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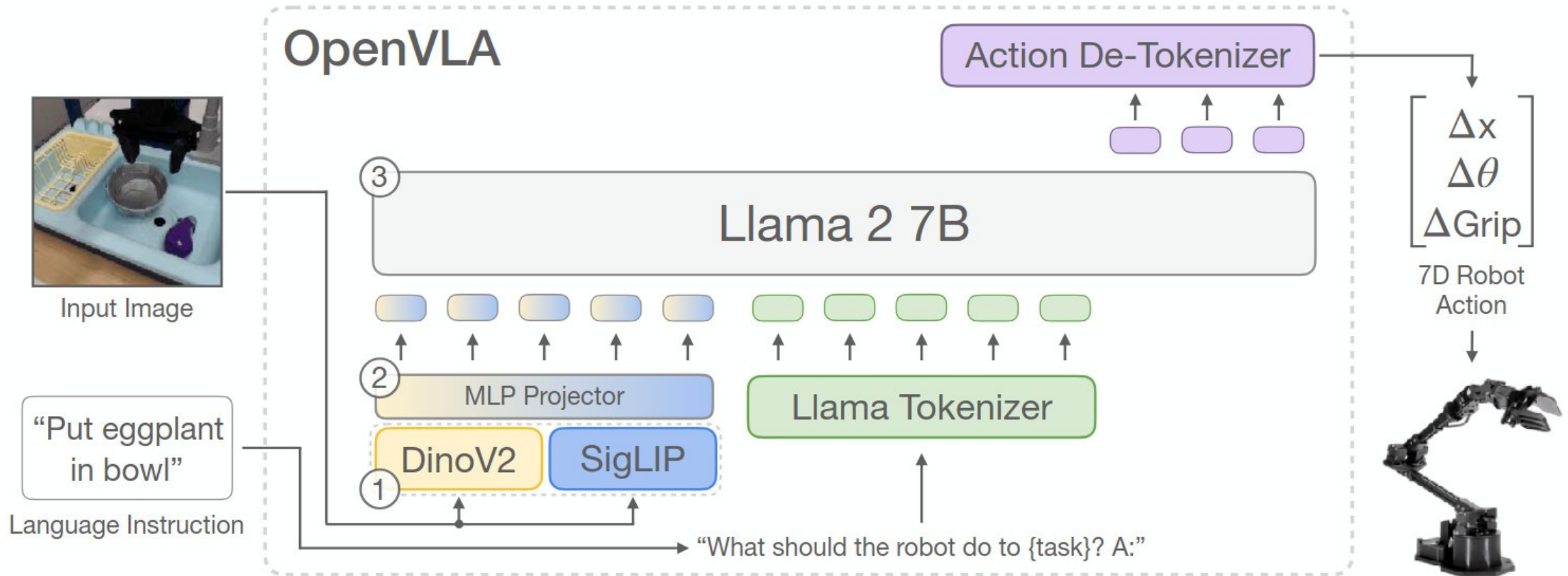
Communauté
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Reinforcement Learning and Fundational Models in Robotics : The revolution

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How to build an intelligent robot ?



Business Challenges

- **Reduction of Hardship & HSE:** Replace humans on repetitive and strenuous tasks, or to avoid exposure to risks.
- **Flexibility & Agility:** Manage part diversity and variability, enabling rapid task reconfiguration.
- **Compliance & Quality:** Ensure certification (strict standards), operation traceability, and flow regularity.

Expected Features

- **Speed:** Should be at least as fast as human in task execution
- **Imitation Learning:** Intuitive programming by demonstration for continuous task transfer.
- **Precise Manipulation & Dexterity:** Ability to handle parts precisely (e.g., screwing, force-feedback) or deformable/ bulky objects.
- **Dynamic Adaptation & Safety:** Management of dynamic obstacles and collaborative safety for human-robot coexistence.
- **Autonomous Navigation & Planning:** Automatic trajectory generation and real-time planning adaptation, including in unstructured environments



