

The left side of the slide features a futuristic visualization of a human brain. The brain is depicted as a glowing blue and white wireframe structure, with various components like a microchip and circuitry visible within. It is surrounded by a dense network of glowing blue and green lines that resemble circuit traces or data paths, creating a sense of digital connectivity and artificial intelligence.

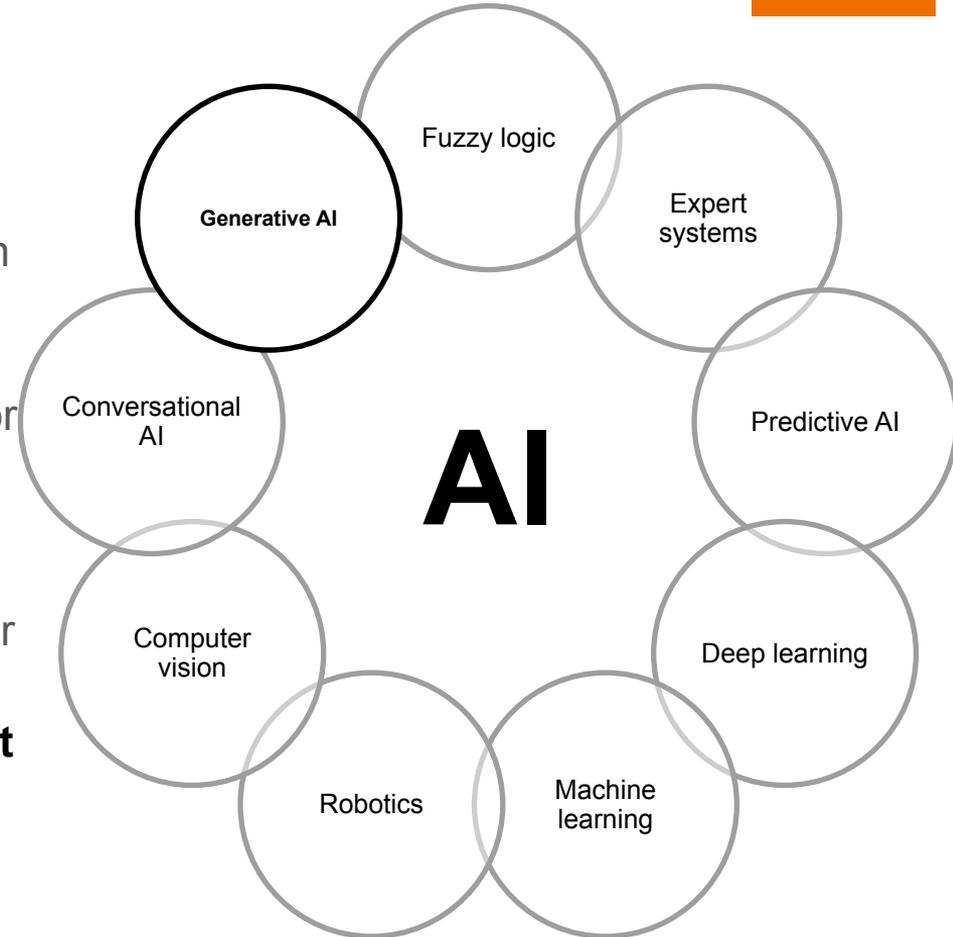
Generative AI in Manufacturing

AI Monday, November 27th, 2023

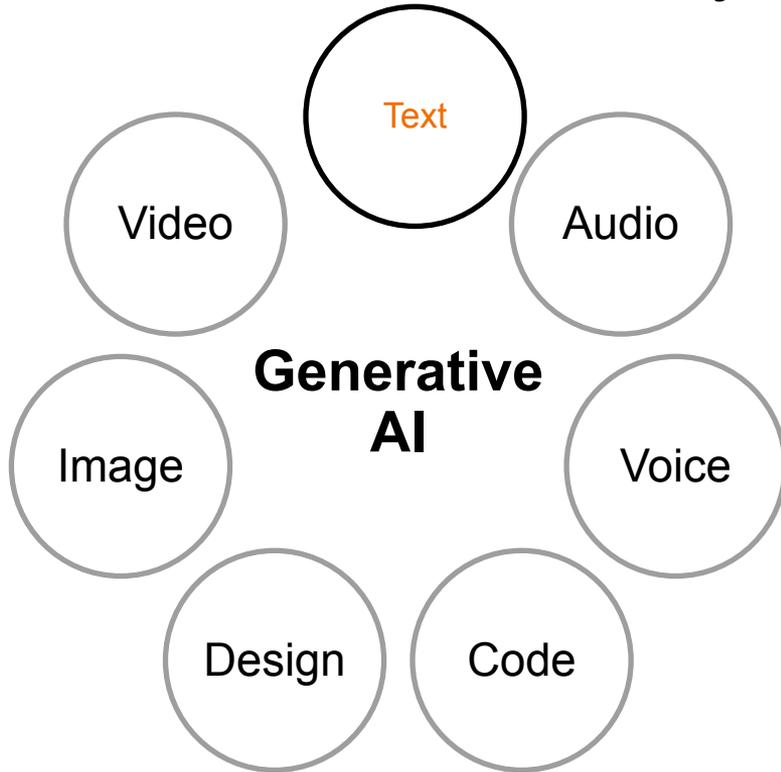
Dr. Heli Helaakoski
Research manager, VTT

Generative AI

- Artificial intelligence technology that can produce various types of content - text, images, video, audio, synthetic data
- New tools with simple user interfaces for creating high-quality, almost authentic contents fast and easily
- Generative adversarial networks first introduced in 2014 and forms a basis for recent developments
- **AI is now available for everybody, not just AI experts**



Generative AI Tools by category



Examples of tools (not recommendations)

Text [ChatGPT](#), [Jasper](#), [Rytr](#), [Notion AI](#)

Image [Midjourney](#), [DALL·E](#), [Magic Studio](#), [Pebblely](#)

Code [CodeGPT](#), [CodeStarter](#), [GitHub Copilot](#),
[Tabnine](#)

Voice [Boomy AI](#), [FineShare](#), [Playlist AI](#), [Speechelo](#),
[Murf](#)

Video [Muse AI](#), [Visla](#), [Topaz](#), [Supercreator](#),
[Synthesys](#)

[The 2023 MAD \(ML/AI/Data\) Landscape](#)

Large Language Models in manufacturing

LLMs

Text generation

Question answering and helping with search

Language translation

Customer service

Software programming in routine tasks

Manufacturing applications

Training and knowledge transfer - skills development, maintenance instructions, user guides

Trouble shooting and root cause analysis
Configuration management, spare parts

Multilingual user guides, helpdesks

Virtual assistants and chatbots for sales and maintenance (internal/external)

Efficient programming, modifications and updates

GenAI potential in manufacturing value chain



Material development

The development of new technological materials with exceptional properties.
AI algorithm to predict the structure and dynamic properties of any material.

Product design

Engineers define specific design goals, constraints, and parameters in the initial phase.
The generative AI system generate various design solutions that satisfy these conditions

