PAL Robotics

Service Robotics to improve people's quality of life

PAL ROBOTICS

Barcelona, 2020

The Company

Our Team

CEO: Francesco Ferro

Founded in 2004

Located in Barcelona

15 nationalities

80% Engineers

10% Ph.D.

Robots sales +30 countries

PAL Robotics

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PAL Robotics in a Nutshell

2004

2020

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eu ROBOTICS

Hispa Rob.

PAL Robotics Business Units

Social Robotics

Banks, shops, malls, events

Platforms and services for social interaction

Products for Research

Companies, universities

Out of the box products for research

Collaborative Projects

International consortiums

H2020
Eurostars
Public funding

Intra-Logistics

Healthcare, Industry,

Platforms for automating transportation of objects

Retail

Retailers

Inventory robots
Assets tracking

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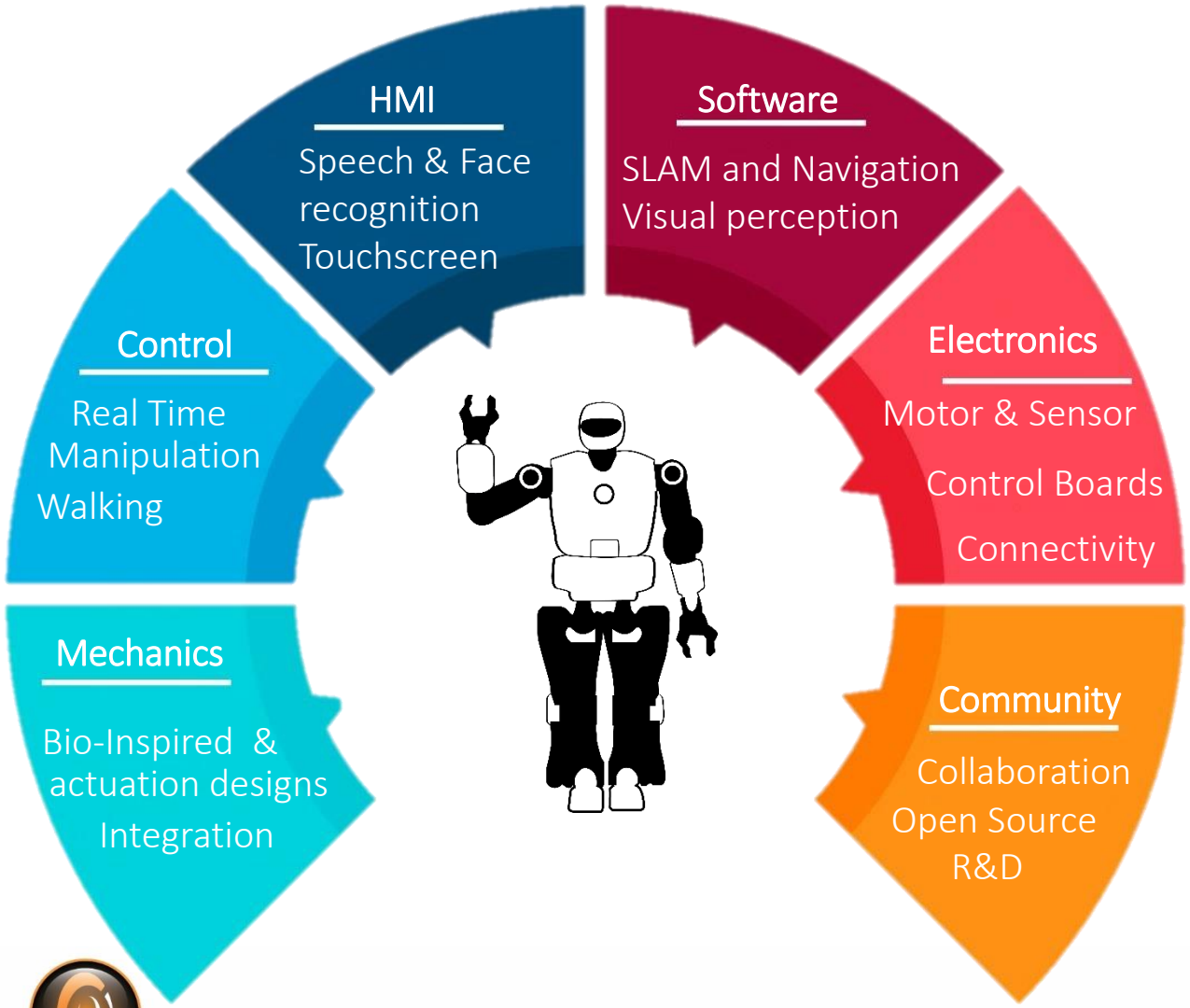
PAL Robotics Expertise



