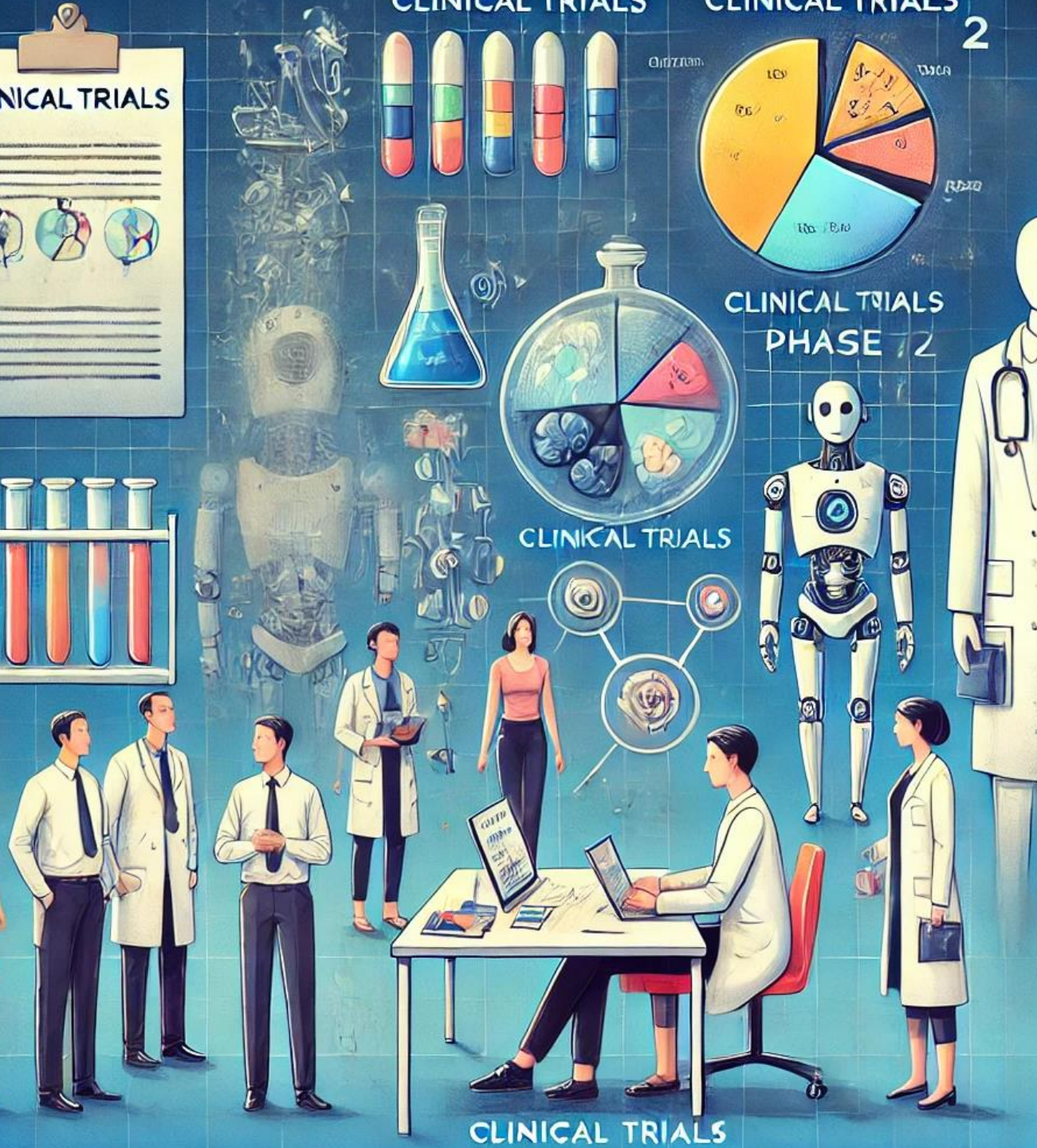


# Generative AI

Opportunities and challenges

Dr. Saskia Lensink





Why do clinical trials take so much time?

