

Ted-SOEP

**Transforming STEM teacher education in South Africa
through Self-Directed Open Educational Practices**

**Open Educational Resources and Practices in the AI
field**

Andreas R. Formiconi

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Firenze

2025

80s — 90s

Where I'm coming from...

Nuclear physics, Nuclear Medicine, Tomography (CT, PET, SPECT), Mathematics, Computer Science

Geometrical response of multihole collimators

<https://pubmed.ncbi.nlm.nih.gov/9832021/>

Least squares algorithm for region-of-interest evaluation in emission tomography

<https://pubmed.ncbi.nlm.nih.gov/18218397/>

Compensation of spatial system response in SPECT with conjugate gradient reconstruction technique

<https://pubmed.ncbi.nlm.nih.gov/2784572/>

2001

You are a professor...

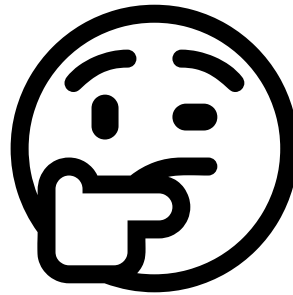
No, please!



300 students

2003

Feeling trapped in a box...



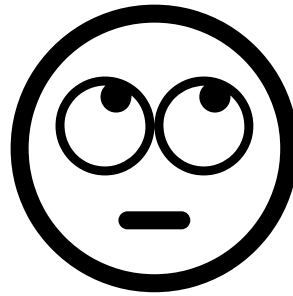
Where are my shy students?

A naive HTML site...

... with interactive boxes!

2007

The message in the bottle...



Does anyone else out there feel the same way?

**A professor of Education Sciences, Antonio Calvani,
picked up the bottle**

LTEver: An educational blogs hub

I jumped into Web 2.0!

<https://iamarf.org/2007/09/28/mi-tuffo-nel-web-20/>

But wait, what's going on out there?

2007 OpenEd An online open course by David Wiley

David Wiley



<https://iamarf.org/?s=opened>

<https://opencontent.org/blog/archives/369>

2008

Connectivism and Connective Knowledge CCK08
A massive online open course by George Siemens
and Stephen Downes (not yet a MOOC)



<https://iamarf.org/?s=cck08>

CCK08

How to mix roles and classes?

CCK08: On writing posts for Italian students in English

<https://iamarf.org/2008/10/25/cck08-on-writing-posts-for-italian-students-in-english/>

<https://iamarf.org/2008/11/03/cck08-short-paper-2-changing-roles-of-educators/>

2013

LTIS13 A MOOC for teachers, just with a blog!

400-750 enrollments

Now a newsletter for 570 teachers

<https://iamarf.org/2013/04/03/ltis13-il-luogo-e-i-suoi-abitanti/#more-7479>

LABORATORIO DI TECNOLOGIE INTERNET PER LA SCUOLA #LTIS13

Un cMOOC offerto dalla Italian University Line
curato da
Andreas Robert Formiconi



Il cMOOC della IUL

- **connectivist:** studente al centro, apprendimento cooperativo
- **Massive:** senza limiti di iscrizioni
- **Open:** liberamente e gratuitamente fruibile
- **Online:** accessibile da qualsiasi browser
- **Course:** un insegnamento universitario



Inizio: 3 aprile 2013

Durata: 10 settimane

Modalità di fruizione

- chiunque può partecipare liberamente e gratuitamente, per iscriversi occorre semplicemente spedire un'email a cmooc@iuline.it specificando nome, cognome e città di provenienza
- i partecipanti che alla fine del corso abbiano preso parte attivamente e con successo a tutte le attività proposte, potranno ricevere 6 CFU mediante un'iscrizione post hoc al costo di 150 €
- i suddetti crediti potranno essere validi per l'insegnamento di "Laboratorio Informatico" per tutti coloro che si dovessero successivamente iscrivere al Corso di Laurea "Metodi e Tecniche delle Interazioni Educative" presso la IUL, ivi compresi eventuali studenti dell'ultimo anno di scuola superiore
- i CFU acquisiti potranno altresì essere riconosciuti, in totalità o in parte, nel Master di I livello "Le nuove competenze digitali: open education, social e mobile learning" promosso da UNIFI e in master e corsi di perfezionamento affini, promossi dalla IUL.

