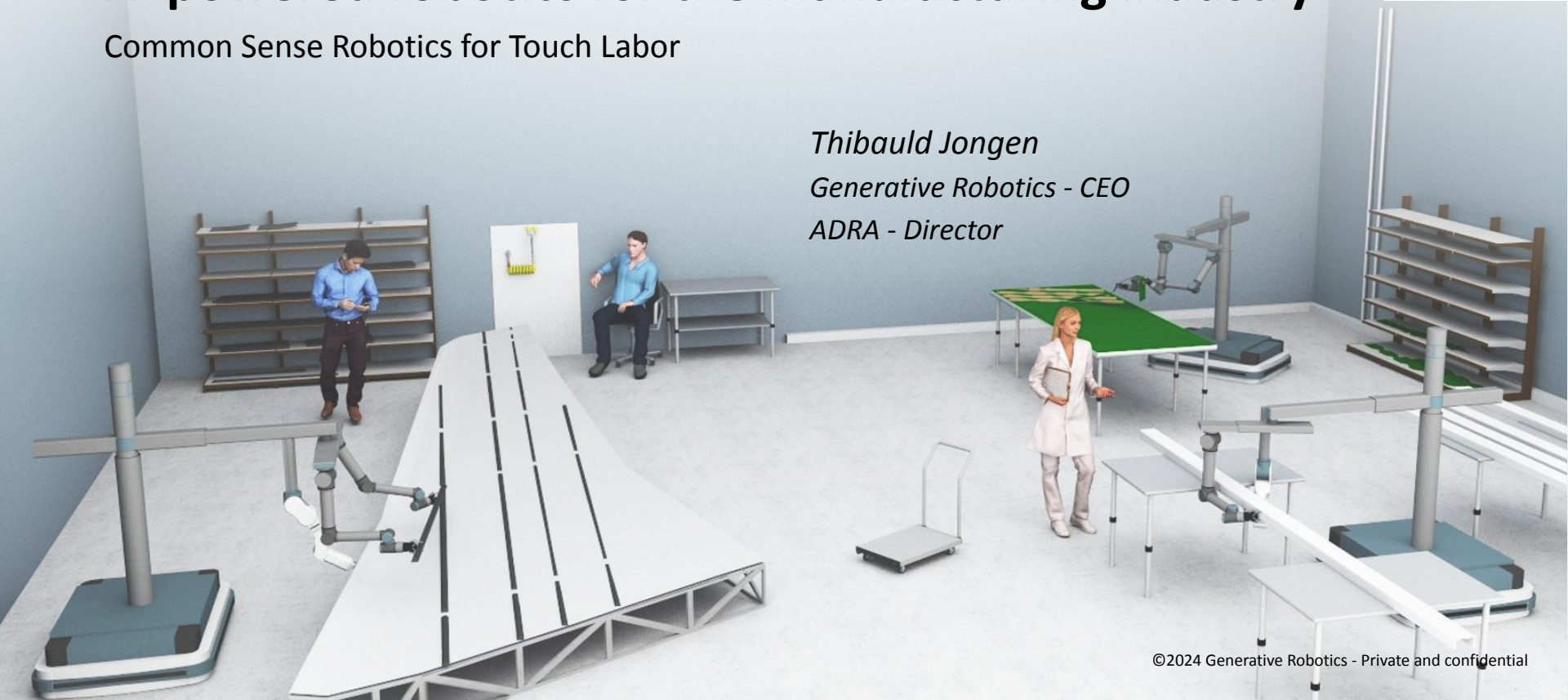


ADRA Cross Community Workshop - Humanoids 2024

AI powered robotics for the manufacturing industry

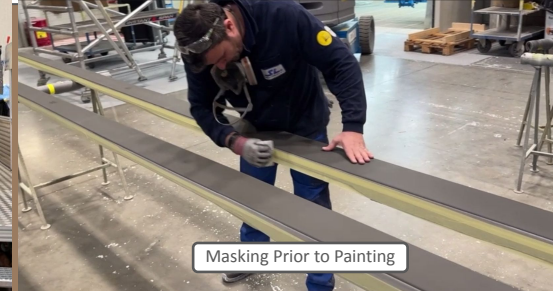
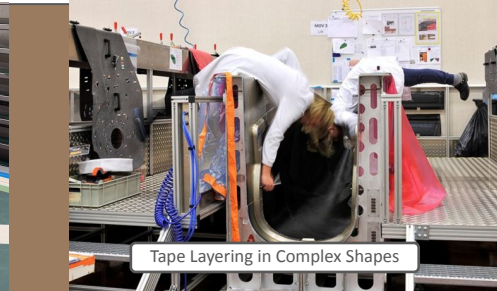
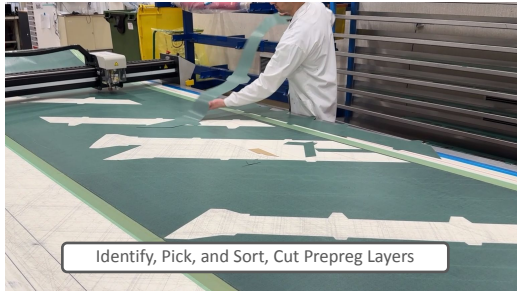
Common Sense Robotics for Touch Labor

Thibauld Jongen
Generative Robotics - CEO
ADRA - Director



Example of Manual Touch Labor in Low-Volume & High-Mix Industry

Automation is costly & complex for “cumulative” manual touch labor manufacturing



What's wrong
with **Manual
Touch Labor?**

Costs : high labor costs, expensive automation projects

Capacity : lack of available workforce, worsening demographics