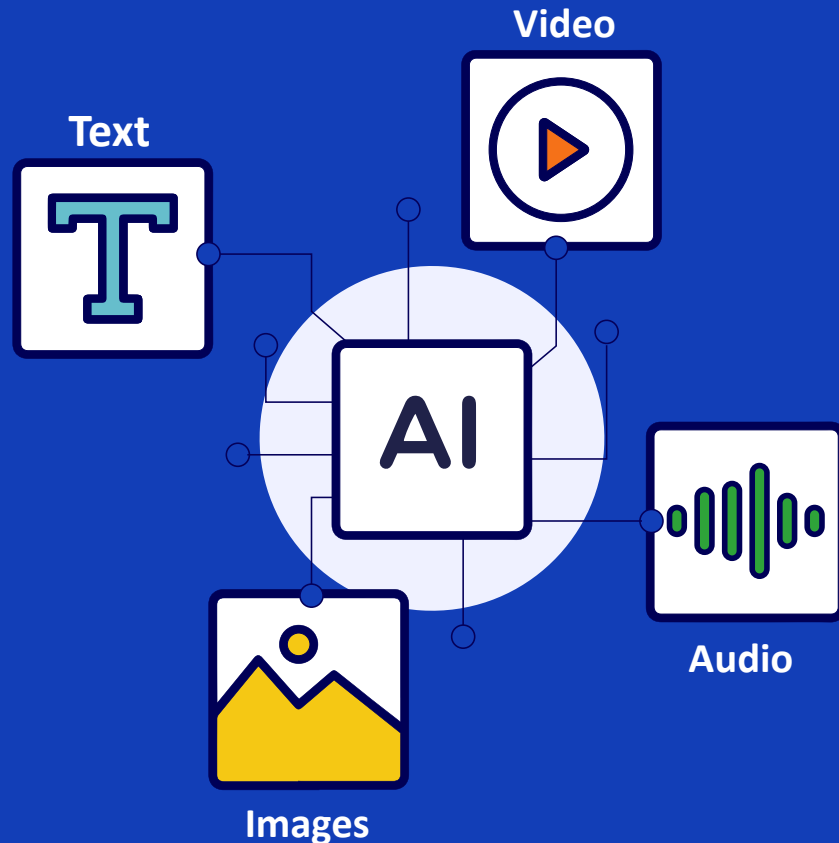
Very well regulated because of the potential of a (hugely) negative impact

... how about  
generative AI?



# What is generative AI?

A category of AI systems designed to generate new content, such as text, images, audio, and video, by learning patterns from existing data.



# GenAI brings significant opportunities and value



Communication  
& Marketing



