

TENFORCE
elisa company



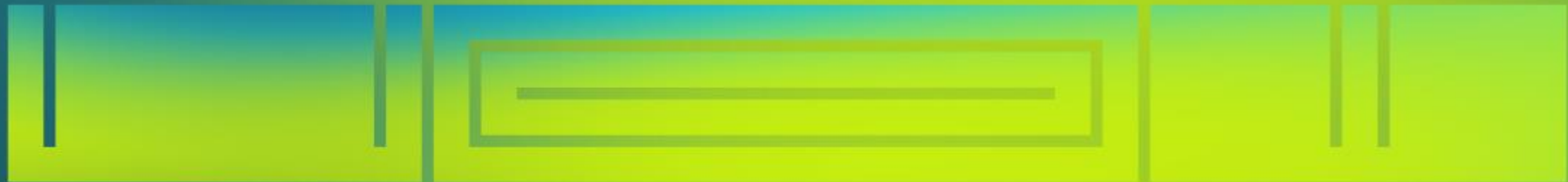
AI-PROFICIENT

Artificial intelligence
for improved production efficiency,
quality and maintenance

JUNE 8TH, 2023



THE FUTURE IS WOW 2023



BRINGING AI TECHNOLOGY TO THE PRODUCTION LINE



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Artificial intelligence
for improved *production efficiency*,
quality and maintenance

2020 - 2023

What happened?!



This product is part of a project that has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 957391.

elisa

INDUSTRIQ

Making intelligent manufacturing happen



PDC Corp is now part of TenForce - a global EHSQ software company. [Learn more.](#)

