

Generative AI for Manufacturing current state and outlook

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What is Generative Artificial Intelligence



Hi ChatGPT? What is Generative AI?



Generative AI, refers to a class of AI systems and models designed to generate data that is similar to, or inspired by, existing data. These AI models have the capability to **create new content, such as text, images, audio, and more, by learning patterns and structures from the data they are trained on.** They are particularly skilled at generating content that is coherent and contextually relevant.

Generative AI for Manufacturing

- **Maintenance:** AI can recommend potential solutions and service plans to help maintenance teams
- **Human Machine Interaction:** Natural Language Interaction with machines and robots.
- **Supply Chain optimization:** Visibility in supply chain; Supply Chain Network re-configuration
- **Quality Control and Defect Detection:** Quality control reports, user feedback, and inspection notes, can be exhaustively analyzed with the assistance of LLMs.
- **Product design:** Customized products; Design for sustainability and circularity

Generative AI to support maintenance tasks

Challenges/Needs:

- Instructions to technicians and service personnel to address a repair/maintenance issue.
- Root cause analysis to identify the causes behind failures in manufacturing assets
- Predict possible asset failures

Solution:

- Recommend potential solutions and service plan
- Large amounts of maintenance data are available in CMMs
- Use this data to fine tune LLMs to be support
- Combine with IIoT data

Benefits:

- Reduced Mean Time To Repair
- Increase Mean Time Between Failure
- Improve OOE



Generative AI to support maintenance tasks

Development Challenges:

- Data processing and curation
- Data quantity and quality
- Development costs (especially for SMEs)
- Privacy concerns
- Fine tuning and customization
- Evaluation and validation

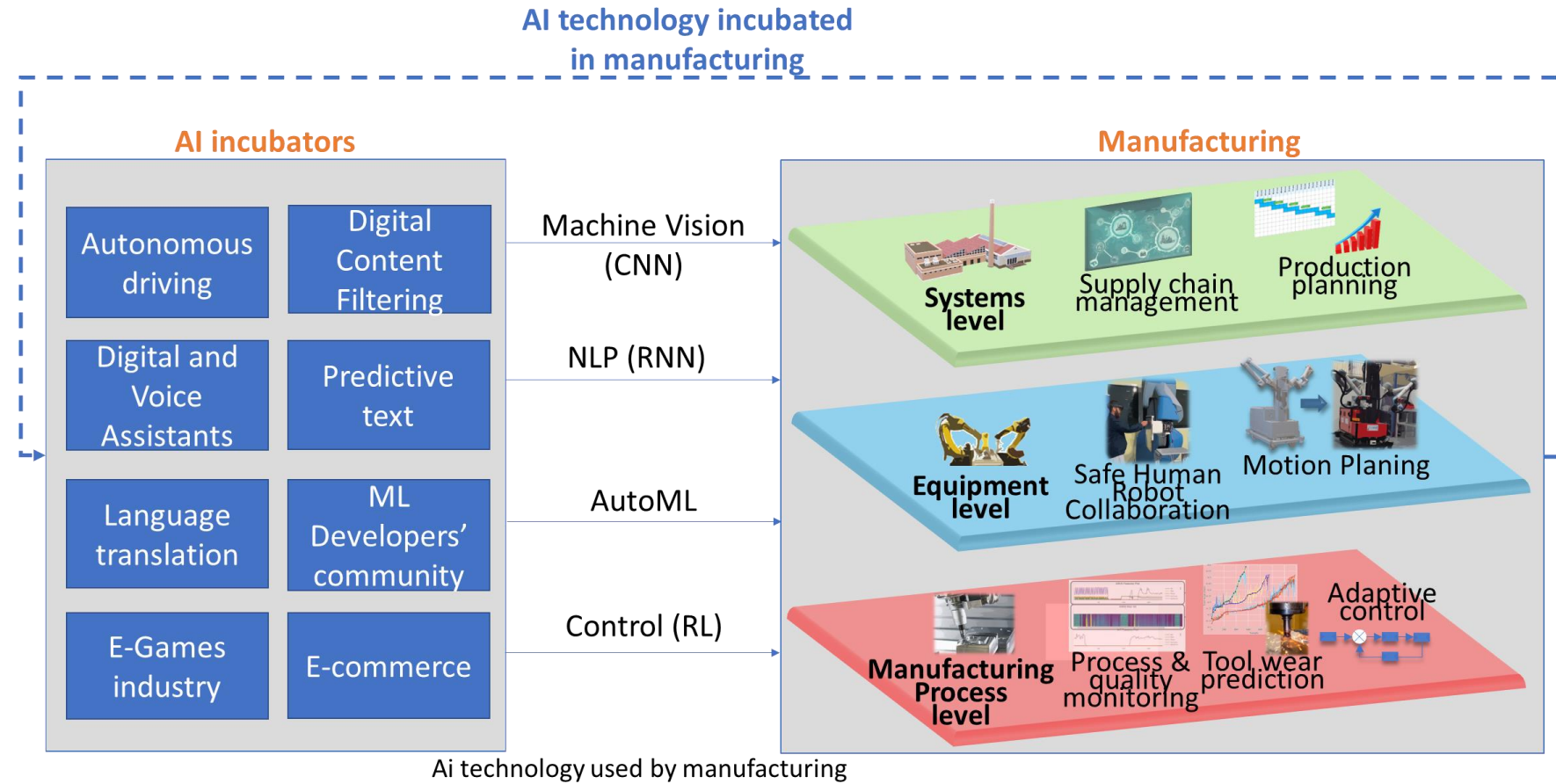
Deployment Challenges:

- Build trust
- Ability to fact-check information provided.
- Bias to specific types of problems and solutions seen
- Continuous improvement of GAI models
- The user should learn to provide the right prompts



Manufacturing as a developer of AI technologies

- New AI technologies will be developed as a result of working on unique problems relevant for manufacturers
- AI technologies to be developed within **manufacturing** will be 'exported' to other industries and bring a wider benefit outside the boundaries of manufacturing



Generative AI for Manufacturing with the “eyes” of Generative AI



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