Research &  
Development



Software  
Development



Data  
Analytics



Customer  
Service



Legal Contract  
Management



Project  
Management

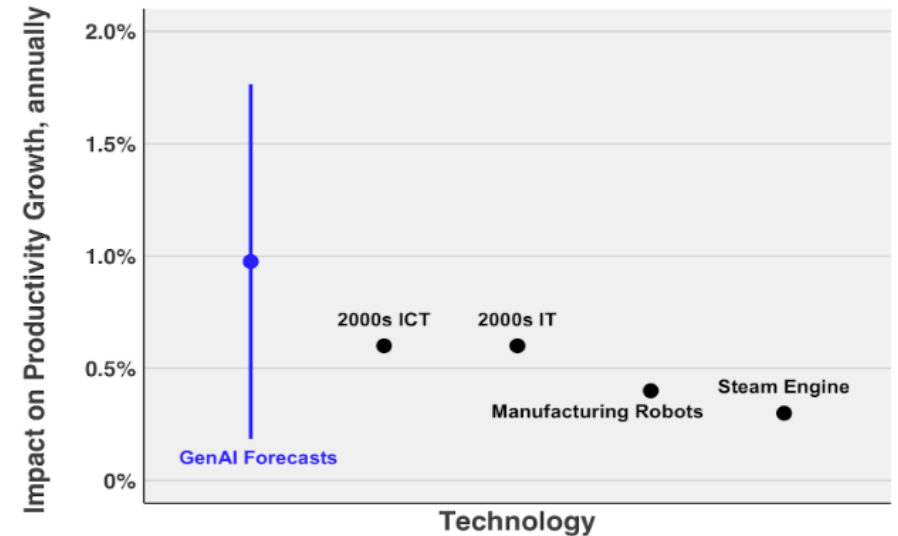
**\$111 billion**

Value the GenAI global market is expected to reach by 2030

**80%**

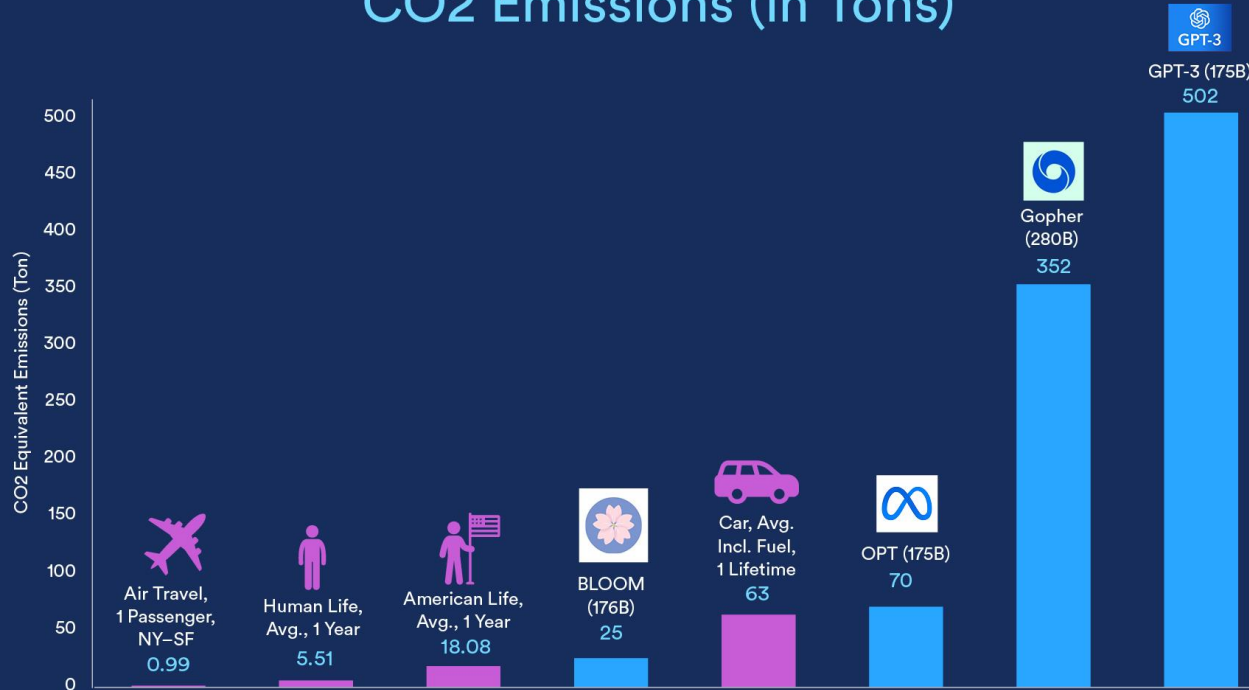
Of enterprises using GenAI powered applications in their workflows by 2026