FLEXIBILITY IS OUR MANTRA



COMPLIANCE
ASSURANCE



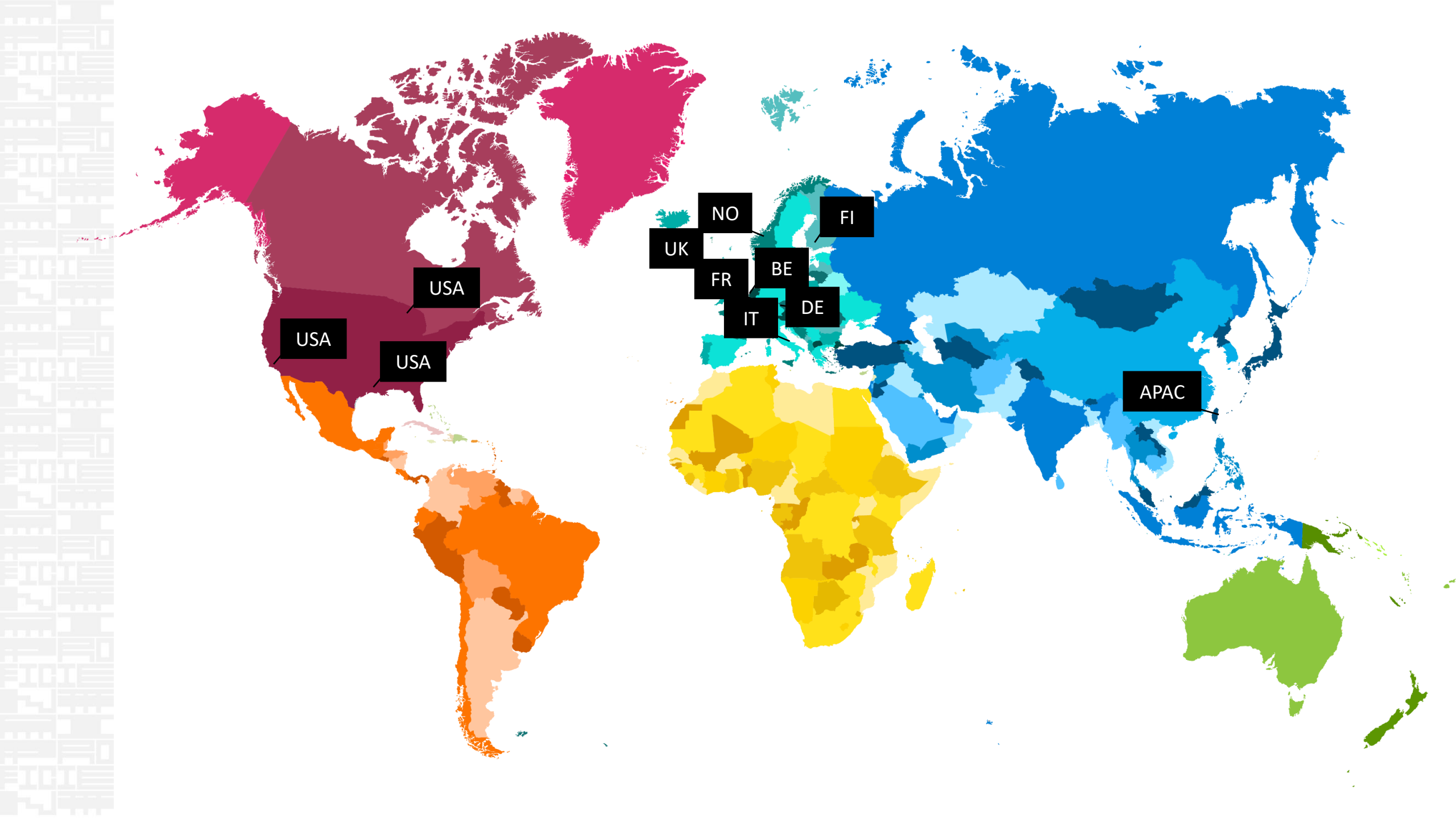
PROCESS
MANAGEMENT



ELECTRONIC
FORMS



BIG
DATA



2020 – 2023: our product & offering



enhesa.



BRADY®

Rombit



Protex AI



From machine learning to generative AI

a picture showing artificial intelligence applied on the manufacturing shop floor



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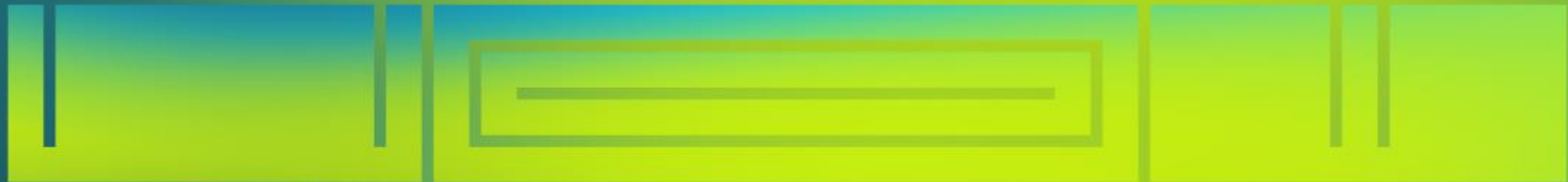
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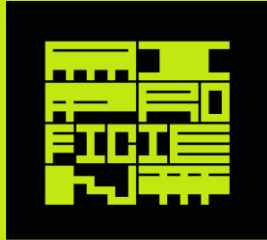
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Three Questions About AI

Alexander Vasylychenko, TenForce, Belgium



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Why AI?



FORBES > INNOVATION > ENTERPRISE TECH

Why Everyone Must Get Ready For The 4th Industrial Revolution

Bernard Marr Contributor

Follow

Apr 5, 2016, 02:38am EDT

🕒 This article is more than 7 years old.

📱 **First came steam and water power; then electricity and assembly lines; then computerization... So what comes next?**



