

**abstarct**

**Title:** Brain machine interface

**BrainMachine interfaces (BCIs)** have the potential to improve the quality of life of individuals with severe motor disabilities. BCIs capture the user's brain activity and translate it into commands for the control of an effector, such as a computer cursor, robotic limb, or functional electrical stimulation device. Full dexterous manipulation of robotic and prosthetic arms via a BCI system has been a challenge because of the inherent need to decode high dimensional and preferably real-time control commands from the user's neural activity. Nevertheless, such functionality is fundamental if BCI-controlled robotic or prosthetic limbs are to be used for daily activities. In this chapter, we review how this challenge has been addressed by BCI researchers and how new solutions may improve the BCI user experience with robotic effectors.

 BCIs capture the user's brain activity and translate it into commands for the control of an effector, such as a computer cursor, robotic limb, or functional electrical stimulation device. Full dexterous manipulation of robotic and prosthetic arms via a BCI system has been a challenge because of the inherent need to decode high dimensional and preferably real-time control commands from the user's neural activity. Nevertheless, such functionality is fundamental if BCI-controlled robotic or prosthetic limbs are to be used for daily activities. In this chapter, we review how this challenge has been addressed by BCI researchers and how new solutions may improve the BCI user experience with robotic effectors.

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