Obiettivi del corso

- Imparare ad abitare nel cyberspazio
- Imparare a imparare e a insegnare nel cyberspazio
- Imparare a creare comunità di apprendimento e aggiornamento professionale
- Annullare il gap tecnologico fra vecchie e nuove generazioni
- Orientare gli studenti dell'ultimo anno di scuola superiore interessati al proseguimento degli studi nell'area delle Scienze della Formazione

L'Italian University Line (IUL) è un'università telematica, soggetta al controllo da parte dell'Agenzia Nazionale di Valutazione del sistema Universitario e della Ricerca. La IUL si avvale della collaborazione delle seguenti organizzazioni: Istituto Nazionale di Documentazione, Innovazione e Ricerca Educativa (INDIRE), Università di Milano-Bicocca, Università di Firenze, Università di Palermo, Università di Catania.

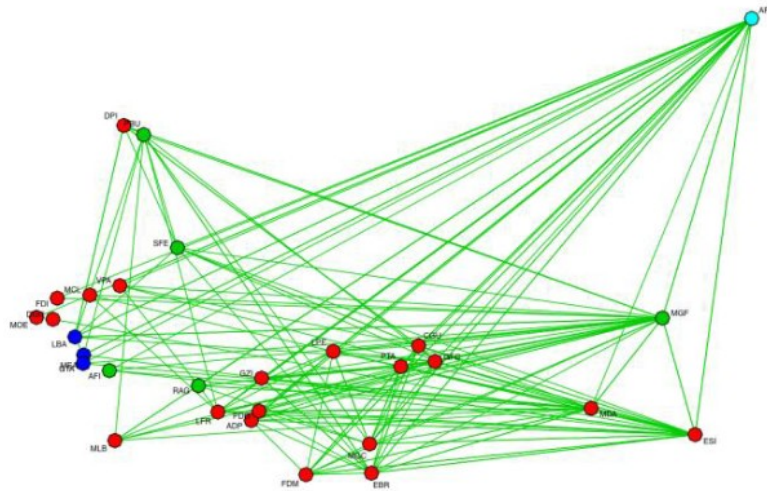
Per informazioni:
www.iuline.it
Email: cmooc@iuline.it
Tel: 055 2380568



2013

How to open the classroom?

Method for studying the network dynamics of a blogs class



<https://oaj.fupress.net/index.php/formare/article/view/3333/3333>

2016

I've got a dream...

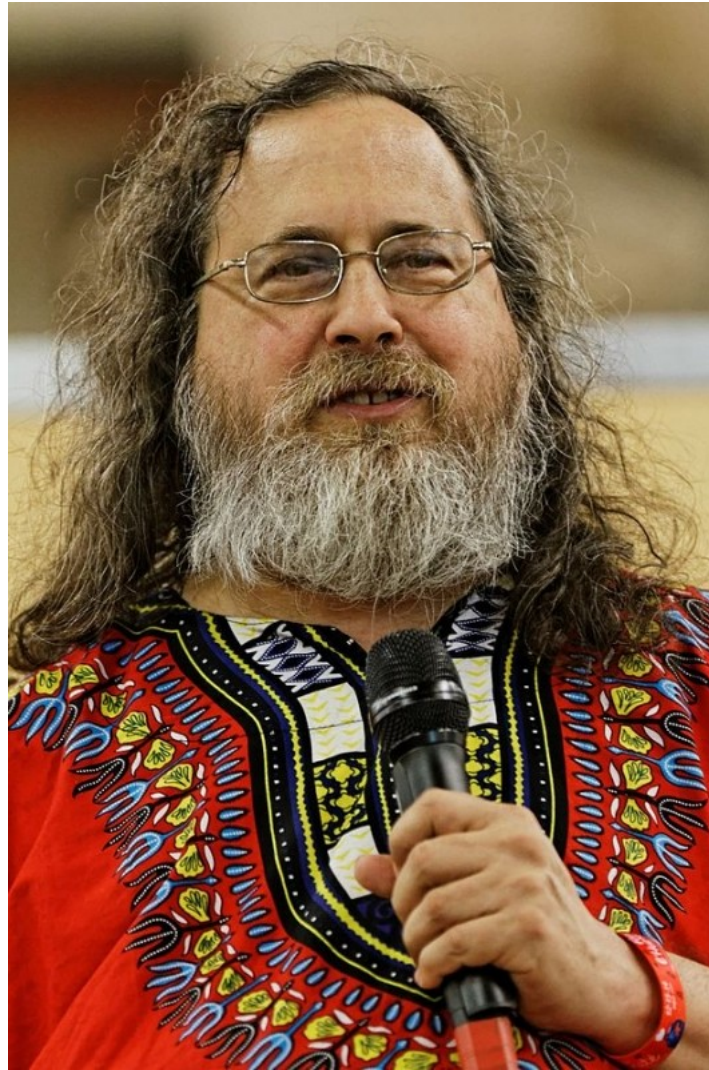
Teaching future teachers!