We help you to integrate cutting-edge robotics

- R&D
- Retail
- Industry
- Logistics
- Assisted Living
- Hospitality
- Automotive
- Aerospace

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Our first robots

PAL Robotics History

REEM-A

2004

- ✓ **First** European autonomous humanoid biped robot
- ✓ Plays chess

REEM-B

2006

- ✓ Payload: 15 kg
- ✓ Autonomous Navigation

REEM-H

2008

- ✓ One of the first robots to navigate in crowded environments
- ✓ Human Robot interaction

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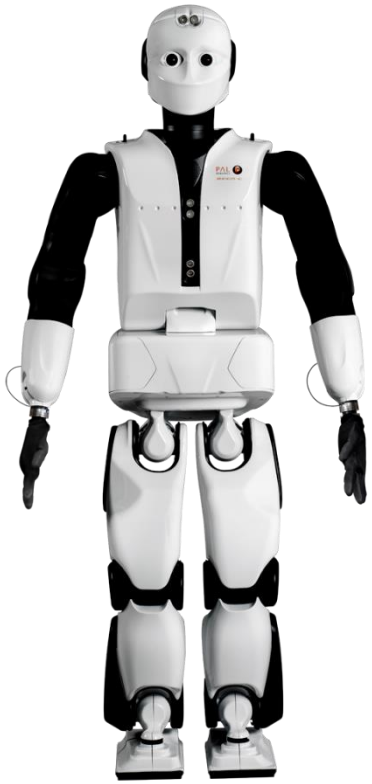
Robots helping today

Research in Robotics

Research



ROS 100% Integrated

Whole-body control

Free public simulation and Dynamic Model

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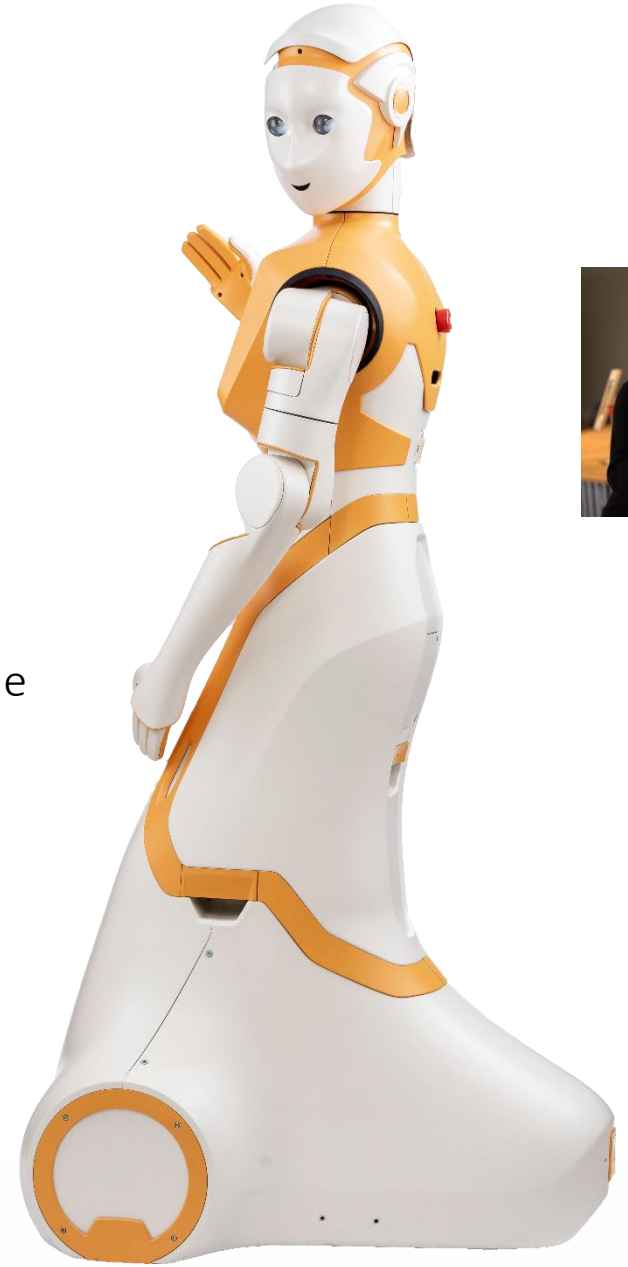
ROS GAZEBO MoveIt!