Forecasts on the impact of Generative AI fall in the middle of historical technologies' impacts



# Environmental impact genAI

## CO2 Emissions (in Tons)



Source: Luccioni et al., 2022; Strubell et al., 2019 | Chart: 2023 AI Index Report

CODE  
CARBON

it produces a lot of CO2 emissions.

### Here's a breakdown of its carbon footprint:

#### 1 Each query 4.32g of CO2

Using a CO2 calculator and some basic math, ChatGPT produces more CO2 per query than Google (apparently, each search query in Google results in 0.2g CO2 per query.)



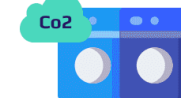
#### 2 16 queries is equivalent to boiling a kettle



Fancy a cup of tea? Boiling an electric kettle produces **70g of CO2**.

#### 3 139 queries produce as much CO2 as doing laundry

That's assuming you started a load at 86 degrees Fahrenheit and used a clothesline to dry them.

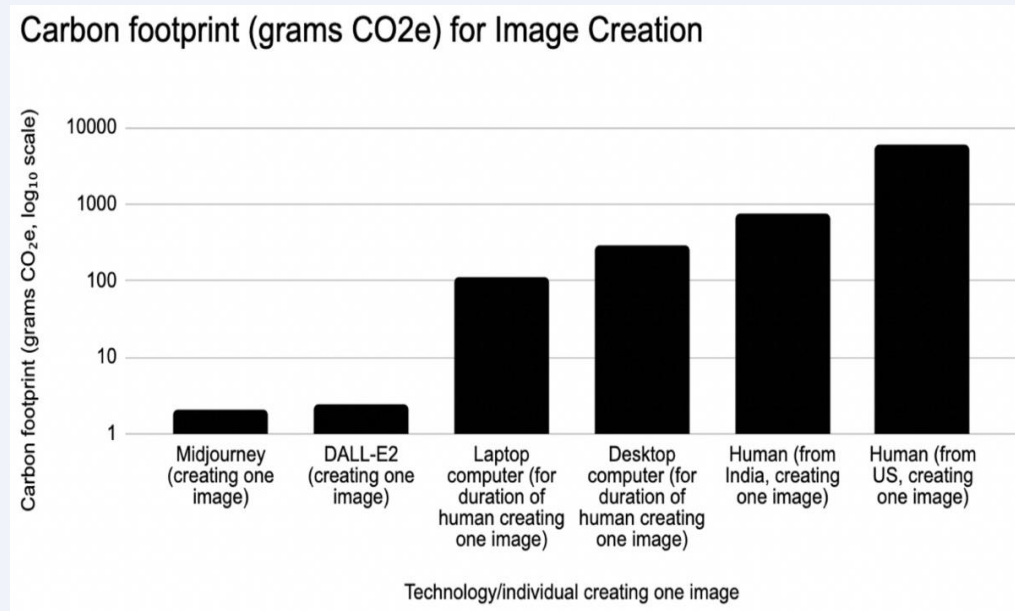


#### 4 92,593 queries will get you from San Francisco to Seattle and back

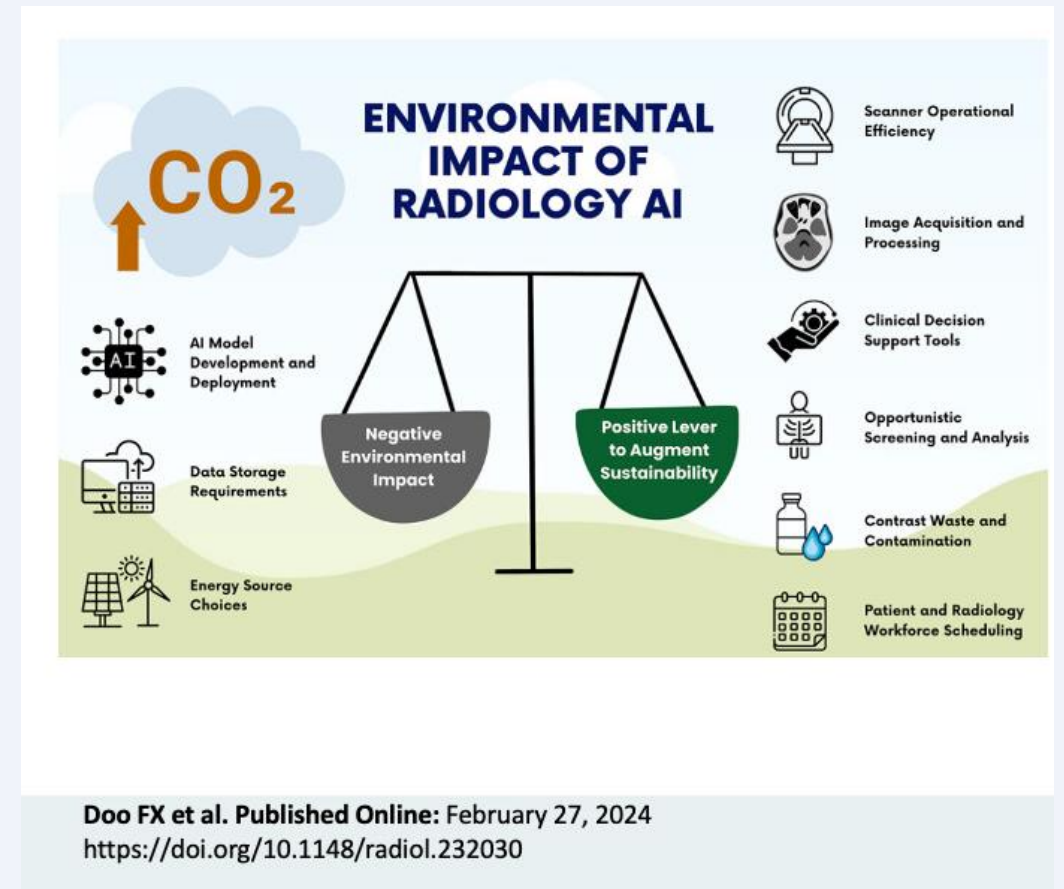


Not that we expect one person to do this on their own, but 92,000+ queries emit **400kg CO2** - as much as a round-trip flight from San Francisco to Seattle.

# Environmental impact genAI



[The carbon emissions of writing and illustrating are lower for AI than for humans | Scientific Reports \(nature.com\)](https://www.nature.com/articles/d41586-023-03000-0)



NOS Nieuws • Dinsdag 13 augustus, 11:49

**Stichting Brein haalt grote hoeveelheid illegale data voor trainen AI offline**

**"Impossible": OpenAI admits ChatGPT can't exist without pinching copyrighted work**

**ChatGPT, Grok, Gemini and other AI chatbots are spewing Russian misinformation. study finds**

Published on 18/06/2024 - 16:57 GMT+2



**Jonathan Turley** ✓

@JonathanTurley

...I learned that ChatGPT falsely reported on a claim of sexual harassment that was never made against me on a trip that never occurred while I was on a faculty where I never taught. ChatGPT relied on a cited Post article that was never written and quotes a statement that was never made by the newspaper.