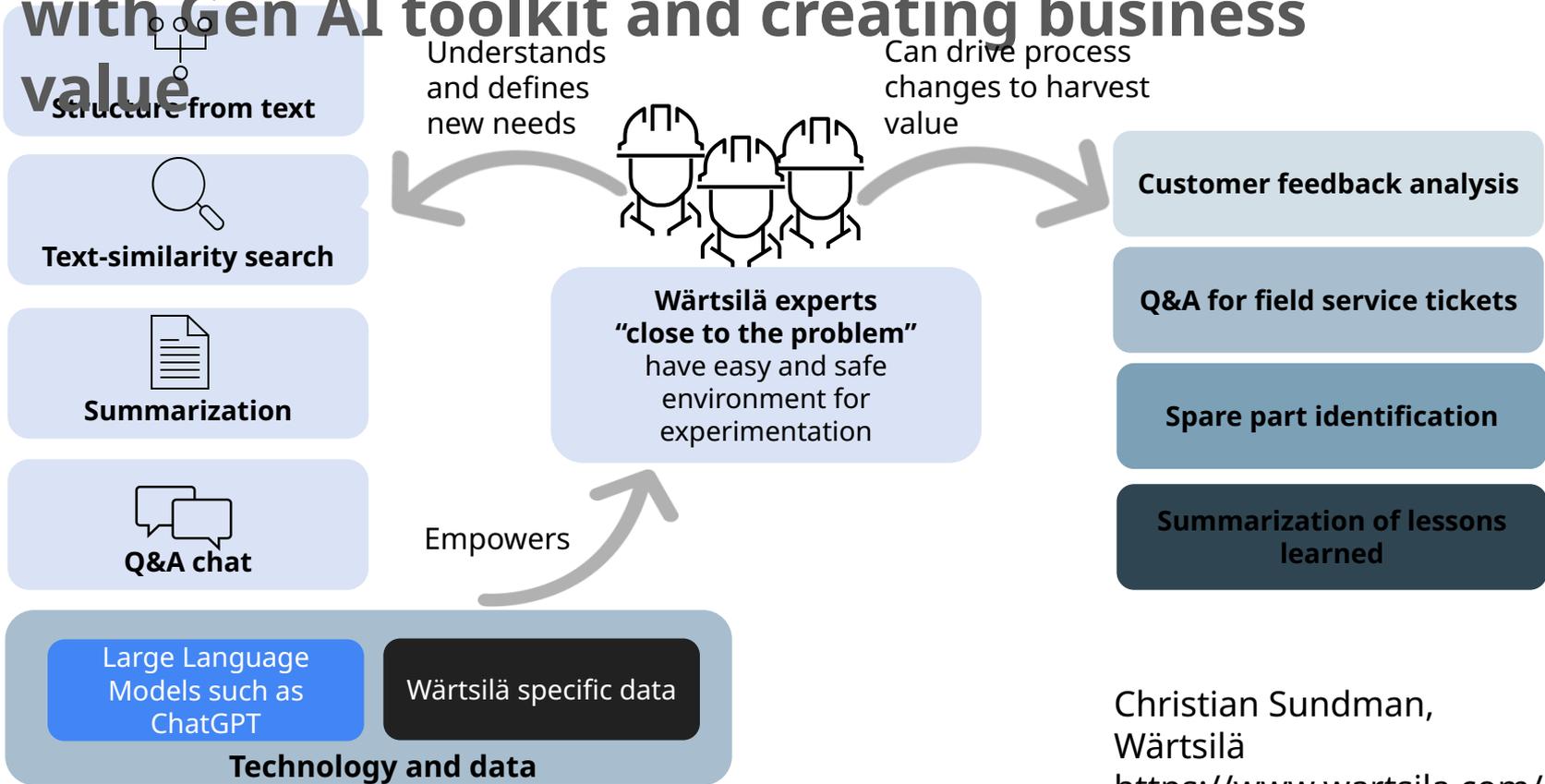
Quality management

Process data is gathered throughout the manufacturing process.
Advanced algorithms analyzes data, identifying exceptions and deviations.
System can provide solutions.

Customer service

Customer specific product/service data is integrated and analysed trough life cycle.
Accelerates time-to-resolution for common interactions (spare parts, troubleshooting, product information)

Wärtsilä case study - empowering people with Gen AI toolkit and creating business value



Christian Sundman,
Wärtsilä
<https://www.wartsila.com/>

Benefits, limitations and risks of GenAI

Benefits

- Easy to use, human-like response
- Can manage huge amounts of data
- Highly versatile
- Improving all the time
- Capable for many tasks



Limitations

- Reliability, might have misinformation
- Not always up-to-date information
- Explainability
- Privacy and data security concerns
- Poor source tracking



Risk management

- Fine tune your own model
- Create your own data management layer
- Data ownership, customization
- Organisational impact
- Social and environmental impact



Reskilling needs

44%

of workers' core skills
are expected to change
in the next five years



Source: World Economic Forum,
Future of Jobs Report 2023.

Work is changing

Working with machines

- How do we respond and prepare for the changing, more complex working environment ?
- How do we work with machines, how do we need to prepare for that ?
- What is the work allocation between humans and machines ? What about the responsibilities ?
- What is the task allocation between the system provider and end-user?
- How do we remain active role for humans ?
- How do we ensure human skills and knowledge ?
- How do we ensure the resilience through human competencies ?



Type of skill

Cognitive skills

Self-efficacy

Management skills

Technology skills

Working with others

Engagement skills

Conclusions

- Future manufacturing will be multi-technology environment, keep eye on the development
- Start testing and adopting AI technology now, use common sense
- People make the change, keep everybody on board



Thank you

Q &

A



Heli Helaakoski



Research Manager, VTT



Digitalisation leader, A.Spire



heli.helaakoski@vtt.fi



[LinkedIn](#)