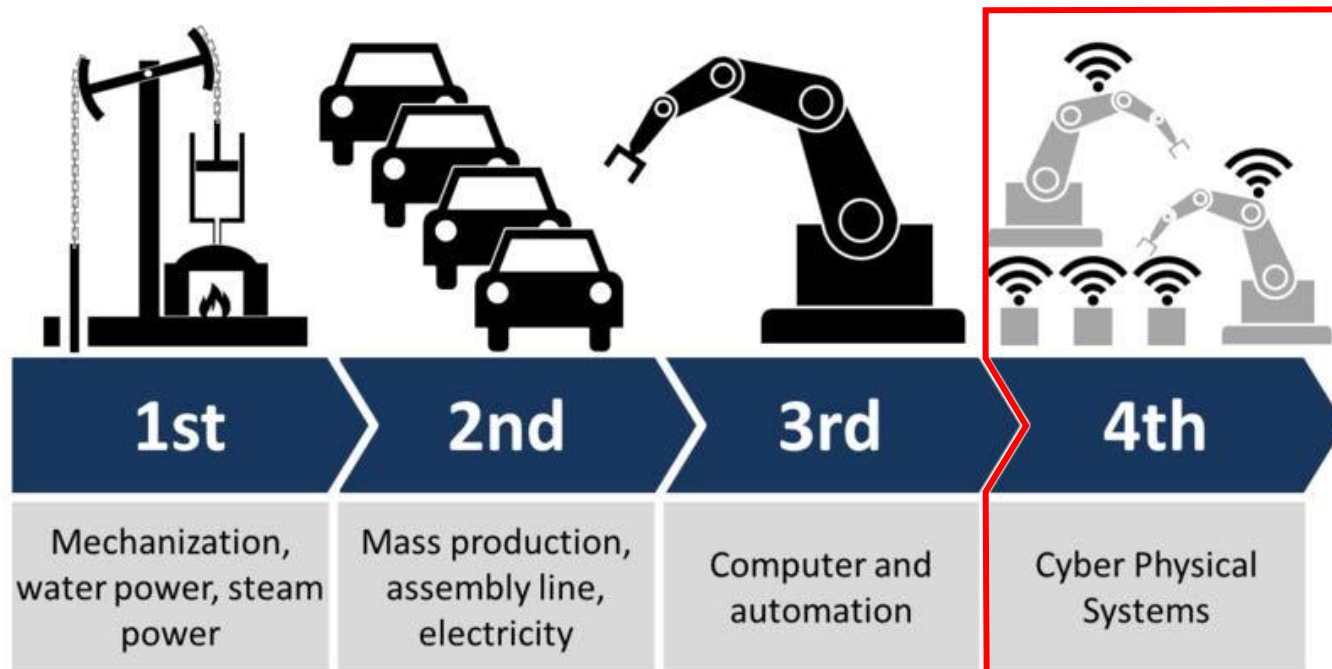
📌 Some call it the fourth industrial revolution, or industry 4.0, but whatever you call it, it represents the combination of cyber-physical systems, the Internet of Things, and the Internet of Systems.



In short, it is **the idea of smart factories in which machines are augmented with web connectivity and connected to a system that can visualize the entire production chain and make decisions on its own.**

And it's well on its way and will change most of our jobs.

The 4 Industrial Revolutions



(by Christoph Roser at AllAboutLean.com)

- Autonomous systems
- IoT
- Machine learning
- Big data analytics
- Augmented reality
- Cloud computing
- Mobile and connected devices
- Advance human-machine interfaces

AI is Transforming Key Industries

MANUFACTURING

- **Predictive Maintenance / Digital Twin**
- **Quality Control / Visual Inspection**
- Demand forecasting
- Inventory management, supply chain & logistics
- Production line, robotics & process optimization

RETAIL

- **Loss Prevention**
- **Logistics / Shelf restocking**
- **Omni-channel & in-store analytics**
- customer engagement / sales automation
- Check-out automation
- Shopping recommendation & merchandising
- Transaction payment systems

