

Scientific/Educational Workshop

Workshop title

Integrating artificial intelligence with neural intelligence to improve control of prosthetic limbs

Workshop organizer

Ning Lan (Shanghai Jiao Tong University)

Speakers

1. Prof. Yu Wang;
2. Prof. Ting Zhang;
3. Prof. Ning Lan;
4. Prof. Guanglin Li;
5. Prof. Chuanxin M. Niu;
6. Prof. Sheng Bi

Workshop goals

The goal is to present a new view to the multi-disciplinary research for the advancement of technologies in neuroprosthetics

Abstract

Lack of acceptance of prosthetic hands by upper extremity amputees has largely been attributed to the low functionality due to absence of sensory feedback and poor engagement with the residual ability of control of amputees. Artificial intelligence, such as recognition of intention of movements and feeling of touch of the prosthetic hand by the amputees, can enhance the performance of prosthetic limbs. Yet, how to integrate artificial intelligence to that of neural system of the amputee remains a main challenge to researchers in neuroscience and biomedical, robotic and rehabilitation engineering alike. This workshop will present development of technologies from a wide range of disciplines that address this challenge, from active materials, to nano-micro sensors, non-invasive natural tactile feedback, motion intention recognition from high-density EMG, model-based neuromorphic control, and so on. Artificial intelligence embedded in the prosthetic hands may promote positive change in the amputee's brain for a better embodiment. The goal is to present a new view to such multi-disciplinary research for the advancement of technologies in neuroprosthetics. Presentations: 1. Prof. Yu Wang, Beihang University Title: Development of Continuum Robot of Superelastic Alloy for Prosthetic Hand 2. Prof. Ting Zhang, Institute of Suzhou Nano-Technologies Title: Electronic Smart Skin for Prosthetic Hand 3. Prof. Ning Lan, Shanghai Jiao Tong University Title: Non-Invasive Sensory Feedback via Evoked Tactile Sensation for Neuroprosthetic Hand 4. Prof. Guanglin Li, Shenzhen Institute of Advanced Technologies Title: Fast-detection of Movement Intention from High Density EMGs 5. Prof. Chuanxin M. Niu, Shanghai Jiao Tong University Title: When Neuromorphic Modeling Meets Prosthetic Hands: Challenge and Confrontation 6. Prof. Sheng Bi, National Research Center for Rehabilitation and Assistive Device Title: Evaluation of prosthetic hand with motion capture system by fNIRs and EEG