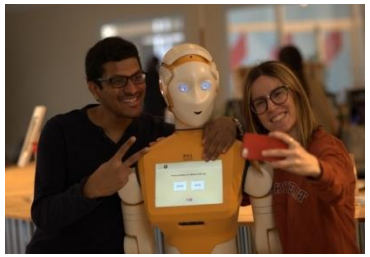
ARI: The Social Robot

Artificial Intelligence Assistant

Social

- Height: 1,65 m
- Customizable
- Human-Robot Interaction
- Free tutorials and simulations available online
- Research, Retail and Ambient Assisted Living
- ROS 100% Integrated





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ARI

Artificial Intelligent Assistant

- LEARNING
- SMART CITIES AND IOT
- SOCIAL
- VISION
- RECOMMENDATION SYSTEM

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REEM in Action

Entertainment

Dynamic info point

Autonomous guide

Museum

Attraction point

Advertisement

Conference host

Service provider

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REEM Press Highlights

THE AUSTRALIAN

Robots ready to invade banks, shopping centres

Chip with Simon Chakeshelf, Kelly Beyer Rosmarin and Mary-Anne Williams. Picture: Jane Dempster.

SIMON KITHEY THE AUSTRALIAN 12:00AM August 22, 2016

Its name is Chip. It stands 1.7m tall, weighs 100kg and can speak nine languages. It makes jokes, gives compliments, shakes hands, helps people find places and tracks

Frankfurter Allgemeine

Feuilleton

Der Golem lebt, möge er friedlich bleiben

VON REGINA MÖNCH

Das jüdische Museum Berlin zeigt eine Ausstellung zu dem Menschheitstraum, selbst zum Schöpfer zu werden. Ist der moderne Golem der Künstliche-Intelligenz-Forschung ein unkontrollierbares Nachbild der Menschen?

Un robot a spasso per Milano

Reem è alto 1 e 70, pesa 100 chili

sa interagire con i passanti:

«Vuoi lo spritz? Fai un selfie?»

li abbracci con i bambini

El primer robot policía es 'made in Barcelona'

LEADING AUSTRALIAN CORPORATE-ACADEMIC PARTNERSHIP SHAPES NEXT GENERATION OF SOCIAL ROBOTICS INNOVATION

22 AUGUST 2016

Commonwealth Bank, Stockland, Australian Technology Network of Universities and University of Technology Sydney partner to invest in research & development of social robotics.

The Sydney Morning Herald Business

Robots to make shopping easier

Carolyn Cummins

Robots are the latest retail "disrupter" as they head to a shopping centre near you to offer advice, assistance and some entertainment.

And it's big business, with International Data Corporation forecasting the global robotic market will be worth $US195 billion ($A182 billion) by 2019. Furthermore, according to Boston Consulting Group, the use of advanced robotics will rise by about 2–3 per cent annually to about 25 per cent in the next decade.

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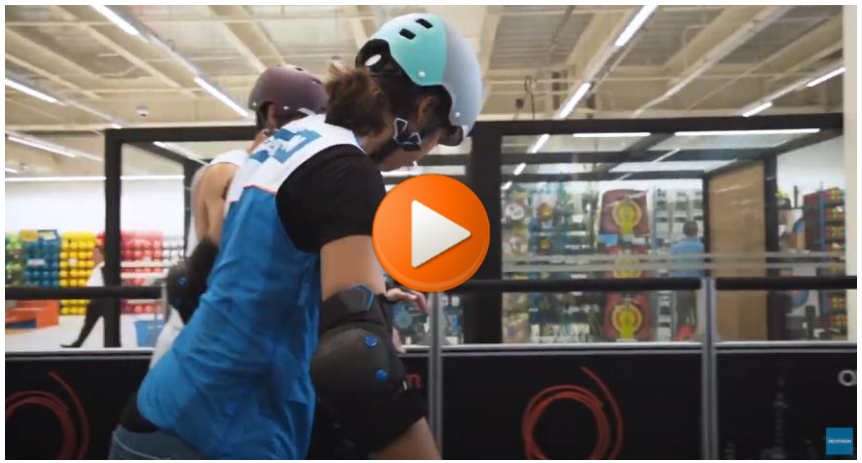
StockBot