4 industries
Account for
57% of AI
use-cases

FINANCE

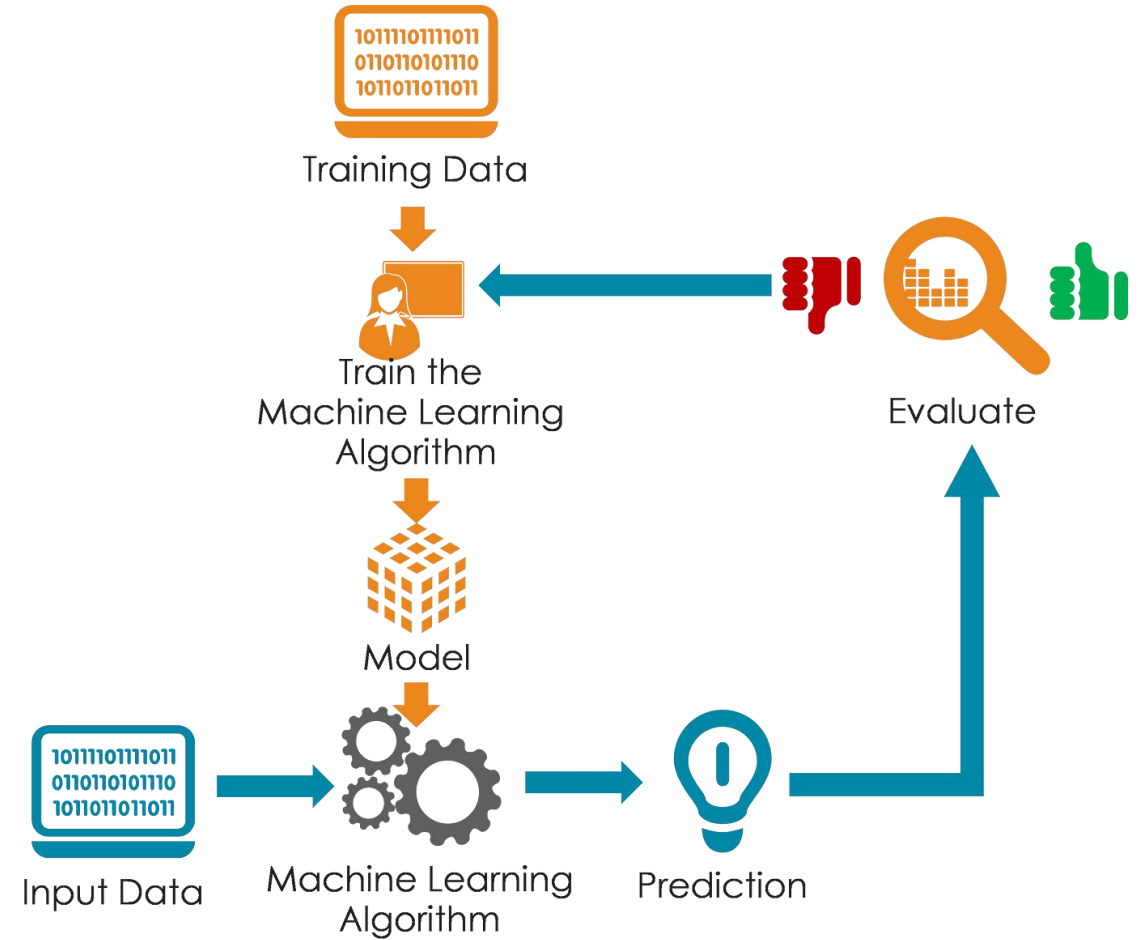
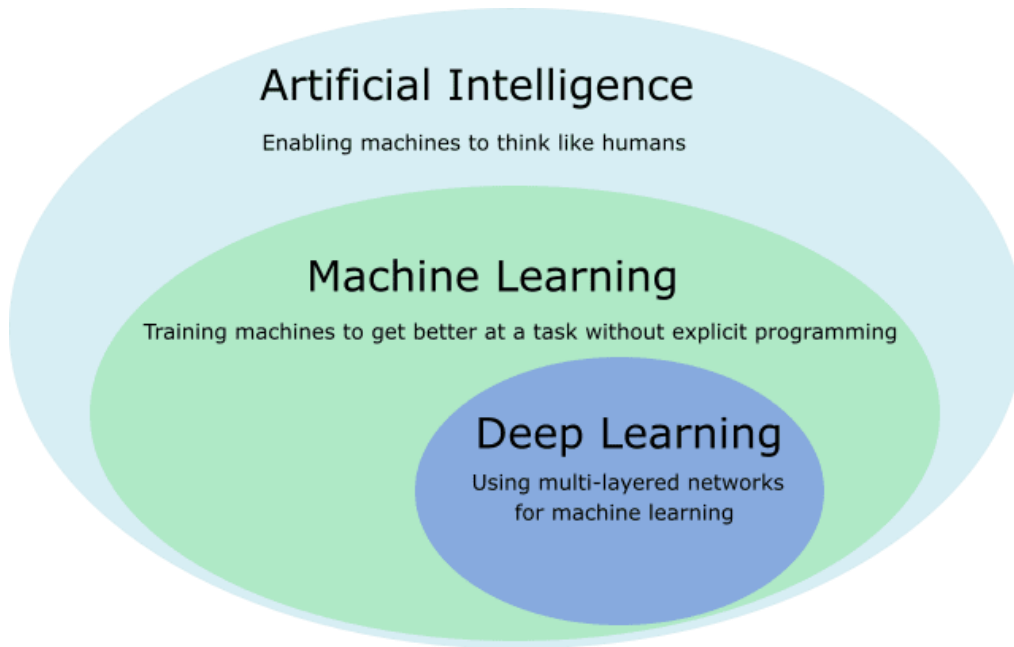
- **Credit decisions & Risk Management**
- **Fraud detection & Threat Intelligence**
- **Algorithmic trading**
- Process automation
- Personalized banking / customer service & sales automation
- Regulatory intelligence