2016 — 2025

LibreOffice — LibreLogo

Turtle geometry

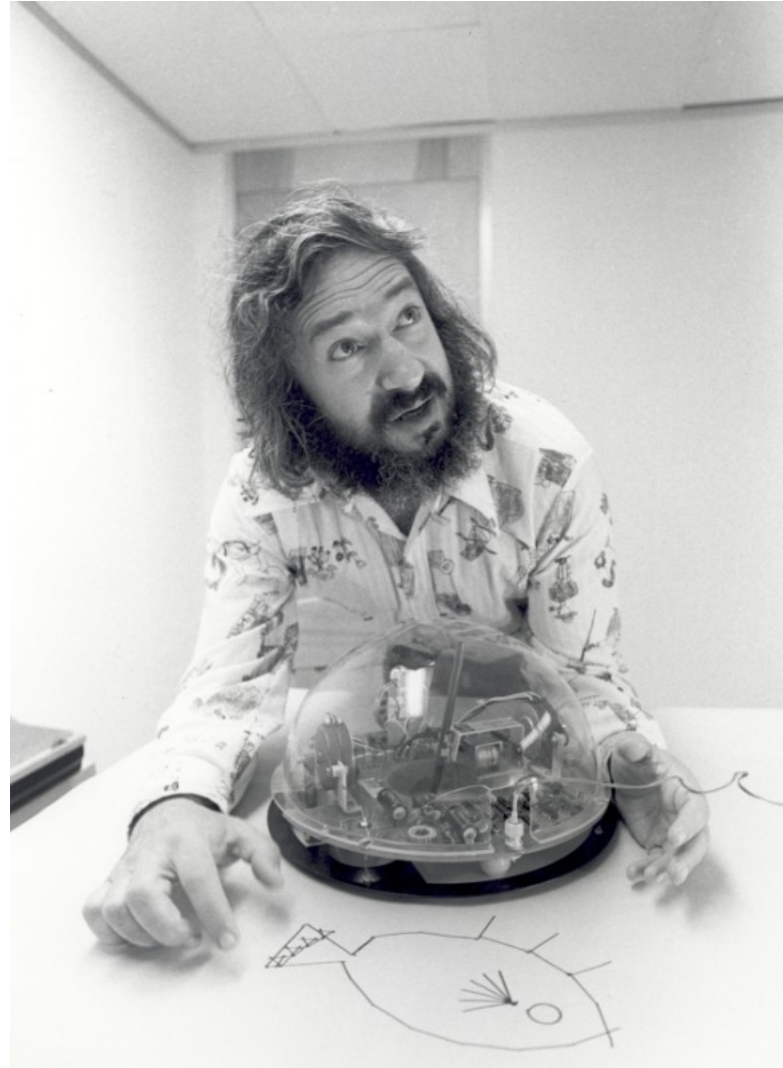
Richard Matthew Stallman



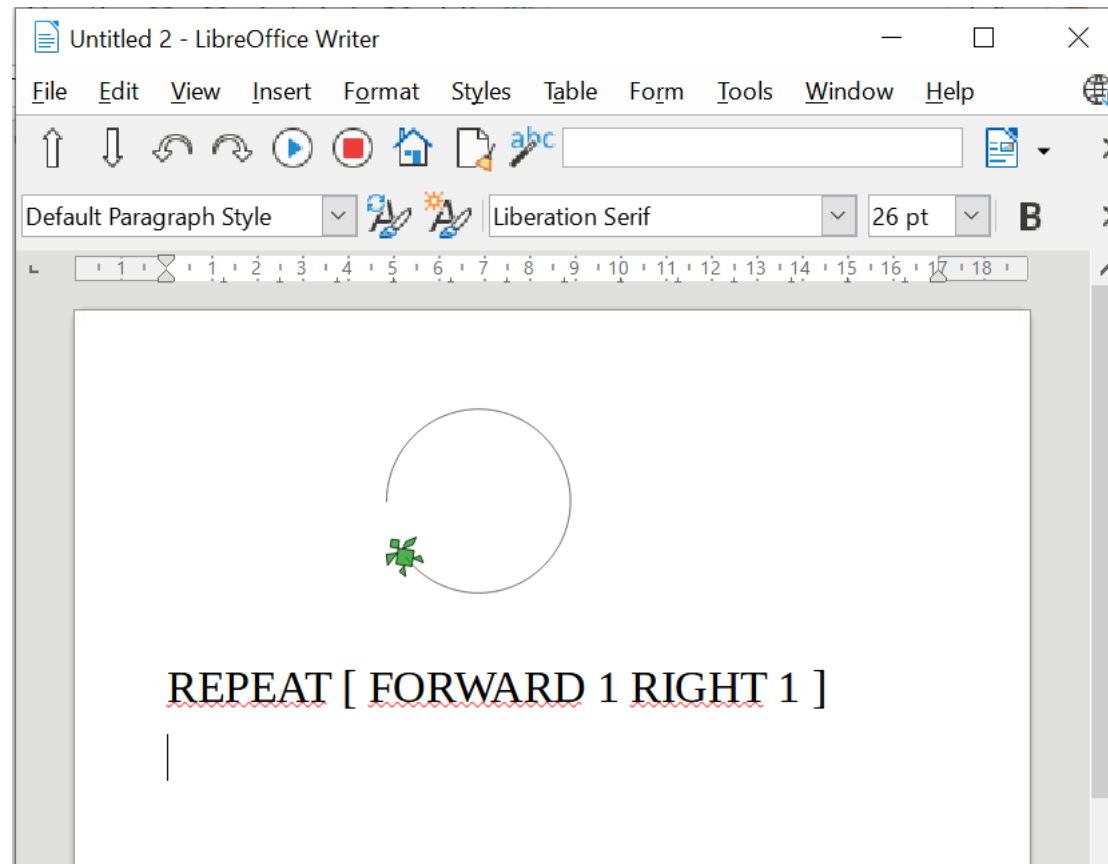
The Four Essential Freedoms of Free Software

- 1) The freedom to run the program as you wish, for any purpose.
- 2) The freedom to study how the program works, and change it so it does your computing as you wish.
- 3) The freedom to redistribute copies **so you can help your neighbor.**
- 4) The freedom to distribute copies of your modified versions to others. **By doing this you can give the whole community a chance to benefit from your changes.**

**Seymour
Aubrey Papert
(1928 — 2016)**



LibreLogo



Paperts' Syntonic learning



Students endless creativity

<https://iamarf.org/tag/elaborati-studenti/>



BOOKS

Piccolo Manuale di LibreLogo

<http://iamarf.ch/unifi/Piccolo-manuale-LibreLogo.pdf>

Building Knowledge with Turtle Geometry

<http://iamarf.ch/unifi/Building-Knowledge-With-Turtle-Geometry.pdf>

MOOCS

FedericaX: Coding a scuola con Software Libero

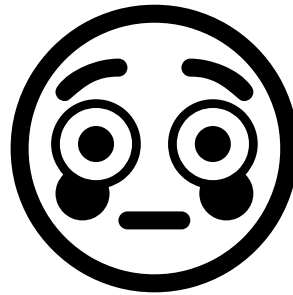
<https://www.edx.org/learn/coding/universita-degli-studi-di-napoli-federico-ii-coding-a-scuola-con-software-libero>

Coding at school with Free Software

<https://lms.federica.eu/enrol/index.php?id=358>

2025

I didn't want to deal with artificial intelligence...



...but I do!

<https://iamarf.org/2024/05/06/corso-accelerato-sullai>

Is AI an OER?



