

## Increasing Perceptual Skills of Robots Through Proximal Force/Torque Sensors: A Study for the Implementation of Active Compliance on the iCub Humanoid Robot (Springer Theses)

Matteo Fumagalli

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This thesis proposes an effective methodology for enhancing the perceptual capabilities and achieving interaction control of the iCub humanoid robot. The method is based on the integration of measurements from different sensors (force/torque, inertial and tactile sensors) distributed along the robot's kinematic chain. Humanoid robots require a substantial amount of sensor information to create their own representations of the surrounding environment. Tactile perception is of primary importance for the exploration process. Also in humans, the tactile system is completely functional at birth. In humanoid robotics, the measurements of forces and torques that the robot exchanges with its surroundings are essential for safe interaction with the environment and with humans. The approach proposed in this thesis can successfully enhance the perceptual capabilities of robots by exploiting only a limited number of both localized and distributed sensors, providing a feasible and convenient solution for achieving active compliance control of humanoid robots.



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