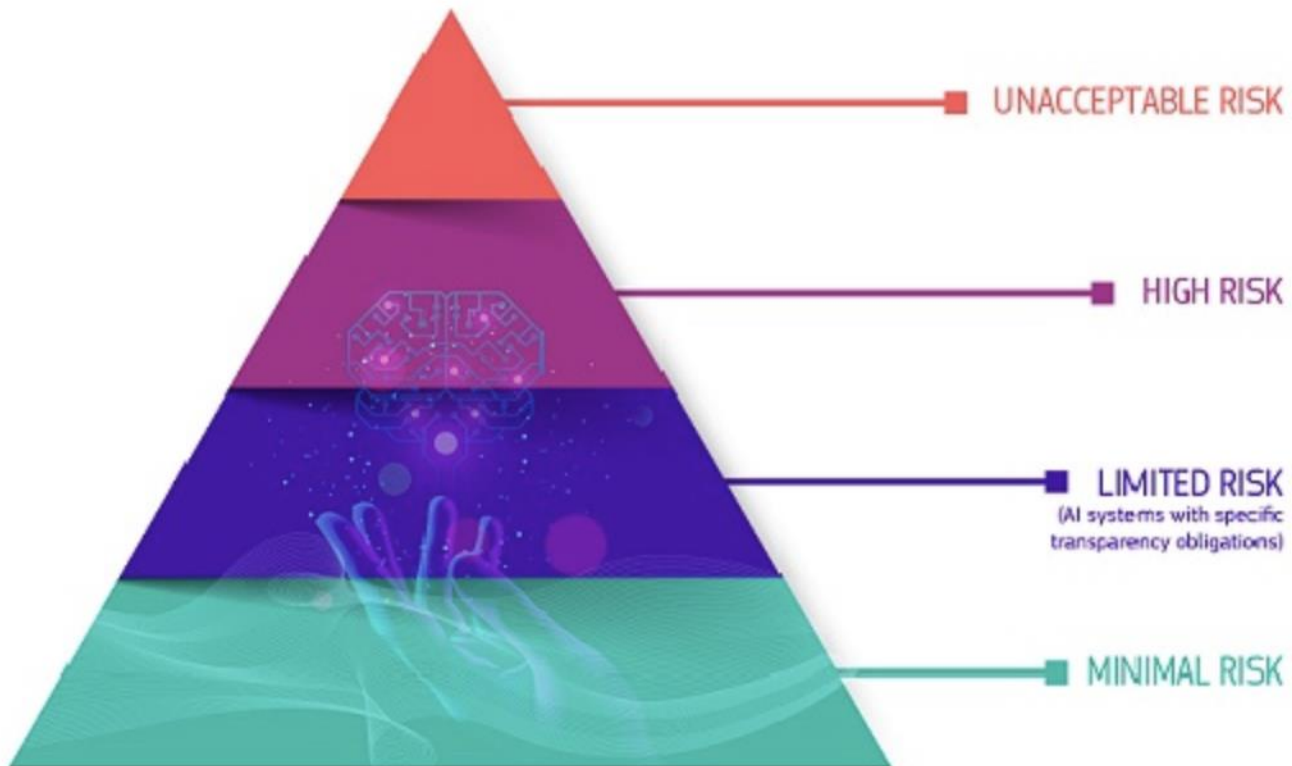
[Post vertalen](#)

3:03 p.m. · 6 apr. 2023 · 91,3K Weergaven



# EU AI Act

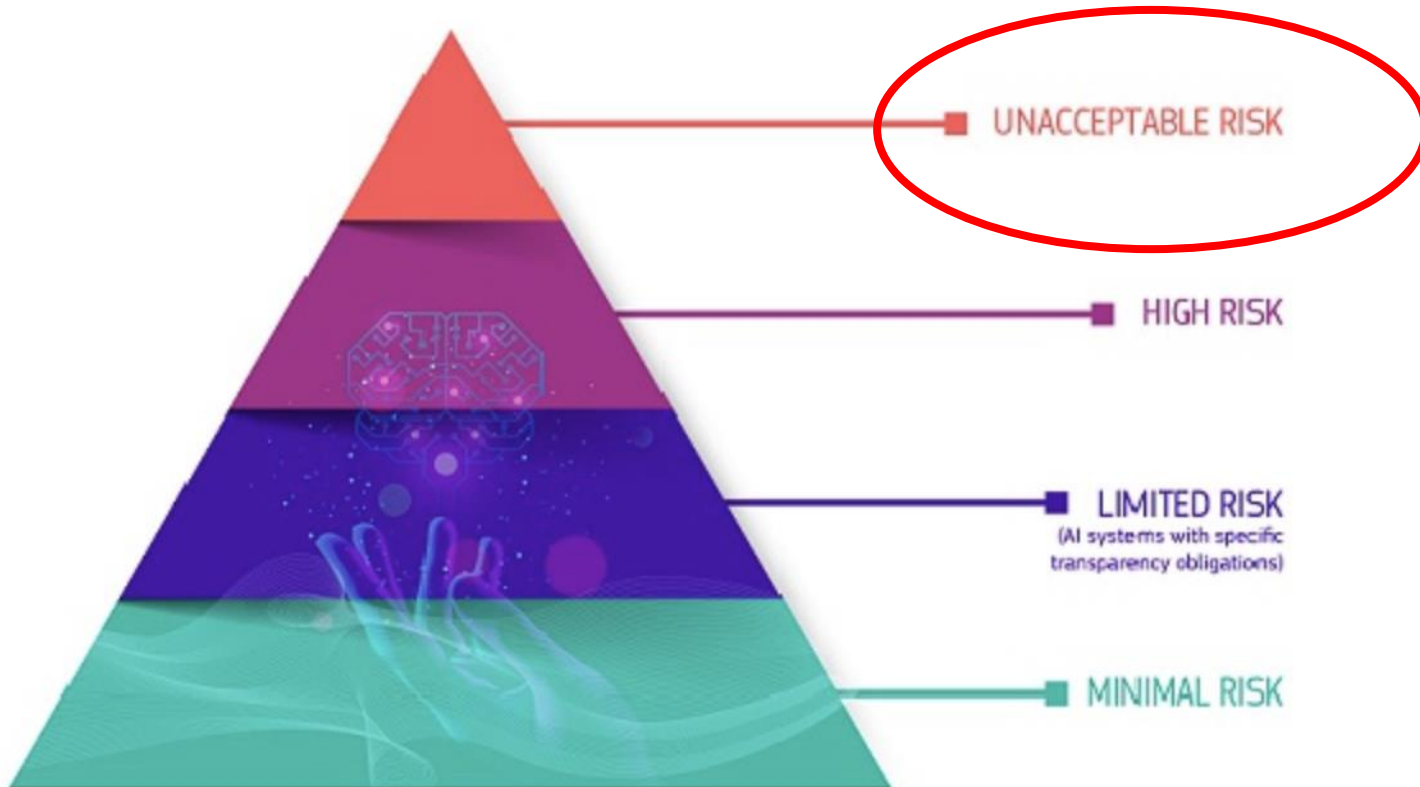
The Regulatory Framework defines 4 levels of risk for AI systems:



- Officially entered into force on August 1<sup>st</sup>, 2024
- Risk-based approach

# EU AI Act

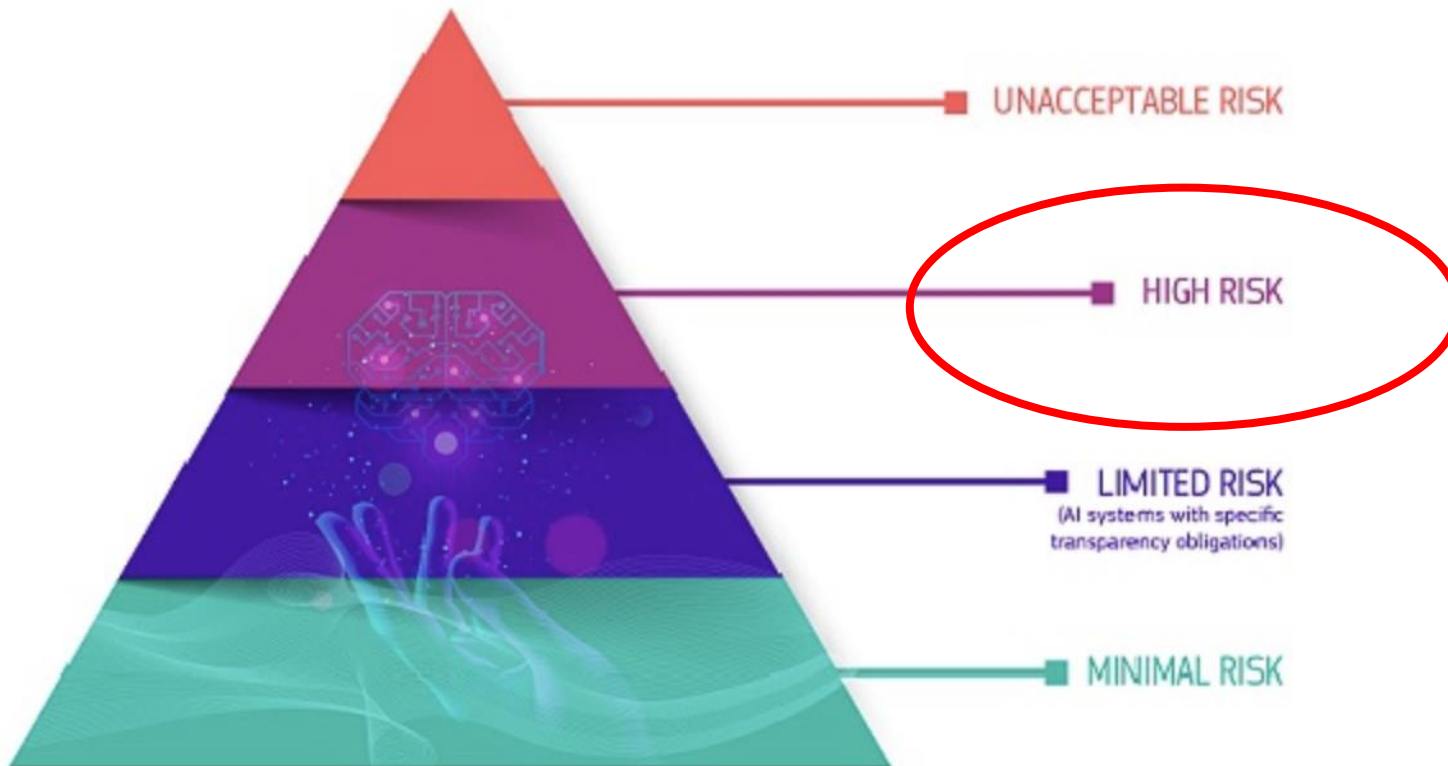
The Regulatory Framework defines 4 levels of risk for AI systems:



- Banned
- Examples: social scoring, emotion recognition in the workplace and schools, biometric categorisation systems

