Biography

Education
2009 Ph.D. in Science, Nara institute of science and technology

Research experience
2011-2014 Researcher, Department of Motor Control and Rehabilitation, ATR
2014- Researcher, Department of Computational Brain Imaging, ATR

Coordinate transformation from extrinsic to muscle-like frame in human parieto-frontal network

Abstract:
The coordinate transformation from the visual (extrinsic) to the intrinsic (muscle or joint) frames is important to generate behavior according to upcoming visual information. Diverse coordinate frames are distributed from the parietal to the frontal cortices but transformations between these frames through brain networks are little known. We developed a method to quantify coordinate transformations via voxel-by-voxel cortical connections, and applied it to the fMRI data during wrist movements. The extrinsic frame represented in voxel patterns of the posterior parietal cortex (PPC) was projected to the dorsal premotor area (PMd) without transformation and then transformed to the muscle-like frame via the connection from PMd to the primary motor cortex (M1). The intermediate frame between the extrinsic and the muscle-like frames in PPC underwent coordinate transformations through the direct pathway to M1. Our results suggest that two pathways from PPC to M1 are responsible to produce motor commands attached on muscles.