Autonomous inventory-taking robot

- 0,45m x 0,45m x 1,8m
- **RFID** enabled
- **Vision** recognition
- **3D location** of items
- Advanced Autonomous Navigation



Credits: Decathlon Singapore

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StockBot enables…

- **Automatic** in-store item **localization**
- **Planogram** compliance
- Increase sales by **reducing OOS** situations
- **Optimization** of inventory management
- **Automatic In-store** item localization (1m accuracy)
- Better **data-driven** **decisions** & big data opportunities

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Indoor Deliveries

The revolution of Autonomous Mobile Robots

TIAGO BASE

- 0,54m x 0,54m x 0,3m
- 100kg payload
- Easy to extend, upgrade and integrate
- Maximum speed 1.5m/s
- Advanced Autonomous Navigation

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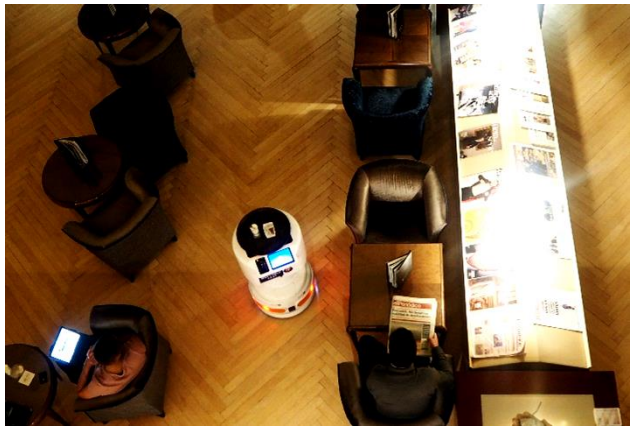
TIAGo Base – Sectors

Industrial plants

Warehousing



Hotels

Hospitals

Labs

Offices

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TIAGo Base

Fully customizable

As robot manufacturers, we can design custom-made solutions for each scenario.

Fixed shelves

Safety Box

Roller Conveyor

TIAGo Base

Mobile Deliveries

Lifter

TIAGo Base – Services

100% INTEGRATION

- **Integrated** with management system
- **Intuitive usability** for employees and clients

SAFETY BOX

- Acces key required
- Enhanced usability thanks to the screen
- Customizable box: size, conditions

SAFETY BOX

CUSTOMIZABLE

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TIAGo Base enables...

INCREASE PRODUCTIVITY: Guarantees a constant production, automating low valued tasks.

OPTIMIZE RESOURCES: Increase time available for workers for tasks that deliver added value.

EASY TO IMPLEMENT AND USE: Installation is fast and easy without changes in space, no technical knowledge needed.

FLEXIBILITY: Possibility of modifying the robot's programmed task during its routine to suit prompt needs in production.

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TIAGo

Take It And Go

- Height: 110cm – 145cm
- Expandable
- Mobile manipulation
- Free Tutorials and simulations available online
- Research, Industry and Ambient Assisted Living
- ROS 100% ROS Integrated

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TIAGo – Customizable

Modular Configurations

TIAGo Base

TIAGo IRON

TIAGo STEEL

TIAGo TITANIUM

TIAGo++

Create your own TIAGo Robot here

TIAGo – Customizable

“The robot that adapts to your research needs, not the other way around”