# EU AI Act

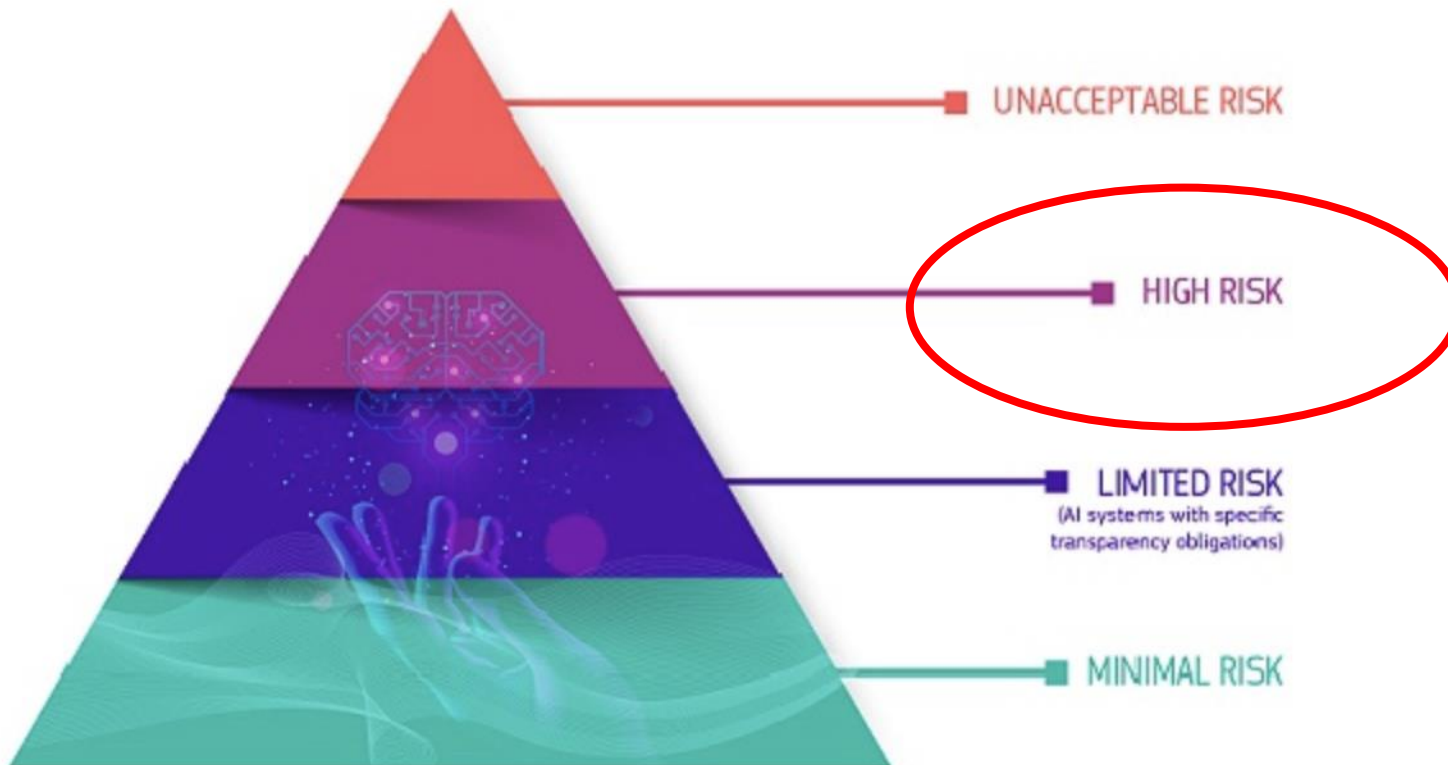
The Regulatory Framework defines 4 levels of risk for AI systems:



- Subject to strict obligations
- Examples: critical infrastructure, education, essential public services such as **healthcare**, law enforcement, border management, justice and democratic processes

# EU AI Act

The Regulatory Framework defines 4 levels of risk for AI systems:



## Obligations:

- adequate risk assessment and mitigation systems
- high quality of the datasets feeding the system to minimise risks and discriminatory outcomes
- logging of activity to ensure traceability of results
- detailed documentation providing all information necessary on the system and its purpose for authorities to assess its compliance
- clear and adequate information to the deployer
- appropriate human oversight measures to minimise risk
- high level of robustness, security and accuracy

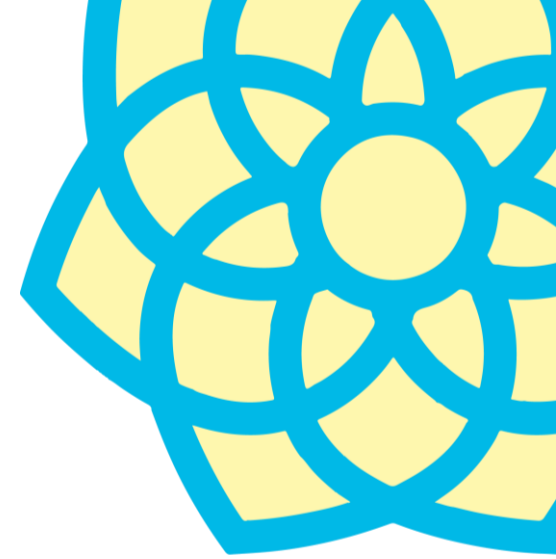


A **lawful** Dutch-English Large Language Model,  
Trained on a dataset we are collecting from scratch,  
Using data that we are allowed to use,  
Striving to be as transparent and compliant as possible



# TrustLLM

- Democratize Trustworthy and Efficient Large Language Model Technology for Europe
- The main objective is the development of an **open, trustworthy, and sustainable LLM** initially targeting the **Germanic languages**.
- This will create the foundation for an open ecosystem for next generation modular and extensible European trustworthy and sustainable large language models.

