

AI och EUs digitala framtid

Fredrik Heintz

Dept. of Computer Science, Linköping University

fredrik.heintz@liu.se

@FredrikHeintz

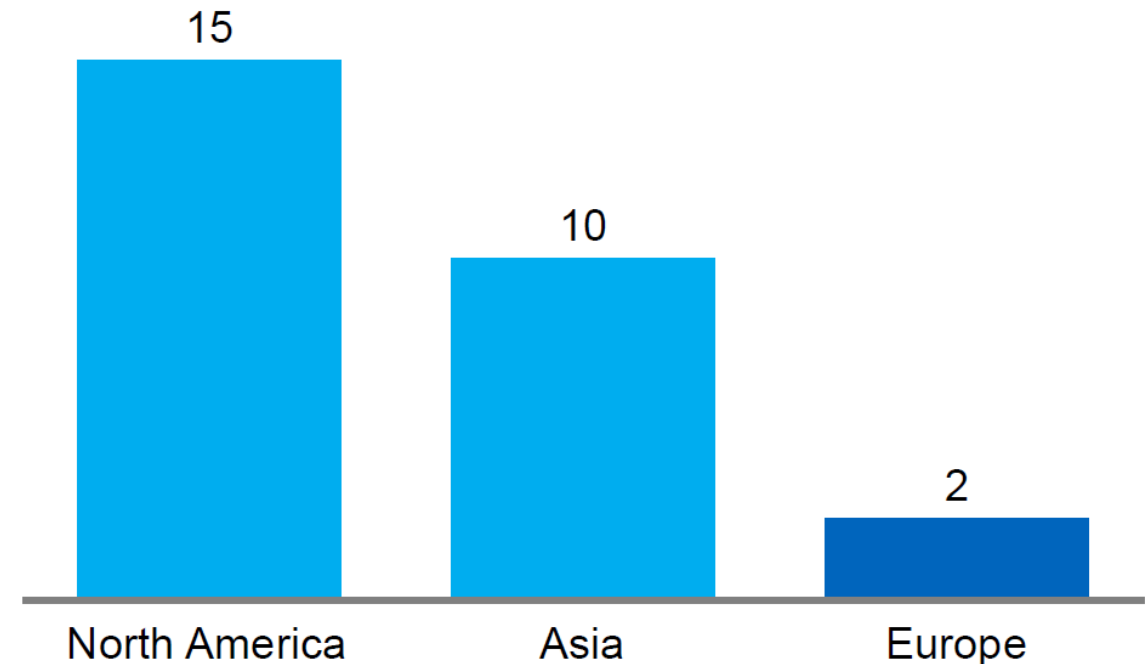


AI in Europe

- Strong AI research track record
- AI skills in short supply in Europe
- Industry digitalization in Europe low
- Low European investments in AI

European Commission is working towards 20 billion euros in AI investment per year. 3 billion EUR from the commission with the expectation of 6x from the private sector.

Internal corporate investment in AI, 2016¹, USD billion



EU strategy for AI

A STRATEGY FOR EUROPE TO LEAD THE WAY

**Boost
technological
and industrial
capacity & AI
uptake**

**Prepare for
socio-
economic
changes**

**Ensure an
appropriate
ethical & legal
framework**



In this context: appointment of Independent High-Level Expert Group on Artificial Intelligence (AI HLEG) in June 2018

