

Evaluation and Fault Classification for Healthcare Robot during Sit-To-Stand Performance through Center of Pressure

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Abstract : Healthcare robot for assisting sit-to-stand (STS) performance had aroused numerous research interests. To author's best knowledge, knowledge about how evaluating healthcare robot is still unknown. Robot should be labeled as fault if users feel demanding during STS when they are assisted by robot. In this research, we aim to propose a method to evaluate sit-to-stand assist robot through center of pressure (CoP), then classify different STS performance. Experiments were executed five times with ten healthy subjects under four conditions: two self-performed STSs with chair heights of 62 cm and 43 cm, and two robot-assisted STSs with chair heights of 43 cm and robot end-effect speed of 2 s and 5 s. CoP was measured using a Wii Balance Board (WBB). Bayesian classification was utilized to classify STS performance. The results showed that faults occurred when decreased the chair height and slowed robot assist speed. Proposed method for fault classification showed high probability of classifying fault classes from others. It was concluded that faults for STS assist robot could be detected by inspecting center of pressure and be classified through proposed classification algorithm.

Keywords : center of pressure, fault classification, healthcare robot, sit-to-stand movement

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