Digitalization in major accident prevention

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Key topics to be covered

Equinor's digital ecosystem

Digitalization & major accident risk in operations

- Machine learning
- Large language models
- Agentic AI

Equinor´s approach to AI development & deployment

Our purpose

Turning natural resources into **energy for people** and **progress for society**.

25,000
employees

20+
countries

9,000
suppliers

N

Always safe
High value
Low carbon

Strategic focus areas

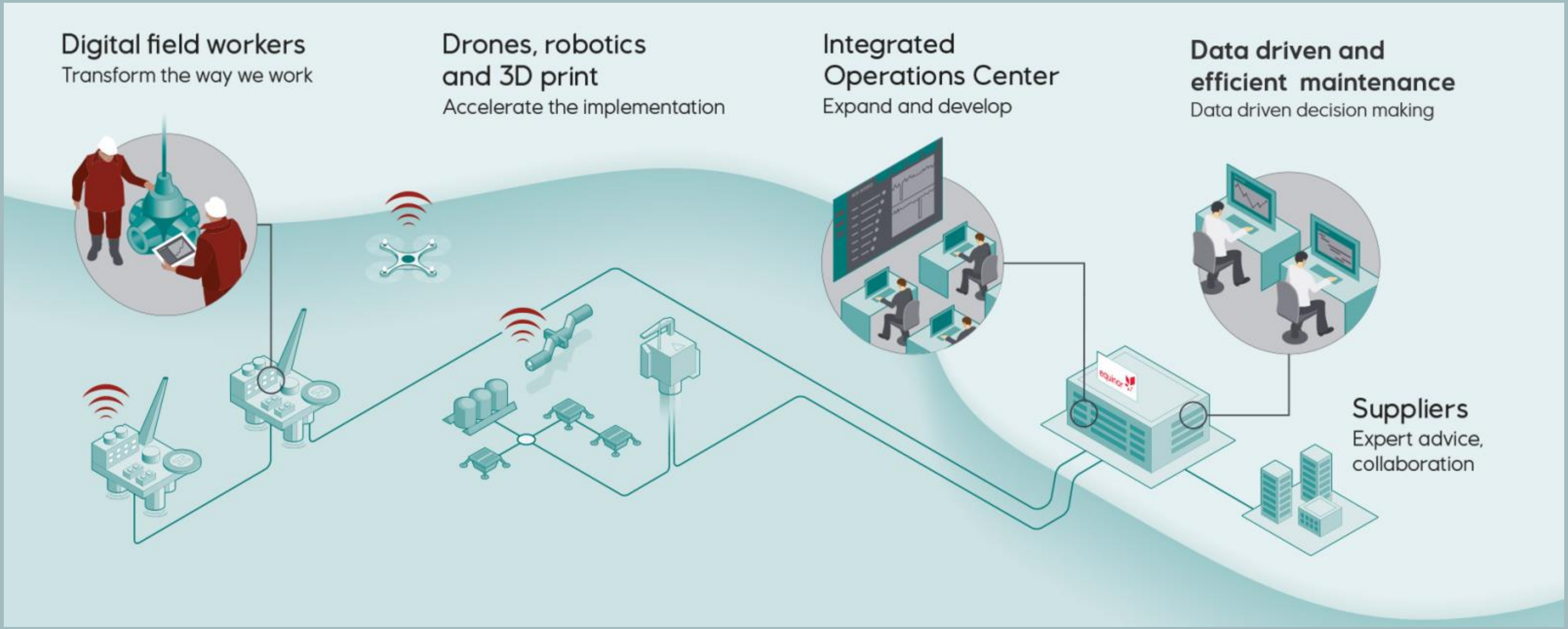
High value growth in renewables

Optimised oil & gas portfolio

CO_2

New market opportunities in low carbon solutions

Equinor | digital operational ecosystem

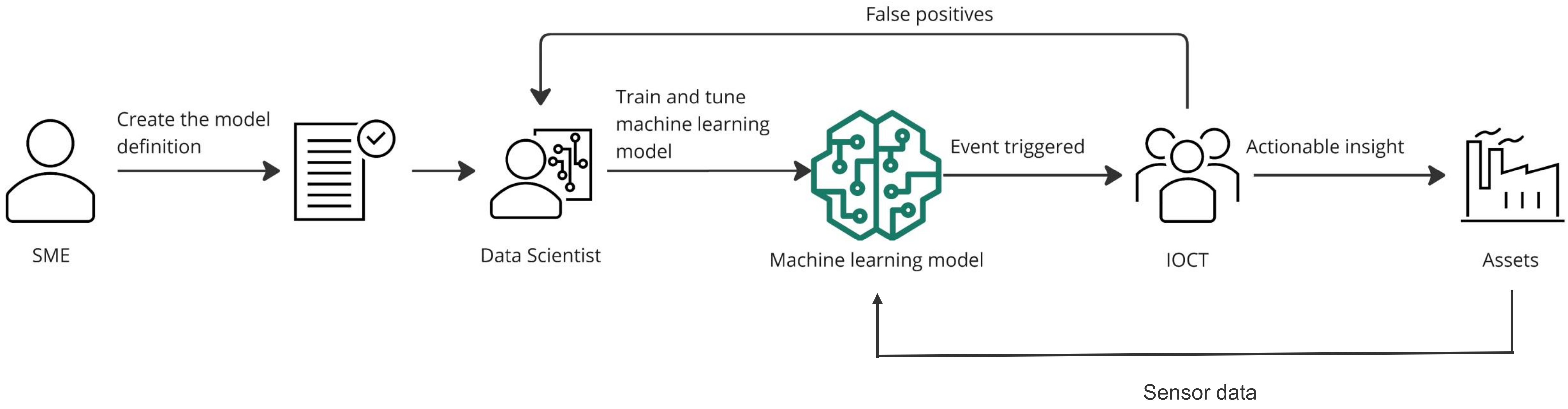


Open

Machine learning

Enabling algorithms to uncover hidden patterns within datasets

OMNIA PREVENT | model building and maintenance flow



OMNIA PREVENT | current situation

- **Condition monitoring**
- **Monitor 24 000 sensors**
- **695 deployed models**
- **Across 35 installations**
- **300+ failures detected and reported**

OMNIA PREVENT

in practice

The hype that just saved Equinor 300 million NOK

Espen Eftedal Svensen | Mon, 18 Sep 2023 11:50 | 5 min read | 351 Views | 1

Do you agree with those who believe that artificial intelligence (AI) is this year's big hype? Not so fast, say the engineers at Kårstø and IOCT, and are supported by proud data scientists. A warning based on artificial intelligence just saved the Kårstø facility the neat sum of 300 million Norwegian kroner. Read about how, and learn a couple of useful expressions about artificial intelligence.

Large language models

AI systems trained on vast amounts of text data to understand, generate, and manipulate human language in a coherent way

equinor

Polite AI | non-compliant work performance

Equinor governing document – isolation plans

«... a valve and blind list **shall** be developed...»

«Hello ChatGPT Please sum up the requirements related to isolation plans in Doc NN...»

«... a valve and blind list **should** be developed...»