Ethics Guidelines for Trustworthy AI – Overview

Human-centric approach: AI as a means, not an end

Trustworthy AI as our foundational ambition, with three components

Lawful AI

Ethical AI

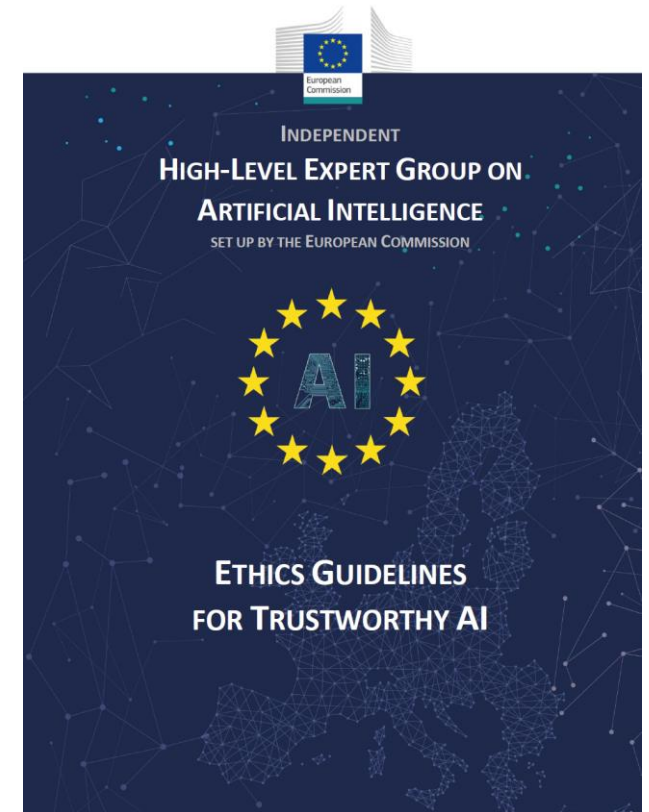
Robust AI

Three levels of abstraction

from principles
(Chapter I)

to requirements
(Chapter II)

to assessment
list (Chapter III)



Ethics Guidelines for Trustworthy AI – Principles

4 Ethical Principles based on fundamental rights



Respect for
human
autonomy

Augment, complement
and empower humans



Prevention of
harm

Safe and secure.
Protect physical and
mental integrity.



Fairness

Equal and just
distribution of
benefits and costs.



Explicability

Transparent, open
with capabilities and
purposes, explanations

The Assessment List for Trustworthy AI (ALTAI)

- **REQUIREMENT #1 Human Agency and Oversight**
 - Human Agency and Autonomy; Human Oversight
- **REQUIREMENT #2 Technical Robustness and Safety**
 - Resilience to Attack and Security; General Safety; Accuracy; Reliability, Fall-back plans and Reproducibility
- **REQUIREMENT #3 Privacy and Data Governance**
 - Privacy; Data Governance
- **REQUIREMENT #4 Transparency**
 - Traceability; Explainability; Communication
- **REQUIREMENT #5 Diversity, Non-discrimination and Fairness**
 - Avoidance of Unfair Bias; Accessibility and Universal Design; Stakeholder Participation
- **REQUIREMENT #6 Societal and Environmental Well-being**
 - Environmental Well-being; Impact on Work and Skills; Impact on Society at large or Democracy
- **REQUIREMENT #7 Accountability**
 - Auditability; Risk Management