HEALTH

- **Medical Imaging / diagnosis treatment**
- **Clinical decisions support (CDS)**
- Customer service agents
- Process & back office automation
- Inventory mgmt, supply chain & logistics

How does it work?

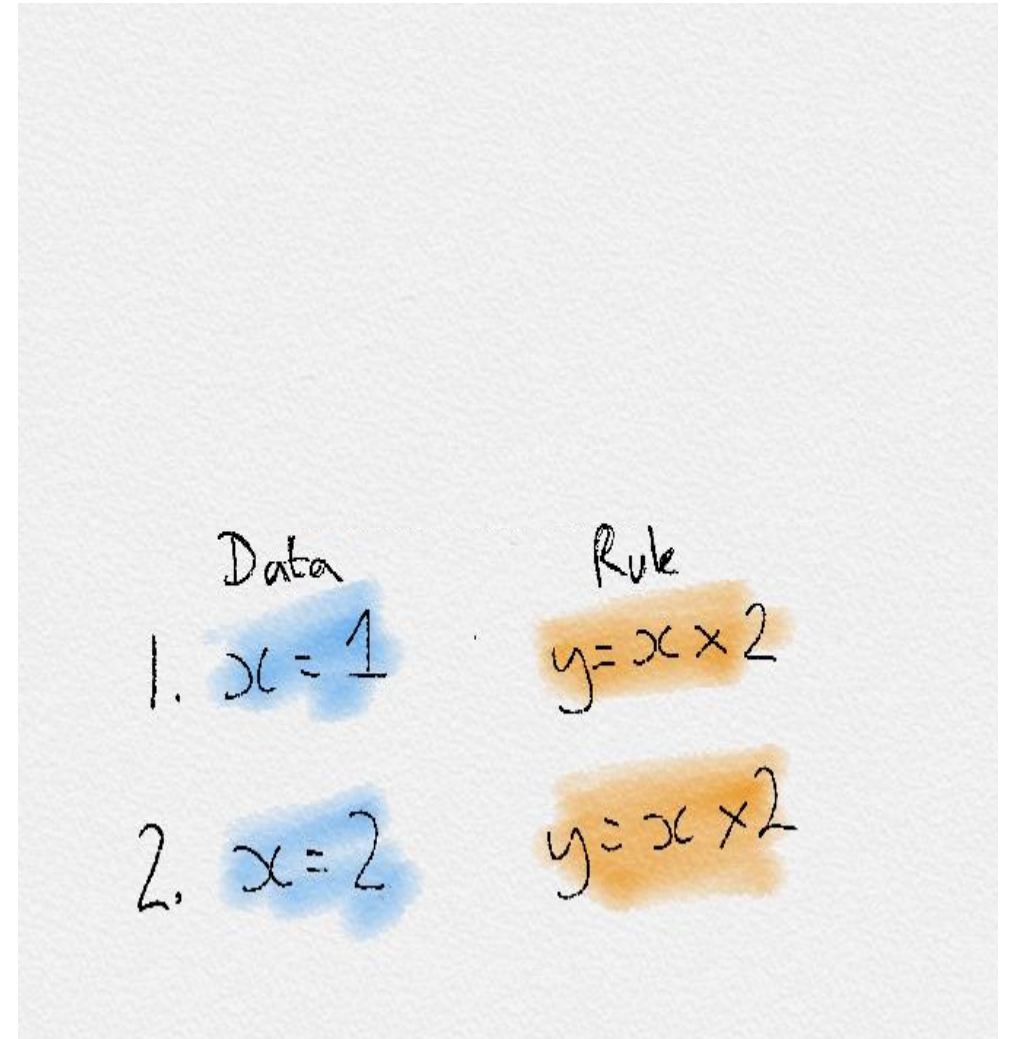
AI vs. ML and How Machine Learning works



