Adaptation de la commande d'un robot d'assistance physique

Mots clés :

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Résumé du projet de recherche (Langue 1)

Assistance robotics is a recent field of research that aims at helping people suffering from deficiencies, either cognitive, perceptive, motor or a combination of the previous. For a patient physically assisted by a robot, using an active mechanical system induces cognitive and physical difficulties related to the necessary adaptation of its unfamiliar behavior. It is therefore crucial to determine which motor commands the robot should perform in order to ease this adaptation and make its use as intuitive as possible for the target population. For instance, in sit-to-stand assistance, the robot should reduce its speed whenever the user is too tired. On the other hand, if the user finds the robot too slow (i.e., he/she is getting used to the system, or simply feels better at that particular time) the system should accelerate appropriately. In other words, the robot behavior should always match what its user is expecting. Therefore, the ideal behavior should vary among the users depending on their particular morphology and also on their physiological state, which evolves over time. The goal of this PhD thesis is to propose and implement methods that enable an assistance robot to adapt its behavior to a particular user, by the means of an intuitive physical interaction, in order to improve the comfort provided by this interaction through time. Since the robot does not know its user's behavior in any situation that may occur, we cannot know directly which motor commands are appropriate. Therefore, the robot adaptation should rely on some Machine Learning techniques.