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Haptic feedback control of a smart wheelchair

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Abstract :

The haptic feedback, which is natural in assistive devices intended for visually impaired persons, has been only recently explored for people with motor disability. The aim of this work is to study its potential, particularly for assistance in the driving of powered wheelchairs. After a review of the literature for the previous related work, we present the methodology and the implementation procedure of a haptic feedback control system on a prototype of a smart wheelchair. We will also describe the approaches utilized to determine the appropriate force feedback that will ensure a cooperative behaviour of the system, and we will detail the two haptic driving modes that were developed, namely the active and passive modes. Experiments on a real prototype were carried out to study the contribution of the method in powered wheelchair driving and to evaluate the interest of the force feedback on the control joystick of the wheelchair. They are discussed on the basis of performance measures.

Keywords : Smart wheelchair, motor disability, haptic feedback, human machine interaction, cooperative systems, laser sensor.

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