How we always did it

Traditionally, software engineering combined human-created *rules* with *data* to **create answers to a problem.**

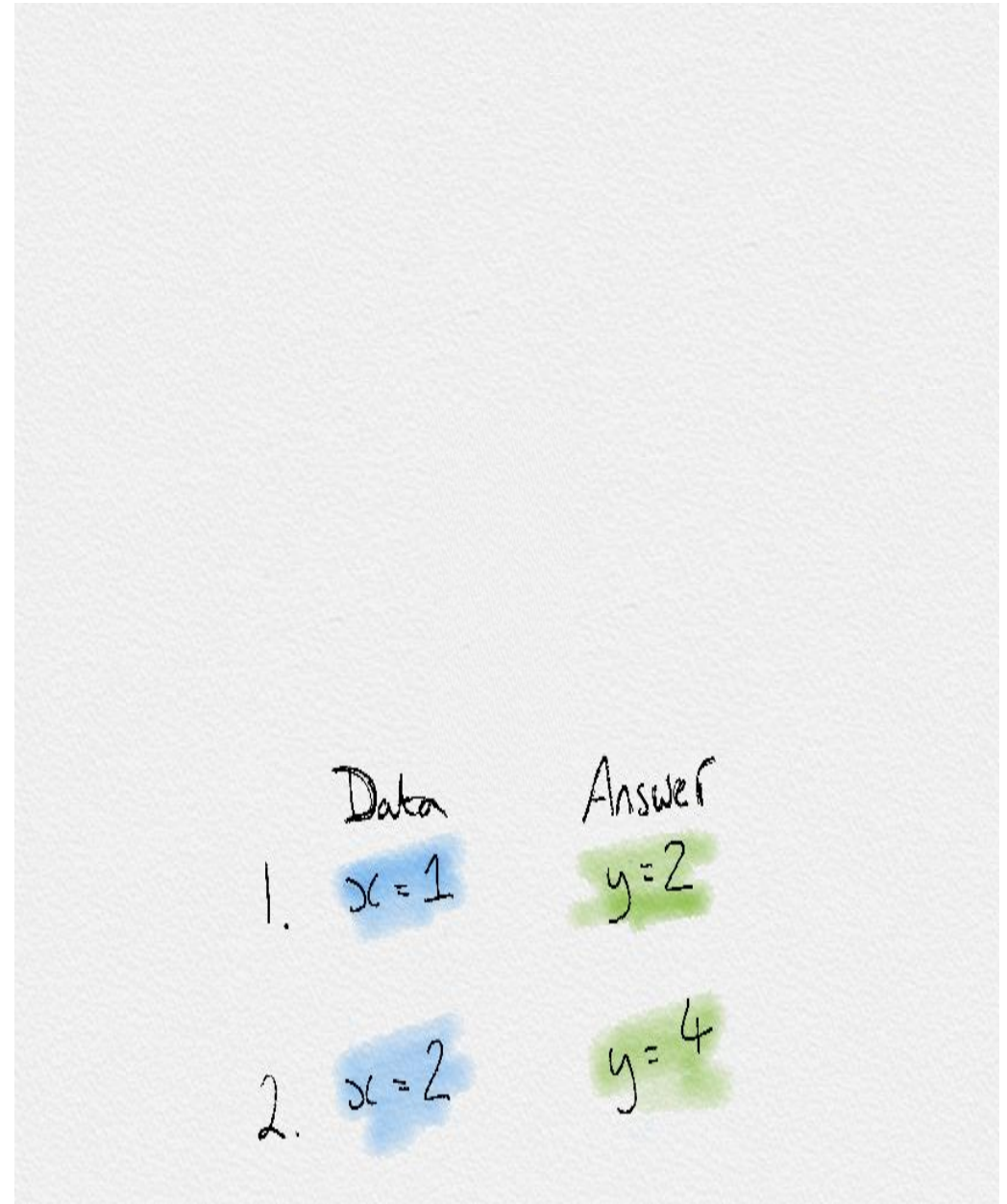
(Chollet, 2017)



