

論文の内容の要旨

Abstract

論文題目 Surface electromyography controlled steering
assistance for automobiles
(表面筋電位を用いた自動車用操舵支援)

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The objective of the current research is to investigate the feasibility of sEMG-based (surface electromyography-based) interfaces as a safe means of steering assistance for drivers with hemiplegia and unilateral upper limb amputation. “Safe” in this context refers to the ability of the steering assistance to provide path following accuracy and vehicle stability to prevent accidents during turning maneuvers. The current research proposed four sEMG-based interfaces. In low-speed steering and parking studies, the sEMG-based interfaces were comparable, overall, to some steering wheels with respect to path following accuracy. For narrow U-turns with minimum turning radii, the sEMG-based interfaces had significantly higher path following accuracy than the tested steering wheels. Using sEMG-controlled steering assistance also resulted in significantly higher vehicle stability during pedestrian collision avoidance.

By possessing path following accuracy and vehicle stability that is comparable, and in some cases superior to some steering wheel interfaces, the sEMG-controlled interfaces provided safe steering assistance. Given the variety of driving scenarios and interfaces that were tested and the statistical significance of the results, the current studies are a major contribution to the development of sEMG-controlled steering assistance for the benefit of drivers with certain disabilities.