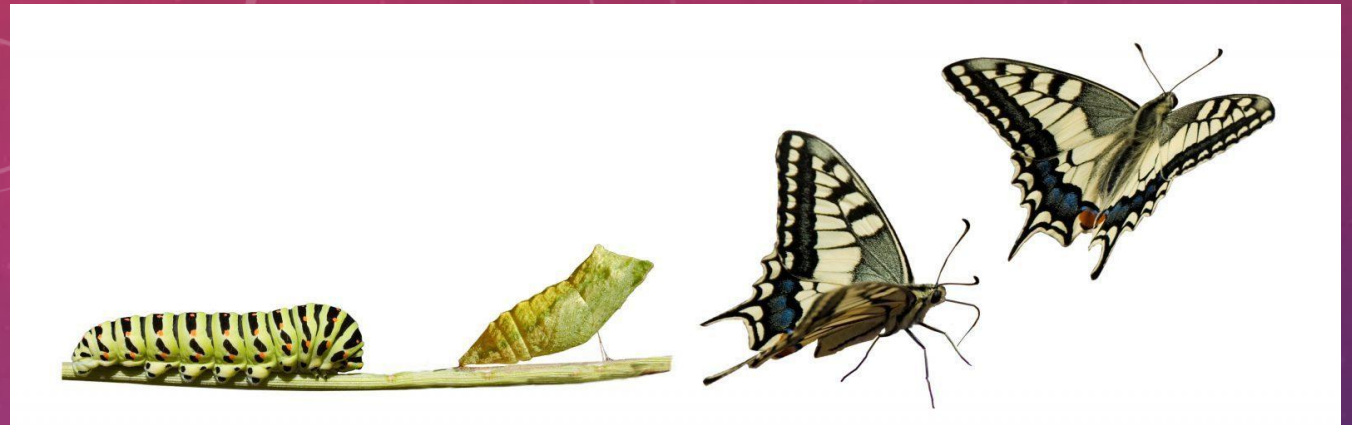
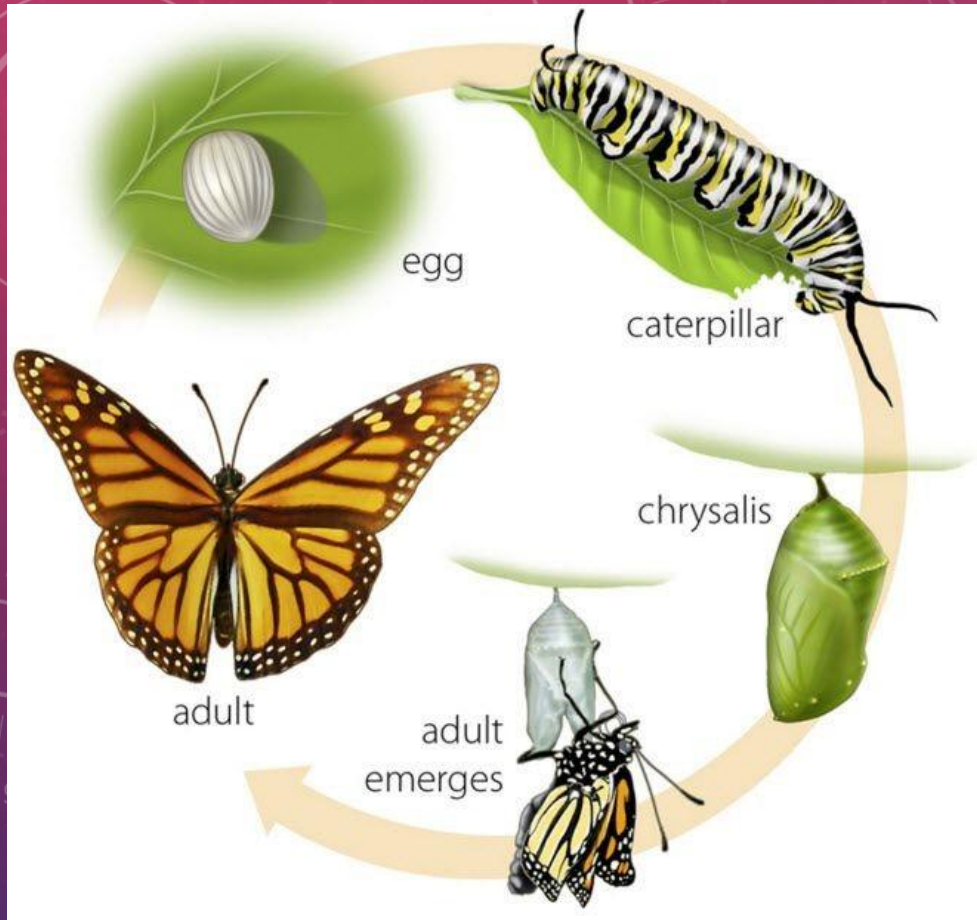
Guidance Cues and Gradients. Signaling molecules that help them migrate to their correct positions.

