

Making Assistive Technology and Rehabilitation Engineering a Sure Bet

Real-Time Forwarding Tipping Detection and Prevention of a Front Wheel Drive Electric Powered Wheelchair

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ABSTRACT

The purpose of this study was to develop a front wheelchair drive electrical powered wheelchair (FWD-EPW) control system with the ability to detect and compensate for forward tipping in real-time. A smart EPW platform was designed and built with a real-time computerized controller that records wheelchair accelerations and angular speeds as a means to detect forwarding tipping. The tipping rate was defined by the pitch direction angular velocity of the wheelchair. To evaluate a simple wheelchair tipping control strategy, our EPW was driven over a ramp at different speeds. Experimental results showed that the tipping could be accurately detected as it was happening and the performance of the tipping prevention strategy was consistent on the slope across different speeds.

KEYWORDS:

Front Wheel Drive Electric-powered Wheelchairs, Forwarding tipping, tipping angle, tipping control

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