How ML does it

Instead, machine learning uses *data* and *answers* to **discover the rules behind a problem.**

(Chollet, 2017)

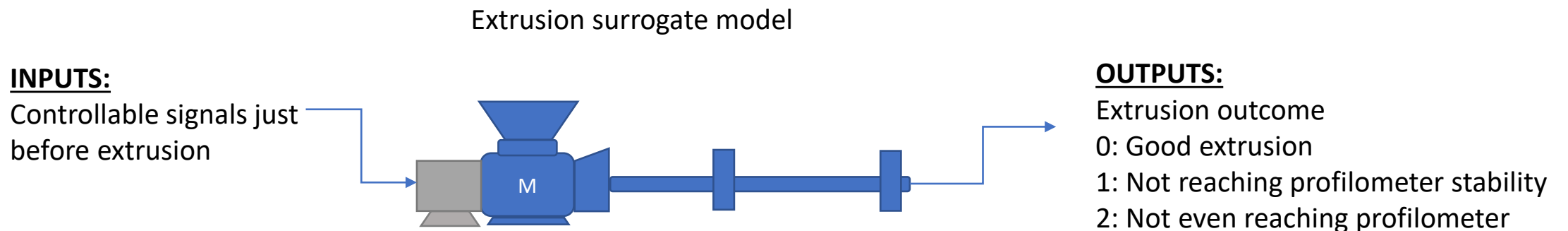


What can we do with AI?

Rubber extrusion restart setup

Reduce the quantity of rework by detecting the readiness of extrusion and providing operators with optimal extrusion setup speed settings

- Aim: Predict quality to constrain input space. Assess quality in production, and possible fault cause.
- Inputs/outputs



