iCub: An Overview

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Schedule

Demos!!

iCub

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The Robot

Who: iCub.

What: a “child” humanoid robot.

When: project started in 2004.

Where: IIT, Genova, Italy.

Why: a platform to study the emergence of cognitive capabilities in artificial, embodied systems.
The iCub “dads”

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1 Accelerometer and Gyroscope
2 Dragonfly cameras resolution: 640 x 480

Overview
• Height: 1 meter
• Weight: 25 Kg
• 53 Degrees of Freedom (total).
• Force/Torque sensors in each limb.
• Tactile “skin” sensor over (almost) the whole body.
• 2 Microphones mounted on the head.
iCub is involved in many projects...

... in CBMM too!
Force/Torque Sensors

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Artificial Skin

**ground plane:** e.g. conductive fabric
**parameters:** mechanical properties, impedance, etc.

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**soft material:** e.g. silicone
**parameters:** dielectric constant, mechanical stiffness, etc.

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**electrodes:** etched on a flexible PCB
**parameters:** shape, folding, etc.

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Artificial Skin

No Tactile feedback

With Tactile feedback

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https://www.youtube.com/watch?v=S7Kk6KEw3C4
Zero Force Control

Del Prete, A. et al. Control of Contact Forces: the Role of Tactile Feedback for Contact Localization, IROS 2012

https://www.youtube.com/watch?v=S7Kk6KEw3C4

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The target of the doubleTouch is detected through the tactile system.
iCub

One-foot balancing via external force control

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https://www.youtube.com/watch?v=VrPBSSQE3A
2004 RobotCub European FP7 Project

2010 Force/Torque sensing

2012 upper body covered with artificial skin

2014 Visuo-motor Calibration

2015 Balancing

Next Talks!

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Enjoy the school!