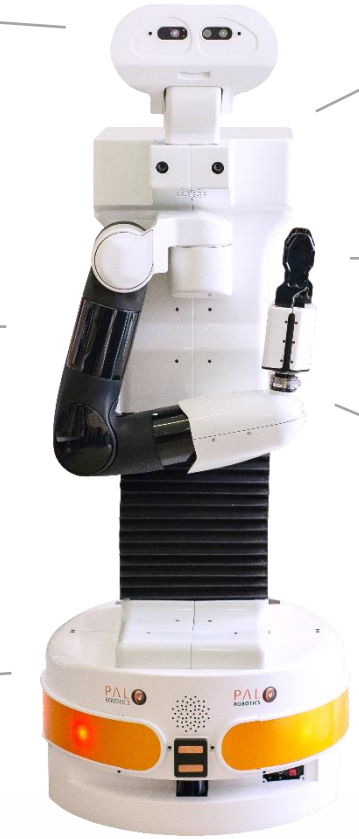
HEAD MOUNTING PORTS

CUSTOMIZABLE COLOR

CUSTOMIZABLE TORSO

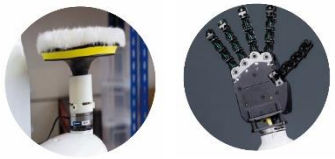
NVIDIA JETSON

TIAGo BASE



LAPTOP TRAY

EXPANSION PANEL



PLUG&PLAY END-EFFECTORS

6 AXIS F/T SENSOR

GRIPPER CAMERA

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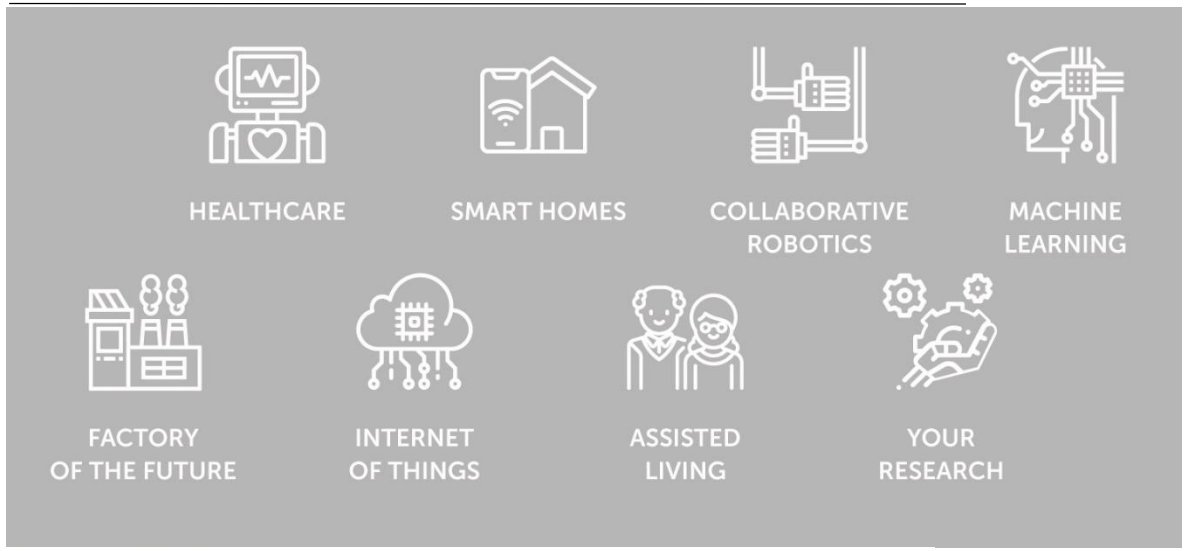
TIAGo – Versatile



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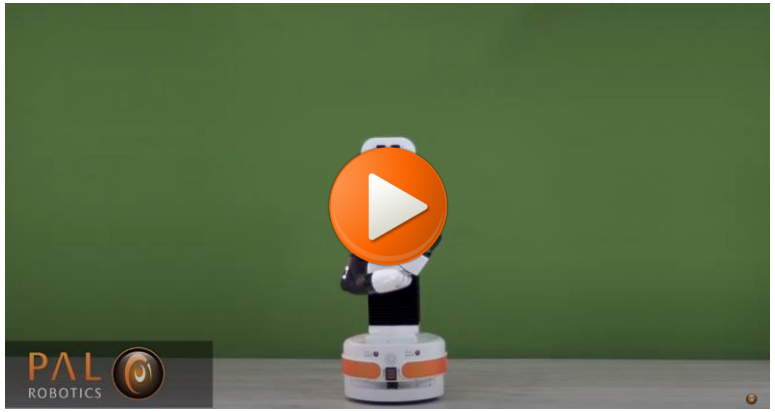
TIAGo – Software tools

