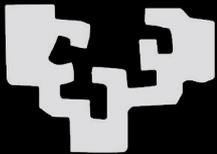


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Basque Center for Language Technology

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ESFRI – EOSC – SSHOC



#SSHOCaVocabulary
#SSHOCifyCLARIN

○ Social Sciences
○ Humanities

European Strategic Forum of Research Infrastructures (ESFRI)

CLARIN: Common **L**anguage **R**esources and
Technology **I**nfrasturcture

DARIAH: Digital **R**esearch **I**nfrasturcture for the
Arts and **H**umanities

Strategy Report on Research Infrastructures

ROADMAP 2021

ESFRI

European Strategy Forum
on Research Infrastructures

CLARIN



DARIAH-EU

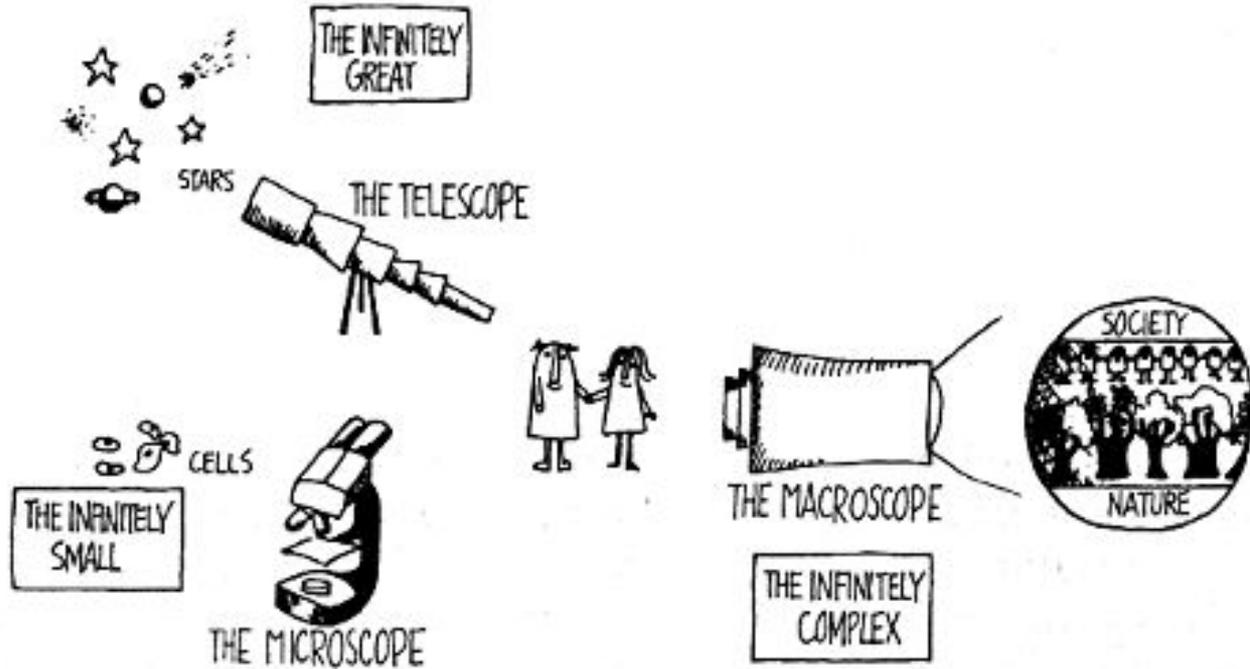
CLARIAH-ES: CLARIN & DARIAH



Distributed RI: **10** centres

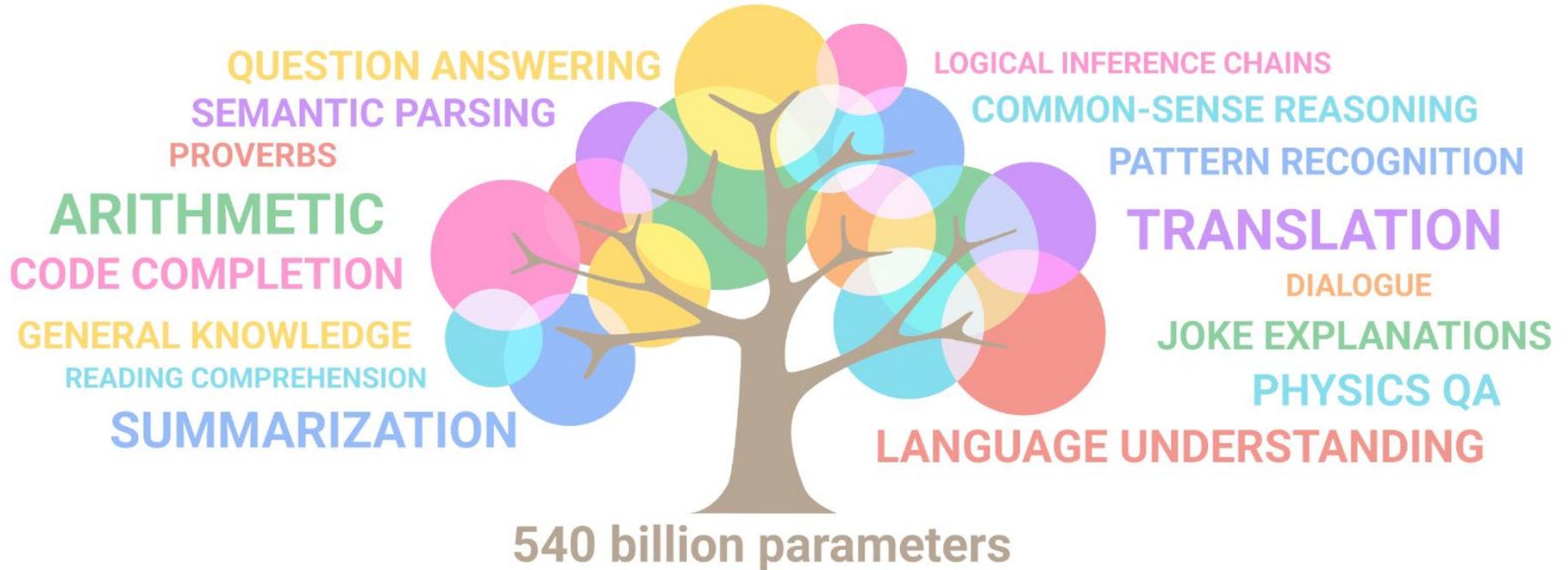
- Community
- Data
- Tools & services
- IT-HPC-infrastructure

The Macroscope



De Rosnay, J. [The macroscope](#), Harper & Row, NY, 1979

Large Language Models



PaLM: Scaling Language Modeling with Pathways (2022)

Aakanksha Chowdhery, + 67 authors



Experts, Data, HPC

Large Language Models

Explaining a joke

Prompt

Explain this joke:

Joke: Did you see that Google just hired an eloquent whale for their TPU team? It showed them how to communicate between two different pods!

Model Response

Prediction: TPUs are a type of computer chip that Google uses for deep learning. A "pod" is a group of TPUs. A "pod" is also a group of whales. The joke is that the whale is able to communicate between two groups of whales, but the speaker is pretending that the whale is able to communicate between two groups of TPUs.

PaLM explains an original joke with two-shot prompts.

PaLM: Scaling Language Modeling with Pathways (2022)

Aakanksha Chowdhery, + 67 authors



Experts, Data, HPC

New AI paradigm

- **Accelerated** discovery cycle
- Impressive progress
 - **Superior** to humans in many tasks
- **Deep** and **reinforcement learning**
 - **Deep** neural networks
- Application in **Language**, Vision, Robotics
- **LLMs** require
 - **Experts, Supercomputing, Data**
 - [LLaMA-2](#) (70B) : 1.7M GPU hours A100-80Gb (~ 1000 A100 71 days)



