

AI Applied to Manufacturing

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The logo for IDEKO, consisting of the letters "I", "D", "E", "K", and "O" in a stylized, outlined font. The "I" and "D" are blue, while the "E", "K", and "O" are black.

MEMBER OF BASQUE RESEARCH
& TECHNOLOGY ALLIANCE



AI applied to Manufacturing

Introduction

- Turning the whole production into data
- Digital transformation in the areas:
 - Asset Maintenance
 - Manufacturing process
 - Production planning
 - Supply chain



AI applied to Manufacturing

Data Based Value Generation

DIGITAL PLATFORM

Edge computing at machine level

+300 machines
PAC

Apps analog signal capture and real time processing

+1000 machines
IoT BOX

Connectivity, Storage and Edge computing Apps

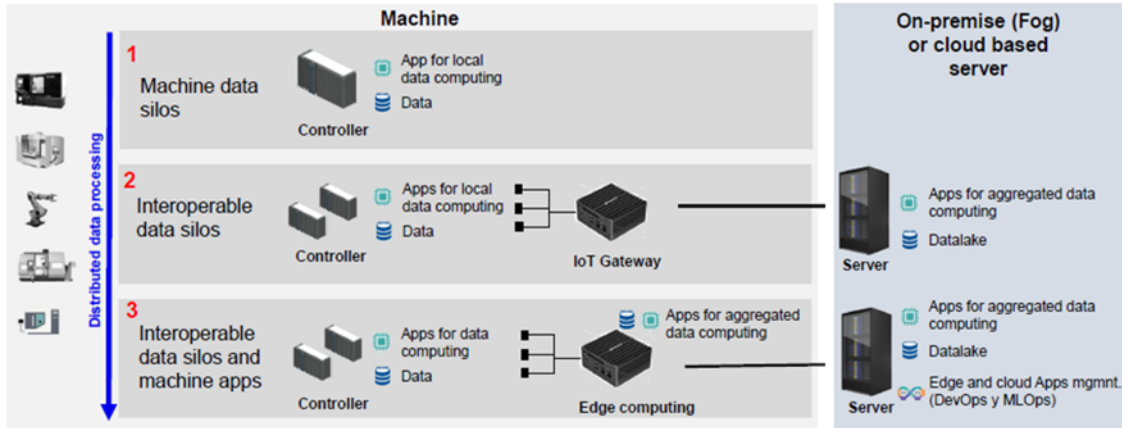
Cloud/ fog computing level and Edge management at plant level

4 customers
FOG

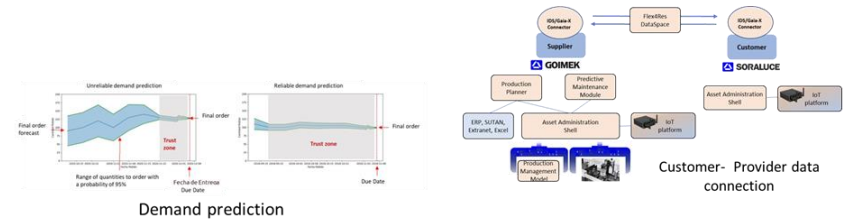
On premise storage and management

+300 machines
CLOUD

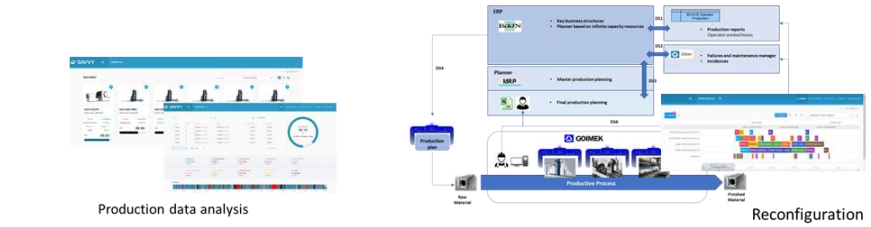
Management, storage and analytics in external cloud



CONNECTED NETWORK



CONNECTED FACTORY



CONNECTED QUALITY



CONNECTED MACHINES



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Generative AI applications in manufacturing

Application areas:

- Generative AI applications in our daily jobs. From office applications to product design and development
- Human machine interaction, encoding with support, virtual assistants, training
- Data generation for scaling digital transformation

Benefit:

- Internal efficiency
- Functionalities associated to ease of use of our products
- Smart production based on Artificial intelligence

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Generative AI for Data Augmentation

Challenges/Needs:

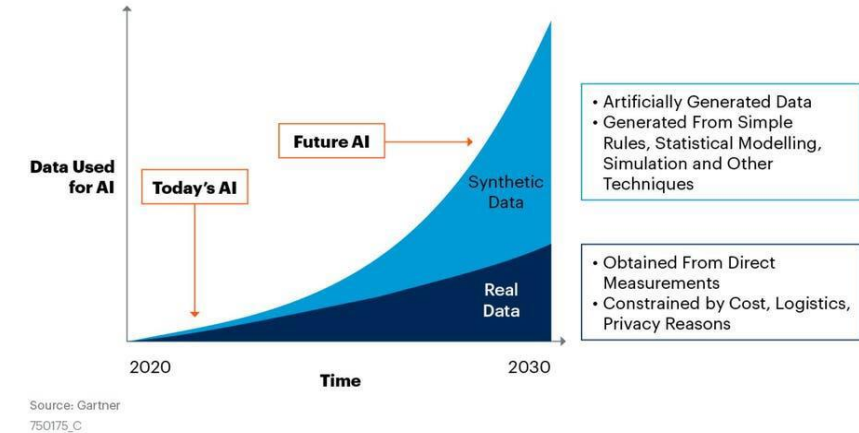
- Industry applications are in the long tail business model, in the customization end of the value creation
- Variety of machines and working environments
- Few data for AI techniques as deep learning. Unbalanced data in the use cases of interest
- Data of good quality is costly in time and efforts

Solution:

- Experimental data generation, testbeds
- Physical model data generation
- Generative AI

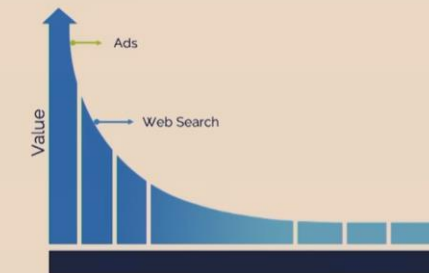
Benefits:

- Real data in controlled environments, problem oriented
- Data for different scenarios, effective for low complexity models
- No physics expertise needed, higher complexity systems



Gartner

Why isn't AI widely adopted yet?
Customization (long tail) problem and low/no code tools

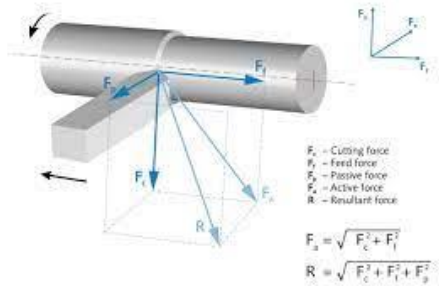


All potential AI projects, sorted in decreasing order of value

Stanford

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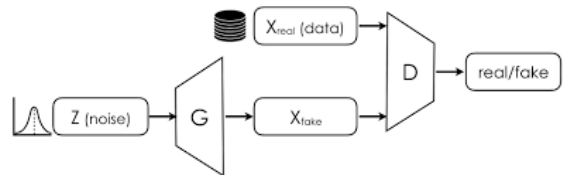
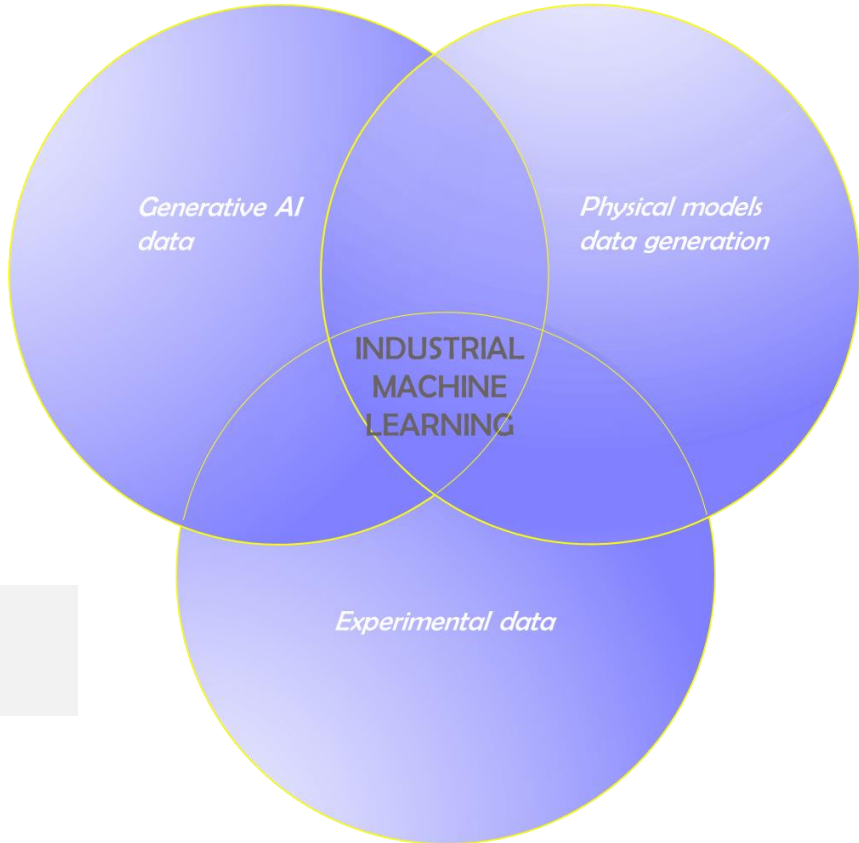
Generative AI for Data Augmentation



Cutting force models

Experimental data

Generative Adversarial Networks



APPLICATION EXAMPLE
Machining process