

Humanoid mechatronics @IIT: main results and lessons learnt



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東京農工大学 小金井キャンパス 講義棟 L0011

Lecture Room L0011, Lecture Hall Bldg. for the Faculty of Engineering, Koganei Campus TUAT

Abstract

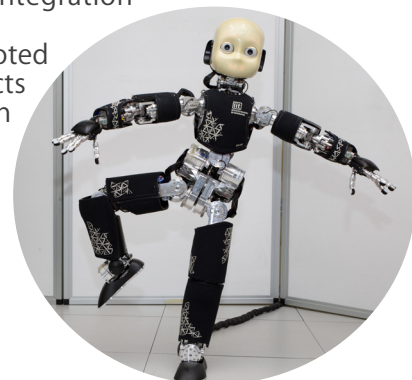
The design and control of humanoid robots has traditionally been a considerably hard problem. These machines have a large number of degrees of freedom whose motion needs to be coordinated to achieve useful tasks. Furthermore, these systems require a rich suite of sensors to plan and control their motion. Finally, such systems are often designed to assist or replace humans and thus need to match human capabilities in terms of strength and dexterity. This combination of requirements and constraints poses an extremely complex mechatronic design and integration problem.

In the past 13 years, several research lines at the Italian Institute of Technology (IIT) devoted their efforts to the implementation of humanoids. This lecture will cover the main aspects of iCub and R1 mechatronics. Finally, I will conclude the seminar with some general considerations on the typical design and implementation challenges and possible strategies to overcome these.



Talk outline

- The design of the iCub humanoid robot
- The design of the R1 humanoid robot
- MWS facility introduct
- Lessons learnt
- Robot prototyping
- Robot CAD modelling
- Q&A



Biography

Alberto Parmiggiani graduated cum laude in Mechanical Engineering at the Università degli Studi di Modena e Reggio Emilia in 2006. He then moved to Genova where he started his PhD at the newly founded Istituto Italiano di Tecnologia (IIT). There, he worked on the hardware of the iCub humanoid robot under the supervision of Lorenzo Natale, Giorgio Metta and Giulio Sandini.

After obtaining his PhD, he served as the hardware lead of the iCub project as a PostDoc since 2010 and as a Technologist since 2016. In 2019, he became the coordinator of IIT's mechanical design and fabrication facility.

His research interests are in mechatronics, robotics, additive manufacturing, digital fabrication, topology optimisation, compliant mechanisms and lightweight design.

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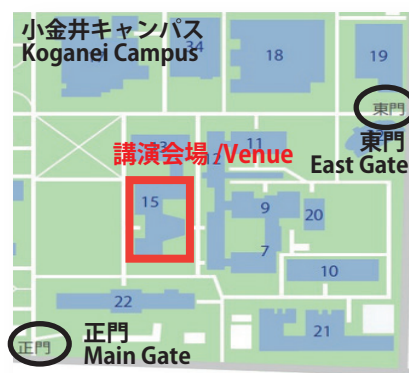
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