Whole Body Control



Hierarchical quadratic solver providing:

- Online inverse kinematics of the robot‘s upper body:
  - 7 DoF arm
  - Torso prismatic joint
  - 2 DoF head
- Self collision avoidance
- Joint limit avoidance
- Gaze control

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Competitions

EUROPEAN ROBOTICS LEAGUE
Brought to you by SPARC

TIAGo is widely used by teams, mainly due to:

- Mobile manipulation (7 DoF arm).
- Fast to program (ROS-based; can work on simulation even before having the robot).
- Customizable and modular.
- Expandable: multiple plug&play add-ons and computers easily connected to the robot.
- Out-of-the-box features, such as navigation, motion planning.

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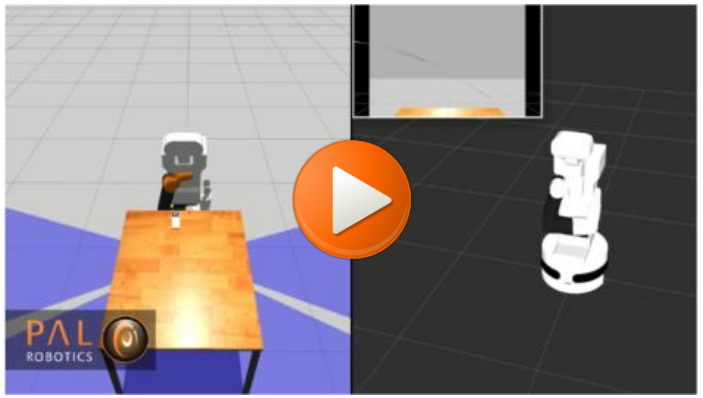
Software

Open Software → Use your own packages, drivers and controllers.

Open source simulation for Gazebo:

- 3D URDF models
- Controllers
- Tutorials

Available on TIAGo ROS Wiki (http://wiki.ros.org/Robots/TIAGo).



ROS

ubuntu

GAZEBO

The Orocos Project
Smarter control in robotics & automation!

MoveIt!

Jenkins

GitHub

GitLab

OpenCV

pcl

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European Projects

PAL Robotics cooperates with other European partners in order to boost innovation in several fields through **more than 15 EU-funded projects**:

	HEALTHCARE	INDUSTRY	R&D
On Going	SPRING SHAPES RobMoSys SOCRATES Social Cognitive Robotics in The European Society	SeCoIIA memmo CYBER FACTORY NO.1 CF#1 4Robots SIMBIOTS	Deep Robotics eurobench neu touch INBOTS Inclusive Robotics for a better Society ROSin OPEN CALL COVER
Past Projects	SACRO growmeup ENRICH me	Factory in a Day	SHERPA

Click on the above logos for more details

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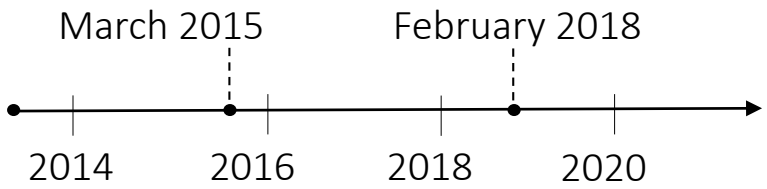
ITEA 3 eurostars RIS3CAT CDTI

EU Project: ENRICHme



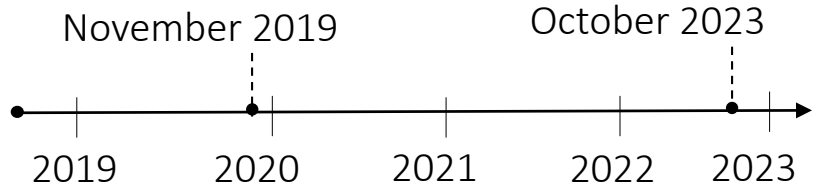
Aim: Social support, encourage and engage the older people in their daily life.