Quality : unskilled, untrained personnel and human limitations

Customization : slow and expensive from design to production

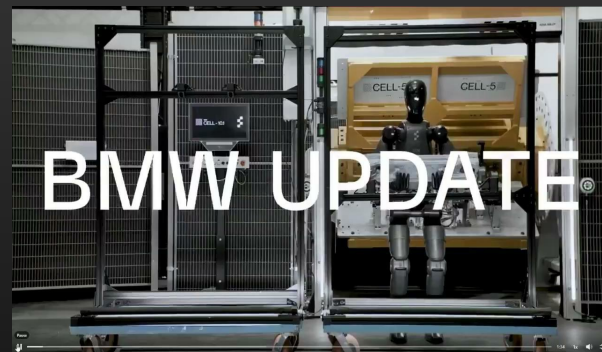
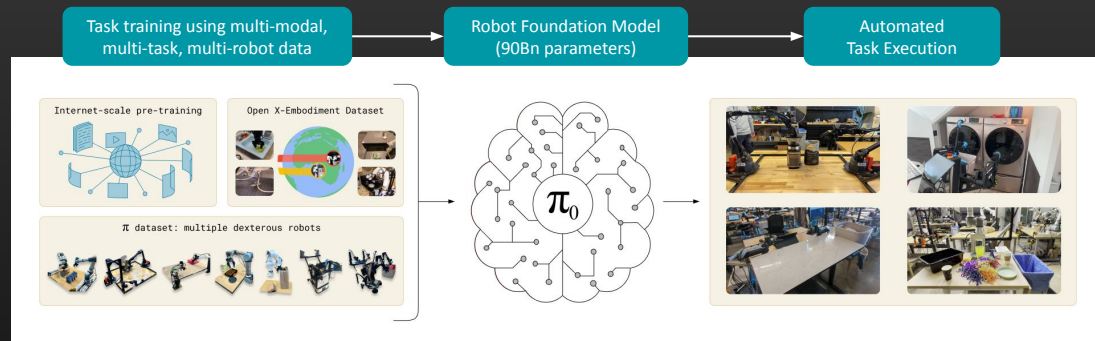
ASSIST
REPLACE
MANUAL WORK
WITH
AFFORDABLE
AUTOMATION

Robotization of Touch Labor

Embodied GenAI-Powered Robotics

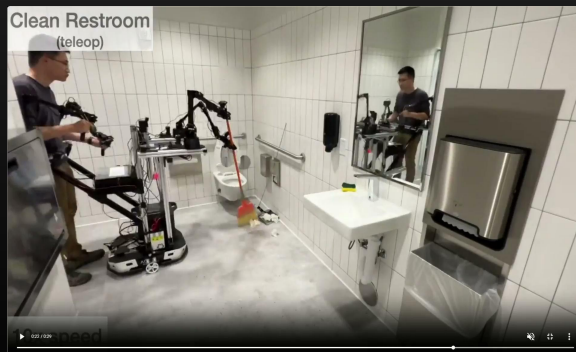
Dexterous Limbs
Word Representation
Multimodal Prompting
Visual Language Action Model
Machine Learning and Reasoning

General-purpose **Robot Foundation Models** bringing AI in the physical world



Physical Intelligence (π)

Investors (US\$ 470M in 2024): Khosla Ventures, Lux Capital, OpenAI, Sequoia Capital, Thrive Capital.