Hydroelectric Power Plant Water Release





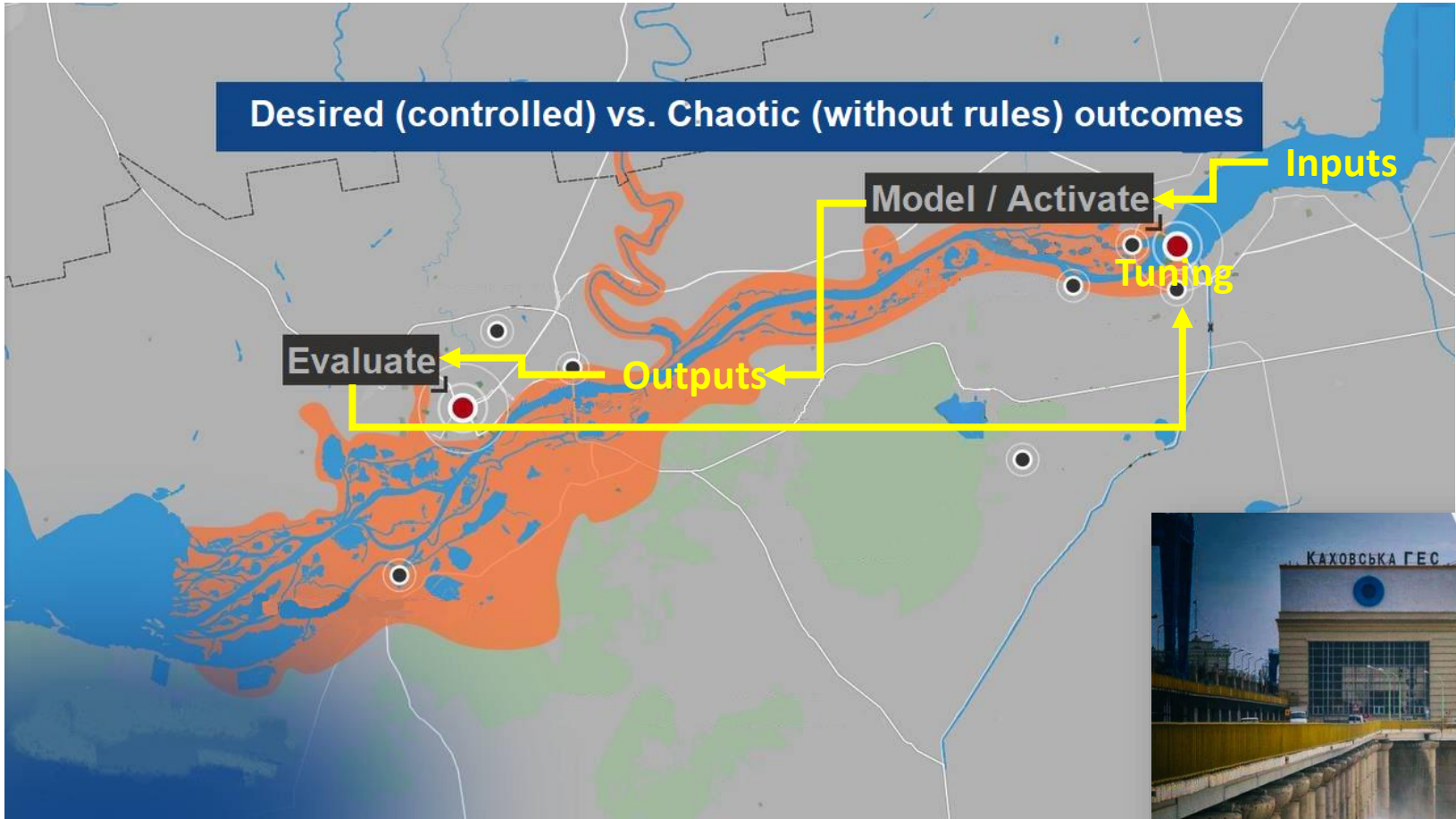
Information is cheap – UNDERSTANDING is expensive

AI is all about converting data into
knowledge, insights and actions

Information -> Action -> Knowledge



What AI can optimize



“No Free Lunch” ☹️

D .H. Wolpert The supervised learning no-free-lunch theorems – Soft Computing and Industry, pp. 25-42. Springer, 2002.

Our model is a simplification of reality



Simplification is based on assumptions (model bias)



Assumptions fail in certain situations

Roughly speaking:

“No one model works best for all possible scenarios.”

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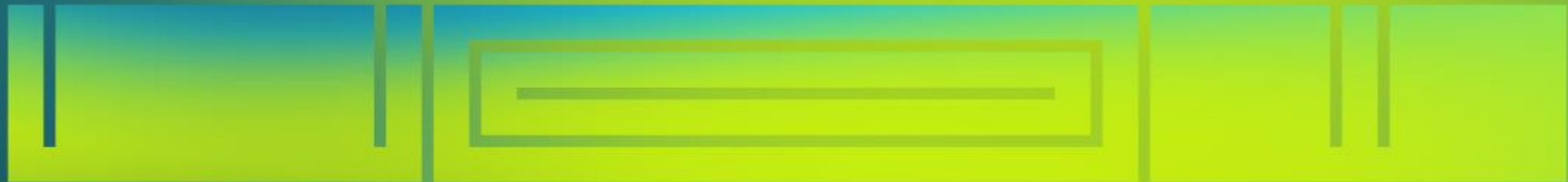
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