Well... it's complicated...

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What does it mean to be open for a LLM?

List of LLMs 70

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

List of Open LLMs 67

<https://github.com/eugeneyan/open-llms>

Open LLMs for code 10

<https://github.com/eugeneyan/open-llms#open-llms-for-code>

Open LLM datasets for pre-training 2

<https://github.com/eugeneyan/open-llms?tab=readme-ov-file#open-llm-datasets-for-pre-training>

Open LLM datasets for instruction-tuning 3

<https://github.com/eugeneyan/open-llms?tab=readme-ov-file#open-llm-datasets-for-instruction-tuning>

Open LLM datasets for alignment-tuning 1

<https://github.com/eugeneyan/open-llms?tab=readme-ov-file#open-llm-datasets-for-alignment-tuning>

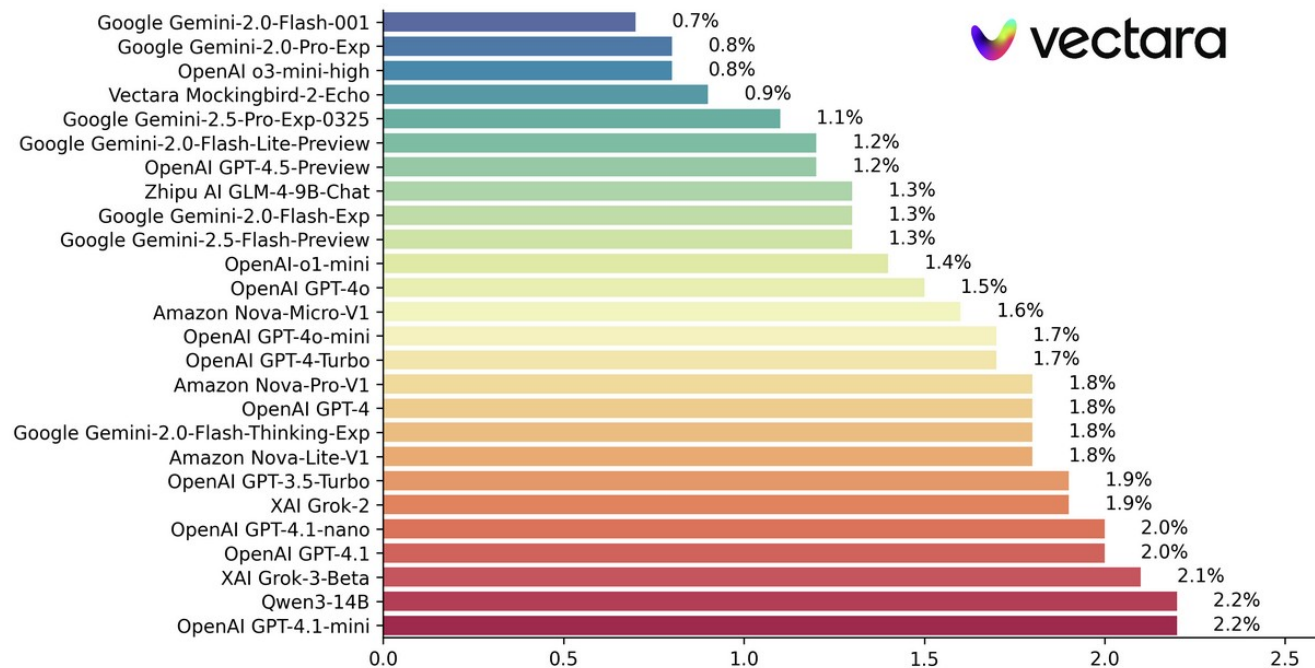
LLMs problems

1) Hallucinations: distortion of factual truth

Hallucination rates (summary production)