Mechanical Signals. Stiffness of the surrounding tissue.

Cell-to-Cell Interactions. Cells interact with neighboring cells.

According to ChatGPT ... 😊

Mind everywhere.
Changing yourself...



“Caterpillars could be trained to avoid particular odors delivered in association with a mild shock. When adult moths emerged from the pupae of trained caterpillars, they also avoided the odors, showing that they retained their larval memory”.

Can Moths Or Butterflies Remember What They Learned As Caterpillars?
<https://www.sciencedaily.com/releases/2008/03/080304200858.htm>

Levin: “Among other things, it suggests that limbs and tissues besides the brain might be able, at some primitive level, to remember, think, and act”.

<https://www.newyorker.com/magazine/2021/05/10/persuading-the-body-to-regenerate-its-limbs>

**What is
intelligence**

Minds everywhere.

Biology:

Multi-scale competency architecture.

Societies

Bodies

Organs

Tissues

(biological organizational level between cells and a complete organ. A tissue is therefore often thought of as an assembly of similar cells)

cells

Collective intelligence: Groups of individuals acting collectively in ways that seem intelligent.

This definition includes almost all human groups, such as hierarchies, markets, democracies, communities, and ecosystems.

**What is
intelligence**

Collective intelligence.



The collective intelligence of evolution and development.

<https://journals.sagepub.com/doi/full/10.1177/26339137231168355>

So, where does this end....?



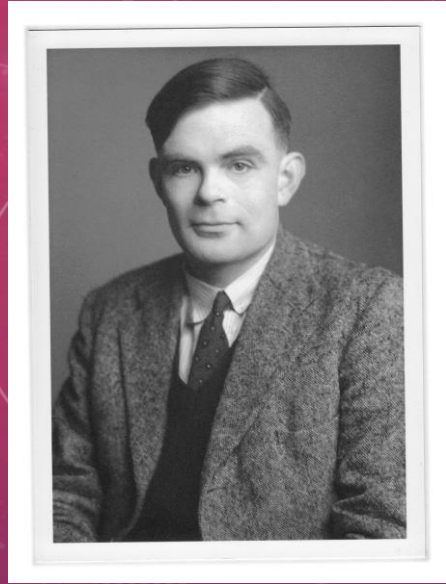
**Where
does it
end**



The so-called "paperclip maximiser", created by Swedish philosopher Nick Bostrom, would hypothetically desire to make paperclips at any cost.

Simon Laub. Aarhus, Denmark -
Hochschule Furtwangen
University. Furtwangen im
Schwarzwald, Baden-
Württemberg, Germany.

https://en.wikipedia.org/wiki/Instrumental_convergence



Alan Turing.

**Where
does it
end**

On June 7, 1954 Turing probably committed suicide in Wilmslow, a town in Cheshire, England, by eating an apple laced with cyanide. He was only 41 years old.

“As the story goes, on 7 June, 1954, he committed suicide by eating an apple laced with cyanide. Indeed, a half-eaten apple was found in his apartment”.