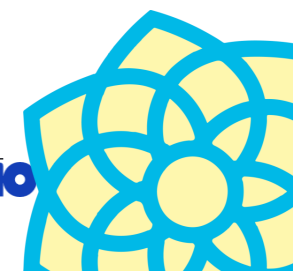


# More about the TrustLLM project

Discord channel (open to everyone) on the [AI Nordics server](#): #trust-llm-public

Website: [www.trustLLM.eu](http://www.trustLLM.eu)

Project manager: [Trine.Platou@liu.se](mailto:Trine.Platou@liu.se)



ANU BRADFORD

# The Brussels Effect

HOW THE EUROPEAN UNION  
RULES THE WORLD

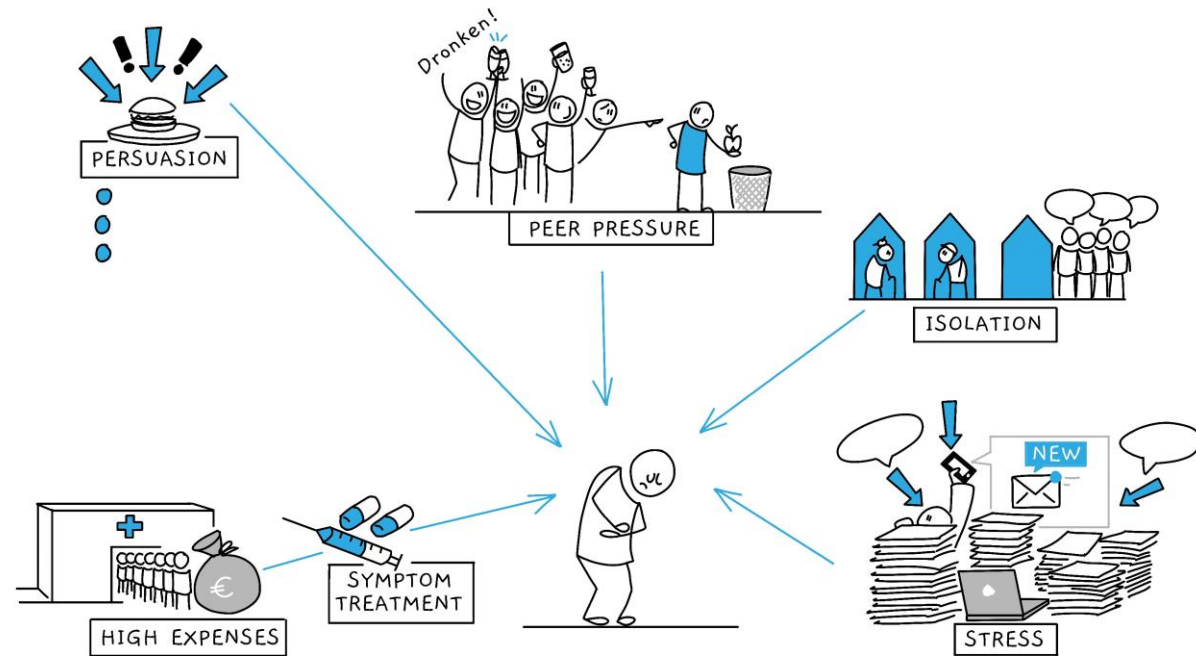




# Thank you for your attention

LDDC 19 September 2024

[saskia.lensink@tno.nl](mailto:saskia.lensink@tno.nl)



CURRENT CHALLENGES IN HEALTH

# EU High-level expert group: ethical guidelines for Trustworthy AI

- 1. Human agency and oversight:** Including fundamental rights, human agency and human oversight
- 2. Technical robustness and safety:** Including resilience to attack and security, fall back plan and general safety, accuracy, reliability and reproducibility
- 3. Privacy and data governance:** Including respect for privacy, quality and integrity of data, and access to data
- 4. Transparency:** Including traceability, explainability and communication
- 5. Diversity, non-discrimination and fairness:** Including the avoidance of unfair bias, accessibility and universal design, and stakeholder participation
- 6. Societal and environmental wellbeing:** Including sustainability and environmental friendliness, social impact, society and democracy
- 7. Accountability:** Including auditability, minimisation and reporting of negative impact, trade-offs and redress



# Ethical guidelines trustworthy AI

Feature	TrustLLM	GPT-NL	NextGen genAI?
Human agency & oversight	● ● ●	● ●	● ● ● ● ●
Technical robustness & safety	● ● ●	● ● ●	● ● ● ● ●
Privacy and data governance	● ●	● ● ● ●	● ● ● ● ●
Transparency	● ● ● ●	● ● ●	● ● ● ● ●
Diversity, non-discrimination and fairness	● ●	● ●	● ● ● ● ●
Accountability	● ● ● ●	● ● ● ●	● ● ● ● ●
Societal and environmental wellbeing	● ●	● ●	● ● ● ● ●