<https://github.com/vectara/hallucination-leaderboard/>

Grounded Hallucination Rates for Top 25 LLMs



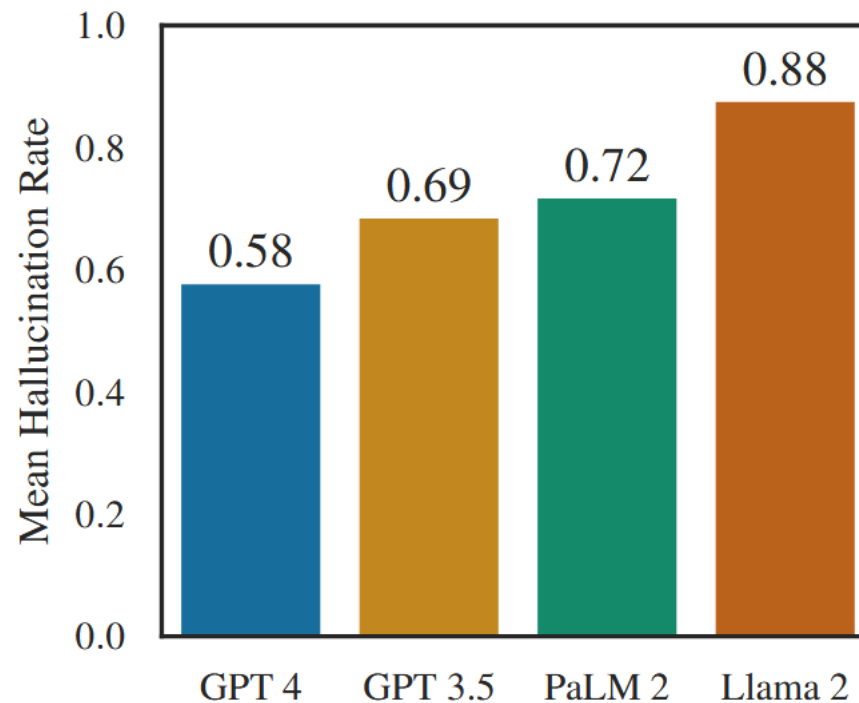
Last updated on April 29th, 2025

LLMs problems (again)

1) Hallucinations: distortion of factual truth

Dahl et al (2024) Large Legal Fictions: profiling legal hallucinations in Large Language Models

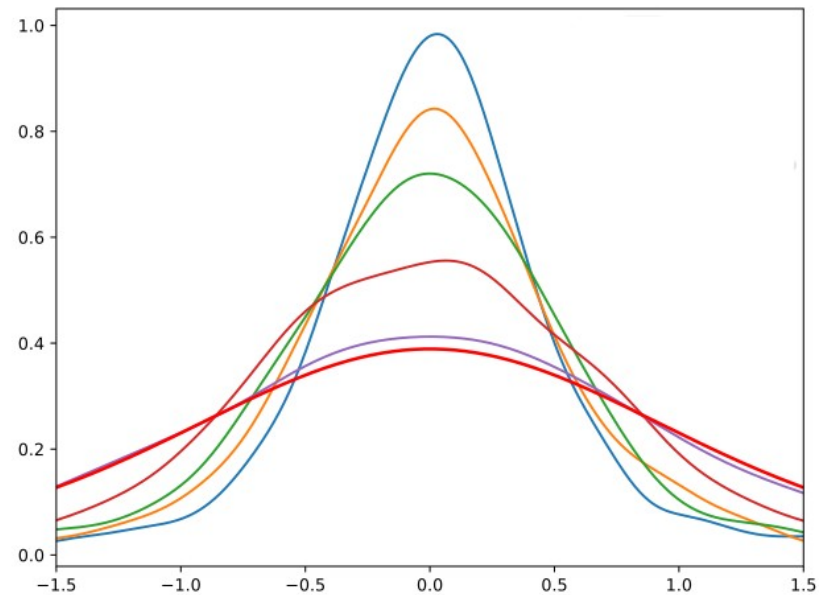
<https://arxiv.org/pdf/2401.01301>



LLMs problems

2) Distortion of the distribution of possible answers to questions that are not easily decideable

Related to point 7: Collapse of society's knowledge (Peterson)

