Politecnico di Torino
Interdepartmental Centre
for
Service Robotics

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PIC4SeR

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Service robots assist human beings, typically by performing a job that is dirty, dull, distant, dangerous or repetitive, including household chores. They typically are autonomous and/or operated by a built-in control system, with manual override options. The term "service robot" does not have a strict technical definition. The International Organization for Standardization defines a “service robot” as a robot “that performs useful tasks for humans or equipment excluding industrial automation applications”
PIC4SeR – Service robotics

Key technologies shaping

Future capabilities of robots

PERCEPTION

COGNITION

ACTION

Industrial Robots

Service Robots

Service robots for professional use. Main Applications
Unit sales 2017** and 2016, forecast 2019* and 2020*–2022*

Service robots for personal/domestic use.
Estimated value 2017** and 2018, forecast 2019* and 2020*–2022*

Service robots for professional use. All other applications -1-
Unit sales 2017** and 2018, forecast 2019* and 2020*–2022*

*forecast, **revised 2017**, 2018, 2019*, 2020*, 2021*, 2022*
• Many of the current research, innovation and development in the service robotic field, can be classified as disruptive technologies
• Several uncorrelated research projects and industrial partnerships must be harmonized and coordinated to optimize the results
• To start a common workplace, a common knowledge and a common language
• To develop an integrated approach and technology development process in this booming area
• To help PoliTO reaching a critical mass in this sector (instead of several scattered initiatives)
• To link together technology needs coming from several industrial partners
• To start interdisciplinary didactic activities in this area
• To join several international research communities with a unique “face” and coordinated research proposals
5 PoliTO departments
- DET (Electronics & Telecoms)
- DAUIN (Informatics & Control)
- DIMEAS (Mechanics & Aerospace)
- DIATI (Geomatics & Photogrammetry)
- DAD (Design & Cultural Heritage)

50 people involved
- 21 staff
- 12 researcher
- 17 PhD students

Location: c/o COVIVIO building
- C.so Ferrucci 112 – Torino
- 580mq of labs and offices
- Indoor & outdoor facilities available for testing
PIC4SeR – key application areas

PRECISION AGRICULTURE

SERVICE ROBOTICS FOR WELLBEING
PIC4SeR – key application areas

CULTURAL HERITAGE

SMART CITY SEARCH & RESCUE

Safe UAS flight in urban areas
PIC4SeR – key application areas

UNDERWATER

SPACE
## PIC4SeR – Internal organization

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<th>Platforms</th>
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<td>UGV</td>
<td>AI &amp; ML</td>
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<td>UAV</td>
<td>Local/Global Positioning</td>
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<td>Mechanism design</td>
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<td>Core</td>
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<td>SLAM</td>
<td>SLAM</td>
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<tr>
<td></td>
<td>Planning</td>
<td>Vision / Image processing</td>
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<td>Edge AI</td>
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</table>

- **Platforms**: UGV, UAV, AUV & ROV
- **Technologies**: AI & ML, Local/Global Positioning, Mechanism design, Generalization, Perception (CV), RL, Vision / Image processing, Edge AI, GNSS, UWB, Locomotion platforms, Robotic arms, Energy management, Embedded systems, System architecture, Power electronics.
Thank you

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Thank you

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