Recent Advances in Functional MRI

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Recent advances of function MRI can be characterized by three keywords; functional connectivity analysis, multivariate-pattern analysis and neurofeedback using real-time fmri. Since brain does not work in isolation, functional connectivity and connectome receives a wide attention not only to understand brain but also to research brain disease and to use it for clinical diagnosis, in combination with graph theory. The resting-state fMRI makes it possible to define functional connectivity in a clinical setting and provides diverse connectivity analysis methods. In contrast to a conventional voxel-by-voxel analysis, multivariate pattern analysis of fMRI is a sort of machine learning technique. This method has been used for brain decoding using fMRI that can be applicable to mind reading or clinical diagnosis. Real-time fMRI neurofeedbacks have been actively researched as a new top-down modulation of neural circuits. In this presentation, these three topics will be reviewed with examples and future perspectives.

Key Words: fMRI; Functional connectivity; Multivariate pattern analysis; Real-time fmri

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