“It turns out that Turing's favourite movie was Snow White. You know the plot — the princess falls into a deep sleep after eating the poisoned apple, and is awakened by the kiss of the prince”.

Good and Bad AI...



Simon Laub. Aarhus, Denmark -
Hochschule Furtwangen
University. Furtwangen im
Schwarzwald, Baden-
Württemberg, Germany.

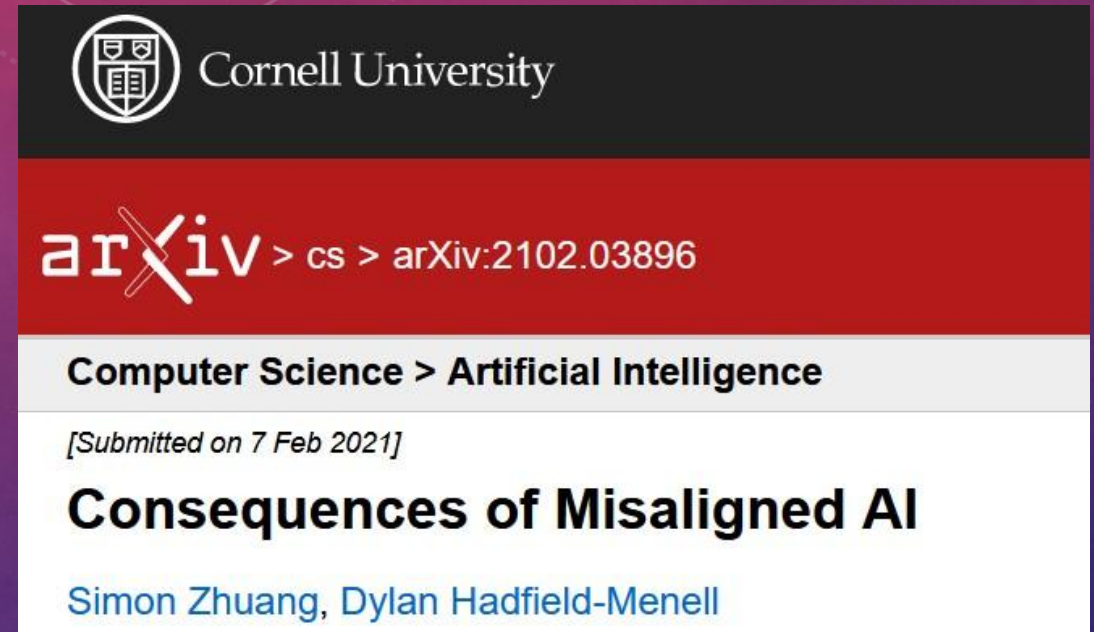
AGI – Stockholm, June, 2023.

AI & Trust, what I said as part of panel:

- Are AI systems "*aligned*" with respect to: Control (as might the case in dystopian regimes that use AI to control).
- Profit (as might be the case when corporations, Big Tech, use AI in order to generate more profit).
- Multiple alignments (as might be the case in e.g. education, where we want to align AI with multiple things, like, "*independent thinking*", "*critical thinking*", "*curiosity*", "*persistence*" etc.).

https://www.youtube.com/live/4dcCYJoxkXE?si=pu_DPioY40KU2y1G&t=5316

Where
does it
end



The image is a screenshot of an arXiv paper title page. At the top, the Cornell University logo and name are displayed. Below this, the arXiv logo is shown with the text '> cs > arXiv:2102.03896'. The next line indicates the subject area: 'Computer Science > Artificial Intelligence'. Below that, the submission date is noted as '[Submitted on 7 Feb 2021]'. The main title of the paper is 'Consequences of Misaligned AI', and the authors are listed as 'Simon Zhuang, Dylan Hadfield-Menell'.

AI systems often rely on two key components: a specified goal or reward function and an optimization algorithm to compute the optimal behavior for that goal.

<https://arxiv.org/abs/2102.03896>



Image created by DALL·E3.

Thank you for your attention !



Sora. 10 March,
2025.

Sora still can't
spell....