Séminaire ISIR

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Jeudi 6 juin 2013 à 14h00

ISIR
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DES SYSTÈMES
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Campus Jussieu, 4 place Jussieu, Paris
Salle de réunion H20

Titre : Virtual character: hybrid controller coupling multi-objective dynamic control and captured motions

Résume : We present an original hybrid control system that allows us to realize an interactive virtual character with certain levels of autonomy. We propose a posture optimization approach, which allows the virtual character to search for optimal and robust postures, including contact positions, before performing a given manipulation task. This approach can be used in either the preparation for a manipulation task, or the evaluation of the feasibility of a task. We develop a multi-objective control framework, which can handle multiple task objectives and multiple unilateral and bilateral contacts with or without friction. It allows the character to perform motion tracking and object manipulation tasks in a physics-based virtual environment, while interacting with an operator in real-time. An important component developed in this control framework is a wrench-bound method, which can handle task conflicts and ensure the controller performance of the higher-priority task. It is a novel prioritized control, which allows inequality constraints on the higher-priority task, and can ensure the passivity of the system to guarantee stable operations. Our control system based on all the approaches developed here can allow a virtual character to perform a variety of tasks, such as tracking captured motions and object manipulation. It can improve task performance by enhancing the character's ability to handle interaction forces. Moreover, it also allows the character to autonomously perform sequences of tasks to achieve a long-term goal.

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