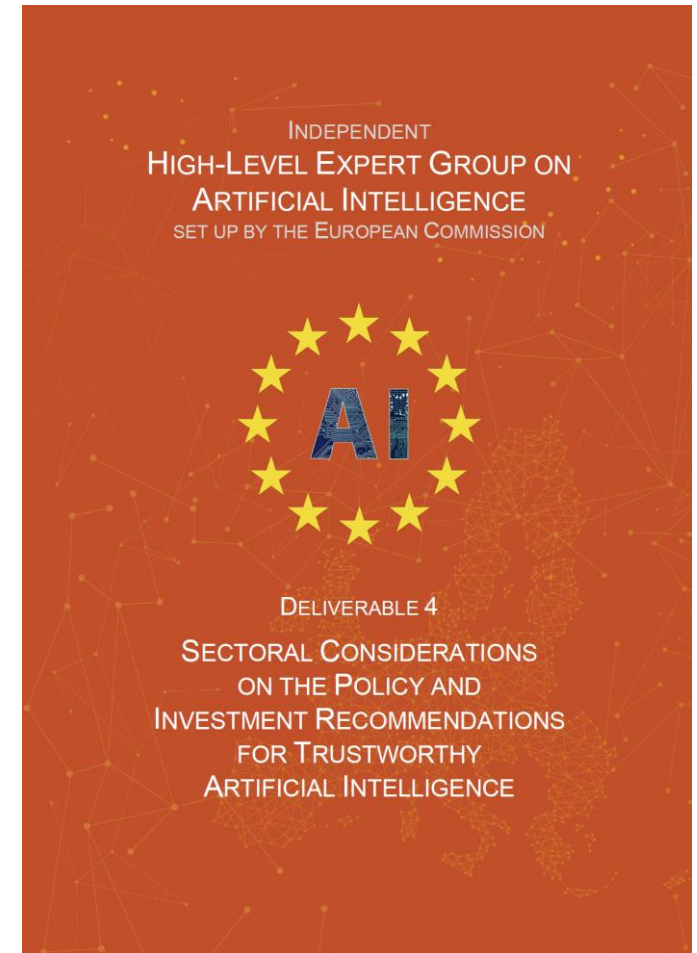
Policy & Investment Recommendations

- Using AI to build a positive impact in Europe
 - Empowering and Protecting Human and Society
 - Transforming Europe's Private Sector
 - Catalyzing Europe's Public Sector
 - Ensuring World-Class Research Capabilities
- Leveraging Europe's enablers of AI
 - Raising Funding and Investments for AI
 - Building Data and Infrastructure for AI
 - Generating appropriate Skills and Education for AI
 - Establishing an appropriate governance framework for AI



Sectorial Considerations on the Policy and Investment Recommendations

- **Sectors**
 - The Manufacturing and Industrial IoT Sector
 - Public Sector: the e-Government domain
 - Public Sector: Justice and law-enforcement
 - The Healthcare Sector
- **General comments**
 - The AI HLEG Policy and Investment Recommendations for Trustworthy AI are perceived as important and relevant
 - There is merit in refining the AI HLEG Policy and Investment Recommendations for Trustworthy AI to account for sectoral specificities
 - Trustworthiness is seen as a crucial feature of European AI
 - There is widespread concern about the need to close the skills gap
 - Europe should be a leader in responsible research and innovation in the field of AI
 - Good governance and the widespread sharing of best practices can promote regulatory certainty
 - Data quality, availability and interoperability must be at the core of EU policy



EC White Paper on Artificial Intelligence: a European approach to excellence and trust

- To build an **ecosystem of excellence** that can support the development and uptake of AI across the EU economy and public administration
 - Working with member states
 - World class lighthouse research center; Networks of research excellence
 - Skills
 - SMEs; Partnership with the private sector (PPP)
 - Promoting the adoption of AI by the public sector
 - Securing access to data and computing infrastructures
- Policy options for a future EU regulatory framework (**ecosystem of trust**) that would determine the types of legal requirements that could apply in particular to high-risk applications.
 - Effective application and enforcement of existing EU and national legislation
 - Limitations of scope of existing EU legislation
 - Changing functionality of AI systems
 - Uncertainty as regards the allocation of responsibilities between different economic operators in the supply chain
 - Changes to the concept of safety

EC White Paper on AI Feedback

- 1215 contributions, 352 business, 406 citizens, 152 research, 73 public authorities, 160 civil society, 72 others. 450 position papers.
- Building an **ecosystem of AI excellence** in Europe
 - **Skills** rated most important action; 90% found this (very) important.
 - Then **support of research and innovation communities** (88%) and **coordination with Member States** (87%).
 - **Public private partnership** (PPP) 72%
 - A world class **lighthouse research centre** 64%.
- Regulatory options for AI: **ensuring an ecosystem of trust**
 - Main concerns possibility of AI **breaching fundamental rights** (90%) and the use of AI that may lead to **discriminatory outcomes** (87%).
 - 42% request the introduction of a **new regulatory framework** on AI, another 33% the current legislation needs to be modified. Only 3% think that current legislation is fully sufficient.

<https://ai-data-robotics-partnership.eu/>

European Partnership on Artificial Intelligence, Data and Robotics

The Vision of the Partnership is to boost European competitiveness, societal wellbeing and environmental aspects to lead the world in researching, developing and deploying value-driven trustworthy AI, Data and Robotics based on fundamental European rights, principles and values.

