



Séminaire ISIR

Lundi 15 juin à 11H

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Campus Jussieu, 4 place Jussieu, Paris
Salle de réunion H20

Humanoid Robot Fall Control and Other Research

Abstract : Balance is one of the oldest topics in humanoid robotics that continue to appeal to researchers of the present day. However, keen interest in balance research sometimes makes us overlook the consequences of a balance failure. Although fall appears to be a rare event in the life of a humanoid robot, its occurrence is virtually unavoidable, and its consequences can be disastrous.

A falling robot is an underactuated system that rapidly gains speed under gravity. The time to act is very short. How can one intervene? In this respect, we will describe our work on humanoid robot fall strategy which tries to modify the robot's fall direction in order to avoid hitting a person or an object in the vicinity. Our approach is based on intelligent foot placement as well as a method called "inertia shaping" which is aimed at controlling the centroidal inertia of the robot. We demonstrate our results through the simulation and hardware experiments.

In addition to humanoid fall research, I will show a few videos on our work on momentum-based humanoid balance control, vehicle-trailer path planning and control (jack-knife prevention), balance assisting control moment gyro (CMG) and some more recent work on assistive exoskeletons.

Short bio : Ambarish Goswami has been with Honda Research Institute in California, for the past twelve years, where he is currently a Principal Scientist. His main research areas are autonomous vehicles (leading the System Integration and Control Team), assistive exoskeletons and humanoid robots.

Ambarish received the Ph.D. degree from Northwestern University in Mechanical Engineering. After that he worked at INRIA Rhone-Alpes (Grenoble, France) first as a post-doctoral researcher and then as a member of the permanent scientific staff (Charge de Recherche). Subsequently he worked in animation, first at the University of Pennsylvania (in Norman Badler Lab) and then at Autodesk (3D Studio Max). Ambarish has 80 publications with more than 4800 Google Scholar citations and twelve patents. Ambarish serves in the Editorial Board of International Journal of Humanoid Robotics and Robotica. He is an Editor-in-Chief of the Springer Reference Handbook of Humanoid Robotics (in preparation).