Deep Learning: HPC

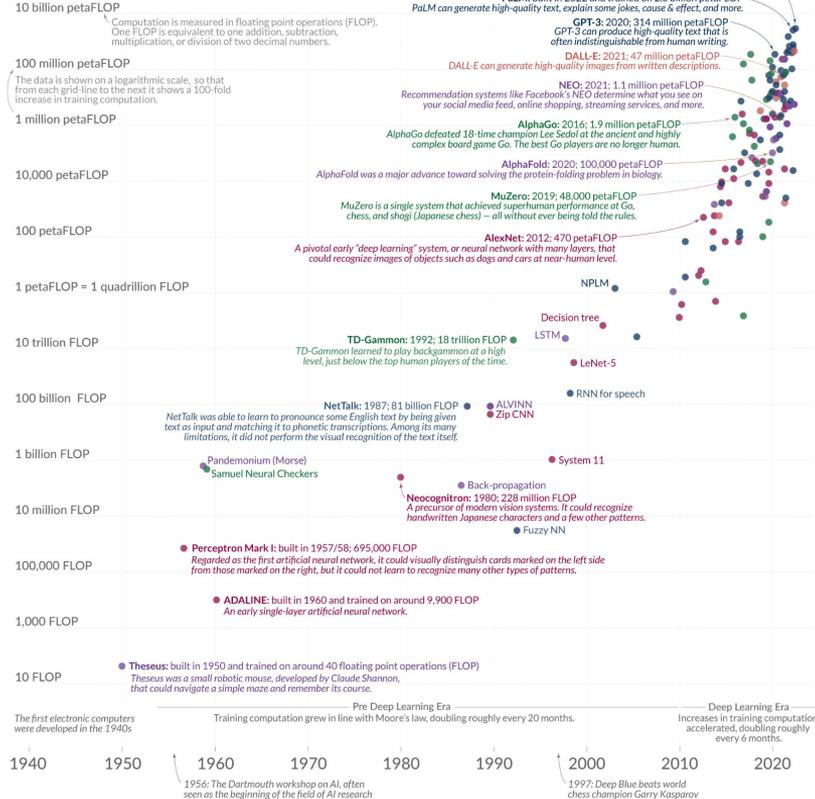
[https://www.visualcapitalist.com/cp/charted-history-exponential-growth-in-ai-computational/](https://www.visualcapitalist.com/cp/charted-history-exponential-growth-in-ai-computational-growth-in-ai-computational/)

The rise of artificial intelligence over the last 8 decades: As training computation has increased, AI systems have become more powerful

Our World in Data

The color indicates the domain of the AI system: ● Vision ● Games ● Drawing ● Language ● Other

Shown on the vertical axis is the training computation that was used to train the AI systems.