An Envelope of Manufacturing Touch Labor Tasks to Execute

Major Challenges for Cumulative Manufacturing

1. Current automation solutions lead to expensive & specific **"Islands of Automation"**
2. **Work Instructions** for Touch Labor tasks made by humans, for humans, with lots of common sense needed.
3. Difficult integration into **enterprise automation systems**
4. Current **AI tools have fundamental limitations** for manufacturing

Global Safety Compliance with Multiple Tasks to Execute

Expensive & specific "Islands of Automation"

Fundamental limitations of end-to-end data-driven Robot Foundation Models

Interaction & coordination with multiple agents difficult

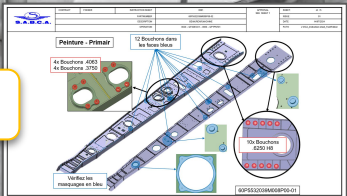
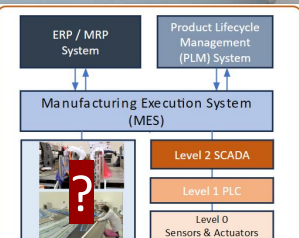
Strong Guarantees and No Acceptance of Failure in Product Conformity

No Integration of Touch Labor into enterprise systems

High-Level, Complex, Human-Readable Work Instructions

Touch Labor

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An Envelope of Manufacturing Touch Labor Tasks to Execute

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Fundamental limitations of end-to-end data-driven Robot Foundation Models

Interaction & coordination with multiple agents difficult

Global Safety Compliance with Multiple Tasks to Execute

End-to-end data-driven AI approach not always appropriate

Additional requirements for cumulative manufacturing with "touch"

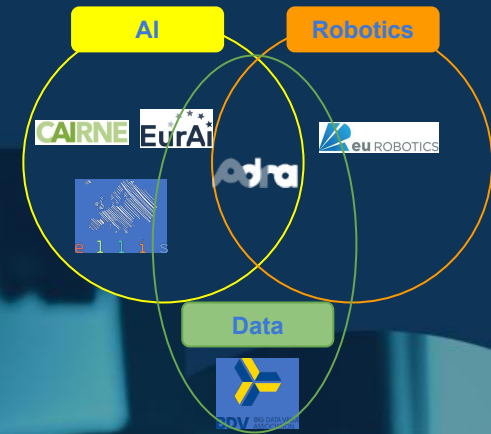
- **Safe & Trustworthy Embodiment** : cannot hallucinate !
- **Strong Guarantees** : continuous quality checks, repeatability, accuracy,...
- **Explainable** : cause of failed actions must be identified and corrected
- **Data** requirements : quantity, availability, standardization, ownership,...
- **Force & Motion** control specific for **touch manufacturing**
- **Frugal** in computational, energy, data, ... requirements
- **Open** for affordability (not proprietary), transparency, and modularity

Strong Guarantees and No Acceptance of Failure in Product Conformity



The AI Data Robotics Association

The Public-Private Partnership between the European Commission and the AI, Data, and Robotics ecosystem



Why Adra?

- Drive the **European Future** around AI, Data, and Robotics
- Create value through **leveraging the convergence of AI, Data and Robotics**
- **Unify** European ADR research bodies and industry to **one single strong voice**
- **Help** formulating **research & innovation objectives**
- **Address** short-term topics (**sustainability, ecological footprint, regulation**)
- **Contribute** to creating a European environment for new ideas



Industry Pilots & Applications

Intelligent Robotics for Industry : Identifying High-Impact Pilots and Applications in Manufacturing

Intelligent Robotics for Industry – Identify High-Impact Pilots & Applications

Objective

Identify high-impact applications of (Gen)AI-enabled robotics in the manufacturing industry to serve as reference points for Europe's Intelligent Robotics Roadmap

Deliverables

- Broad **consultation** on representative industrial ecosystem (end-users !)
- **Market Pull** in complement to Technology Push
- High-impact **challenges** for competitiveness, societal development, and European autonomy
- Required pre-competitive technology **capabilities & infrastructures**



thibauld.jongen@generative-robotics.com

Co-Lead

- Dr. Cécile HUET, Head of Unit Robotics & AI Innovation – and excellence, DG-CNCT, European Commission
- Dr. Thibauld JONGEN, ADRA Director & CEO of Common Sense Robotics