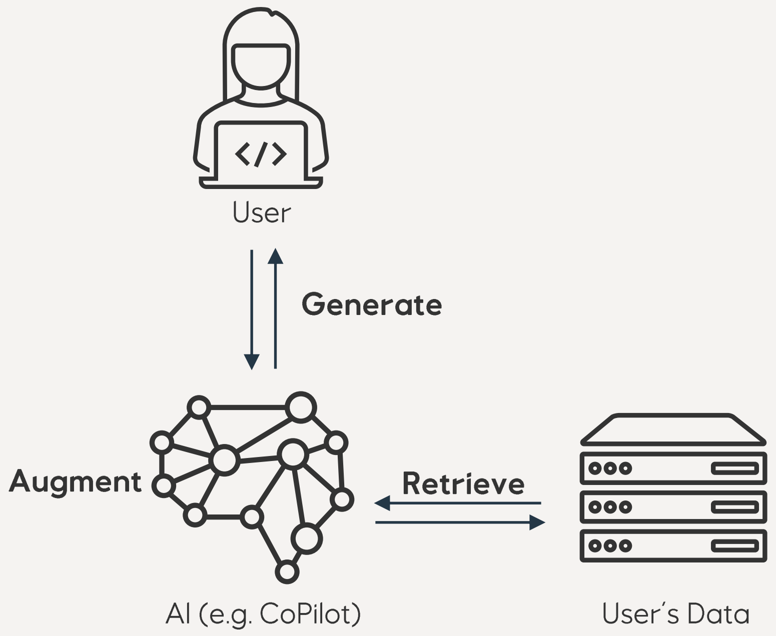
I don´t have to make a valve and blind list for this simple job...

RAG case | incident database powered by LLM

Testing of tool in Beta-version

Q: What installation has the highest number of drilling and well incidents?

A: The Mongstad plant (onshore refinery) has the highest number of drilling and well incidents, totaling 10 incidents.



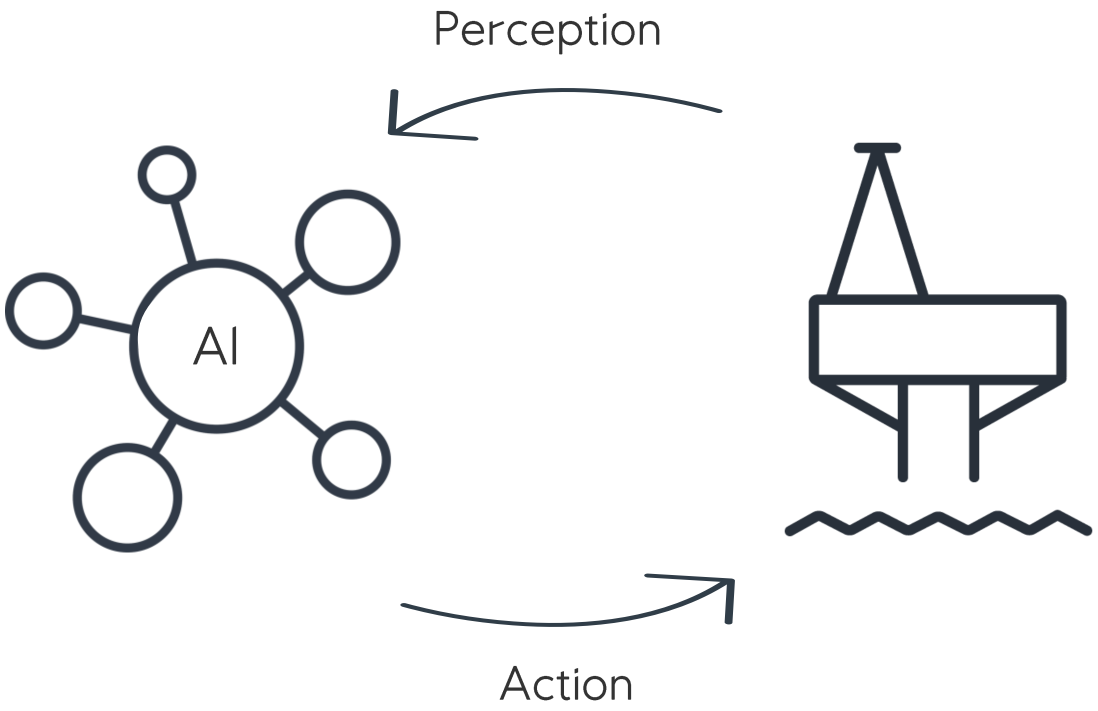
Higher **relevance**
Higher **precision**
Less **hallucinations**

