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A Brain-Computer Interface for Controlling a Mobile Assistive Device by Using the NeuroSky EEG Headset and Raspberry Pi

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The brain-computer interface (BCI) constitutes an excellent solution for people with neuromotor disabilities that need an alternative communication and control channel with the outside environment. This paper proposes a Python-based BCI system for controlling a mobile assistive device using the NeuroSky EEG portable headset and the Raspberry Pi microcontroller board. Thus, disabled persons could enjoy the opportunity of controlling a mobile robot by using commands based on voluntary eye-blinking. The original implementation of the proposed BCI system consisted of Python programming for raw EEG signal analysis on the computer (Spyder IDE) for detection and counting of intentional eye-blinks and Python coding for executing the robot movement commands by the Raspberry Pi (Thonny IDE). The WebSockets protocol facilitates wireless communication between the computer (Windows) and Raspberry Pi. The presented BCI system is an experimental prototype for a better understanding of simulation and testing of the BCI technology by people with neuromotor disabilities.