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Francois G Meyer* (fmeyer@colorado.edu), Department of Electrical Engineering, Campus Box 425, University of Colorado, Boulder, CO 80309-0425. *Learning Behavior as a Function of Brain Dynamics.*

Traditional neuroimaging experiments, dictated by the dogma of functional specialization, aim at identifying regions of the brain that are maximally correlated with a simple cognitive or sensory stimulus. Very recently, functional MRI (fMRI) has been used to infer subjective experience and brain states of subjects immersed in natural environments. These environments are rich with uncontrolled stimuli and resemble real life experiences. Conventional methods of analysis of neuroimaging data fail to unravel the complex activity that natural environments elicit. The contribution of this work is a novel method to predict action and sensory experiences of a subject from fMRI. This method relies on an embedding that provides an optimal coordinate system to reduce the dimensionality of the fMRI dataset while preserving its intrinsic dynamics. We learn a set of time series that are implicit functions of the fMRI data, and predict the values of these time series in the future from the knowledge of the fMRI data only. We conducted several experiments with the datasets of the 2007 Pittsburgh Experience Based Cognition competition. (Received September 16, 2007)