- **Openness and inclusiveness** to bring European and cross-domain knowledge together to fulfill the vision
- **Openness to include new partners** (new businesses, new experts, new knowledge, new entrepreneurs etc.)
- Joint strategy leveraging **European strengths and unique selling points** to be developed **BUT** also a strong focus on new emerging businesses (e.g. verticals, service businesses etc.)
- Leading principle must **produce valuable content in/for Europe** and to overcome particular interests. **Trust to each others.**
- **Well balanced** amount of members covering AI, Data and Robotics and well balanced between Research and Industry. Representativeness of the new innovation forces/communities (e.g Start-ups, high-tech companies, ...)

A joint initiative by:



CLAIRE



EurAi



CLAIRE

**CONFEDERATION OF LABORATORIES FOR
ARTIFICIAL INTELLIGENCE RESEARCH IN EUROPE**

**Excellence across all of AI. For all of Europe.
With a Human-Centred Focus.**

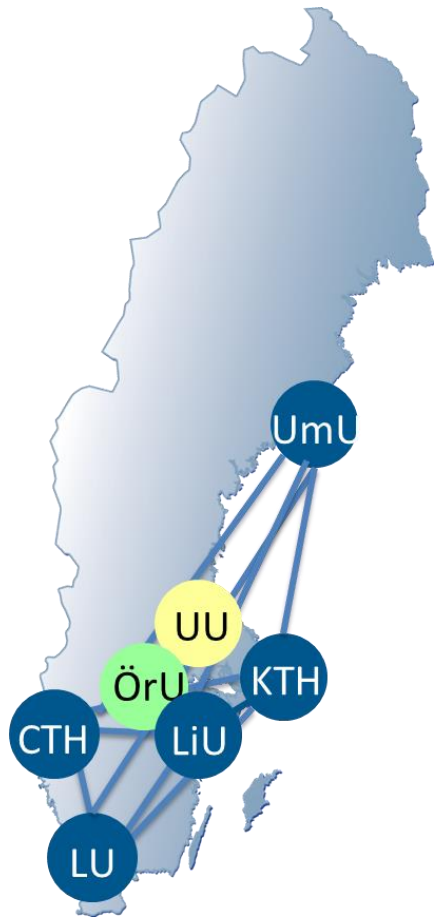
🐦 Follow us at @vision_claire 🐦

f Like us at @claire.initiative f

TAILOR brings together leading AI research centres from learning, optimisation and reasoning together with major European companies representing important industry sectors into a single scientific network addressing the scientific foundations of Trustworthy AI to reduce the fragmentation, boost the collaboration, and increase the AI research capacity of Europe as well as attracting and retaining talents in Europe.

- 54 research excellence centres from 20 countries across Europe
- Four instruments
 - An ambitious research and innovation roadmap
 - Five basic research programs integrating learning, optimisation and reasoning in key areas for providing the scientific foundations for Trustworthy AI
 - A connectivity fund for active dissemination to the larger AI community
 - Network collaboration activities promoting research exchanges, training materials and events, and joint PhD supervision

AI Innovation, Competence and Research in Sweden



Most important aspects for Europe to lead?

- Provide **dedicated, significant and long-term research funding** for both **fundamental** and **purpose-driven research on AI** to promote AI that is trustworthy and to address relevant scientific, ethical, sociocultural and industrial challenges.
- Create incentives and support for **interdisciplinary** and **multi-stakeholder research** for example through large-scale challenge-driven research missions.
- Simplify and **streamline** the structure of **research funding instruments**.
- Create the proposed **lighthouse centre** in a way that effectively achieves **critical mass, synergy, and cohesion** across the European AI ecosystem.
- Invest both in **up-/reskilling** and in **basic education** related to AI.
- Establish a **clear strategy** for coordinating and structuring an **AI-based innovation ecosystem** across Europe.
- Focus "AI made in Europe" on "**AI for Good**" and "**AI for All**".
- Invest in promoting **broader awareness** of AI in **society**.



Respect for
human autonomy



Prevention of
harm



Fairness



Explicability