Recherche Reproductible et IA

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2èmes Journées du Réseau National de la Recherche Repro
Table ronde
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Different Reproducibility Concerns in Modern Science

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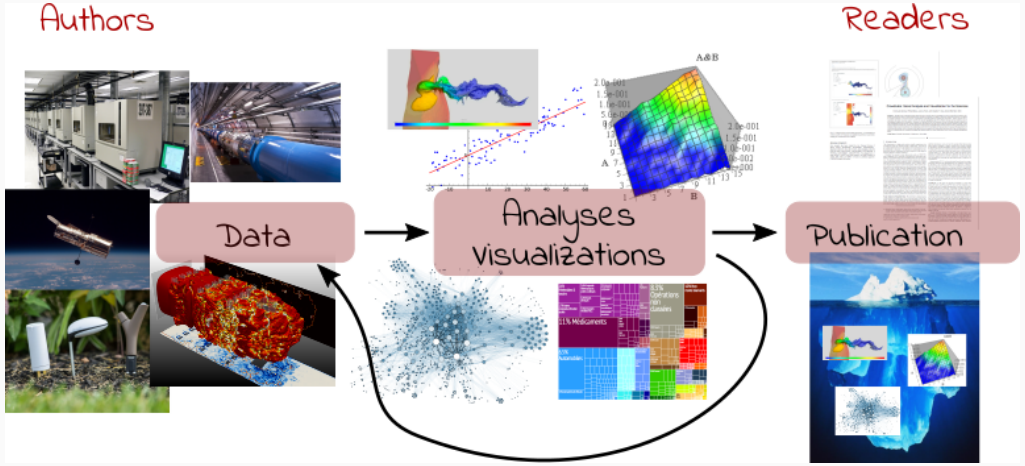
Artificial Intelligence most of the above 😉

AFAIC, I care about **transparency**



Reproducibility Issues in ML-based Science

Machine Learning: Trouble at the lab, The Economist 2013

> *According to some estimates, three-quarters of published scientific papers in the field of machine learning are bunk because of this "overfitting".*
>
> *– Alex "Sandy" Pentland*

The Reproducibility Crisis in ML-based science (Princeton workshop 2022)

> *Reproducibility failures in ML-based science are systemic. We found 20 reviews across 17 scientific fields (medicine, neuroimaging, autism diagnosis, genomics, computer security, ...) that find errors in a total of 329 papers that use ML-based science and in some cases leading to wildly overoptimistic conclusion. [...] complex ML models don't perform substantively better than decades-old LR models.*
>
> *Data leakage: spurious relationship between the independent variables and the target variable that arises as an artifact of the data collection, sampling, or pre-processing strategy.*
>
> *– S. Kapoor and A. Narayanan*

Specific and hot issues

Same Old, Same Old...

- Software profusion and chaos
- Complex process

Big Sensitive Data Large volume of data and computation

- Different from climate-change/astrophysics/... research ?
- Sensitive data and privacy issues

"Autonomy" of Science GAFAM/NATU, OpenAI/Mistral/Anthropic/... and Academia. Same game ?

- Jean-Zay $\approx$ 40 PetaFlops, Meta's AI supercomputer $\approx$ 5,000 PetaFlops
- A moving target
- Reproducibility vs. Market shares

AI is now driving science ☹ (e.g., astrophysics)

Scientific Integrity ChatGPT's disruption

- Scientific integrity, Bias, Opacity, ... $\rightsquigarrow$ lost of trust