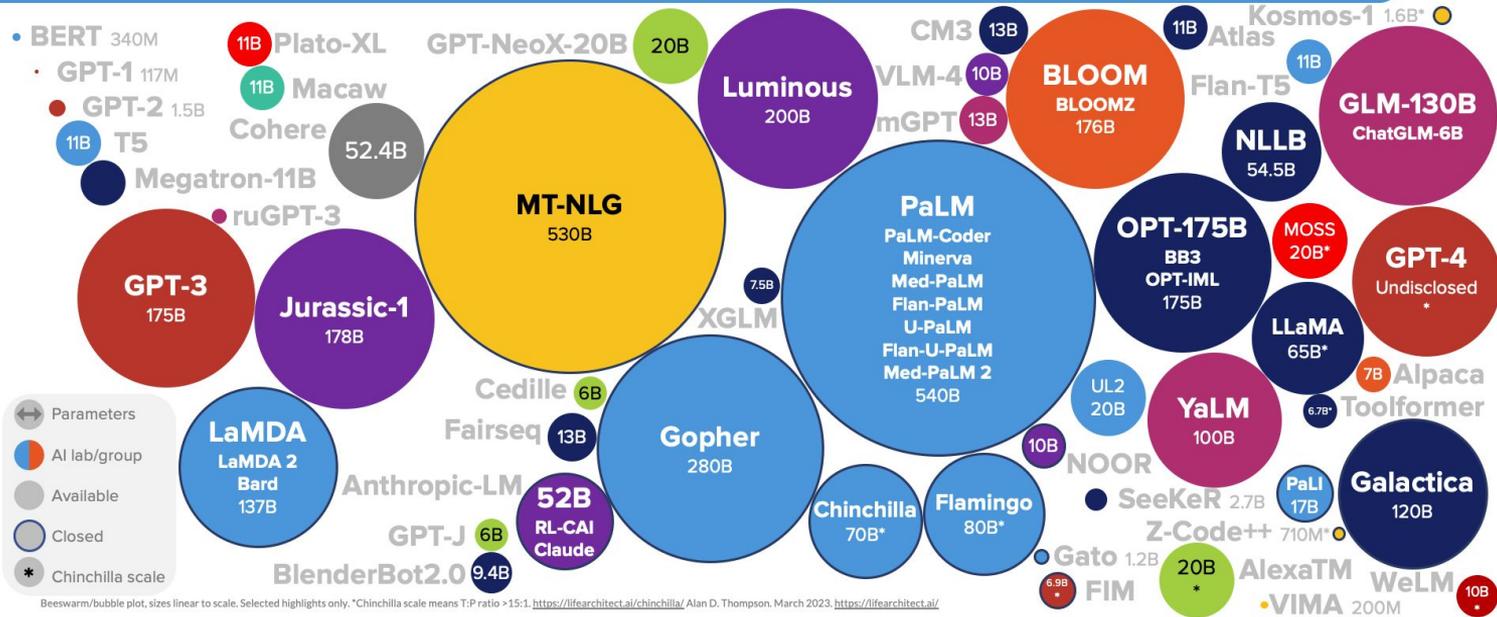
GPT-3

The data on training computation is taken from Sevilla et al. (2022) – Parameter, Compute, and Data Trends in Machine Learning. It is estimated by the authors and comes with some uncertainty. The authors expect the estimates to be correct within a factor of two. OurWorldInData.org – Research and data to make progress against the world's largest problems.

Licensed under CC-BY by the authors Charlie Giattino, Edouard Mathieu, and Max Roser

Large Language Models

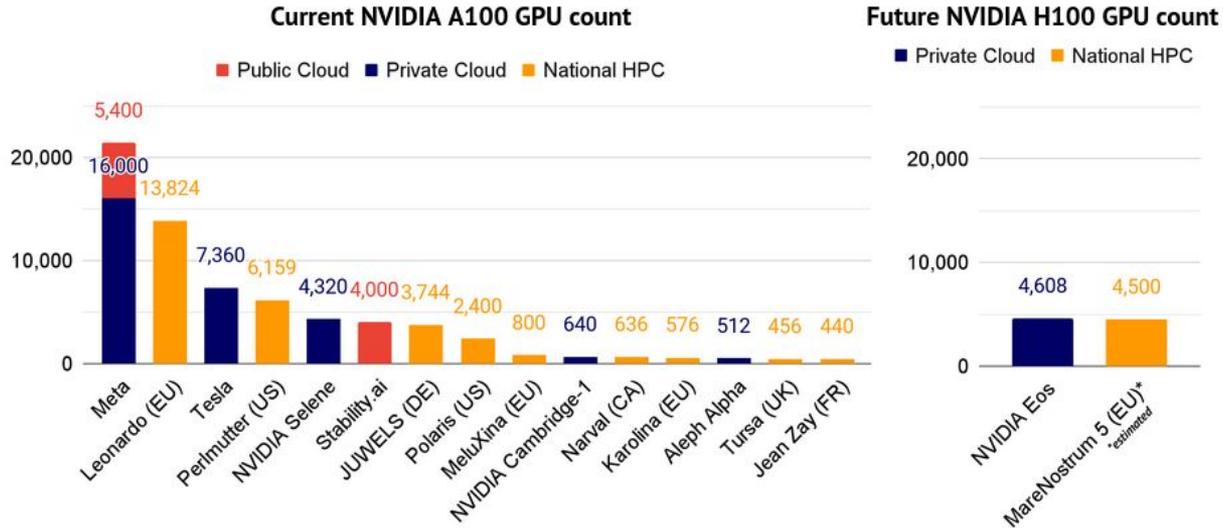
LANGUAGE MODEL SIZES TO MAR/2023



Deep Learning: HPC

In a gold rush for compute, companies build bigger than national supercomputers

▶ “We think the most benefits will go to whoever has the biggest computer” – Greg Brockman, OpenAI CTO



stateof.ai 2022

<https://www.stateof.ai/>

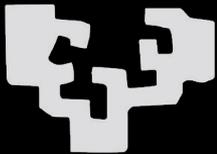
https://eurohpc-ju.europa.eu/about/our-supercomputers_en

Summary

- **Unthinkable** AI applications just a few years ago
- Even more **amazing** results in the near future (day by day)
- Experts, **Supercomputing**, Data ...

- Regarding **HPC**:
 - Not only for big research projects ... (RES, MN5, EuroHPC JU, ...)
 - Small, medium HPC facilities
 - Flexible **access** to GPUs:
 - small, medium HPC facilities
 - Undergraduate CS and AI students
 - PhD students
 - Small Research groups
 - ...

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