SCHAEFFLER



RENAULT



AMPERE

AIRBUS

THALES

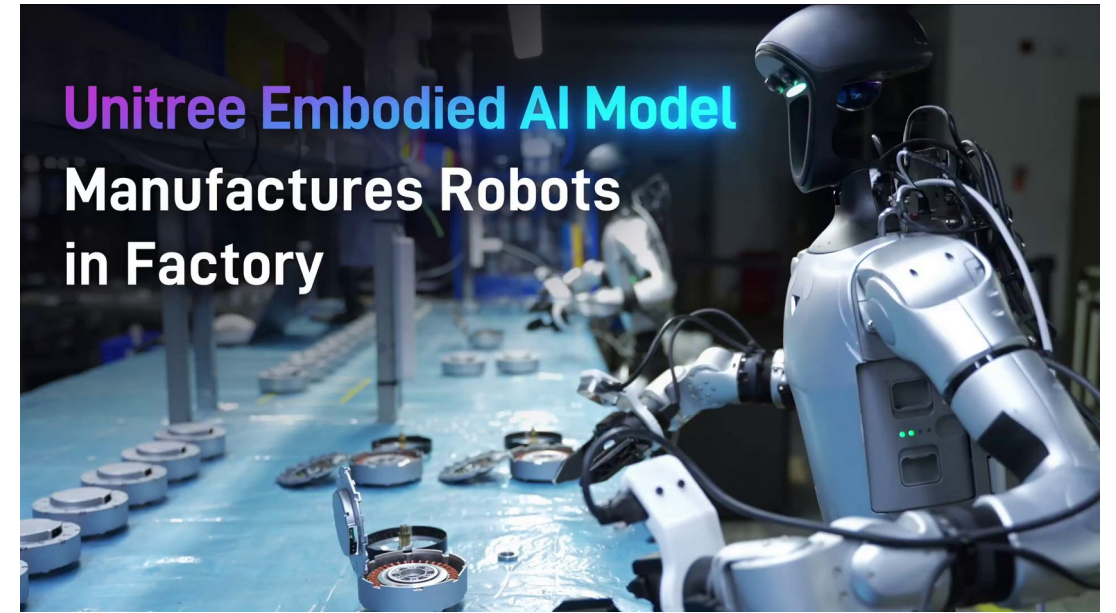


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Unitree : The leader among the Chinese Humanoid Robotics Manufacturer

- + Low Price
- + Backdrivable actuator
- + Impressive upgrade of the hardware



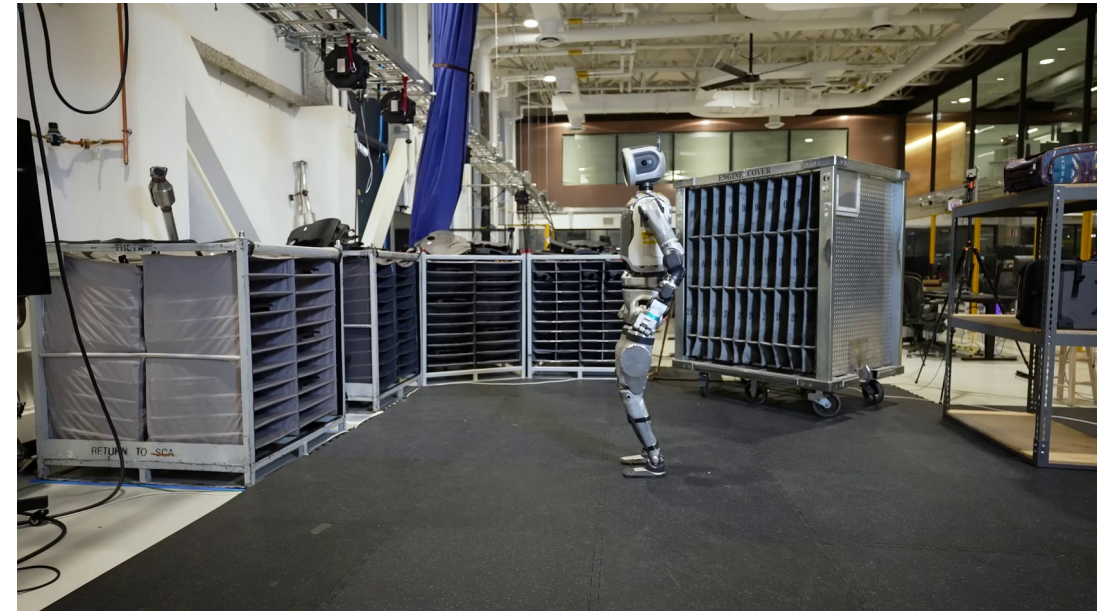
Footage from a real factory

This approach is using the Universal Manipulation Interface to :

- Collect Data
- Diffusion Policy for Behavior Cloning
- But it has a Slow execution

ATLAS : Probably the best humanoid robot

- + High Price
- + Backdrivable electric actuator
- + The most impressive hardware



Footage of a Proof Of Concept

This approach is using the Universal Manipulation Interface to :

- MPC / Reinforcement Learning
- Sensor feedback / Vision
- The industrial version did not move during CES 2026

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RECHERCHE

C3PO Results in Robotics :

Latent Conditioned Loco-Manipulation Using Motion Priors

+ ICHR 2025

+ Backdrivable electric actuator

+ Open source robot



Hierarchical Reinforcement Learning

- Imitation Learning + GAN Diffusion
- Low level policy modulated by a latent space
- High Level policy specified by a simple reward function

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RECHERCHE

C3PO Results in Robotics :

Constrained Reinforcement Learning for Unstable Point-Foot Bipedal Locomotion Applied to the Bolt Robot

- + ICHR 2025
- + Backdrivable electric actuator
- + Open source robot
- + PPO + Constraints = CaT





- Shizen Chen, INRIA, WILLO
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DIVERSITÉ

