Theses at IIT

Humanoid and Human-Centred Mechatronics Lab

ISTITUTO ITALIANO
DI TECNOLOGIA

Lab presentation

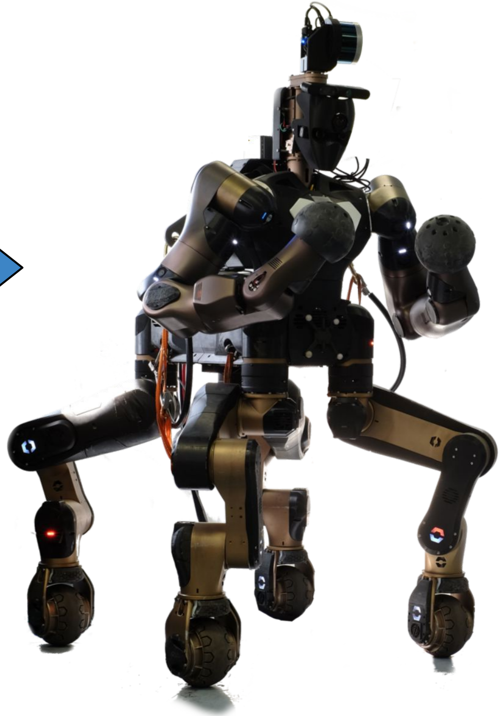
Mechatronics

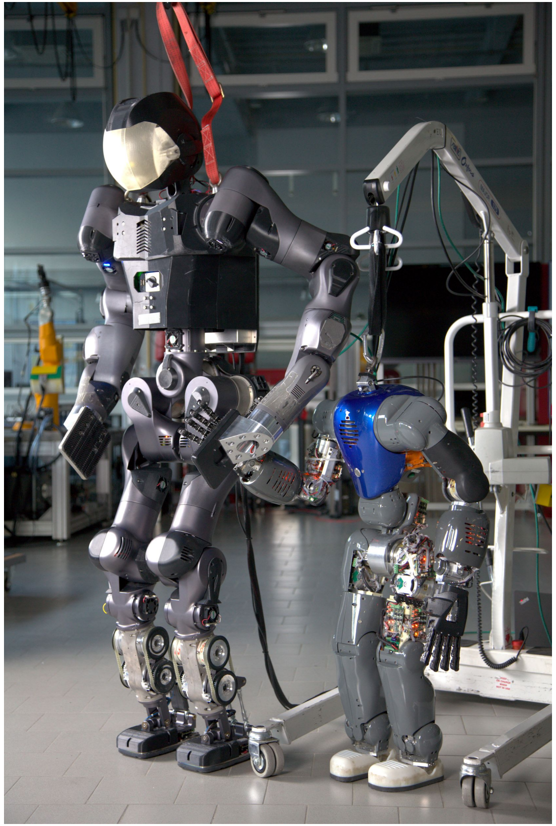
Softwares for RT Control & Planning

CartesI/O

OpenSoT

Position & Torque-Controlled Legged Robots





People

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Post-Doc

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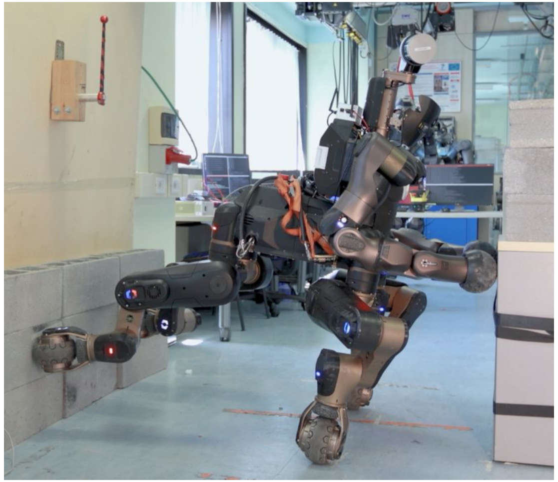
Topic #1: Motion Planning

Goal: We want to plan dynamic motions for a legged humanoid robot.

Dynamic motions may include jumping or pushing exploiting contacts with the environment.

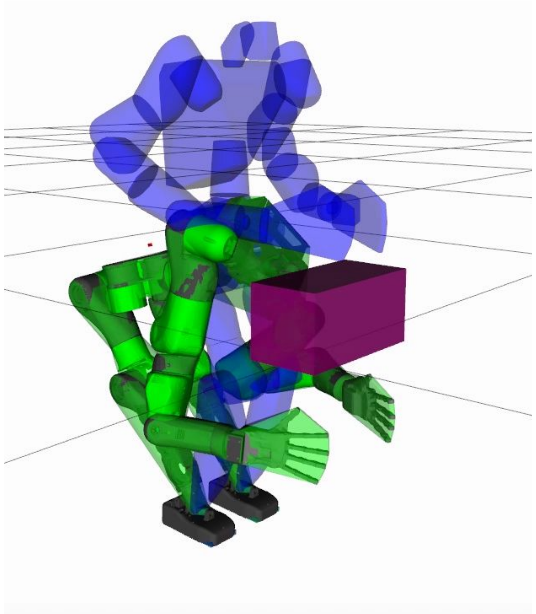
Experimental validation on CENTAURO and COMAN+.

Methodology: Optimal control (CasADi)



Topic #2: Motion Planning

Goal: We want to perform manipulation tasks with a humanoid (e.g. pick a box from the ground) while avoiding self-collisions and collisions with the environment, and simultaneously keeping balance.

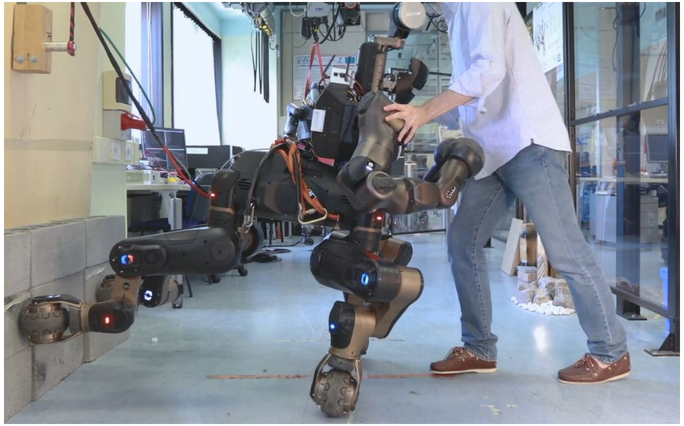


Experimental validation on CENTAURO and COMAN+.

Methodology: Sampling-based motion planning for floating-base systems

Topic #3: Balancing Control

Goal: We need a control layer that can enforce balance during locomotion and manipulation tasks, based on a simplified model (e.g. linear inverted pendulum).



Experimental validation on CENTAURO and COMAN+.

Methodology: Inverse dynamics, admittance/impedance control

Topic #4: Locomotion

Goal: We are able to make CENTAURO crawl (3 feet are always in contact with the ground) and COMAN+ walk statically. Yet we would like to make CENTAURO trot (2 feet are in contact with ground) and COMAN+ walk dynamically, to speed up locomotion.

Experimental validation on CENTAURO and COMAN+.

Methodology: Dynamic walking