Agentic AI

Autonomous systems designed to perceive, reason, and take actions with minimal human intervention

Types of agentic AI

- Rule based decisions
- Model based decisions
- Goal based decisions
- Utility based decisions
- Learning based decisions



Agentic AI and **major accident risks**

Reduction of major accident risk

- Real-time hazard detection and swift responses
- Improved maintenance planning and execution
- Enhanced decision support through human-agent collaboration

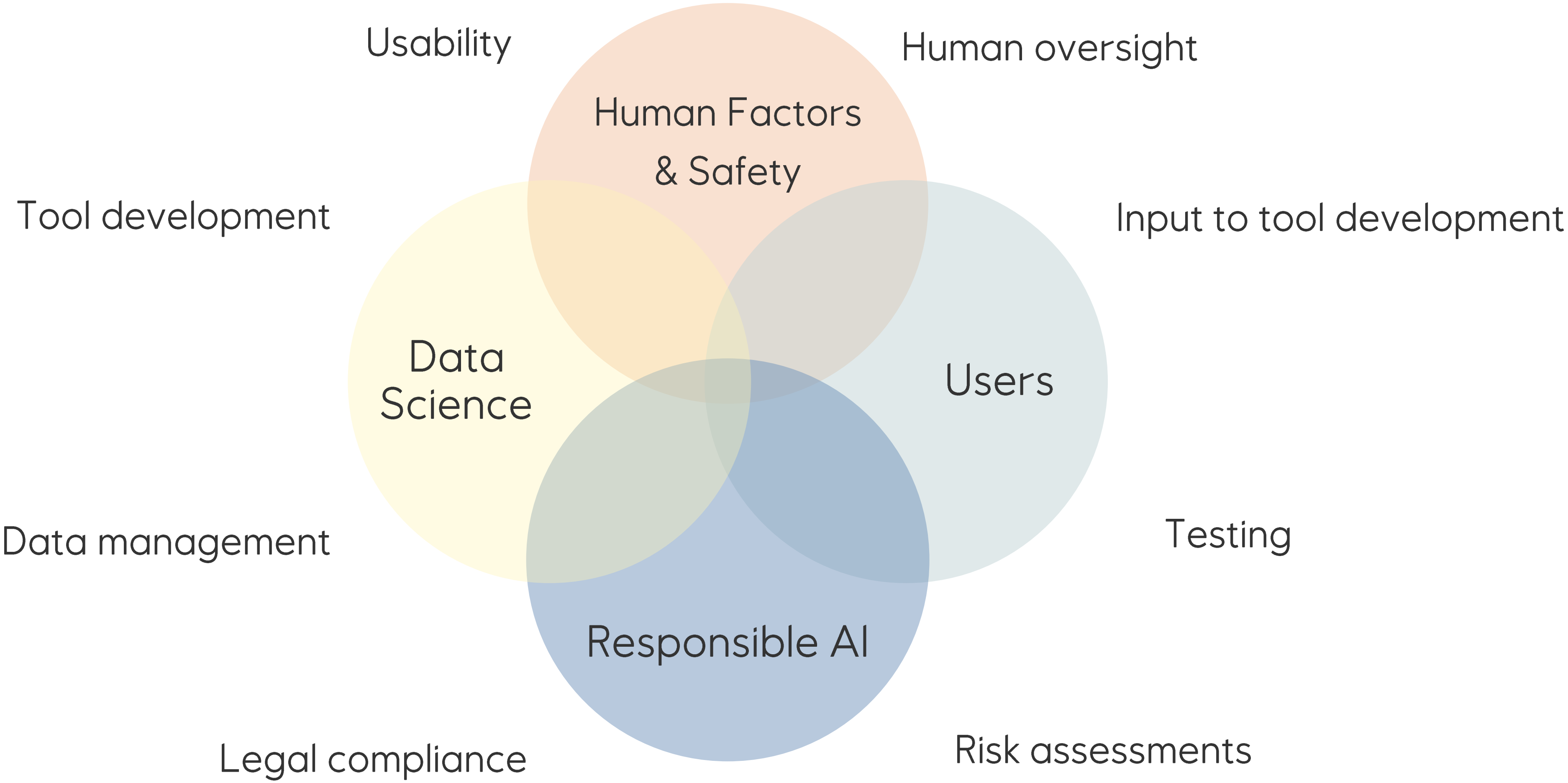
Key downside risks

- Loss of human oversight
- Goal misalignment
- Unpredictable behavior and scalability of harm

Our approach

Harvesting upsides, mitigating downsides

AI development & deployment | **a multi-disciplinary approach**



A contextual understanding of risk

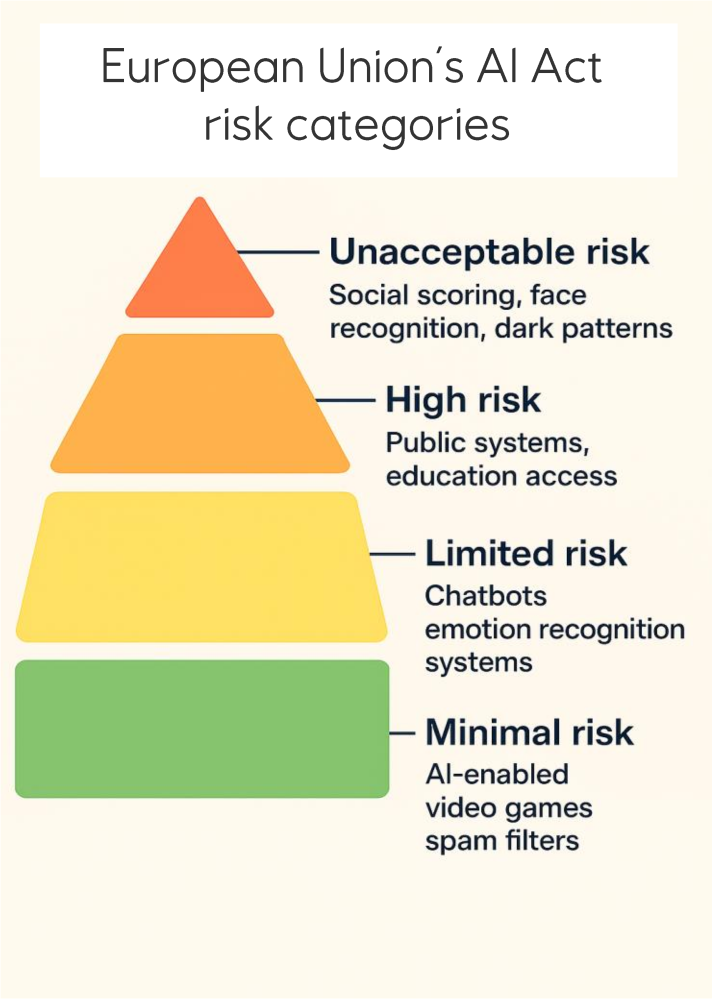


Illustration: CoPilot

Oil and gas industry
top risk category

Picture: NASA

Don´t underestimate the complexity of AI

- Range of opportunities
- **Learn**: models and data change over time
- **Tested in isolation:** in a real life setting they may interact
- **Rapid evolution:** today´s requirements and insights may not be relevant tomorrow
- **Not always transparent** and/or explainable to the users

Key takeaways

AI and other emerging digital technologies **can play a critical role in reducing major accident risk.**

Realizing this potential requires that the risks of these powerful tools are **openly assessed, carefully managed, and effectively mitigated** throughout every stage of development, deployment, and use.

Want to know more?

[Digitalisation – Equinor]

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