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# A Brain Controlled Robotic Gait Trainer for Neurorehabilitation

**Authors :** Qazi Umer Jamil, Abubakr Siddique, Mubeen Ur Rehman, Nida Aziz, Mohsin I. Tiwana

**Abstract :** This paper discusses a brain controlled robotic gait trainer for neurorehabilitation of Spinal Cord Injury (SCI) patients. Patients suffering from Spinal Cord Injuries (SCI) become unable to execute motion control of their lower proximities due to degeneration of spinal cord neurons. The presented approach can help SCI patients in neuro-rehabilitation training by directly translating patient motor imagery into walkers motion commands and thus bypassing spinal cord neurons completely. A non-invasive EEG based brain-computer interface is used for capturing patient neural activity. For signal processing and classification, an open source software (OpenVibe) is used. Classifiers categorize the patient motor imagery (MI) into a specific set of commands that are further translated into walker motion commands. The robotic walker also employs fall detection for ensuring safety of patient during gait training and can act as a support for SCI patients. The gait trainer is tested with subjects, and satisfactory results were achieved.

**Keywords :** brain computer interface (BCI), gait trainer, spinal cord injury (SCI), neurorehabilitation
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