

Workshop - Hybrid Intelligence

Service robotics and AI from an industry point of view



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9 November, 2023



Our company

Company

- 🕒 Founded in 2004
- 📍 Barcelona (HQ) / Toulouse / Rome
- 🌐 +20 nationalities
- ⚙️ ~100 people
- 📄 80% Engineers | 10% Ph.D.
- 🌍 Robots sales +35 countries

Our robots



Business units

2004

2023

Intralogistics

INDUSTRY | RETAIL | HEALTHCARE

Platforms for automating transportation of goods, inventory robots.



Legged

RESEARCH | UNIVERSITIES

Humanoid service Platforms for state-of-the-art research



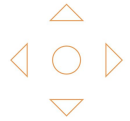
Mobile Interaction

RESEARCH | INDUSTRY | HEALTHCARE

ARI & TIAGo products and services for industry & research.



Our expertise



Navigation

SLAM
Navigation
Localization



Software

DevOps
Continuous integration
Perception



Embedded

Motor & Sensor
Control boards
Connectivity



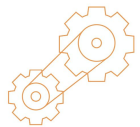
HRI

Social AI
Human Perception
Interaction Design



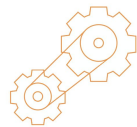
Control

Real Time
Manipulation
Walking



Electronics

Firmware
Sensor boards
Integration



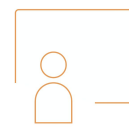
Mechanics

Bio-inspired
Actuation designs
Integration



Sales

Flexibility
Adaptation
Customised solutions



Post-sales

Training sessions
Technical assistance
On-demand programs



Community

Collaboration
Open Source
R+D

We help you integrate cutting-edge robotics

- R&D
- RETAIL
- INDUSTRY
- LOGISTICS
- ASSISTED LIVING
- HOSPITALITY
- AUTOMOTIVE
- AEROSPACE

Collaborative projects

We cooperate with other European partners in several fields through more than 25 EU-funded projects.

<https://pal-robotics.com/collaborative-projects>



Horizon Europe / H2020 / FP7 / Eureka / ITEA / FSTP

R&D Projects

Healthcare Projects

Industry Projects

Agri-food Projects



Why do we need hybrid AI?

Hybrid AI Main challenges

- **Current data-driven AI is still too narrow to fully help humans**, lacking in social and emotional intelligence and restricted in reality
- Staffing hybrid AI projects with the appropriate technical skills is essential
- It's important to address the absence of established industry standards for the design of hybrid AI systems
- How does that resonate with PAL Robotics' robots/ projects/ applications?





Humanoid robots in logistics and manufacturing

TALOS and Kangaroo

to work with humans in manufacturing

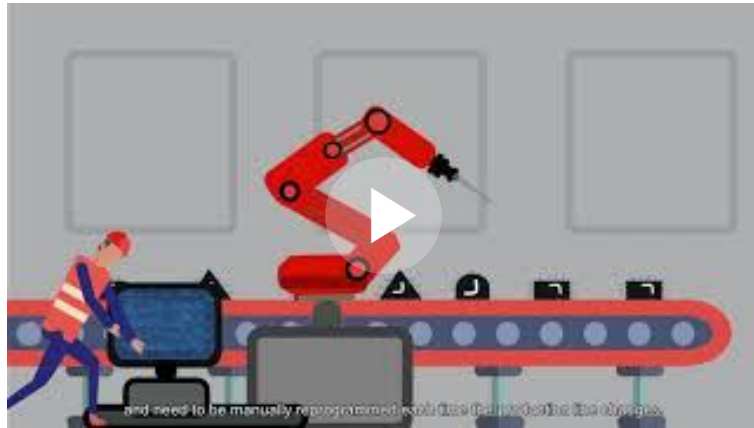
Hybrid AI?

working with **LAAS-CNRS** to develop algorithms to enable joint manipulation of objects with humans

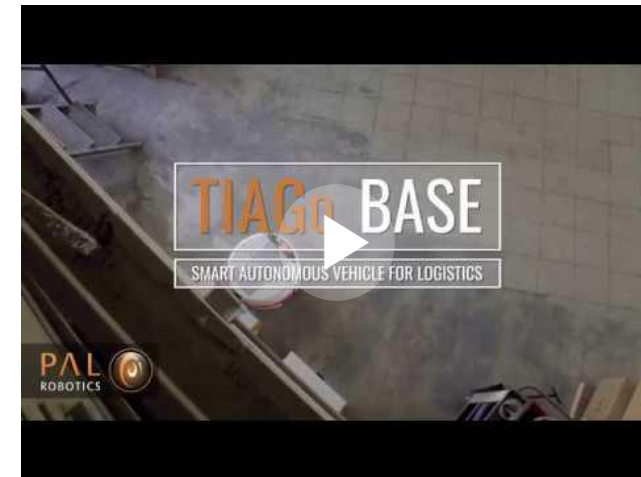
Future goal?

TALOS and Kangaroo working together with humans in manufacturing to pick up boxes and carry loads.





Aims to deliver an **open-source breakthrough innovation in AI-powered agile production**, introducing solutions that push the limits of perception, planning, and control in robotics, enabling general-purpose robots to be quick to set-up, autonomous and to easily adapt.