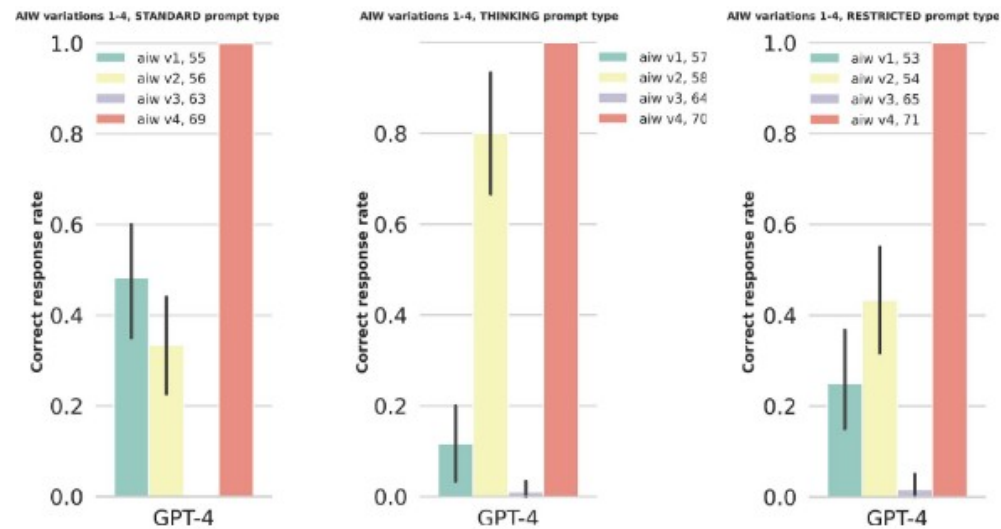


LLMs problems

3) Serious inability to reason properly

Alice in Wonderland: Simple Tasks Showing Complete Reasoning Breakdown in State-Of-the-Art Large Language Models

<https://arxiv.org/pdf/2406.02061>

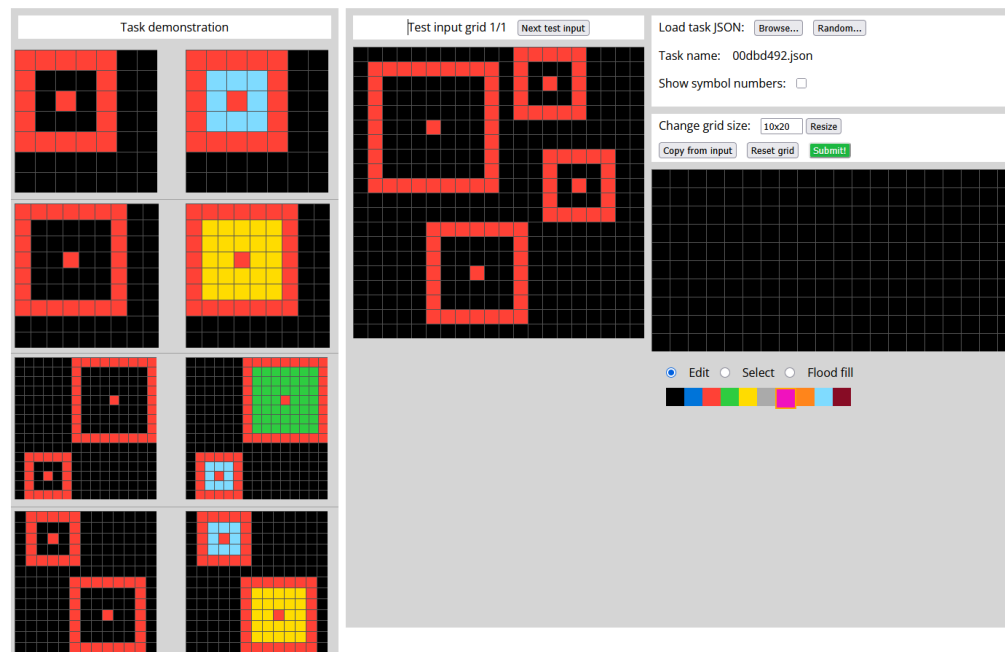


LLMs problems

3) Serious inability to reason properly (again)

Abstract and Reasoning Corpus for Artificial General Intelligence" (ARC-AGI) benchmark: <https://arcprize.org/arc-agi>

François Chollet "[On the Measure of Intelligence](#)" 2019



LLMs problems

4) Contamination of linguistic forms and ways of thinking by dominant languages in the corpora used for training (>90% English)

Xu et al (2024) A Survey on Multilingual Large language Models: Corpora, Alignment, Bias
<https://arxiv.org/abs/2404.00929>