Call: PHC-19-2014.

Find out more about the project here

PAL ROBOTICS · HORIZON 2020 · Elettronica Bio Medicale, a company of TBS Group · Smart Homes · Fondazione Don Carlo Gnocchi Onlus · LACE Housing with Care · Aktios www.aktios.gr Aktios Elderly Care Units · ENSTA ParisTech université PARIS-SACLAY · University of Lincoln

EU Project:

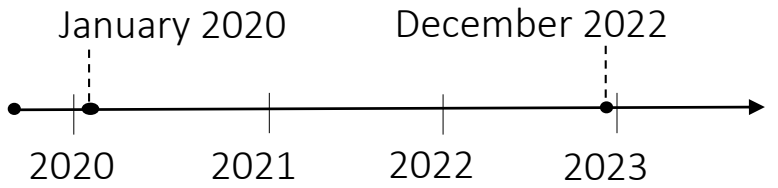


Aim: SHAPES aims at a large-scale deployment of a broad range of digital solutions for supporting and extending healthy and independent living for older individuals.

Topic: DT-TDS-01-2019.

Find out more about the project here

EU Projects: OpenDeep Robotics

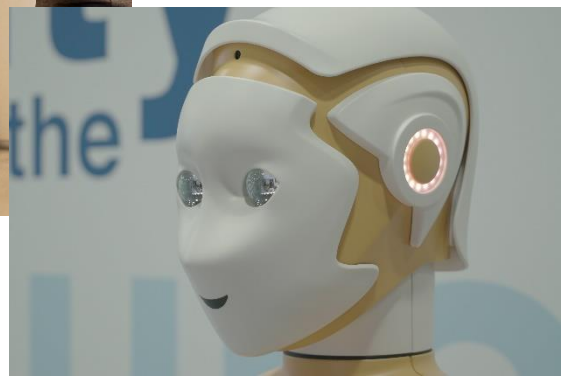


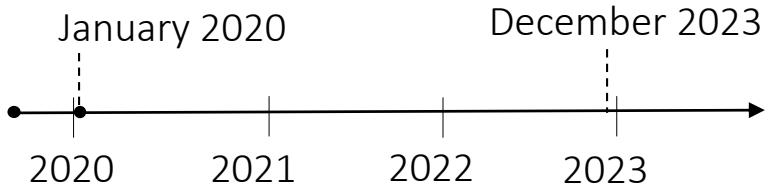
Aim: to develop a modular, open and non-proprietary tool kit for core robotic functionalities by harnessing deep learning to provide advanced perception and cognition capabilities.

Topic: ICT-10-2019-2020.

Find out more about the project here

EU Projects: SPRING





Aim: to develop a novel paradigm and novel concept of socially-aware robots, and to conceive innovative methods and algorithms for computer vision, audio processing, sensor-based control, and spoken dialog systems based on modern statistical- and deep-learning to ground the required social robot skills.

Topic: ICT-09-2019-2020.

Find out more about the project here

TIAGo Fast AVs

PAL Robotics develops a cost-effective solution based on its TIAGo Base robot

Voxdale
F&P Robotics AG
Akara Robotics Limited
Jonker-Makis Robotics B.V.

Hocoma AG
MetraLabs GmbH Neue Technologien und Systeme
ACCREA Engineering Sp. z o.o.
KELO Robotics GmbH

PAL Robotics
Rubedo sistemos

At the end of the project, the solution will provide the following functionalities:

- Robotic system that automated disinfection tasks allowing health personnel to focus on other high value tasks
- Higher effectiveness of the disinfection by removing human errors when positioning the lamps at several spots in a room that may lead to shadow regions
- Reduction of risks for operators and people
- Higher repeatability and accuracy. The automated solution is not affected by fatigue or stress
- Full traceability of the disinfection tasks performed thanks to the software that manages the robot and tracks it along the facility
- Possibility to teleoperate the robot for specially difficult disinfection tasks or for disinfection of new areas of the facility

TIAGo Disinfection

Disinfection of Healthcare Environments by Autonomous Robots

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Conclusion

Service Robotics is NOT a single company work

Interact with the customer from start

Passion and Motivation are mandatory

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Thank you!
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