Addresses challenges of Multi-Robot Systems (MRS) by **developing an open, model-based engineering approach for dependable MRS operation in uncertain environments**. Includes use-cases in domains like agile manufacturing, healthcare, agri-food, and inspection and maintenance.



Social robots in healthcare logistics and assistance

TIAGo Pro

to work with humans in healthcare

Healthcare robots in hospitals today:

- non-social logistics robots
- therapeutic social robots

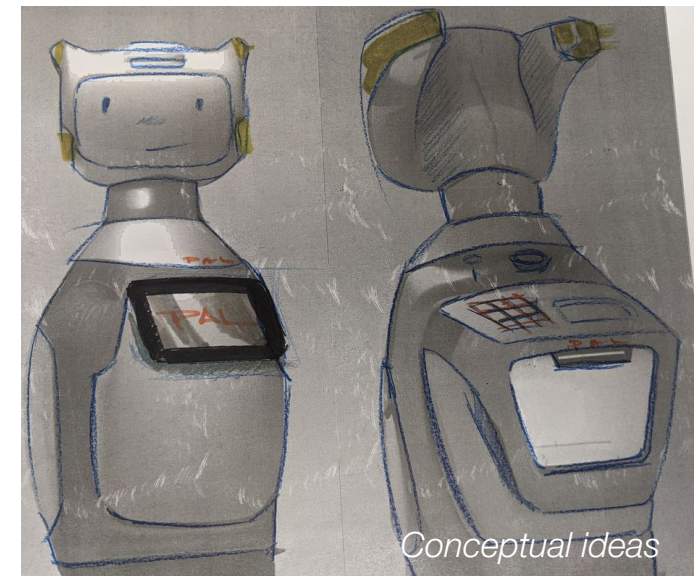
Hybrid AI?

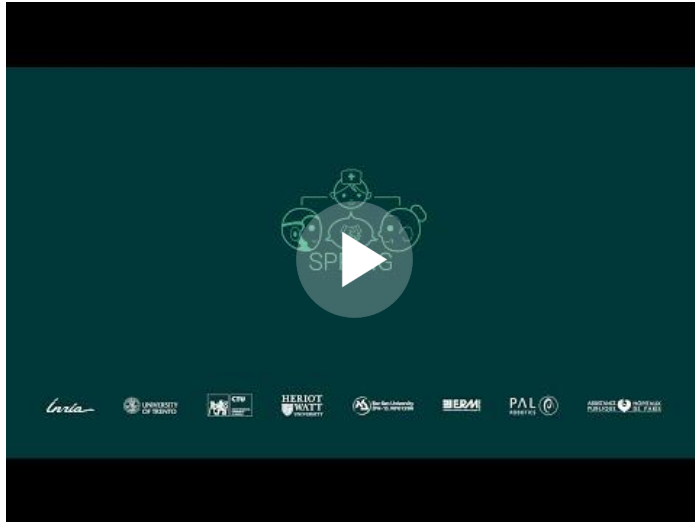
TIAGo Pro with ROS4HRI being developed for hospitals with added delivery box for logistics

Future goal?

TIAGo Pro for healthcare

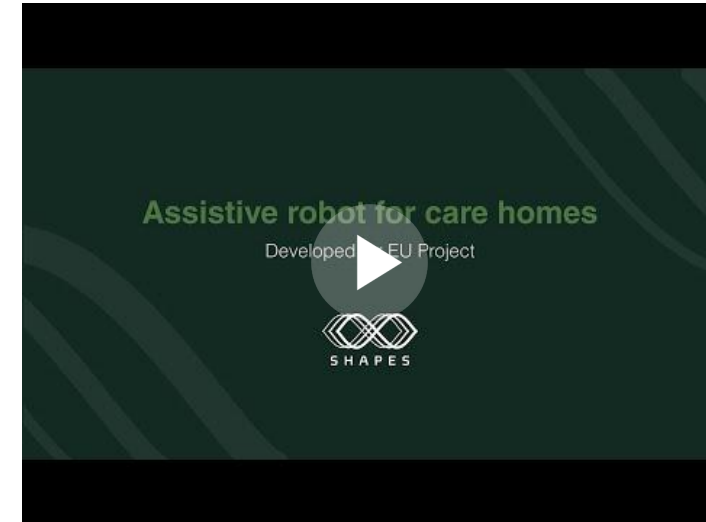
- human input at the core of the cognitive architecture
- from friendly robot for logistics to social companion
- driven by the users' needs (nurses, patients, families).





Socially Pertinent Robots in Gerontological Healthcare

Adaptation of Socially Assistive Robots, with the ability to perform multi-person interactions and have an open and extensive dialogue.



Smart and Healthy Ageing through People Engaging in Supportive Systems

Aims at a large-scale deployment of a broad range of digital solutions for supporting and extending healthy and independent living for older individuals.



Conclusion

Our aim is to create service robots to enhance people's quality of life.

We are developing **service robots and AI to work together with humans on a daily basis.**

Topics such as **emerging ethical issues and new regulations related to Hybrid Intelligence research are key** - collaboration between academia and the robotics industry is essential.



PAL
ROBOTICS



Thank you!



YouTube

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