Model	Languages	Language proportion	Source
XLNet	100	English (12.56%); Russian (11.61%); Indonesian (6.19%); Vietnamese (5.73%); Others (63.89%)	Generated using the open source; CC-Net repository
BLOOM	46	English (30.03%); Simplified Chinese (16.16%); French (12.9%); Spanish (10.85%); Portuguese (4.91%); Arabic (4.6%); Others (20.55%)	Web Crawl (38%); BigScience Catalogue Data (62%)
Falcon	>100	Inglese (58.2%); Russian (13.19%); German (10.81%); Spanish (9.45%); Others (66.55%)	Common Crawl
GPT-3	95	English (92.7%); French (1.8%); German (1.5%); Others (5.9%)	Common Crawl, Wikipedia, Books1, Books2, WebText2
GPT-4	26	Unknown	Common Crawl, Wikipedia, Books1, Books2, WebText2
LLaMa 3	176	Over 5% non-English	Publicly available sources excludes Meta user data
Claude 3	43	Unknown	Publicly available information on the Internet; Non-public data.

LLMs problems

5) Impossibility of eliminating ethical biases (gender, ethnicity, dominant countries, etc.)

Xu et al (2024) A Survey on Multilingual Large language Models: Corpora, Alignment, Bias

<https://arxiv.org/abs/2404.00929>

Model	Languages	Language proportion	Source
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LLMs problems

6) Degeneration of LLMs in the presence of contamination of training corpora with information produced by the models themselves

AI models collapse when trained on recursively generated data

Shumailov et al (2024) Nature

<https://www.nature.com/articles/s41586-024-07566-y>

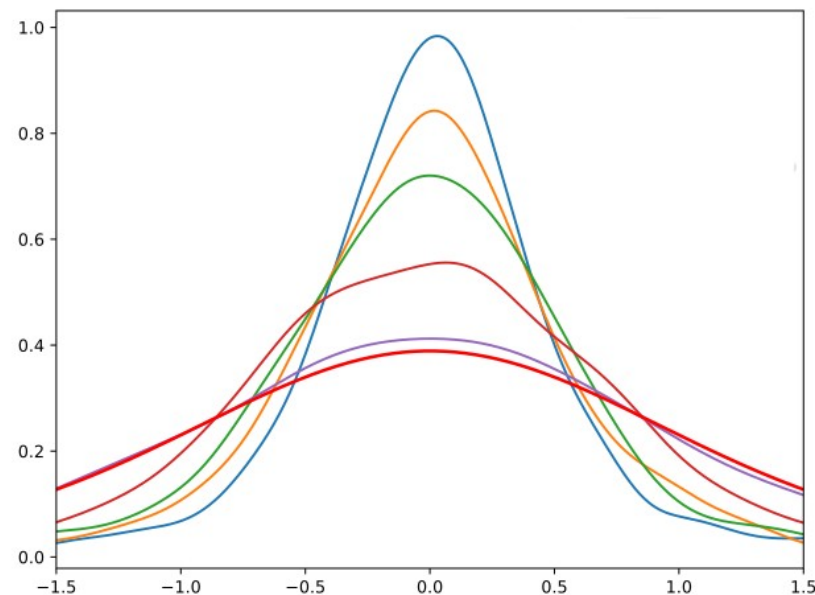
LLMs problems

7) Collapse of society's knowledge in the presence of large proportions of people opting for information pre-digested by AI

AI and the problem of knowledge collapse

Peterson (2024) Springer

<https://link.springer.com/article/10.1007/s00146-024-02173-x>



LLMs problems

8) Control and manipulation of AI by the powers — companies and governments — that produce it

Wired. Mar 14, 2025 7:29 PM

Under Trump, AI Scientists Are Told to Remove ‘Ideological Bias’ From Powerful Models

<https://www.wired.com/story/ai-safety-institute-new-directive-america-first/>

The National Institute of Standards and Technology (NIST) has issued new instructions to scientists that partner with the US Artificial Intelligence Safety Institute (AISI) that eliminate mention of “AI safety,” “responsible AI,” and “AI fairness” in the skills it expects of members and introduces a request to prioritize “reducing ideological bias, to enable human flourishing and economic competitiveness.”

So what?